

**Demand for Curative Health Care Services in Odisha:
A Study for KBK Region**

*A thesis submitted to the University of Hyderabad
in partial fulfillment of the requirements for the award of*

**DOCTOR OF PHILOSOPHY
IN
ECONOMICS**

**By
SUSANTA NAG**



**SCHOOL OF ECONOMICS
UNIVERSITY OF HYDERABAD
HYDERABAD-500046 (INDIA)
DECEMBER 2018**

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**Thesis Supervisors
Prof. Phanindra Goyari
Dr. K. Ramachandra Rao**



**SCHOOL OF ECONOMICS
UNIVERSITY OF HYDERABAD
HYDERABAD-500046 (INDIA)
DECEMBER 2018**

*DEDICATED
TO
MY PARENTS*



**School of Economics
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DECLARATION

I, **Susanta Nag**, hereby declare that this thesis entitled '**Demand for Curative Health Care Services in Odisha: A Study for KBK Region**' submitted by me under the guidance and supervision of Prof. Phanindra Goyari and Dr. K. Ramachandra Rao of University of Hyderabad, is a bonafide research work which is also free from plagiarism. I also declare that it has not been submitted previously in part or in full to this University or any other University or Institution for the award of any degree or diploma. I hereby agree that my thesis can be deposited in Shodganga/INFLIBNET.

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CERTIFICATE

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A. Publications:

1. Nag, Susanta, P Goyari, G Sridevi and Inder Sekhar Yadav (2015): Opportunity cost of illness and occupational classes: A case study of Balangir district of Odisha, In: *Artha Vijnana*, ISSN: 0971-586X, Vol. LVII, No. 3, pp.211-231, September.
2. Nag, Susanta (2018): Trends and patterns of public health expenditure: A study for the state Odisha, India, *Current Global Reviewer*, Vol. II, Issue I, pp. 194-204, ISSN: 2319-8648.

B. Presentations in conferences:

1. Presented a paper: “Opportunity Cost of Illness and Occupational Classes: A Case Study of Balangir Odisha” in: 2nd National Conference of IHEPA on Better Health Access: The Rough Road Ahead, at ISEC, Bangalore, 20-21 December 2012.
2. Presented a paper: “Determinants of Health Expenditure: A Household Level Analysis in Odisha”, in: National Seminar on Globalisation and Future of Adivasis, at Centre for Dalit and Adivasi Studies and Translation, University of Hyderabad, 9 August 2012.

Further, the student has passed the following courses towards fulfillment of coursework requirement for Ph.D./was exempted from doing coursework (recommended by Doctoral Committee) on the basis of the following courses passed during his M.Phil program and the M.Phil degree was awarded:

Course Code	Course Title	Credits	Pass/Fail
SE-600	Research Methodology	4	Pass
SE-601	Social Accounting and Data Base	4	Pass
SE-602	Advanced Economic Theory	4	Pass
SE-620	Study Area	4	Pass
SE-680	Dissertation	16	Pass

Signature of PhD Supervisors


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ACKNOWLEDGEMENTS

I owe a deep sense of gratitude to my supervisor, Professor Phanindra Goyari and co-supervisor Dr. K Ramachandra Rao, School of Economics, University of Hyderabad, for their supervision and valuable suggestions without which the completion of this thesis would have been a remote possibility.

My profound sense of gratitude is to Prof. Naresh Kumar Sharma, Dean, School of Economics and other faculty members of the School for their kind co-operation. I also acknowledge the support I got from the non-teaching staff of the School of Economics.

Words fall short to express my indebtedness to my family members for their unconditional trust, timely encouragement, and endless patience. I express my love and affection to my son Shrutik, my nieces Mamata and Mamuni and my nephews Abhi, Omkar and Asish. They are my constant sources of inspiration.

I would like to put on record my sincere gratitude to my teachers Uma Charan Pati and Late A. N. Pradhan for render me a base in Economics during my graduation. I feel very proud to be a student of them.

I am also thankful to the librarian and staff of the IGML, University of Hyderabad for making available all the required materials for the study.

I am thankful to all my friends, seniors and juniors for their incessant help during my research work. Especially I would like to express thanks to Sarbe, Sujit Da, Jogindra Da, Kedar, Siddheswar, Dinesh, Sudam, Subal, Chinta, Anand, Chitra, Lanu, Prasad, Prasanta and Rohin for their encouragement and assistance.

I cannot forget my colleagues and friends who went through hard times together, cheered me on, and celebrated each accomplishment: Dr. M. A. A Farooq and Mr. Rajesh Kumar.

I would express my thanks to my students, especially Balbir, Sakshi, Sonika, Zen, Sagar, Sandeep, Quyum and Rashid for their love and affection.

Last but not the least, I thank with love to my wife Payal for her companion, love, support and encouragement during my research endeavor and helped me to get through agonizing period in the most positive way.

Susanta Nag

CONTENTS

List of Tables	viii-x
List of Figures	xi
List of Abbreviations	xii-xiii
Abstract	xiv

CHAPTER 1 : Introduction and Background **1-14**

1.1	Introduction
1.2	Structure of Health Care Financing in India and Odisha
1.3	Theoretical Framework on Demand for Curative Health Care
1.4	Research Gaps
1.5	The Need for Study of Demand for Curative Health Care Study KBK Region
1.6	Significance of the Study
1.7	Objectives of the Study
1.8	Hypotheses of the Study
1.9	Data Sources and Methodology
1.10	Organisation of the Thesis

CHAPTER 2 : NSSO Surveys on Morbidity and Health Care: Concepts and Methodology **15-31**

2.1	Introduction
2.2	Sampling Design and Coverage: 52nd, 60th and 71st Round
2.3	A Brief Description of NSSO Schedule 25.0: Information on Morbidity, Utilisation and Expenditure on Health Care
2.3.1	Information on Morbidity
2.3.2	Information on Utilisation of Health Care
2.3.3	Information on Expenditure on Health Care
2.4	Comparability of the 52nd, 60th and 71st Round Survey Data
2.5	Justification for using the Latest Three Rounds of NSSO data
2.6	Limitations of NSSO Health Surveys Database
2.7	Summary

CHAPTER 3 : Demographic, Socio-economic and Health Profile of KBK Region and Odisha **32-54**

3.1	Introduction
3.2	Demographic Profile of the KBK Region and Odisha
3.3	Socio-economic Profile of KBK Region and Odisha
3.4	Household Monthly Per Capita Consumption Expenditure of KBK Region and Odisha
3.5	Housing Conditions in KBK Region of Odisha
3.6	Drinking water and Sanitation Facilities and Cooking practices
3.7	State of Health and Health Care in KBK Region and Odisha

- 3.8 Health Infrastructure in Odisha and Other Major States of India
- 3.9 Selected Health Indicators in the State and KBK Region
- 3.10 Delivery of Health Care System in Odisha
- 3.11 System Load in Government Health Care Facilities
- 3.12 Alternative System of Medicine (AYUSH) in Odisha
- 3.13 Per Capita Public Health Expenditure in Odisha
- 3.14 Summary

CHAPTER 4 : Morbidity Patterns and Curative Health Seeking Behaviour of Households

55-100

- 4.1 Introduction
 - 4.2 Morbidity Patterns in the KBK Region of Odisha
 - 4.2.1 Trends and Patterns of Morbidity in KBK Region of Odisha
 - 4.2.2 Trends and Patterns of Self-Reported Morbidity Rate by Background Characteristics in KBK Region and Odisha
 - 4.3 Trends and Patterns in Hospitalisation Rate in KBK Region of Odisha
 - 4.3.1 Trends and Patterns of Hospitalisation Rate by Background Characteristics in KBK Region and Odisha
 - 4.4 Health Care Utilisation and Choice of Health Provider in KBK Region of Odisha
 - 4.4.1 Theoretical Framework
 - 4.4.2 Curative Health Seeking Behaviour for Non-hospitalisation cases in KBK Region
 - 4.4.3 Utilisation of Health Care Services from Private and Non-government Sources
 - 4.4.4 Reasons for not Seeking Medical Treatment in KBK Region and Odisha
 - 4.5 Modelling Choice of Health Care Provider in the KBK Region of Odisha
 - 4.5.1 Choice of Inpatient Health Care Providers
 - 4.5.2 Choice of Outpatient Health Care Providers
 - 4.6 Summary
- Appendix 4.A: Disease Classification based on ICD-10

CHAPTER 5: Out of Pocket Health Payments and Its Catastrophic Impacts on Households

101-146

- 5.1 Introduction
- 5.2 Out of Pockets Health Expenditure in the KBK Region of Odisha
 - 5.2.1 Out of Pocket Health Payment and its Coping Strategies of the Households
- 5.3 Burden of Catastrophic Health Care Payment: Some Evidences
- 5.4 Measurement of Catastrophic Health Payment
- 5.5 Incidence, Intensity and Distribution of Catastrophic Health Payments
- 5.6 Catastrophic Burden of Health Payments across Socioeconomic Characteristics of the Households
 - 5.6.1 Catastrophic Health Count and Payment Gap across Social Groups
 - 5.6.2 Catastrophic Health Count and Payment Gap across Religion
 - 5.6.3 Catastrophic Health Count and Payment Gap across Occupational Classes

5.7	Catastrophic Health Payments across Different Diseases and Types of Health Care Institutions
5.8	Determinants of Out of Pocket Health Payments: An Econometric Analysis
5.9	Burden of Indirect Cost of Illness in KBK Region of Odisha
5.10	Indirect Cost of Illness across Socioeconomic Characteristics of the Households
5.11	Summary
Appendix 5.A: A Note on Concentration Curve (CC) and Concentration Index (CI)	

CHAPTER 6 : Illness Induced Impoverishment in KBK Region of Odisha 147-176

6.1	Introduction
6.2	Illness Induced Poverty: Conceptual Framework
6.3	Diagrammatic Representation of Illness Induced Poverty Methodology
6.4	Measurement of Illness Induced Poverty Impact
6.5	An Overview of Poverty Measurement in India
6.6	Justification for Adjustment of OOP health expenditure in Poverty Line
6.7	Poverty Impact of Health Care Payments in KBK Region of Odisha
6.8	Poverty Impact of Illness in KBK Region of Odisha
6.9	Poverty Impact of Illness in Socioeconomic Characteristics of the Households
6.10	Illness Induced Impoverishment in Morbidity Patterns & Health Care Institutions
6.11	Econometric Modelling: Illness Induced Impoverishment
6.12	Summary

CHAPTER 7: Summary and Conclusion 177-188

7.1	Summary
7.2	Chapter-wise Main Findings
7.3	Policy Implications and Suggestions
7.4	Limitations and Directions for Future Research

References 189-207

List of Tables

T. No.	Table Names	Page
1.1	Health Financing in India during 2000-2015	3
1.2	Household, Public and Total Health Expenditure in selected States of India (2014-15)	4
2.1	NSSO Surveys on Morbidity, Utilisation and Expenditure on Health Care	16
2.2	Distribution of NSSO Region and Districts in Odisha, 1995-96 to 2014	19
2.3	Criteria for hamlet-group or sub-block formation in 52nd, 60th and 71st Round (Schedule 25.0)	20
2.4	Formation of Second Stage Stratum (SSS) and allocation of Households in 52nd, 60th and 71st Round (Schedule 25.0)	21
2.5	Distribution of Sample Households across Sector in KBK Region and Odisha	21
2.6	Distribution of the Attitudes of the Informant at the time of Data collection in the KBK Region and Odisha	22
2.7	Particulars of Household Information from NSSO 52nd, 60th and 71st Round Survey (Schedule 25.0)	24
3.1	Age Distribution of the Population in KBK Region and Odisha	33
3.2	Gender Distribution of Population in KBK Region and Odisha	33
3.3	Distribution of Religion in KBK Region and Odisha	34
3.4	Caste Distribution of households KBK Region and Odisha	34
3.5	Educational Distribution of People in KBK Region and Odisha	35
3.6	Occupational Distribution of Households in KBK Region and Odisha	36
3.7	Distribution of Monthly Average Per Capita Consumption Expenditure	38
3.8	Distribution of Housing Conditions in KBK Region and Odisha	39
3.9	Major Source of Drinking water facilities in KBK Region and Odisha	40
3.10	Cooking Energy Sources for Households in KBK Region and Odisha	40
3.11	Distribution of Latrine Facilities in KBK Region and Odisha	41
3.12	Distribution of Drainage Conditions in households in KBK Region	41
3.13	Health Infrastructure in Odisha and other few States of India	43
3.14	District-wise Selected Health Indicators in Odisha	44
3.15	District-wise Selected HDI, GDI and IDI for Odisha	45
3.16	District-wise Health Infrastructure in Odisha	47
3.17	Work-loads in Government Hospitals of Odisha	49
3.18	Government AYUSH Medical Institutions and Services in Odisha	50
3.19	Per Capita Public Health Expenditure in Odisha during 1991-2014 (Rs.)	53
4.1	Percentage of Ailments and Hospitalisation in the KBK Region and Odisha, 1995-96 to 2014	57
4.2	Some Selected Ailments in KBK Region and Odisha, 1995-2014	58
4.3	Prevalence of Morbidity per 1000 persons in Odisha	59
4.4	Prevalence of Different Types of Diseases per 1000 population in Odisha	59
4.5	Prevalence of different morbidities by background characteristics in KBK Region	61

T. No.	Table Names	Page
4.6	Prevalence of different morbidities by background characteristics in Odisha	64
4.7	Hospitalisation rate per 1000 population in Odisha	65
4.8	Hospitalisation rate in different Types of diseases per 1000 population in Odisha	65
4.9	Hospitalisation rate per 1000 population for different diseases by background characteristics in KBK Region	67
4.10	Hospitalisation rate per 1000 population by background characteristics in Odisha	68
4.11	Seeking Medical Care against No Care across Socioeconomic Characteristics	72
4.12	Utilisation of Health Care Services from Non-government Sources in the KBK Region and Odisha	74
4.13	Reasons for not availing govt. health care services in KBK Region and Odisha	75
4.14	Reasons for Not Seeking Medical Treatment in the KBK Region of Odisha	78
4.15	Reasons for Not Seeking Medical Treatment in the State of Odisha	79
4.16	Estimated Binomial Logistic Model for Choice of Inpatient Health Care Providers in KBK Region	87
4.17	Estimated Binomial Logistic Model for Choice of Inpatient Health Care Providers in Odisha	88
4.18	Estimated Mean Predicted Probabilities for Choice of Inpatient Health Care Providers in the KBK Region and Odisha	90
4.19	Estimated Multinomial Logistic Model for Choice of Outpatient Health Care Providers in KBK Region	93
4.20	Estimated Multinomial Logistic Model for Choice of Outpatient Health Care Providers in Odisha	94
4.21	Estimated Mean Predicted Probabilities for Choice of Outpatient Health Care Providers in the KBK Region and Odisha	98
5.1	Monthly Per Capita Out of Pocket Health Expenditure in KBK Region and Odisha, 1995-2014	102
5.2	Avg. Monthly Per Capita Inpatient, Outpatient, Medical and Non-Medical Health Expenditure in KBK Region of Odisha (Rs.)	103
5.3	Avg. Monthly Per Capita Inpatient, Outpatient, Medical and Non-Medical Health Expenditure in Odisha (Rs.)	104
5.4	Sources of Finance for Expenses in Health Care in KBK Region of Odisha	105
5.5	Sources of Finance for Expenses in Health Care in Odisha, 1995-2014	106
5.6	Incidence, Intensity and Distribution of Catastrophic Impact of OOP Health Payment in KBK Region and Odisha in 1995-96	114
5.7	Incidence, Intensity and Distribution of Catastrophic Impact of OOP Health Payment in KBK Region and Odisha in 2004	115
5.8	Incidence, Intensity and Distribution of Catastrophic Impact of OOP Health Payment in KBK Region and Odisha in 2014	115
5.9	Caste-wise Catastrophic Head Count (%) at 10% Threshold Level in Odisha	117

T. No.	Table Names	Page
5.10	Caste-wise Catastrophic Payment Gap (%) at 10% Threshold Level in Odisha	118
5.11	Religion-wise Catastrophic Head Count (%) at 10% Threshold Level in Odisha	119
5.12	Religion-wise Catastrophic Payment Gap (%) at 10% Threshold Level in Odisha	120
5.13	Occupation-wise Catastrophic Head Count at 10% Threshold Level in Odisha	121
5.14	Occupation-wise Catastrophic Payment Gap (%) at 10 Percent Threshold Level	122
5.15	Different Diseases and Catastrophic Health Payments at 10 percent in the KBK Region and Odisha	123
5.16	Type of Health Care Institutions and Catastrophic Health Payments at 10 percent in KBK region and Odisha	124
5.17	Estimated Two Part Model for Household Health Expenditure in KBK Region	131
5.18	Estimated Two Part Model for Household Health Expenditure in Odisha	132
5.19	Burden of Indirect Cost of Illness in KBK Region and Odisha, 1995-2014	137
5.20	Burden of Indirect Cost of Illness for Inpatient and Outpatient Care in KBK Region of Odisha, 1995-96 to 2014	139
5.21	Caste-wise Burden of Indirect Cost of Illness in KBK Region and Odisha	141
5.22	Religion-wise Burden of Indirect Cost of Illness in KBK Region and Odisha	142
5.23	Occupation-wise Burden of Indirect Cost of Illness in KBK Region and Odisha	143
6.1	Impact of Out of Pocket Health Expenditure on Poverty for KBK Region and Odisha during 1995-96 to 2014	157
6.2	Poverty Impact of Illness in KBK Region and Odisha	159
6.3	Caste-wise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014	162
6.4	Religion-wise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014	163
6.5	Occupation-wise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014	164
6.6	Consumption Class-wise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014	165
6.7	Impoverishment across Different Diseases in KBK Region and Odisha	166
6.8	Type of Health Care Institutions and Impoverishment in KBK region/Odisha	167
6.9	Variable Description & its Expected Sign for the Occurrence of Impoverishment	170
6.10	Estimated Logistic Regression Results for Illness Induced Impoverishment in KBK Region of Odisha	171
6.11	Estimated Logistic Regression Results for Illness Induced Impoverishment for Odisha	172
6.12	Estimated Mean Predicted Probabilities for Impoverishment in KBK Region and Odisha	173

LIST OF FIGURES

Figure No.	Names	Page
1.1	Sketch Map of India and Odisha	10
1.2	The Sketch Map of KBK Region within the State of Odisha	10
6.1	A Simplified Framework on Illness Induced Impoverishment	149
6.2	Diagrammatic Representation of Illness Induced Poverty Methodology	150

List of Abbreviations

ACGR	Annual Compound Growth Rate
AJSA	Anchalika Jana Seva Anusthan
ANM	Auxiliary Nurse Midwife
AYUSH	Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy
BPL	Below Poverty Line
CC	Concentration Curve
CGHS	Central Government Health Scheme
CHC	Catastrophic Health Count
CHCs	Community Health Centre
CI	Concentration Index
CMR	Child Mortality Rate
CPG	Catastrophic Payment Gap
CPG	Catastrophic Payment Gap
CSO	Central Statistical Office
ECG	Electrocardiography
EEG	Electroencephalography
ESI	Employees' State Insurance
FCMs	Financial Coping Mechanisms
FSU	First Stage Units
GDI	Gender Development Index
GDP	Gross Domestic Product
GER	Gross Enrolment Rate
GoI	Government of India
GoO	Government of Odisha
GSDP	Gross State Domestic Product
HC	Head Count Ratio
HDI	Human Development Index
HH	Household
ICI	Indirect Cost of Illness
ICP	Indirect Cost of Illness in Per Capita terms
IDI	Infrastructure Development Index
IMR	Infant Mortality Rate
IUD	Intra Uterine Device
KBK	Kalahandi Balangir Koraput region
LPG	Liquid Petroleum Gas
MMR	Maternal Mortality Rate
MPCE	Monthly Per Capita Consumption Expenditure
MPG	Mean Positive Gap
MPG	Mean Poverty Gap
MTP	Medical Termination of Pregnancy
NGOs	Non Governmental Organisations
NHA	National Health Account
NRHM	National Rural Health Mission
NSSO	National Sample Survey Office
OECD	Organisation for Economic Cooperation and Development
OOP	Out-of-Pocket Expenditure
PCGHE	Per Capita Government Health Expenditure

PCHE	Monthly Per Capita Health Expenditure
PCOOP	Per Capita Out of Pocket Health Expenditure
PCTHE	Per Capita Total Health Expenditure
PHCs	Primary Health Centres
PI	Poverty Impact
PIHC	Poverty Impact of Health Payment
PIHE	Monthly Per Capita Inpatient Health Expenditure
PL	Poverty Line
PMHE	Monthly Per Capita Medical Health Expenditure
PNMHE	Monthly Per Capita Nonmedical Health Expenditure
POHE	Monthly Per Capita Outpatient Health Expenditure
RRR	Relative Risk Ratio
SC	Schedule Caste
SCs	Sub centres
SSS	Second Stage Strata
ST	Schedule Tribe
UFS	Urban Frame Survey
UNEP	United Nations Environment Programme
WHO	World Health Organisation
WHS	World Health Statistics

Demand for Curative Health Care Services in Odisha: A Study for KBK Region

Abstract

The present thesis has examined the morbidity patterns, health seeking behaviour and catastrophic and impoverishment impact of illness of people in KBK region of Odisha, India. The analysis is based on NSSO 52nd, 60th and 71st rounds unit level data. Specific objectives of the study are: (i) to analyze the patterns of morbidity and utilisation of available health care services across selected socioeconomic characteristics by the people in the study region, (ii) to examine the factors that determine the demand for curative health care services by the people, (iii) to measure the catastrophic impact of health care payments at the households level in both rural and urban areas of the study region, and (iv) to examine the impoverishment effects of illness for both rural and urban households and to look into its impact across various social groups, religion, occupational classes and consumption quintiles of the households.

The main findings of the study are: (i) Morbidity rate is found to be higher in rural areas compared to urban areas. Prevalence of infectious and other diseases is higher among SC, ST and population engaged in agriculture and labour work whereas cardiovascular diseases are found to be more among educated and salaried and regular wage earners, (ii) The choice of health care provider is influenced by factors such as MPCE, severity of illness, opportunity cost of time, caste, age group and education of the head, (iii) As MPCE increases, there is a greater preference for private care, because MPCE increases the affordability of health care services, mostly people prefer private care on quality ground, (iv) The percentage of households experiencing catastrophic head count in the study region has increased from 12.9 percent in 1995-96 to 33 percent in 2014 and a negative value of concentration index indicates a greater tendency for the poor households to cross the threshold level and the problem of catastrophic health payments, (v) Rural households, SC, ST and labour class households are more vulnerable due to illness shocks as the impact of normalized poverty gap in rural areas is higher than that of urban areas, and (vi) The number of children, number of old persons in a household, opportunity cost of time, severity of illness and MPCE quintile are found to be statistically significant determinants of probability of illness induced impoverishment.

Keywords: Morbidity, Curative Health Seeking Behaviour, Catastrophic, Impoverishment

JEL Codes: I10, I12, I15

Chapter 1

Introduction and Background

1.1 Introduction

Development of a nation depends on the health of its population. World Health Organization (WHO, 1948) correctly said that “Health is a complete physical, mental and social and not merely the absence of disease or infirmity”. The relationship between health and development of a country is like a two-way process. In general, healthy people in a country can promote the development of the economy by their productive contributions. On the other hand, economic development can promote better income earning opportunities, which in turn, can generate demand for better services including health services (Gaimard, 2014). When people are healthy and are in good health conditions, they are generally more productive. Higher level of productivity can result only in an economy with strong and hardworking labour force because when people are strong or healthy it results lower level absenteeism due to ill health and sickness (Sengupta, 2016). Thus, healthy and educated workforces are considered as essential inputs to economic growth with social welfare and benefits of growth tend to percolate to all sections of people in the economy.

Providing proper health care to all has become a basic concern in all nations. India is also not an exception to this end. But major hindrances for India are inadequate resources for health sector, insufficient allocation of resources, high population growth, inefficient use of resources and lack of public proper awareness/consciousness about health. So the major issues for a country like India is how best to deliver health care to its population. However, apart from the supply side considerations, the demand for health care services by households assumes significance in policy considerations. It is most important for a country like India where almost 3/4th of its health financing is coming from household sector. Most of this spending is on primary care and within primary care, on curative care: households spending 92 percent on primary curative care (Berman, 1998). According to the international classification of health accounts, major portion (77.96 percent) was incurred on curative care services, followed by 8.07 percent on reproductive child health and family welfare, and a meager portion (1.80 percent) on medical

education and research activities (NHA, 2004-05). Therefore, analysis on households' demand for curative health care plays a crucial role in the policy decisions of health financing issues. The traditional theory of demand for health care model started with Grossman's human capital approach in 1972. According to this model, health is both consumption good as well as capital good. As a consumption good for consumers, 'health' commodity enters directly into the utility function of the individual as people enjoy being in healthy condition. As a capital good for individuals, good 'health' reduces the numbers of illness days, and therefore it increases the number of days available for both productive market and non-market activities including leisure. Therefore, the production of good health has positive effects on all individuals and for the country as a whole. Thus, a study on the demand for curative health care services assumes importance specially for a backward region like KBK (Kalahandi Balangir Koraput) in Odisha where no study exists on the current topic. Our present study proceeds in that direction.

The remaining parts of this chapter have been organized in the following ways. Section 1.2 describes briefly structure of health care financing in India and Odisha. Section 1.3 provides theoretical frameworks of on the current study topic followed by a section 1.4 identifying research gaps. Section 1.5 and 1.6 provide the need for demand for curative health care study in KBK region and the significance of the study respectively. Section 1.7 provides objectives of the study and section 1.8 is on hypotheses of the study. Section 1.9 deals descriptions of data and methodologies. Section 1.10 provides organization of the whole thesis.

1.2 Structure of Health Care Financing in India and Odisha

Health expenditure varies across the globe both in terms of percentage of their GDP and percentage to government expenditure. For instance, OECD countries accounted for less than 20 percent of world's population but were responsible for almost 90 percent of world's health spending. Hence, 80 percent of world's population spent only 10 percent of the total expenditure on health (World Health Report, 2003). While in developed countries (U.K, Germany, Japan, Canada, France), the share of government is $\frac{3}{4}^{\text{th}}$ on total health expenditure, it is only $\frac{1}{4}^{\text{th}}$ in case of South-east Asian countries (WHS, 2010). In India, health expenditure as percentage of GDP and public spending as percentage of total health expenditure is very low in comparison to developed or developing countries of the world (WHS, 2010 and Nag, 2011). Moreover, the

percentage of government health expenditure in India is much lower than that of less developed countries like Ghana, Zimbabwe, and Ethiopia (WHS, 2010).

Table 1.1: Health Financing in India during 2000-2015

Year	Health expenditure as % to GDP	Health expenditure as % of total govt. expenditure	Govt. expenditure on health as % of THE	Private expenditure on health as % of THE	External sources expenditure as % of THE	HH OOP health expenditure as % of THE	HH OOP health expenditure as % of private health expenditure
2000	4.2	3.3	20.7	76.6	2.7	71.7	93.6
2001	4.3	3.2	18.9	78.8	2.3	74.1	94.0
2002	4.2	2.9	18.2	79.4	2.5	73.4	92.4
2003	4.0	2.7	18.7	79.8	1.5	73.4	92.0
2004	4.0	2.8	18.0	79.8	2.2	72.5	90.9
2005	3.8	3.0	20.1	78.3	1.5	73.1	93.4
2006	3.6	3.0	20.5	78.1	1.4	72.3	92.6
2007	3.5	3.0	20.9	77.6	1.5	70.8	91.2
2008	3.5	3.0	22.6	75.5	1.9	69.1	91.5
2009	3.5	3.2	25.6	73.4	1.0	66.8	91.0
2010	3.3	3.2	26.2	72.8	1.0	65.2	89.6
2011	3.2	3.5	28.9	70.3	0.9	62.2	88.5
2012	3.3	3.5	28.0	71.1	0.9	63.0	88.6
2013	3.7	3.1	23.1	76.7	0.3	69.1	90.1
2014	3.6	3.0	23.7	75.6	0.7	67.0	88.6
2015	3.9	3.4	25.6	73.5	0.9	65.1	88.6

Source: Author's compilation from World Health Organisation (www.who.int/countries/ind/en/)

Notes: THE-Total health expenditure, GDP- Gross domestic product, OOP-out of pocket

Table 1.1 shows the sources of health expenditure in India for the period 2000 to 2015. Total health expenditure as a percentage of GDP is hovering around 4 percent or less of it. Almost 75 percent of total health expenditure in India comes from private sector and of this, about 90 percent comes from households' 'out-of-pocket' payments. This gives rise to the importance private sources particularly household health expenditure in India. In the absence of prepayment mechanisms like health insurance it results serious consequences at the household level.

Table 1.2 shows the household, public and total health expenditures in some of the selected states in India. The health care financing in India is pre-dominantly determined by the private sector and India is one among the developing countries where households spend a disproportionately larger share in total health expenditure, with the government's contribution

being very minimal. The data shows that the per capita health expenditure in Kerala is one of the highest in the country and it is lowest in the states like Bihar and Jharkhand. However, in most of the states, households spend the major share in the total health expenditure. Households from

Table 1.2: Household, Public and Total Health Expenditure in selected States, India (2014-15)

States	Health Expenditure		Government			Household		
	PCTHE(Rs.)	% GSDP	PCGHE(Rs.)	% GSDP	% THE	PCOOP(Rs.)	% GSDP	% THE
Andhra Pradesh	3720	4.3	573	0.7	15.4	2901	3.4	78.0
Assam	2049	3.3	602	1.0	29.4	1293	2.1	63.1
Bihar	2047	6.0	338	1.0	16.5	1685	4.9	82.3
Chhattisgarh	3151	3.6	880	1.0	27.9	1838	2.1	58.3
Gujarat	3060	2.1	1040	0.7	34.0	1626	1.1	53.1
Haryana	3799	2.2	927	0.5	24.4	2376	1.4	62.5
Himachal Pradesh	4547	3.0	2016	1.4	44.3	2274	1.5	50.0
Jammu & Kashmir	3245	4.1	1124	1.4	34.6	1971	2.5	60.7
Jharkhand	2004	3.1	480	0.8	23.9	1436	2.2	71.7
Karnataka	4374	3.0	939	0.7	21.5	2282	1.6	52.2
Kerala	6801	4.5	1208	0.8	17.8	5023	3.3	73.9
Madhya Pradesh	2511	3.9	640	1.0	25.5	1808	2.8	72.0
Maharashtra	4502	3.0	763	0.5	17.0	2684	1.8	59.6
Odisha	3421	4.9	735	1.0	21.5	2518	3.6	73.6
Punjab	5220	4.1	889	0.7	17.0	4138	3.3	79.3
Rajasthan	2943	3.5	904	1.1	30.7	1740	2	59.1
Tamil Nadu	4101	2.8	1026	0.7	25.0	2724	1.9	66.4
Uttar Pradesh	3060	6.2	581	1.2	19.0	2396	4.8	78.3
Uttarakhand	4233	2.6	1534	0.9	36.2	2545	1.6	60.1
Telangana	4565	2.3	1019	0.5	22.3	2834	1.4	62.1

Source: National Health Accounts Estimates for India, 2014-15

Notes: PCTHE: Per capita total health expenditure, PCGHE: Per capita govt. health expenditure

PCOOP: Per capita out of pocket health payments, GSDP: Per capita gross state domestic product

THE: Total Health Expenditure

states like Bihar, Punjab, Kerala, Odisha, Uttar Pradesh and Andhra Pradesh met their health care expenditures mostly by OOP (out-of-pocket payments), ranging above 70-75 percent of total health expenditures. On the other hand, states like Gujarat, Chhattisgarh, Himachal Pradesh, Karnataka, J&K, Maharashtra, Rajasthan, Uttarakhand households' health spending is relatively lower (about 60 percent of the total health expenditure). There may be various reasons behind this low share of household health expenditure; one may be because of good public health systems. Government expenditure on health accounts for about 28 to 44 percent of the total

health expenditure in these (lower household health expenditure) states. In Odisha, 74 percent of health expenditure comes from household ‘out-of-pocket’ payments and the contribution of central, state local governments is only 21.5 percent in health expenditure. According to National Health Accounts 2004-05, the share of households and government were 79 percent and 18 percent respectively in total health expenditure (NHA, 2004-05). Therefore, the situation has not improved in the 10 years; still households incur 3/4th of total health expenditure in Odisha.

Health being a state subject in Indian federal system, different states in the country has been trying to meet the WHO health goal through utilization of resources. The state of Odisha has been lagging behind in achieving the goal of “health for all” and still the health care services are most backward and inadequate in this region. Odisha is one of the most backward states in India and still 32.6 percent of its population lives below poverty line (Planning Commission, 2012). Apart from mass poverty, low per capita income, large scale unemployment, illiteracy, and poor social and economic access like shelter and quality of housing, sanitation, electricity and road connectivity and so on are creating more serious problems in achieving the above stated goal. And the above stated problem is more severe for the backward region like KBK districts of Odisha. So the present study attempts to examine the issues of morbidity, health seeking behaviour, expenditure on health care and Illness induced poverty in KBK districts of Odisha.

1.3 Theoretical Framework on Demand for Curative Health Care

According to Gary Becker (1964), investments in human capital in the form of education, health, and on-job-training are considered to be important for the individual well-being and economic development. Following Gary Becker (1964, 1965), human capital theory and Kevin Lancaster (1966) characteristics approach to demand, Michael Grossman (1972a) developed his model of demand for health. According to Grossman, the individuals make investment or demand health because health is both consumption good as well as investment good. As stated above, as a consumption good, it enters into the utility function of the individual and augments the utility level (health itself creates happiness) of the individual. However, health as a commodity or good is not directly available in the market from where the individual can purchase it, rather individual purchases health care or medical care on the presupposition that it restores or augments the stock of health. Similarly, as an investment good, it gives a flow of services and helps in enhancing the

productivity or earning and welfare of the people. Hence economists take a different approach to define health. According to them, health is a capital stock or durable capital good that provides services and the flow of services derived from capital stock health consumes over the life times (Grossman, 1972a and 1972b). Each individual is assumed to be endowed with a given stock of health at the beginning of his life, over period the stock of health depreciates with age and may be augmented by investments in medical services. Death occurs when an individual's stock of health falls below a critical minimum level. Naturally the stock of health and the rate of depreciation vary from individual to individual and depend greatly on many factors and some are uncontrollable. Therefore, people demand health care or utilise health care and other health related inputs in order to reduce illness or augment their health and to improve their well being. The investment in health capital is considered to be crucial for the individual and nation because it improves the returns to investment in other sector of the economy as well. Even the return to education is dependent on the investment in health. For instance, performance of the children in school is dependent on the health condition of the children which in turn is determined by investment in health. Above all, the investment in health starts even before the birth of a baby.

However, the demand for health model developed by Grossman (1972a) in his paper comprised one individual who planned investments in health over the lifecycle in a world without uncertainty (Muurinen 1982; Dardanoni and Wagstaff, 1990). Most of the times, people face an unexpected illness during their life time. In most cases, illness is not serious enough to induce the individual to receive treatment or stay away from work. In some cases, it restricts the individual from work and in the event of illness, the rate of depreciation is even faster thus illness calls for a measure (curative health care) to restore the level of health. Sometimes, the rate of depreciation is so high that it exceeds the rate of return of health investment, in such a case the individual/household is left with no option other than death. The curative health care is taken with the purpose of restoring the stock of health, therefore, it is different from other measures such as preventive and promotive health care. For instance, preventive and promotive measures such as check up visits to a physician, physical exercise etc. are taken in order to maintain health or reducing the risk of becoming ill. Hence the demand for health care increases following increased uncertainty over the incidence of ill health (Dardanoni and Wagstaff, 1990). Moreover, when the amount of curative health care is needed, it must take a point of departure that curative

health care is not welfare enhancing per se, but rather it is used as a tool for achieving or restoring a certain level of health.

1.4 Research Gaps

In general, households do not demand the commodity ‘health care’ (i.e., curative health care) until and unless any of their family members falls sick. During the period of illness, the households/individuals not only sacrifice their earnings due to inability to work, but also require additional money in order to get treatment which they could have used it in consumption, saving or some other purposes. Again, most of the times, they are forced to involve in borrowing, mortgage and sale of valuable assets if they don’t have past saving or sufficient income for the treatment of the household members. So, the individuals or households loss their income or working days at the time when they need additional money to cure the diseases. Some families do on the occasion encounter great difficulties in paying for health services. They persist in using the services because they don’t see any choice if they are to save their relatives. The money used to pay for health care may otherwise have been used for food, agricultural development or education. Payment for health services is thus made at considerable social cost to the family and can scarcely be said to represent a willingness to pay in the normal sense of the word (Dreze and Sen, 1999). Often these high health care payments leave a catastrophic consequence at the household level.

The existing literatures on the relationship of ‘health and poverty’ measure the impoverishment effects of health care payment by estimating the number of households or people below poverty line before and after health care payment. The underlying assumption in this methodology is that health care payment is involuntary or nondiscretionary in nature. This is in fact true for a developing country like India. Most of the health expenditures on curative care is involuntary in nature. In such circumstances, household consumption expenditure will go up with health care payments. Hence, disregarding the funding sources in meeting health care costs by selling physical assets and borrowing would lead to an underestimation of prepayment health care poverty situation and overestimation of impoverishment effect of health care payments. Uncorrected measures would make households with high OOP spending appear to be better off than without such expenditure, other things being equal. Flores et al. (2008) and Berman et al.

(2010) rightly argued that household expenditure must be corrected for financial coping mechanisms while measuring the impoverishment effect of health care payment (Berman, P et al. 2010). Although the methodology adopted in Flores et al. (2008) and Berman et al. (2010) studies considered to be improved over the earlier methodology as developed by O' Donnell et al. (2008) at least for theoretical grounds, the major limitation of the previous studies is that none of them have considered indirect impact of illness while measuring impoverishment impact of health payment on the households. In addition to medical expenses, illness shocks have catastrophic economic consequences through lost earnings. In a study, Gertler and Gruber (2002) find that in Indonesia earning losses are more important than medical spending in disrupting household living standards following a health shock. The existing studies fail to capture the indirect cost of illness while measuring the impoverishment effect of illness or morbidity. It becomes troublesome for the household for their survival if working member fall sick or ill. Therefore, disregarding these issues lead to under estimation of impoverishment effect of health care payments. Moreover, for the estimation of detail impact of health expenditure burden, one needs to consider both outpatient as well as inpatient cases. There are quite possible that one household might have faced both inpatient and outpatient expenditure or households may have spent a huge amount on outpatient care may not face a hospitalized case. In this present study, we try to fill this gap by taking into consideration of total illness cost on household poverty by using NSSO data for the period 1995-2014. Relatively little is yet known about the experience of ill health among the poor or how poor people cope with illness in an economically backward region. In this backdrop, the present study addresses the morbidity pattern, health seeking behaviour of the people, identifies the barrier to the accessing health services, catastrophic impact of health payments and illness induced poverty in the KBK region of Odisha.

1.5 The Need for Study of Demand for Curative Health Care Study KBK Region¹

In Odisha, earlier undivided KBK districts were divided into eight districts in the year 1992-93. The eight districts of KBK region now are Koraput, Malkangiri, Nabarangpur, Rayagada (formerly parts of undivided Koraput), Balangir, Sonepur (formerly parts of undivided Balangir),

¹ This section has been derived from Human Development Report of Odisha, 2004; Kar et al. 2007; Planning Commission GoI, 2007; Parida, 2008, Dash, 2007 and Rahman, 2016.

Kalahandi and Nuapada (formerly parts of undivided Kalahandi). These eight districts together are still known as KBK districts or region. These eight districts comprise of 14 sub-divisions, 37 Tahasils, 80 CD blocks, 1,437 Gram Panchayats and 12,293 villages. KBK districts together account for 47649 sq km area within 155707 sq km in the state (Census, 2011). The undivided KBK districts account for 20.54 percent population and over 30.59 percent geographical area of the state. About 90 percent people of this region still live in villages. Lower population density (153 persons/sq km) in comparison to 269 for Orissa indicates different living conditions and undeveloped economy (Census, 2011). The KBK region is infamous for its multi-faced underdeveloped characteristics. Since the reports of starvation deaths in the mid-1980s, the KBK zone has always attracted special attention. These districts continue to figure in the list of 150 most backward districts of the country as identified by the Planning Commission of India (Kujur, 2006). This region is a typical region that has drawn the attention of the world because of persistent poverty and malnutrition as a result of multifaceted under developed characteristics despite quite a large number of development endeavours have been put in place by the state, centre and various NGOs in this region. KBK region has historically been found to be suffering from chronic poverty, hunger and distress migration (Parida, 2008). Another distinguishing feature of the KBK region is the very larger proportion (more than 70 percent) people belonging to SC and ST households. Agriculture and casual labour are the primary sources of livelihood. It is also highly underdeveloped owing to vulnerability to natural calamities (Shah et al., 2007). Droughts and floods are common in this region and the irrigation facilities are unevenly distributed. This often leads to wide fluctuations in the agricultural production.

There are substantial regional, social and gender disparities in terms of literacy, health and other socio-economic indicators in these districts in relation to the state average. The Human Development Report 2004 of Orissa ranks these districts in terms of Human Development Index (HDI) in descending order. The said ranking exercise puts Balangir at 21, Kalahandi at 11, Koraput at 27, Malkangiri at 30, Nawarangpur at 26, Nuapada at 14, Rayagada at 25, Sonepur at 16 among 30 districts in the state which shows that most of the districts in the KBK region stand towards the tail end in terms of HDI in the state. Coming to health sector, the said report puts Balangir at 14th, Kalahandi at 3rd, Koraput at 27th, Malkangiri at 29th, Nawarangpur at 23rd,

Nuapada at 5th, Rayagada at 26th and Sonepur at 13th places in terms of Health Index. This implies that position of the KBK Districts is not also encouraging in terms of Health Index



Figure 1.1: Sketch Map of Odisha State in India

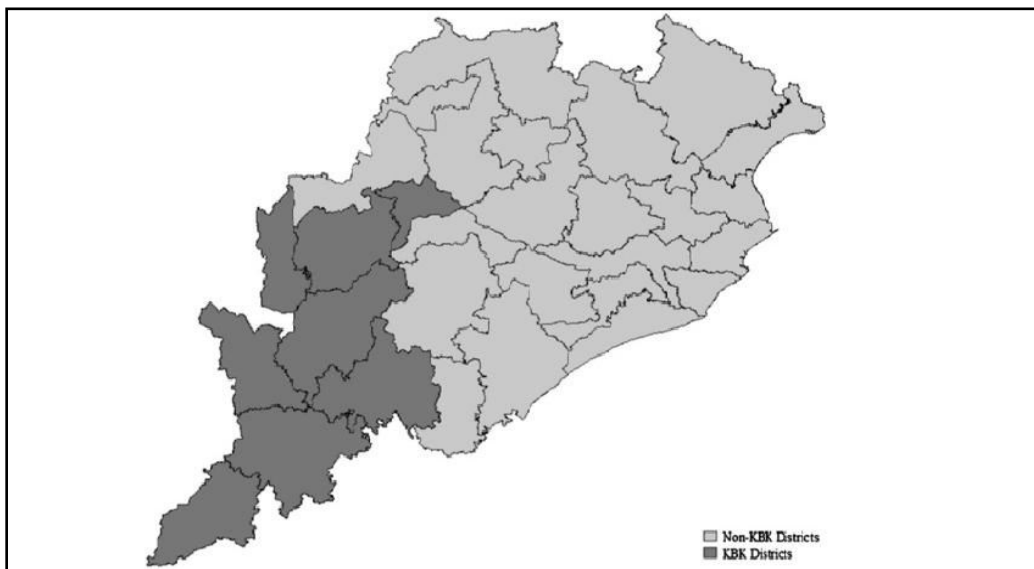


Figure 1.2: Sketch Map of KBK Region within the State of Odisha

(except present Kalahandi district). Though this region has rich natural resources, there is no substantial progress in many areas during the last 50 years. Poverty in this region is massive. As

per 2002 BPL census, the percentage of families below the poverty line is 61.06 percent in Balangir, 62.71 percent in Kalahandi, 83.81 percent in Koraput, 81.88 percent in Malkangiri, 73.66 percent in Nawarangpur, 85.70 percent in Nuapada, 72.03 percent in Rayagada and 73.02 percent in Sonepur districts against a state average of 66.37 percent. The population of this region suffer from high morbidity on account of under nutrition, endemic malaria, lack of quality health care facilities, the hospital ratio and the doctor patient ratio is much more less than the national figures (Kar et al. 2007, Planning commission GoI, 2007). Though there are studies on poverty, hunger, food security and nutritional intake in the KBK region (Dash, 2007, Nathan et al. 2008, Parida, 2008, Rahman, 2016), however, there is dearth of literature on morbidity patterns, health seeking behaviour and illness induced poverty in this region. Hence this study tries to fill this gap.

1.6 Significance of the Study

As mentioned in the above, the existing literatures on the relationship between health and productivity concentrate mainly on the effect of nutrition on productivity. The other component of health that affects productivity is *illness*. Moreover, better food and nutrition is something which can be directly controlled by the human beings, but illness or disease is something which individuals or households have little control over it (Fostor, A, 1994). Specially, for poor people, good health is also a crucially important economic asset which determines their livelihoods. When a poor or socially vulnerable person becomes ill or injured, the entire family can become trapped in a continuous downward spiral of lost income and high cost of health care. One person's ill health can affect all other members in the family. Such cascading effects may divert valuable time from earning an income/schooling to care for the sick person. Situation may also force the sale of assets required for livelihoods. Poor people are more vulnerable to this downward spiral because they are more prone to diseases and have more limited access to health care and social insurances (WHO, 2003).

Odisha is one of the economically poor states, with extreme poverty and hunger especially in the KBK region. As such, reliance on private health providers which are the base of high health costs are fraught with serious economic consequences especially for the poor and deprived sections of the people in this region. The root cause of poor health remains poverty and

social deprivation with women, child, Schedule Caste and Schedule Tribe being the most vulnerable groups. Most of the disease burdens can be directly or indirectly attributed to poverty. The linkage between poverty and health is well recognised in the literature across the globe as well as in India. It is also well established that one of the way to reduced poverty is through the reduction in the burden of disease or illness. Hence, a study of this kind plays a significant role in policy formulations particularly in a very backward KBK region of Odisha.

1.7 Objectives of the Study

As stated above, the present study is with reference to the KBK region of Odisha. The specific objectives of the study are:

- (a) to analyse the pattern of morbidity and utilisation of available health care services across selected socioeconomic characteristics by the people in the KBK region of Odisha,
- (b) to examine the factors that determine the demand for curative health care services,
- (c) to measure the catastrophic impact of health care payments at the households level in both rural and urban areas of study region, and
- (d) to examine the impoverishment effects of illness for both rural and urban households in the region and to look into its impact across various social groups, religion, occupational classes and consumption quintiles of the households.

1.8 Hypotheses of the Study

The present study is based on following six hypotheses. (i) Morbidity prevalence rates (across all the diseases) are generally higher among the rural households and poor households compared to urban and rich households. Moreover, the prevalence rate is more among female, children and old age population. (ii) Higher the standard of living, occupation of the households and education, the better the health status of the people or lesser the morbidity rates. (iii) Utilization of health care services and choice of the health care provider is determined by affordability, availability of health care facilities and severity of illness. (iv) The incidence and intensity of poverty due to OOP health payment is more among rural and poor households. (v) Rural households particularly labour class and agricultural households are more vulnerable to health

shocks. (vi) Impoverishment due to illness is more severe in rural areas compared to urban areas and higher among SC and ST households compared to others social groups.

1.9 Data Sources and Methodology

In order to examine the above stated objectives, National Sample Survey Organisation's (NSSO) data on morbidity and health care surveys of 52nd, 60th and 71st rounds have been used. NSSO data are highly validated and among the most important and a rich source of information for health research in India. Since the year 1986-87, NSSO survey on health is conducted on a decennial basis and considered to be the most comprehensive database on morbidity, utilisation of health services and detailed expenditure on curative health care². One of the main objectives of the study is examine curative health seeking behaviour and illness induced impoverishment in the KBK region as a whole in the state of Odisha. Therefore, it was not possible on the part of an individual researcher to collect field level information from the whole KBK region. Hence, the present study relies on NSSO's morbidity and health surveys data.

To examine the impact various explanatory variables of health seeking behaviour, to identify the risk factors of catastrophic health payment and illness induced impoverishment, regression techniques such as binomial logit model, multinomial logit model and two-part model have been used in chapter 4, 5 and 6. In chapter 4, the choice of health care provider has been estimated separately for inpatient and outpatient care by using binomial and multinomial logistic models respectively. Since the dependent variable in case of choice of inpatient health care provider is classified into two categories (public and private), a binomial logistic model has been employed. Similarly the dependent variable for choice of health care provider is classified into three categories (no health care, public health care and private health care), a multinomial logistic regression model has been used. A two-part model (2PM) has been estimated to examine the risk factors associated with out-of-pocket health expenditure in chapter 5. Here, the dependent variable is out-of-pocket health expenditure of the households. The first part of the 2PM is a binary logistic model (participation equation) and it determines whether the household is spending any amount on health care or not and the second part of the 2PM is a log-linear model (level of spending) which determines the amount or the level of health spending of the

² Detailed discussions on NSSO Morbidity and Health Surveys and its methodology are done in Chapter 2

households. Similarly, in chapter 6, a binomial logistic regression model has been employed to examine the factors associated with impoverishment. Impoverishment occurred when a non poor household becomes poor due to illness. The dependent variable is the impoverishment of the households; classified into two categories - occurrence and non-occurrence of impoverishment.

1.10 Organisation of the Thesis

This thesis is organised into seven chapters. Chapter 1 provides introduction and background of the study, theoretical framework and research gaps. It also contains significance, objectives of the study, data and methodologies. Chapter 2 broadly focuses on the concepts and methodologies used in the NSSO 52nd, 60th and 71st rounds morbidity and health care surveys. In this chapter, sampling design, data collection, comparability and limitations coupled with justification for the use of the 52nd, 60th and 71st round NSSO data have been discussed. Chapter 3 describes broadly demographic, socio-economic and health profiles of KBK Region and Odisha state. It gives an overview of health scenario in the KBK Region as well as in the state Odisha. Morbidity and curative health seeking behaviour of households in the KBK region of Odisha have been discussed in Chapter 4. Chapter 5 discusses ‘Out-of-Pocket’ health payments, coping mechanisms of the people for uncertain and unexpected curative health care payments and its catastrophic impact on households in KBK region of Odisha. A detailed analysis of indirect cost of illness is also provided in this Chapter. Illness induced impoverishment in KBK region of Odisha is discussed in Chapter 6. Discussion of how illness cost (i.e., direct cost as well as indirect cost) can push the households into poverty is a part of Chapter 6. The poverty impact of illness across selected socioeconomic characteristics of the households is analysed using NSSO health survey data. Chapter 7 provides broad summary of the study and derives some policy implications.

Chapter 2

NSSO Surveys on Morbidity and Health Care: Concepts and Methodologies

2.1 Introduction

This chapter provides a detailed description of the surveys conducted by National Sample Survey Office (NSSO) on morbidity and health care in India in general and in KBK region of Odisha in particular. Hence, this chapter offers an overview of NSSO surveys on morbidity and health care. Special focus of this chapter has been on in-depth analysis of methodologies adopted, sampling design, data collections, comparability and limitation coupled with justification for the use of the 52nd, 60th and 71st round NSSO data for the present research. For convenience of descriptions of information, this chapter has been organized into seven sections including summary of the chapter.

The present National Sample Survey Office (NSSO) was earlier known as the National Sample Survey Organisation. It was set up by the Government of India in 1950 to collect information on various facets of the Indian economy through nation-wide sample surveys to help in socioeconomic planning and various policy making decisions.

The first attempt to collect information on health by NSSO was in its 7th round (Oct 1953-March 1954). This round of survey and three subsequent rounds (i.e., 11th to the 13th, 1956-58) collected data on health. The basic objective was to obtain a morbidity profile of the country. In those three surveys, the reference periods were 30 days and morbidity did not include the chronic diseases. At a later stage, the 16th round (Nov.1960- Oct. 1961) is considered to be a special study on morbidity. This study adopted a longitudinal approach in order to ensure a better reporting of morbidity. During this round of surveys, sample households were visited repeatedly in every alternative month with a recall period of two months for one year. These surveys were followed up in the 17th round (Sept. 1961-July 1962) to examine alternative approaches for suitable reporting on morbidity. However, in this round, the recall period was reduced from two months to one month and households were visited only once instead of repeated visits. In this way, these surveys were exploratory in nature.

A full-scale survey on morbidity in India was conducted in the 28th round (Oct. 1973 - June 1974) after which NSSO did not undertake any separate morbidity survey. Data on morbidity became a part of the decennial surveys on social consumption as reported in the NSSO Report 60th Round (2004). Compared to earlier surveys, the 28th round survey

collected information on chronic ailments prevailing among the household members. Besides data on morbidity, this survey collected information on births, deaths, migration and disability. The reference period on morbidity information was of last two weeks preceding the date of survey (NSSO Report 28th Round, 1973-74).

With the passing of time and to collect information of current period, NSSO has been adopting slightly different methods almost in every round. The 35th round (July 1980 - June 1981) carried out first all India social consumption with a focus on items like public distribution system, health services including mass immunisation and family welfare programmes, and educational services. But final results of this survey could not be brought out due to some unavoidable reasons (NSSO 60th Round, 2004). It is worth mentioning that since 35th round of NSSO survey, along with morbidity related information, utilisation of health services and expenditures on medical services were also collected. The second all India survey on social consumption was carried out in the 42nd round (July 1986- June 1987). In this round, reference periods of 30 days for outpatient (ailment) and 365 days for inpatient (hospitalised) care were adopted. Issues and problems of aged persons were also included in this round.

Table 2.1: NSSO Surveys on Morbidity, Utilisation and Expenditure on Health Care

Round	Survey Period	Reference Period		Topics Covered
		Inpatient Care	Outpatient Care	
52	July 1995- June 1996	365 days	15 days	Morbidity and utilisation of medical services, utilisation of maternity and child health care services, problems of aged persons, participation in education
60	January- June 2004	365 days	15 days	Curative aspects of the general health care system in India and also the utilization of health care services provided by the public & private sector, together with the expenditure incurred by the households for availing these services.
71	January- June 2014	365 days	15 days	The role of alternative schools of medicine in respect of prevalence of use, cost of treatment and type of ailments were covered for the first time in an NSS health survey. Prevalence of ailments, propensity of the population to seek health care from the public sector, together with the expenditure incurred by households for availing health care services from the public and private sectors. Information on the condition of the 60-plus population was also collected.

Source: 52nd, 60th and 71st Round NSSO Reports

Three NSSO rounds (52nd, 60th and 71st) are considered special and important so far as the information on morbidity and health care are concerned. Table 2.1 shows the topics covered in each of these rounds. One common aspect in these rounds was the reference period for outpatient care as 15 days and 365 days for inpatient care. The survey period for the 52nd round was one year divided into four sub-rounds each of 3 months durations. The survey period for the 60th round was six months divided into two sub-rounds each of 3 months duration. Similar to the earlier round, the survey period for the 71st round was also six months divided into two sub-rounds each of 3 months duration.

The 52nd round was on the “Survey on Health Care” (July 1995-June 1996). This is the third round of all India survey on health care and it was carried out in order to facilitate collection of more comprehensive information on morbidity. However, this round dropped data information on public distribution system and utilisation of family planning services which were parts of 42nd round because, these items were collected in the NSSO 50th round survey. In the 52nd round, the reference period for information on ailments or outpatients was reduced from 30 days to 15 days. Moreover, certain pieces of data information with respect to an estimate on indirect cost of ailments were also added in this survey. After 52nd survey, the next survey on “Morbidity and Health Care” (60th round) was carried out in Jan-June 2004 which was also comprehensive and nationwide survey. The 60th round retained the same concepts, definitions and procedure used in the 52nd round, for the purpose of survey on utilisation of health services and problem of aged persons. After a gap of 10 years, NSSO’s 71st round titled “Social Consumption: Health” was carried out on social consumption on health in India. One of the important components of the survey was the collection of information for calculation of prevalence rate of different diseases among various age and sex groups in different regions of India. Besides other variables, the extent of use of health services provided by the government was an important component of this survey. For the first time in an NSSO health survey, the extent of use and cost of treatment by Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy (AYUSH, an alternative system of medicine) was covered in this round of survey.

2.2 Sampling Design and Coverage: 52nd, 60th and 71st Round

In NSSO survey, regions are generally considered hierarchical domains below the State or Union Territory level. Each state or union territory is divided into one or more agro climate zones characterised by similar geographical features and population densities. As per NSSO

surveys, regions are assigned 3 digit codes called State-Region code. The first two digits represent the state or Union Territory and the third digit indicates the particular region under the State. In Odisha, there are three NSSO regions - Coastal, Southern and Northern region. In the 60th and 71st round surveys, the Coastal Region included 11 districts, the Southern Region included eight districts and the Northern Region included eleven districts as shown in Table 2.2. Since the number of districts was only 13 during the 52nd round survey, Coastal region included 4, Southern region included 3 and Northern region included 6 districts. Classification and code numbers remain similar during these two rounds. As far as KBK Region is concerned, erstwhile it was having only three districts, viz., Koraput, Balangir and Kalahandi. These three districts were bifurcated into 8 districts, out of which six districts form a part of Southern and two form a part of Northern Region.

Table 2.2: Distribution of NSS Region & Districts in Odisha, 1995-96 to 2014

NSSO Round	State Code	NSSO Region	NSSO Region Code	Regionwise Districts and its Code
52nd	19	Coastal	191	Baleswar(05), Cuttack(06), Puri(13), Ganjan(12)
		Southern	192	Phulbani*(08), Kalanandi(10), Koraput(11)
		Northern	193	Sambalpur(01), Sundergarh(02), Keonjhar(03), Mayurbhanj(04), Balangir(09), Dhenkanal(07)
60th	21	Coastal	211	Baleswar(08), Bhadrak(09), Kendrapada(10), Jagatsinghpur(11), Cuttack(12), Jajpur(13), Nayagarh(16), Khorda(17), Puri(18), Ganjan(19), Gajapati(20)
		Southern	212	Kandhamal(21), Boudh(22), Nuapada(25), Kalanandi(26), Rayagada(27), Nabarangpur(28), Korraput(29), Malkangiri(30)
		Northern	213	Bargarh(01), Jharsuguda(02), Sambalpur(03), Debagarh(04), Sundergarh(05), Kendujhar(06), Mayurbhanj(07), Dhenkanal(14), Anugul(15), Sonepur(23), Balangir(24)
71st	21	Coastal	211	Baleswar(08), Bhadrak(09), Kendrapada(10), Jagatsinghpur(11), Cuttack(12), Jajpur(13), Nayagarh(16), Khorda(17), Puri(18), Ganjan(19), Gajapati(20)
		Southern	212	Kandhamal(21), Boudh(22), Nuapada(25), Kalanandi(26), Rayagada(27), Nabarangpur(28), Korraput(29), Malkangiri(30)
		Northern	213	Bargarh(01), Jharsuguda(02), Sambalpur(03), Debagarh(04), Sundergarh(05), Kendujhar(06), Mayurbhanj(07), Dhenkanal(14), Anugul(15), Sonepur(23), Balangir(24)

Notes: 13 Districts of Odisha became 30 Districts in the year 1992-93, * Phulbani district is also called Kandhamal, the bracketed numbers are respective NSS District codes.

Source: NSSO 52nd, 60th and 71st Round Reports

In NSSO surveys, multi stage stratified sampling procedure was adopted for the 60th and 71st rounds¹. The first stage units (FSU) are census villages in rural areas and urban frame survey (UFS) blocks in urban areas. The ultimate stage units are the households in both the sectors. Large villages were divided into suitable number of hamlet groups (hgs) and large block into sub-blocks (sbs) and these subdivisions are dependent on the population of the FSU. On identifying the hamlets, two hamlet-groups are randomly selected, using simple random

¹ However, in 52nd round NSSO survey, a two stage stratified sampling were adopted, the first stage units are the census villages and urban frame blocks in rural and urban sector respectively. The second stage units are the households in both sectors.

sampling without replacement, and the listing of households is undertaken in these hamlet-groups. For urban areas, two sub-blocks are selected using simple random sampling without replacement.² Table 2.3 shows the criteria for hamlet-group or sub-group formations.

Table 2.3 Criteria for hamlet-group or sub-block formation in 52nd, 60th and 71st Round (Schedule 25.0)

52 Round				60th Round		71st Round	
Rural Sample		Urban Sample		Rural/Urban Sample		Rural/Urban Sample	
Approx. present population of the FSU	No. of hgs/sbs	Approx. present population of the FSU	No. of hgs/sbs	Approx. present population of the FSU	No. of hgs/sbs	Approx. present population of the FSU	No. of hgs/sbs
Less than 1200	1	Less than 1200	1	Less than 1200	1	Less than 1200	1
1200 to 1799	4	1200 to 1999	2	1200 to 1799	3	1200 to 1799	3
1800 to 2199	5	2000 to 2799	3	1800 to 2399	4	1800 to 2399	4
2200 to 2599	6	2800 to 3599	4	2400 to 2999	5	2400 to 2999	5
2600 to 2999	7	3600- 4399	5	3000 to 3599	6	3000 to 3599	6
(and so on)		(and so on)		(and so on)		(and so on)	

Source: 52nd, 60th and 71st Round NSSO Reports

For the selection of survey households, i.e., the second-stage strata (SSS) or ultimate sampling units (USU), households in the selected hamlet-groups and sub-blocks are listed. Table 2.4 shows this for three rounds. From each SSS or USU, the sample households are selected by using simple random sampling method without replacement. The criteria for the selection of households are specific to the round being conducted. For instance, in the 52nd and 60th rounds of survey, 10 households were selected from each FSU and in 71st round 8 households were selected from each FSU.³ In order to avoid purposive sampling biasedness and to make it representative at the higher level, collected data was assured by multipliers which are to be used as weights.

² In 52nd round survey one sub-block was selected at random from each UFS for urban areas.

³ In case there is shortfall of households available in the frame of any SSS will be compensated from the same SSS of the other hamlet/sub-block or the other SSS of the same or other hamlet/sub-block where additional households are available.

Table 2.4: Formation of Second Stage Stratum(SSS) and allocation of Households in 52nd, 60th and 71st Rounds (Schedule 25.0)

NSSO Survey	SSS	Composition of SSS	No. of Households to be selected	
			Without hg/sb	With hg/sb
52nd	1	Households with a child of 0 year	2	
	2	of the remaining households, households with atleast one hospitalisation case during the last 365 days	2	
	3	remaining households	6	
60th	1	Households with atleast one hospitalisation case during the last 365 days	4	2
	2	from the remaining households, households with atleast one child below the age of five years	2	1
	3	from the remaining households, households with atleast one member of age 60 age of five years	2	1
	4	Others households	2	1
71st	1	households having at least one child of age less than 1 year	2	1
	2	from the remaining, households with at least one member (including deceased former member) hospitalised during last 365 days	4	2
	3	other households	2	1

Source: 52nd, 60th and 71st Round NSSO Reports

Notes: hg: Hamlet group and sb: Sub-block

Table 2.5: Distribution of Sample Households across Sectors in KBK Region & Odisha

NSSO Surveys	Sector	No. of FSUs(Villages/ Blocks) Surveyed in Odisha	KBK		Odisha	
			Households	Persons	Households	Persons
52nd	Rural	352	675	3097	3219	16301
	Urban	112	190	985	1120	5422
	Total	464	865	4082	4339	21723
60th	Rural	211	450	2066	2094	10292
	Urban	56	100	459	560	2711
	Total	267	550	2525	2654	13003
71st	Rural	212	432	1966	1696	8186
	Urban	94	128	544	746	3390
	Total	306	560	2510	2442	11576

Source: Extracted from NSS 52nd, 60th and 71st round data

In the 52nd round of survey, 352 FSUs (census villages) and 112 UFSs (urban blocks) were selected and surveyed in Odisha (see Table 2.5). This survey consisted of 4339 households and 21723 persons of Odisha. The 60th rounds of survey included 211 census villages and 56 urban blocks consisting of 2654 households and 13003 individuals and in the 71st round of survey, 212 census villages and 94 urban blocks were surveyed and it covered 2442 households and 11576 individuals for the state of Odisha. As far as KBK Districts are

concerned, in 52nd round 865 households (4082 individuals), in the 60th round, 550 households (2525 persons) and in the 71st round 560 households (2510 persons) were surveyed.

Table 2.6: Distribution of the Attitudes of the Informant at the time of Data collection in the KBK Region and Odisha

Responses of Informants	1995-96		2004		2014	
	Odisha	KBK	Odisha	KBK	Odisha	KBK
Cooperative and Capable	66.8	63.6	68.0	84.1	82.6	79.5
Cooperative and but not capable	29.8	35.8	29.7	14.3	15.9	16.7
Busy	0.7	0.1	0.9	1.2	0.9	3.7
Reluctant	2.5	0.4	1.3	0.4	0.6	0.1
Others	0.3	-	0.1	-	-	-
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Author's calculation from NSSO 52nd, 60th and 71st round data

2.3 A Brief Description of NSSO Schedule 25.0: Information on Morbidity, Utilisation and Expenditure on Health Care

In NSSO surveys, data were collected from the sample households with the help of an interview schedule method. A set of questions was put to the household members. The respondent or principal informant usually the head of the household answered the presence or absence of morbidity for themselves (self reporting) as well as for other household members (proxy reporting). Therefore, the quality of this household information mainly depends on capability and attitude of the informant. In NSSO survey, these responses are classified into five categories - (i) cooperative and capable, (ii) cooperative and but not capable, (iii) busy, (iv) reluctant and (v) others. Table 2.6 shows that in most of the cases, 82.6 percent informants are cooperative and capable in the State of Odisha and the same is 79.5 percent for KBK region.

Block 0 and 1 provide the identification of the sample household in terms of its state, region, district, sector, hamlet group or sub-block etc. Block 3 collects information on household characteristics like household size, principal occupation, household type, social group, religion, type of latrine, type of drainage, major source of drinking water, primary source of cooking, household usual consumption expenditure and insurance premium status etc (as given in Table 2.7)⁴. The above household level information determines the socioeconomic background of the household. In a country like India, majority of the people

⁴ The same information is collected in Block 2 of NSS 52 round survey.

are living in rural areas and income for these rural households may fluctuate during the year according to harvest cycle.

Similarly, in urban areas with large informal sectors, income flows may be erratic. In such a situation, a potential difficulty for households in correctly recalling their income, in which case the information on income derived from the survey may be of low quality and consumption expenditure may better reflect a household's actual standard of living and ability to meet basic needs. The present study divided the households into five per capita consumption expenditure quintiles groups and these groups are done for rural and urban areas separately. Household type is an indicator of occupational status of the household, depending upon the major sources of household income during the last one year. The household type code based on the means of livelihood of a household will be decided on the basis of the sources of the household's income during the last 365 days preceding the date of the survey. In NSSO survey, household types are classified as self employed in agriculture, self employed in non-agriculture, regular wages and salary earning class, casual labour in agriculture, casual labour in non-agriculture and other categories in the rural areas and self employed, regular wage/salary earning class, casual labour and other categories in urban areas. However, for the analysis purpose in the present study household types have been classified into five categories, i.e., (a) self employed or business class, (b) agriculture, (c) labour, (d) regular wage or salary earning class and (e) others class households. In this research work, casual labour and agricultural labour have been clubbed into one category for analysis. Information on source of drinking water, type of latrine and drainage, sources of energy for cooking etc. determine hygienic practices of the household. Block-4 and (Block-3 in the 52nd round) contains individual characteristics of household members, viz., gender, age, marital status, general education level including the information on (a) whether the individual member of the household was ailing during the reference, (b) whether the individual was hospitalised during the reference period and (c) the number of times the individual was hospitalised. Block 4, Block 7 and Block 6 in the 52nd, 60th and 71st round respectively collect the details of hospitalization including questions related to the nature of ailment or diseases for which hospitalization took place. Details of hospitalization related expenditure, sources of finance and places of hospitalization are collected in Block 4.1, Block 8 and Block 7 for 52nd, 60th and 71st round respectively. Particulars of ailment during the last fifteen days and expenses incurred for treatment during the last 15 days including the sources of finance and reimbursement related information are collected in three rounds of survey.

Details of economic independence and ailment of members aged 60 and above, immunisations of the children, prenatal and post natal of ever married women are also collected in the NSSO health survey.

Table 2.7 Particulars of Household Information from NSS 52nd, 60th and 71st Round Surveys (Schedule 25.0)

S. No.	Particulars	52nd Round	60th Round	71st Round	Items Covered
1	Identification of the Sample Household	Block 0 and 1	Block 0 and 1	Block 0 and 1	state, region, district, sector, hamlet group or sub-block etc.
2	Household Characteristics	Block 2	Block 3	Block 3	household size, household type, social group, religion, type of latrine and drainage, source of drinking water, source of cooking, household consumption expenditure and insurance premium status etc
3	Individual Level Information	Block 3	Block 4	Block 4	gender, age, marital status, general education level, suffering from ailment during last 15 days, hospitalisation during last 365 days, no. of times hospitalised etc.
4	Particulars of Hospitalisation during last 1 years	Block 4	Block 7	Block 6	Age of hospitalised member, nature of ailment, nature of treatment, level of care, duration of treatment, loss of income, when admitted and discharged etc.
5	Expenses incurred for Hospitalisation	Block 4.1	Block 8	Block 7	Whether receive free medical services or not, medical expenditure for treatment during the stay, non-medical expenditure, sources of finance, amount of reimbursement if
6	Particulars of spells of ailment during last 15 days	Block 5	Block 9	Block 8	Number of days ill, on restricted activity, confined to bed, nature of ailment, status of ailment, duration of ailment, whether receive any treatment, reason for no treatment, loss of income due to ailment etc.
7	Expenses incurred for treatment during last 15 days	Block 5.1	Block 10	Block 9	Whether receive free medical services or not, medical expenditure for treatment, non-medical expenditure, sources of finance, amount of reimbursement if any etc.
8	Particulars of economic independence and ailments of aged 60 and above	Block 9, 10 & 11	Block 6	Block 10	state of economic independence, living arrangement, physical mobility and ailments etc.
9	Particulars of immunisation of children (0-4 Years), prenatal and post natal care of ever married women	Block 6, 7 & 8	Block 11	Block 11	Whether immunisation received, whether any prenatal/post natal received. outcome of delivery, place of delivery/abortion etc.

Source: NSSO 52nd, 60th and 71st Interview Schedule

2.3.1 Information on Morbidity

Morbidity generally refers to a physical or mental condition having a disease or a symptom of disease or amount of disease within a population in a region. Morbidity also refers to side effects caused by a medical treatment.

There are many different ways of measuring the morbidity or illness, each may be related to different actors supplying the definitions of illness. The medical models of illness, as followed by medical profession which define illness in terms of physical and mental disorders are dealt with. The presence or absence of diseases and the stages of its invasiveness dominates such definitions which are pathologically based. The other definitions however may be more functional based and measured its effects on the basis of individual's function in their daily life (McGuire et al. 1998). The medical models of illness are more

relevant and scientific because they are followed through the clinical assessment by medical professionals. However, if someone has not visited the medical professionals, clinical assessment is not done in such case the medical model of illness will not work even in the presence of disease or illness. Moreover, this method is very expensive in nature. Similarly, the function based measure focuses on certain functions of daily life in order to define illness or morbidity. There may be cases where individual is able to perform his/her routine activities even in the presence of disease or morbidity.

Data on morbidity collected through NSSO survey are based on subjective judgement of the individuals during the reference period. Subjective judgement or self reported morbidity is highly influenced by socioeconomic characteristics and knowledge about diseases and health care of the concerned individual. However, this is a widely accepted measure of morbidity because it is more convenient and less expensive than clinical assessment measure. In NSSO health survey, the informant was asked whether any member had suffered from any ailment. Ailment, i.e., illness or injury, means any deviation from the state of physical and mental well being. (i) It means one must feel anything wrong related to skin, head, eyes, ears, nose, throat, arms, hands, chest, heart, stomach, liver, kidney, legs, feet or any organ of the body. (ii) All types of injuries such as cuts, wounds, haemorrhage, fractures and burns caused by accidents including bites in any part of the body are also ailment. (iii) Cases of abortion, i.e., natural or accidental are also considered as ailment. Cases of sterilization, insertion of IUD, getting MTP etc. a state of normal pregnancy without complications and cases of preexisting visual, hearing, speech, locomotor and mental disabilities are not considered as ailment.⁵ Similarly untreated injuries like cuts, burns, scald, bruise etc. are not ailment.

The ailment cases have been classified into three categories - (i) the ailments for which the patients were hospitalised during the last 365 days preceding the date of survey, (ii) all such ailments for which the patients were treated during the last 15 days preceding the date of survey and (iii) all ailments suffered during the last 15 days preceding the date of survey for which no medical treatment was availed. Row 4 of Table 2.7 demonstrates particulars of inpatient or hospitalisation during the last 365 days. Here 'hospitalised' means admitted as an in-patient in a medical institution. It covers all HSC, PHC, CHC, public dispensaries with facilities for inpatient treatment, any public hospital (district hospital/state

⁵ Unlike 71st round survey cases of pre-existing visual, hearing, speech, locomotor and mental disabilities are considered as ailment in 52nd and 60th round survey.

hospital/ medical college hospital etc.) and private hospital of any kind equipped with facilities for in-patient treatment. A hospitalised member may be found to be suffering from more than one type of ailment. In such cases, the code corresponding to the major ailment has been recorded and in case it is not possible to determine the major ailment, the code appearing in the code list has been recorded. Severity of illness is one of the important dimensions of illness; in case of hospitalisation, severity of illness can be captured by duration of stay in the hospital and duration of treatment after discharge from hospital. Similarly the two indicators, i.e., when admitted in the hospital and when discharged from the hospital can give an indication of the status of illness. Row 6 of Table 2.7 discusses particulars of outpatient or ailments during the last 15 days of reference period. A continuous period of sickness due to a specific ailment is a spell. A spell is identified separately by ailments. For instance, if one reported two or more ailments during the reference period, it will be considered two or more spells of ailment. However, chronic ailment with periodic check up is considered as a single ailment case. Ailment status is recorded in four ways - (a) started more than 15 days ago and continuing, (b) started more than 15 days ago and has ended, (c) started within 15 days and it is continuing and (d) started within 15 days and has ended. The severity of illness during the last 15 days can be judged by looking at the number of days within the reference period the individual is ill, on restricted activity and confined to bed.

2.3.2 Information on Utilisation of Health Care

Utilisation of health care services is influenced by both demand and supply side factors. It is influenced by factors like providers' behavior, severity of the disease, cost of the care, payment systems, availability and affordability of health care services. In NSSO health surveys one is considered to utilise medical care or receive health care if he or she has taken treatment from a doctor. Therefore, self-medication, use of medicines taken on the advice of persons in chemists' shops etc. were not considered as medical treatment and ailments for which such medication was taken were considered as untreated ailments. However, in the latest 71st round of health survey all such medication was considered as medical treatment. Row 4 of Table 2.7 highlights the details of utilisation of hospitalisation care. Any interaction with a doctor or other medical care professional that involve an overnight stay at a hospital. A person is considered to receive hospitalised treatment or inpatient care if he or she availed it as an indoor patient in any medical institution during the reference period. In NSSO health

surveys, the utilisation of inpatient care includes information on age of the hospitalised member, the type of hospital in which the patient admitted, type of ward, details of medical services like surgery, medicine, X-ray/ECG/EEG/Scan and other diagnostic tests received by the patient, whether treatment availed before hospitalisation or not, source of treatment, duration of stay in hospital and duration of treatment. Sources of treatment are classified as public hospital (including Sub-centre, PHC, CHC etc.), public dispensary (like CGHS, ESI), private hospital and private doctor, etc. Duration of stay in the hospitals and duration of treatment are recorded in terms of number of days. Loss of household income due to hospitalisation is collected in monetary terms. Ailment of non-working member too causes disruption of usual activity of the working member of the household, which in turn leads to loss of work or income. Loss of household income either as inpatient or outpatient is the indirect cost of illness to the households.

Not all ailments require a hospitalisation. Row 6 of Table 2.7 accounts for a detailed analysis outpatient care. Outpatient care is the interaction of a patient with a doctor or other medical care professional that does not involve an overnight stay in a hospital. More severe cases will require overnight stays for the patient's monitoring and recovery. Such outpatient cases tend to be less complex than inpatient cases. Household members were asked whether they received any treatment for the ailment during the last 15 days, whether they received any treatment from government sources and if they did not avail any treatment reasons of the same were recorded. In NSSO, the reasons for no treatment are classified as follows - no medical facility available in the neighbourhood, facility available but no treatment sought due to lack of faith, long waiting, financial reasons, ailment not considered serious and others. The possible reasons for not receiving government health care facilities are - (a) government doctor/facility too far, (b) not satisfied with the treatment by government, (c) long waiting, (d) required specific services not available and (e) others. Loss of household income, if any, due to ailment, was also recorded. Row 9 of Table 2.7 depicts whether immunisation received for children, whether prenatal and postnatal care received, place of delivery and abortion etc.

2.3.3 Information on Expenditure on Health Care

Row 5 and 7 of Table 2.7 have focused on the expenses incurred on inpatient and outpatient care respectively in NSSO rounds. For each treatment case, information on health expenditure, sources of finance and total amount of reimbursement were collected separately. Household health expenditure is the expenditure incurred by the household on health care and

it includes out of pocket expenditure and prepayment. Expenditure on health care consists of both medical and non medical expenditure. Medical expenditure includes doctor's or surgeon's fees, medicine cost, expenditure on diagnostic tests, attendant charges, physiotherapy, personal medical appliances, others (like food and other materials, blood and oxygen cylinder, ambulance services etc.). Non medical component includes transport charges other than ambulance, lodging charges of ailing person and escorts and others. Expenditure on these items was collected for hospitalisation case (inpatient care) during the last 365 days as well as outpatient care during last 15 days. Sources of finance for meeting the expenses can be: (i) current income/saving, (ii) borrowings, (iii) contribution from friends and relatives, and (iv) other sources (including sale of ornaments and other physical assets, draught animals). Total amount reimbursement if any from employer (i.e., government or private), medical insurance companies and other agencies is also recorded. Total inpatient health expenditure for the household is the total sum of medical and non medical expenditure incurred as an inpatient for each hospitalised episode plus total insurance premium minus amount of reimbursement if any from the total sum. Similarly, total outpatient health expenditure for the household is the total medical and non medical expenditure incurred as an outpatient for each non hospitalised treatment episode plus total insurance premium minus amount of reimbursement if any from the total sum. Since the recall periods for inpatient case is 365 days and outpatient case is 15 days. This research endeavour has converted the health expenditure figures into monthly units. If a household contains more than one hospitalised (non-hospitalised) cases, in such case, a simple summation of each case gives the household inpatient (outpatient) health expenditure. Total household health expenditure or out of pocket health expenditure is the sum of total inpatient health expenditure and total outpatient health expenditure. Household health expenditure is also called direct cost of illness. Per capita household health expenditure is calculated as total household health expenditure divided by household size.

2.4 Comparability of the 52nd, 60th and 71st Round Survey Data

The NSSO collected information on morbidity and health care for all the states and union territories of India by using a multi-stage sampling design. It adopted a uniform sampling procedure and geographical coverage, hence its survey data are comparable. In the 52nd and 60th NSSO surveys only treatment of ailments administered on medical advice was considered as medical treatment. However in the latest 71st round, self medication, medicine

taken on the advice of persons in chemists' shop etc. are also considered as medical treatment. This is due to the fact that there is widespread prevalence of self medication in India. In earlier surveys on health, persons with disabilities were regarded as ailing persons. In 71st round pre-existing disabilities were considered as chronic ailments provided that they were under treatment for a month or more during the reference period. In the 71st round childbirths were given a dummy ailment code so that details of treatment and expenditure childbirth could be recorded. As usual childbirth is not considered as ailment. A more detailed and updated ailments code list was adopted in the 71st round as per the requirements of Ministry of Health and Family Welfare. Information on expenditure incurred on treatment was collected with a paid instead of payable approach in the 71st round survey, as such information was considered to be more readily available. In the 71st round, the concept of household marginally deviated from the earlier survey. As usual household is a group of persons who normally lived together and taking food from a common kitchen constituted a household. It included temporary stay-away but excluded temporary visitors and guests. In 71st round, assuming that expenditure related information could be better collected from the person who actually funded it. The 71st round includes, (i) students residing in hostels were considered as members of the household to which they belonged before moving to the hostel irrespective of the period of absence from the household they belonged. (ii) any women who has undergone childbirth during last 365 days was considered a member of the household which they incurred the cost of childbirth irrespective of her place of residence during the last 365 days and (iii) a child aged less than 1 year was considered a member of the household to which its mother belongs.

2.5 Justification for using the Latest Three Rounds of NSSO data

The objective of the study is to examine morbidity patterns, utilisation and expenditure on health care and its consequences on the households. The NSSO 52nd, 60th and 71st round surveys are all India comprehensive surveys which collect information on morbidity, utilisation and expenditure on health care separately for inpatient and outpatient care. These three rounds contain relevant information about morbidity, not all of which were included in the earlier rounds. Unlike the previous round the reference period for both inpatient and

outpatient care are same in these three rounds.⁶ The same definition of illness, namely any deviation from the state of physical and mental well being is adopted in all the three rounds. One will be treated as sick if one feels sick is itself a subjective judgement of a person's health. More interestingly, the concepts and methodology are almost same in these rounds. The same concepts and methodology of 52nd round were adopted in 60th round survey. However, in 71st round survey there are minor differences in the concepts and definitions related to some of the variables, but these changes have been taken into consideration while making any comparison with 52nd and 60th rounds. Moreover, these three rounds of NSSO Surveys focus on curative aspect of health care services.

2.6 Limitations of NSSO Health Surveys Database

The major limitation of health expenditure data is that it does not capture the actual amount that household incurred for health care. There is a possibility of downward bias in the expenditure because of its fixed reference period. The information related to expenditure on health care beyond the reference period was not captured. The status of ailments are classified into four categories, viz., (a) started before the reference period and still continuing (b) started before the reference period but ended within the reference period (c) started within the reference period and is continuing and (d) started and ended within the reference period. Hence except the last category where ailments started and ended within the reference period the actual expenditure on health care cannot be captured. The same problem arises for inpatient care also. One of the specific problem relevance to household level health surveys data is that it excludes people living in institutions such as hospitals, nursing homes etc. In such cases individuals may well have above average health expenditure. Studies in some countries have suggested that people living permanently in institutions may account for 5-10 percent of overall health use (WHO, 2010). If the survey period is not designed to collect data for the whole year then there is a significant seasonal variation in the morbidity rate, health care use and expenditure. There are certain non sampling errors are associated with health survey data. Most of the health surveys rely on the information provided by principal informant, who provides information for other family members. Therefore, if the principal informant is not able to recall the pertinent event then there is high chance of error in the

⁶ The 42nd round NSS survey also comprehensive survey and includes information about morbidity, not all of which were included in the previous surveys; however we have not used 42nd round data in this study because of the difference in the reference period related to outpatient care.

information. Sometimes the number of events forgotten is proportional to the length of recall period. Events with less relevance or impact on the individual are most likely to be forgotten.

2.7 Summary

This chapter provided a detailed description of the surveys conducted by National Sample Survey Office (NSSO) on morbidity and health care in India in general and in KBK region of Odisha in particular. Special focus of this chapter was on methodologies adopted, sampling design, data collections, comparability and limitation coupled with justification for the use of the 52nd, 60th and 71st round NSSO data for the present research. Despite the limitations mentioned above, NSSO Health Surveys are considered to be more comprehensive and widely accepted health surveys which give information on morbidity, utilisation and expenditure on health care at both national and state level. As far as the latest three rounds (52nd, 60th and 71st) of health surveys are concerned, the recall periods with respect to inpatient care and outpatient care are same and the concepts and methodology adopted in these three rounds are almost same. Although there are some changes in the concepts used in the 71st round survey, these differences have been taken into consideration while making comparison with the previous round surveys.

Chapter 3

Demographic, Socio-economic and Health Profile of KBK Region and Odisha

3.1 Introduction

The previous chapter has given a brief description of “Morbidity and Health Care” and the methodologies adopted in the 52nd, 60th and 71st rounds of survey. This chapter attempts to describe demographic, socioeconomic and health profile of KBK Region and Odisha. Availabilities of basic household amenities like drinking water, toilet and sanitation facilities, cooking practices, housing conditions and type of dwelling in which household members reside, largely determine the health promotion, health condition and health outcomes of the population. Household’s demographic and socio-economic characteristics such as age, gender, caste, religious affiliation, educational qualification, occupational status, and consumption patterns influence health seeking behaviour of the households. Similarly, community level factors like availability of health facilities, municipal garbage disposal, activities of NGOs and charitable trust and public expenditure on health care determine the utilisation of health care and health indicators of the people.

The present chapter is broadly divided into two parts. First part describes the demographic and socioeconomic profile of the KBK region and the state of Odisha. Second part discusses the health profile in KBK region and Odisha. This chapter is schematized as follows: Section 3.2 describes demographic profile of the KBK region and Odisha. Section 3.3 dwells upon the socio-economic profile of KBK region and Odisha. Section 3.4 discusses household monthly per capita consumption expenditure of KBK Region and Odisha. Section 3.5 and 3.6 depict housing, drinking water and basic sanitation facilities of the households. Section 3.7 to 3.13 give an overview of the health and health care in the KBK region and the state and the final section 3.14 offers concluding remarks to this chapter.

3.2 Demographic Profile of the KBK Region and Odisha

Age Distribution: Table 3.1 depicts the age distribution of the household members in the KBK region and Odisha. It is expected that more the people in the old age and child age group, the greater will be the morbidity and health needs. More than 60 percent of the population are in the age group of 15-59 in the KBK region of Odisha. Moreover, the percentage of urban people in this age group is more compared to that of the rural areas. This has been observed during the period from 1995-96 to 2014. This implies that a larger

proportion of people are capable of working and earning income. While percentage of child age group is decreasing from 15.2 percent in 1995-96 to 9.4 percent in 2014, the percentage of old aged people has increased from 3.5 to 7.1 percent during the same period in the KBK region. Furthermore, the percentage of child age-group is marginally higher in KBK region compared to the state average during the period 1995-96 to 2014 and the reverse result was found when it was compared with the old aged population during the same period.

Table 3.1: Age Distribution of Population in KBK Region and Odisha (in %)

Age Structure		KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	(0-5)	15.3	14.2	9.7	13.9	13.9	9.6
	(6-14)	21.7	20.0	17.4	21.6	19.7	15.8
	(15-59)	60.0	59.8	65.8	59.0	59.0	66.6
	60 Above	2.9	6.0	7.1	5.5	7.3	8.0
Urban	(0-5)	14.1	9.7	6.7	11.5	10.5	8.6
	(6-14)	18.3	14.1	18.4	19.8	16.1	14.3
	(15-59)	59.9	70.9	68.1	64.2	67.5	69.7
	60 Above	7.7	5.2	6.8	4.5	5.8	7.3
Combined (Rural+Urban)	(0-5)	15.2	13.9	9.4	13.6	13.5	9.4
	(6-14)	21.3	19.5	17.5	21.3	19.3	15.6
	(15-59)	60.0	60.7	66.0	59.7	60.0	67.1
	60 Above	3.5	5.9	7.1	5.4	7.1	7.9

Source: Author's calculation from NSS 52nd, 60th and 71st Round

Table 3.2: Gender Distribution of Population in KBK Region and Odisha (in %)

Sector wise Sex Structure		KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Male	49.0	49.4	52.8	50.1	49.3	52.3
	Female	51.0	50.6	47.2	49.9	50.7	47.7
	Sex Ratio	1042	1024	894	998	1028	914
Urban	Male	51.6	55.0	49.0	52.6	52.1	51.9
	Female	48.4	45.0	51.0	47.4	47.9	48.1
	Sex Ratio	938	818	1039	903	919	925
Combined (Rural+Urban)	Male	49.3	49.8	52.5	50.4	49.6	52.2
	Female	50.7	50.2	47.5	49.6	50.4	47.8
	Sex Ratio	1028	1006	905	984	1015	915

Source: Same as in Table 3.1

Note: Sex-ratio is calculated as no. of females per 1000 males

Sex Composition: Table 3.2 presents the sex composition of the households in the KBK region. The health needs of female are different from that of the male. However, a mixed

result has been found with regard to the relationship between gender and morbidity is concerned. Table 3.2 shows that the number of male population was larger than the number of female population in the KBK region and Odisha in 2014. The sex ratio in the KBK region has decreased from 1028 in 1995-96 to 905 in 2014. Interestingly the sex ratio in the rural areas is more compared to that of the urban areas except the year 2014. This was observed in both KBK region and Odisha.

Table 3.3: Distribution of Religion in KBK Region and Odisha (in %)

Religion Structure		KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Hinduism		99.2	99.1		96.5	98.1
	Islam		0.0	0.0		1.5	0.3
	Christianity		0.8	0.8		2.0	1.6
	Others		0.0	0.1		0.0	0.0
Urban	Hinduism		98.7	91.7		92.8	96.0
	Islam		0.0	7.9		3.4	3.3
	Christianity		1.3	0.4		3.8	0.2
	Others		0.0	0.0		0.0	0.6
Combined (Rural+Urban)	Hinduism		99.1	98.5		96.0	97.7
	Islam		0.0	0.7		1.7	0.8
	Christianity		0.8	0.8		2.3	1.3
	Others		0.8	0.1		0.0	0.1

Source: Author's calculations from NSS 60th and 71st Round

Table 3.4: Caste Distribution of households in KBK Region and Odisha (in %)

Caste Structure		KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	ST	47.7	47.3	40.2	28.6	26.3	26.7
	SC	14.7	13.1	20.4	16.6	19.4	20.1
	OBC	*	29.7	33.4	*	38	36.2
	Others	37.7	9.9	6.1	54.7	16.4	17.0
Urban	ST	12.3	7.5	9.4	8.6	10.1	10.8
	SC	13.1	28.5	18.7	12.2	18.1	10.9
	OBC	*	26.3	39.8	*	30.6	36.1
	Others	74.7	37.8	32.1	79.1	41.2	42.1
Total (Rural+Urban)	ST	43.1	44.3	37.4	25.9	24.1	23.8
	SC	14.4	14.2	20.2	16.0	19.2	18.5
	OBC	*	29.4	34.0	*	37.0	36.1
	Others	42.5	12.1	8.5	58.0	19.6	21.6

Source: Same as in Table 3.3

Note: * OBC category households are included in 'Others' category in the 52 round

3.3 Socio-economic Profile of KBK Region and Odisha

Table 3.3 and 3.4 demonstrate the religion and caste distribution of the households. Hindu population form the bulk of the masses in the state of Odisha. The proportions of Muslim and Christian households are very small in the state as well as in the KBK region. It is apparent from Table 3.4 that the percentage of SC and ST households (more than 60 percent) is significantly higher in the KBK region compared to the state average. Furthermore, the percentage of SC and ST households are more in the rural areas compared to urban areas. Contrary to this percentage of OBC and other social groups are more in the urban areas.

Table 3.5: Educational Distribution of People in KBK Region and Odisha(in %)

Educational Qualification		KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Illiterate	80.7	67.2	42.8	57.7	53.2	34.1
	Elementary	17.2	28.6	46.6	37.0	39.9	51.1
	Secondary	1.7	2.8	6.0	3.0	4.1	8.2
	Higher Secondary	0.3	0.4	3.1	1.1	1.1	4.0
	Higher Education	0.1	0.6	1.4	1.2	1.5	2.7
Urban	Illiterate	44.4	31.1	14.7	33.0	29.6	21.4
	Elementary	39.5	43.4	51.1	42.8	41.4	41.2
	Secondary	9.5	14.0	12.5	10.5	10.9	13.3
	Higher Secondary	3.2	4.9	6.2	4.9	7.6	10.7
	Higher Education	3.5	6.6	15.5	8.8	10.5	13.4
Combined (Rural+Urban)	Illiterate	76.0	64.4	40.5	54.3	50.4	32.1
	Elementary	20.1	29.7	47.0	37.8	40.1	49.5
	Secondary	2.7	3.6	6.6	4.0	4.9	9.0
	Higher Secondary	0.7	0.8	3.4	1.6	1.9	5.0
	Higher Education	0.5	1.0	2.6	2.2	2.6	4.4

Source: Author's compilations from NSSO 52nd, 60th & 71st Rounds

Table 3.5 depicts the educational status of the people in the KBK region of Odisha. In the present study educational status of the people is classified into five broad categories. Illiterate and literate without formal schooling are considered as illiterate, educational qualification up to below primary, primary and middle school are elementary education, and secondary, higher secondary and higher education are the other three categories. Though the percentage of illiterate persons has decreased over the period from 1995-96 to 2014 in the KBK region, still more than 40 percent people are illiterate. The percentage of illiterate is more in KBK region compared to the state average. The percentage of all other categories of education status is more in the state compared to the KBK region. The percentage of higher secondary

and higher education is very small, i.e., only 2.6 percent in the KBK region compared to 4.4 percent of the state average in the year 2014. However, the percentage of illiterate in urban KBK region is less than the state average and percentage of higher education is marginally higher in the urban KBK compared to the state average particularly in the latest NSSO survey of 2014.

Table 3.6: Occupational Distribution of Households in KBK Region and Odisha (%)

Occupational Distribution		KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Self-employed in non-agriculture	4.5	11.7	14.7	13.7	17.0	16.5
	Agriculture	44.5	27.4	41.8	40.2	28.4	37.9
	Labour	46.0	49.3	33.3	37.4	42.2	28.8
	Regular wage/salaried	4.7	11.5	6.1	8.7	12.3	9.3
	Others			4.0			7.6
Urban	Self-employed in non-agriculture	42.8	40.6	38.1	36.2	32.1	30.9
	Regular wage/salaried	25.4	14.3	29.2	14.4	12.0	13.1
	Labour	24.0	28.0	26.3	41.9	37.3	45.5
	Others	7.8	17.0	6.4	7.5	18.5	10.5
Combined (Rural+ Urban)	Self-employed in non-agriculture	9.5	14.0	16.8	16.8	19.0	19.1
	Agriculture	39.0	25.4	37.9	34.7	24.6	30.9
	Labour	43.3	46.6	33.0	34.3	38.2	25.9
	Regular wage/salaried	3.1	2.1	8.0	5.7	4.9	15.9
	Others	5.1	12.0	4.3	8.5	13.1	8.1

Source: Same as in Table 3.5

In NSSO survey, information on the sources of the household's income during the 365 days preceding the date of survey were sought and within household income single major source of its income from economic activities during last 365 days is considered in order to classify a household in a particular household type. In this study household types are used as an occupational category of the household. Since rural and urban both follow the same occupational classifications hence it can be clubbed together for the combined sample. Agricultural labour and casual labour classes are combined into a single occupational class called labour class. More than 70 percent of the households belong to the labour and agricultural occupational class in the KBK region. This shows the backwardness of the region. The situation is even worse in the rural areas compared to urban areas. The percentage of household in the self-employed in non agriculture and regular wage/salaried class is very less in the KBK region compared to the state average. Interestingly, this trend has been observed in both rural and urban sectors as well as in all the time points during the period from 1995-96 to 2014. There has not been a significant shift in the occupational

structure of the households in the KBK region. Labour work, including casual and agricultural labour followed agricultural activities which continue to be the main sources of livelihood in the KBK region of Odisha. Due to non availability of work the phenomenon of distress migration continues to be heartbreak in the KBK region of Odisha and on an average; nearly 400,000 people migrate annually from the Koraput-Bolangir-Kalahandi (KBK) region (AJSA Report, 2012). Despite decade long implementation of the rural employment scheme, distress migration for labour work continues unabated in the KBK region (The Hindu, 2016).

3.4 Household Monthly Per Capita Consumption Expenditure of KBK Region and Odisha

Consumption expenditure is measured as the expenditure incurred by a household on domestic account during a reference period. It includes the home produced items but excludes the expenditure incurred toward durable items of the households. Monthly per capita expenditure (MPCE) is the household consumer expenditure over a period of 30 days divided by household size. It is generally observed that households are less likely to reveal their income, therefore consumption expenditure or consumer items may be a better proxy for household income. Moreover unlike household income, consumption expenditure is more or less stable in nature. Hence consumption expenditure is used as a measure of standard of living of the household. The researcher have classified the households into five different classes, viz., poorest, poor, middle, rich and richest on the basis of MPCE to represent their standard of living.

Table 3.7 presents the data of monthly per capita consumption expenditure of the households for KBK region and Odisha. Over the period from 1995 to 2014 the average MPCE has increased in KBK region as well as in Odisha. On an average, the MPCE in the KBK region is lower than the state average in all the three rounds during the period 1995-2014. Moreover, the gap in the MPCE in between KBK region and Odisha is increasing in each round of the surveys. The MPCE in urban areas is significantly higher than that of rural areas. Looking across consumption quintiles, it has been seen that there exists a high inequality in the monthly per capita consumption expenditure. The MPCE of the poorest quintile is very low (i.e., Rs. 554) in the latest round (2014) for the state. But as one moves to middle, rich and richest consumption quintile, the MPCE also increases. The MPCE of richest quintile is Rs. 2452 in the year 2014 for Odisha. This inequality in the MPCE is even higher in the KBK region, MPCE of the poorest quintile is Rs. 530 compared to the richest

quintile Rs. 2945 in the year 2014. This is in fact true in all the three rounds of the surveys. One interesting finding is that the richest consumption quintile households in the KBK region enjoyed higher MPCE compared to their counterparts in the State for the combined and urban areas in the year 2014. However, the same was not observed in rural areas and for other (poorest, poor, middle and rich) consumption quintiles.

Table 3.7: Distribution of Monthly-Average-Per-Capita-Consumption-Expenditure (Rs.)

Sector	MPCE Quintile	KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Poorerst	154	183	517	153	185	527
	Poor	199	263	714	199	261	714
	Middle	235	326	873	237	324	869
	Richer	285	406	1105	287	407	1103
	Richest	406	611	1541	409	647	1621
	All Quintile Classes	224	298	810	264	361	960
Urban	Poorerst	214	274	676	212	325	726
	Poor	292	500	1086	293	503	1096
	Middle	360	686	1438	376	675	1516
	Richer	479	954	2117	488	962	2540
	Richest	678	2037	11343	788	1595	5119
	All Quintile Classes	358	727	2578	442	896	2512
Combined (Rural+ Urban)	Poorerst	163	190	530	164	200	554
	Poor	210	279	747	212	287	774
	Middle	251	352	925	256	367	985
	Richer	304	478	1204	318	495	1394
	Richest	458	731	2945	485	806	2452
	All Quintile Classes	257	331	973	311	432	1245

Source: Compiled from NSSO 52nd, 60th and 71st Rounds

3.5 Housing Conditions in the KBK Region of Odisha

House structure can be a significant determinant of transmission of disease or morbidity. In a study Parikh and Lakhmi (2000) found that people living in Kutcha house are more prone to respiratory diseases due to poor ventilation and lower ceiling heights. As per NSSO surveys structure of the houses are classified into five broad categories, viz., pucca, semi-pucca, serviceable kutcha, unserviceable kutcha and no structure. In this study these five categories of house structures are reclassified into 3 categories to make its comparability possible across the three rounds of health surveys. According to NSSO definition, a pucca structure is one whose walls and roofs are made of pucca materials such as cement, concrete, oven burnt bricks, stone, stone blocks, iron, zinc or other metal sheets, timber, tiles, slate, corrugated

iron, asbestos cement sheet, veneer, plywood, artificial wood of synthetic material and poly vinyl chloride (PVC) material (NSSO, 2006). A structure which has walls and roof made of non-pucca materials is regarded as a katcha structure. Table 3.8 depicts the housing conditions of the people in the KBK region and Odisha. In rural areas majority of the people live in kutchha houses and in urban areas, majority of the people live in pucca houses. In KBK region, more than one third of the rural households are living in kutchha houses. Though the housing conditions are improving marginally in KBK region (the percentage of pucca houses increased over the period from 1995 to 2012) still it is very poor compared to the state average both in rural as well as in urban areas.

Table 3.8: Distribution of Housing Conditions in KBK Region and Odisha (in %)

Type of House		KBK Region			Odisha		
		1995-96	2004	2012	1995-96	2004	2012
Rural	Pucca	5.6	15.0	19.0	12.0	20.7	33.3
	Semi Pucca	10.3	40.6	50.0	9.8	27.6	32.3
	Kuchha	84.1	44.5	31.0	78.0	51.7	34.4
Urban	Pucca	34.9	60.0	62.0	54.9	69.5	75.5
	Semi Pucca	23.1	30.9	31.0	18.3	14.4	16.9
	Kuchha	42.0	9.1	7.0	26.8	15.4	7.6
Combined (Rural+Urban)	Pucca	9.4	18.4		17.8	27.1	
	Semi Pucca	12.0	39.8		10.9	25.9	
	Kuchha	78.6	41.8		71.0	46.9	

Note: Information on 'Type of House' was not collected in 71st round of NSSO data

Source: Author's compilations from NSSO 52nd, 60th & 71st Rounds

3.6 Drinking water, Sanitation facilities and Cooking practices

Drinking water and sanitation facilities are the most basic necessities for a decent standard of living of the community. Lack of safe drinking water and proper sanitation facilities are the leading causes of mortality and morbidity especially caused by the water borne diseases like diarrhea, dysentery, typhoid, cholera and malaria etc. (Hinrichsen, et al., 1997). More than 90 percent of diarrhoea and malaria disease burden could be avoided if there is availability of safe drinking water and proper sanitation facilities (UNEP, 1999). In the present study, bottle water, tap and tube well and hand pump water is considered as safe sources of drinking water. Similarly, water collected from tankers, pucca well, tank, pond, river and canal are rated as unsafe water because the quality of water is lower than the desired level which adversely affects the health status. Over the period the safe sources of drinking water has increased in both rural and urban areas of KBK and Odisha. The data in Table 3.9 reveals that more than

90 percent of the households started having safe source of drinking water in both KBK region and Odisha in 2014 and tube well water remains the major drinking water source for majority of the households in both rural and urban areas. The latest health survey has revealed that 9.6 percent households in rural area and 5.7 percent in urban areas have no access to safe source of drinking water in Odisha. However, the scenario is different in KBK region; rural households have advantages compared to its counterparts as far as safe drinking water source is concerned in the KBK region, i.e., 5.9 percent of the households in rural areas and about 10 percent of the households in urban areas have no access to safe source of drinking water.

Table 3.9: Major Sources of Drinking water facilities in KBK Region and Odisha (%)

	Sources of drinking water	KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Safe	67.6	94.6	94.1	52.5	78.7	90.4
	Unsafe	32.4	5.4	5.9	47.5	21.3	9.6
Urban	Safe	79.4	87.7	89.9	77.0	79.9	94.3
	Unsafe	20.6	12.3	10.1	23.0	20.1	5.7
Combined (Rural+Urban)	Safe	69.2	94.1	93.7	55.8	78.9	91.1
	Unsafe	30.8	5.9	6.3	44.1	21.1	8.9

Source: Author's compiled from NSSO 52nd, 60th and 71st Rounds

Table 3.10: Cooking Energy Sources for households in KBK Region and Odisha (%)

	Sources of Energy for Cooking	KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Clean energy fuel		1.9	4.3		2.4	6.3
	Unclean energy fuel		96.3	95.7		96.6	91.7
	No cooking arrangement		1.8	0.0		0.9	0.1
Urban	Clean energy fuel		32.2	61.3		41.2	61.5
	Unclean energy fuel		58.9	38.6		46.0	32.1
	No cooking arrangement		8.9	0.0		12.8	3.0
Combined (Rural+Urban)	Clean energy fuel		4.2	9.5		7.5	16.4
	Unclean energy fuel		93.5	90.5		90.0	80.8
	No cooking arrangement		2.3	0.0		2.5	0.7

Source: Same as in Table 3.9

Note: Clean energy fuel includes electricity, LPG and gobargas

Similarly, sources of fuel for cooking and availability of cooking space in the house can influence the morbidity patterns of the household members. Poor ventilation in the kitchen, along with heat and smoke can lead to chronic cough and chest infections. Use of traditional fuels such as firewood and cow dung may cause respiratory diseases symptoms such as cough, breathlessness, wheezing etc (Parikh and Lakshi, 2000, UNEP, 1999). Generally,

electricity, gobar gas and LPG are treated as clean energy fuel whereas coke, coal, firewood and chips, dung cake, charcoal, kerosene are unclean energy fuel. Table 3.10 presents the information about the sources in which fuel is generally used for cooking purposes. As expected, use of clean cooking fuel became significantly higher in urban areas compared to rural areas in both KBK region and Odisha over time. On an average, more than 90 percent of the households do not use clean sources of energy fuel for cooking in KBK region which is relatively poor when compared with that of the state average. The use of traditional cooking fuel firewood is quite popular in Odisha, particularly in rural KBK region.

Table 3.11: Distribution of Latrine Facilities and Drainage Conditions in KBK Region & Odisha (%)

Sector	Type of Latrine	KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Service	0.3	1.2	2.2	0.7	1.1	0.9
	Pit		1.0	5.8		2.3	8.9
	Septic tank /flush system	0.6	3.7	1.8	1.8	3.7	8.6
	No latrine/open defecation	99.1	94.1	90.1	96.7	92.3	81.4
	Others	0.1	0.0	0.0	0.6	0.6	0.3
Urban	Service	9.7	1.5	2.4	5.7	1.5	2.3
	Pit		13.1	31.9		6.4	12.9
	Septic tank/flush system	33.6	51.6	45.2	44.5	59.3	64.3
	No latrine/open defecation	54.5	32.7	20.5	45.1	31.3	20.1
	Others	2.2	1.0	0.0	4.7	1.3	0.4
Combined (Rural+Urban)	Service	1.5	1.2	2.2	1.4	1.2	1.2
	Pit		1.9	8.2		2.8	9.6
	Septic tank/flush system	4.9	7.3	5.8	7.6	11.0	18.8
	No latrine/open defecation	93.2	89.4	83.7	89.7	84.3	70.1
	Others	0.4	0.1	0.0	1.2	0.7	0.3

Source: Compiled from NSSO data of 52nd, 60th & 71st Rounds

Table 3.12: Distribution of Drainage Conditions in KBK Region and Odisha (in %)

Sector	Drainage Conditions	KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Rural	Open	0.9	5.4	9.0	9.0	4.2	7.1
	Covered	0.0	0.4	0.2	0.3	1.3	1.3
	No Drainage	99.1	94.1	90.9	90.6	94.4	91.6
Urban	Open	34.9	46.4	41.7	32.3	38.0	35.9
	Covered	4.5	10.6	30.7	15.6	24.1	28.6
	No Drainage	60.6	42.9	27.6	52.1	37.7	35.5
Combined (Rural+Urban)	Open	5.4	8.6	12.0	12.2	8.7	12.4
	Covered	0.6	1.2	3.0	2.4	4.3	6.3
	No Drainage	94.0	90.2	85.0	85.4	87.0	81.3

Source: Same as in Table 3.11

The use and availability of proper toilet facilities is also important for a healthy life. Table 3.11 indicates that there has been no significant improvement in the availability and use of proper toilet facilities in Odisha and KBK region over the period stretching from 1995 to 2014. As expected, the percentage of households without any toilet facilities is much higher in the rural areas compared to the urban areas. About 70 percent of the households reported the absence of toilet facilities at the home premises in Odisha; the condition is more pathetic in KBK region, .i.e., almost 84 percent of the households using open spaces for defecation. Regarding drainage conditions, the data in Table 3.12 reveals that there is no significant changes in the drainage conditions during the period from 1995 to 2014 as far as the rural areas are concerned. About 85 percent and 81 percent households reported the absence of any drainage at their house premises in the KBK region and Odisha respectively. Covered drainage is considered to be safe from the point of view of disease or illness; however the proportion of households with covered drainage system is negligible.

3.7 State of Health and Health Care in KBK Region and Odisha

Odisha is one of the major States located in the eastern region of the country. The state of Odisha was formed on 1 April 1936 and it had 6 districts at that time. Odisha is the 8th largest state of the country in terms of its area with a landmass of 1, 55,707 sq. km which accounts for 4.74 percent of India's total landmass. Its population of 42 million (census, 2011) makes it the eleventh most populous state of India (Economic survey, 2017-18). Odisha reported an annual average growth rate of 7.14 percent as against the national average of 6.5 percent for India. During the fiscal year 2011 to 2017, the economy of Odisha expanded by 53 percent and its real per capita income by 42 percent to an estimated level Rs. 92,727 (as against Rs.126,349 at the national level) in 2017-18 (Economic Survey, 2017-18). Despite an impressive growth rate, in the last couple of years, economically Odisha continues to remain one of the least developed states in the country. Poverty levels remain high in the state. Almost 32.59 percent people in 2011-12 (Economic survey, 2017-18), living below poverty line and thus Odisha remains mainly an agrarian state. Agriculture and allied sectors have provided employment, directly or indirectly, to more than 60 percent of the state's work force. In social sectors also its performance is not quite impressive in terms of education, health, drinking water, sanitation as well as development of the marginalised groups and backward regions. In terms of health indicators, Odisha is lagging behind the national average as well as some of its neighbouring states like Andhra Pradesh, West Bengal,

Telangana, Tamil Nadu, and Karnataka perhaps due to poor health services in the state (Sample Registration System, 2016).

3.8 Health Infrastructure in Odisha and Other Major States of India

Table 3.13 depicts the health infrastructure of Odisha in relation to the major states of India during the period of 10 years, i.e., 2005-2015. There is no crystal clear cut pattern in the growth of Sub-centre, Primary Health Centre (PHC) and Community Health Centre (CHC) across developed and less developed states. However, the growth in the Sub-centre, PHC and CHC has been observed to be maintaining a positive trend during the 10 years period for most the states. Compared to other major states of India, the figures for Odisha is not so impressive. The growth rates in sub centre, PHC and CHC are 12.84 percent, 1.79 percent and 63.20 percent respectively for the state of Odisha. Moreover, the growth rate for some of the states showed a negative trend during the period 2005 to 2015. This is due to the fact that some of the sub centres were changed to PHCs and PHCs into CHCs during these periods.

Table 3.13: Health Infrastructure in Odisha and other few States of India

No. of sub-centres, Public Health Centres (PHCs) & Community Health Centres (CHCs)

States	Sub-Centre			PHCs			CHCs		
	2005	2015	(Growth 2005-15)	2005	2015	(Growth 2005-15)	2005	2015	(Growth 2005-15)
Andhra Pradesh	12522	7659	-38.8	1570	1069	-31.9	164	179	9.1
Assam	5109	4621	-9.6	610	1014	66.2	100	151	51.0
Bihar	10337	9729	-5.9	1648	1883	14.3	101	70	-30.7
Gujarat	7274	8063	10.8	1070	1247	16.5	272	320	17.6
Haryana	2433	2569	5.6	408	461	13.0	72	109	51.4
Karnataka	8143	9264	13.8	1681	2353	40.0	254	206	-18.9
Kerala	5094	4575	-10.2	911	827	-9.2	106	222	109.4
Madhya Pradesh	8874	9192	3.6	1192	1171	-1.8	229	334	45.9
Maharashtra	10453	10580	1.2	1780	1811	1.7	382	360	-5.8
Odisha	5927	6688	12.8	1282	1305	1.8	231	377	63.2
Punjab	2858	2951	3.3	484	427	-11.8	116	150	29.3
Rajasthan	10512	14407	37.1	1713	2083	21.6	326	568	74.2
Tamil Nadu	8682	8706	0.3	1380	1372	-0.6	35	385	1000.0
Uttar Pradesh	20521	20521	0.0	3660	3497	-4.5	386	773	100.3
West Bengal	10356	10357	0.0	1173	909	-22.5	95	347	265.3
All India	146026	153655	5.2	23236	25308	8.9	3346	5396	61.3

Source: Rural Health Statistics Bulletin (2015), Government of India

Table 3.14: District-wise Selected Health Indicators in Odisha (year 2011-12 to 2012-13)

Districts		2012-13			2011-12			2011
		Infant-mortality rate	Crude-death rate	Crude-birth rate	Neo-natal mortality rate	natal mortality rate	five-mortality rate	Maternal death
KBK Region	Kalahandi	54	6.7	19.9	30	25	75	0
	Nuapada	49	7.4	22.2	31	21	74	18
	Balangir	97	9.9	20.7	34	18	61	21
	Sonepur	49	7.5	20.6	35	17	81	1
	Koraput	48	7.8	24.8	34	18	69	22
	Malkangiri	48	7.1	24.3	33	20	77	0
	Nabarangpur	50	7.7	24.3	29	21	85	18
	Rayagada	58	8.4	22.5	30	31	103	15
Non-KBK Region	Anugul	48	7.1	17.5	32	16	58	0
	Baleswar	45	6.7	18.6	34	13	53	21
	Bargarh	60	9.8	17.4	48	14	72	10
	Baudh	57	10.3	29.1	72	26	110	0
	Bhadrak	48	7.9	20.2	46	14	88	0
	Cuttack	56	6.8	19.4	38	23	88	32
	Debagarh	60	8.8	18.4	45	17	78	2
	Dhenkanal	67	10.5	20.6	47	22	80	7
	Gajapati	56	7.5	19.9	30	31	82	3
	Ganjam	56	8.3	18.9	37	22	90	5
	Jagatsinghpur	48	7.0	17.6	30	23	64	1
	Jajpur	48	7.6	17.8	37	13	59	3
	Jharsuguda	42	8.0	16.9	37	10	55	4
	Kandhamal	82	9.0	21.1	41	45	142	13
	Kendrapara	58	8.8	18.3	44	16	66	1
	Kendujhar	53	9.2	20.4	43	15	81	3
	Khordha	67	8.2	18.7	45	27	100	1
	Mayurbhanj	47	8.5	19.7	38	13	73	9
	Nayagarh	60	8.9	20.3	38	27	83	5
	Puri	75	8.7	17.3	42	37	105	0
	Sambalpur	47	9.1	18.6	32	20	67	46
	Sundargarh	47	7.2	17.8	34	15	58	29
All	Odisha	56	8.1	19.6	39	21	79	290

Source: Compiled from Annual Health Survey (2013), Govt. of India

3.9 Selected Health Indicators in the State and KBK Region of Odisha

Table 3.14 shows district-wise selected health indicators in the state. The infant mortality rate is highest (97) in Balangir district of Odisha. Except Balangir and Rayagada district, in most of the districts of KBK region, the infant mortality rate and crude death rate are marginally below the state average. However, the crude birth rate and post-natal mortality rate are significantly high in all the KBK districts compared to the state average.

Table 3.15: District-wise HDI, GDI and IDI in Odisha

Districts	HDI		GDI		IDI	
	Value	Rank	Value	Rank	Value	Rank
Anugul	0.663	6	0.637	4	90.68	18
Balangir	0.546	21	0.518	16	100.24	15
Baleshwar (Balasore)	0.559	18	0.519	14	118.46	8
Bargarh	0.565	17	0.528	13	114.01	11
Baudh	0.536	23	0.509	19	86.34	21
Bhadrak	0.646	8	0.497	21	119.8	5
Cuttack	0.695	3	0.618	7	134.87	4
Debagarh (Deogarh)	0.669	5	0.647	3	86.55	20
Dhenkanal	0.591	12	0.531	12	96.88	16
Gajapati	0.431	28	0.401	27	89.45	19
Ganjam	0.551	20	0.518	15	119.15	6
Jagatsinghapur	0.557	19	0.491	22	140.4	3
Jajapur	0.54	22	0.386	28	114.19	10
Jharsuguda	0.772	2	0.687	1	109.59	12
Kalahandi	0.606	11	0.579	8	79.75	25
Kandhamal	0.389	29	0.372	29	73.28	29
Kendrapara	0.626	10	0.516	18	105.52	13
Kendujhar (Keonjhar)	0.53	24	0.504	20	82.09	24
Khordha	0.736	1	0.632	5	160.04	1
Koraput	0.431	27	0.415	26	95.93	17
Malkangiri	0.37	30	0.362	30	75.65	27
Mayurbhanj	0.639	9	0.621	6	86.31	22
Nabarangapur	0.436	26	0.422	25	66.06	30
Nayagarh	0.571	15	0.452	23	77.36	26
Nuapada	0.581	14	0.561	9	75.39	28
Puri	0.657	7	0.516	17	154.04	2
Rayagada	0.443	25	0.428	24	84.37	23
Sambalpur	0.589	13	0.56	10	119.01	7
Sonepur	0.566	16	0.543	11	115.82	9
Sundargarh	0.683	4	0.659	2	104.17	14
Odisha	0.579		0.546		100	

Source: Compiled from Economic Survey Odisha, 2017-18, Govt. of Odisha

Notes: HDI: Human development index, GDI: Gender development index and
IDI: Infrastructure development index (Rank 1 is the best)

The human development index (HDI) is a summary of index which shows overall human development in a region. It brings together two aspects - economic progress and social development. Human Development Index (HDI) is an average of: (i) health index that is generally based on the life expectancy at birth, (ii) education index (a weighted average of the

adult literacy rate - $2/3^{\text{rd}}$ weight and combined gross enrolment rate (GER) index - $1/3^{\text{rd}}$ weight) and (iii) income index based on per capita income. Similarly, Gender Development Index (GDI) is calculated by using female life expectancy, female adult literacy and gross enrolment ratio and female per capita income as a measure of overall gender related disparity. Infrastructure development index (IDI) is a composite index which includes transport, energy, irrigation, banking, communication, education, health. Table 3.15 demonstrates that the HDI in all the eight KBK districts are: Balangir (21), Kalahandi (11), Koraput (27), Malkangiri (30), Nawarangpur (26), Nuapada (14), Rayagada (25) and Sonepur (16). This is among the 30 districts in the state which indicates that most of the districts in the KBK region stand towards the tail end in terms of HDI in the state. Similarly, the performance of KBK districts in terms of GDI and IDI are very poor compared to other Non-KBK districts of the state.

3.10 Delivery of Health Care System in Odisha

Like the case of India as a whole and some other states individually, health care system of Odisha is characterised by a combination of both public and private health care system. In public sector, health care system has a three tier structure, i.e., primary, secondary and tertiary health care. All the states in India including Odisha, primary health care is the first level of contact between individuals and households with the health care system. According to Alma Atta Declaration of 1978, primary health care addresses the main health problems in the community through promotive, preventive, curative and rehabilitative services. It includes a wide range of provisions such as promotion of food supply and proper nutrition, education concerning prevailing health problems and the methods of preventing and controlling them, an adequate supply of safe drinking water and basic sanitation, maternal and child care including family planning, immunization against major infectious diseases, prevention and control of locally endemic diseases, appropriate treatment of common diseases and injuries etc. In India, primary health care is provided through a network of sub centres and primary health centres (PHCs) in rural areas and it is provided through health posts and family welfare centres in urban areas. Sub Centre is the most peripheral and first contact point between rural community and health care system. One sub centre caters to the health needs of 5000 population in plain area and 3000 population in hilly, tribal and backward areas. It consists of one female health worker (Auxiliary Nurse Midwife), one male health worker

(Multipurpose worker) and voluntary worker to help the auxiliary nurse midwife. One PHC is manned by one medical officer and 14 paramedical and other staffs. PHC is the first level of

Table 3.16: District-wise Health Infrastructure in Odisha (number as on 2016)

Districts	Government Sector							Private Sector		Govt. and Private	
	Total Hospital	CHC	PHC	MHU	Medical Inst.	Health centre	No. of beds	Medical Inst.	No. of beds	Total Med. Inst.	Total No. of beds
Anugul	4	10	31	1	46	166	472	55	304	101	776
Balangir	3	16	68	2	89	275	636	48	345	137	981
Baleswar	2	14	46	5	67	204	249	52	350	119	599
Bargarh	4	7	50	1	62	178	409	24	437	86	846
Baudh	5	15	42	15	77	226	444	113	213	190	657
Bhadrak	1	5	12	2	20	67	167	3	6	23	173
Cuttack	13	18	57	0	88	332	2440	375	3357	463	5797
Debagarh	2	4	7	1	14	42	118	0	0	14	118
Dhenkanal	7	10	32	5	54	167	385	26	238	80	623
Gajapati	2	8	20	8	38	136	259	9	164	47	423
Ganjam	5	30	89	0	124	460	1722	107	1073	231	2795
Jagatsinghpur	1	9	37	1	48	189	268	33	138	81	406
Jajpur	4	12	56	1	73	260	482	30	181	103	663
Jharsuguda	2	6	15	1	24	66	182	20	266	44	448
Kalahandi	4	16	43	19	82	242	525	149	232	231	757
Kandhamal	6	14	36	17	73	172	494	16	80	89	574
Kendrapara	2	9	45	0	56	227	268	15	100	71	368
Kendujhar	9	17	61	12	99	351	533	35	153	134	686
Khordha	21	13	46	1	81	202	965	254	5415	335	6380
Koraput	2	16	48	15	81	307	354	49	46	130	400
Malkangiri	4	8	25	10	47	158	286	15	0	62	286
Mayurbhanj	8	28	82	20	138	589	852	30	185	168	1037
Nabarangpur	2	11	39	11	63	289	236	16	70	79	306
Nayagarh	1	12	37	1	51	166	489	28	165	79	654
Nuapada	1	6	17	7	31	95	180	10	134	41	314
Puri	6	16	45	1	68	241	684	58	243	126	927
Rayagada	4	11	36	17	68	235	293	19	284	87	577
Sambalpur	4	11	31	4	50	167	1349	79	589	129	1938
Sonepur	4	5	18	7	34	89	161	18	21	52	182
Sundargarh	8	20	56	14	98	390	635	85	1188	183	1823
Odisha	141	377	1227	199	1944	6688	16537	1771	15977	3715	32514

Source: Compiled from Odisha Economic Survey, 2017-18, Govt. of Odisha

Notes: CHC: Community Health Centre, PHC: Primary Health Centre, MHU: Mobile Health Units

contact between rural community and medical officers. It provides preventive, curative and promotive services to the rural population. One PHC serves a population of 30000 in plain area and 20000 in hilly, tribal and backward areas. Moreover it possesses 4-6 beds for

patients and acts as referral unit for 6 sub centres. At the secondary level, it has community health centre (CHCs) at block levels and districts headquarter hospital in urban areas. One community centre serves 120000 and 80000 population plain and hilly areas respectively. Patients from sub centres and PHCs are referred to these institutions. In tertiary health care specialised health services are provided usually on referral from primary and secondary health care. Medical colleges, advanced medical research institutes and speciality and super speciality hospitals with advanced diagnostics support services and specialised medical personnel etc. are part of tertiary health care. In Odisha, health care is also delivered through the private sector. Generally traditional system of health care consisting of Ayurveda, Homeopathy, Siddha, Naturopathy and Yoga have been largely dominated by the private practitioners and private financing, although allopathic system of health care is also provided by the private providers. These private providers provide these services through a network of private hospitals, nursing homes, hospital run by NGOs and Trusts and village traditional healers. In addition, most of the doctors and health providers working in and retired from the public health care system and all those qualified allopathic who are in and out of employment in other sectors are based in the private health sector in the state. Now-a-days the patients in the state are showing a strong preference for the private health care system particularly for ambulatory and curative cares.

It has been mentioned above that the health care is provided through a network of both private and public sector. Table 3.16 shows the available medical institutions at the district level. Each district has at least one district medical hospital in the state. There are 7 government medical college hospitals, one each in the district of Cuttack, Sambalpur, Ganjam, Balasore, Koraput, Mayurbhanj and Balangir with a total of 1050 seats in the state¹. Health Infrastructure in the KBK districts is dismally low. There are only 2 medical colleges, 24 medical hospitals, 89 CHCs, 294 PHCs, 1690 Sub-centres and 2671 hospital beds (compared to total 7 medical college hospitals, 141 medical hospitals, 377 CHCs, 1227 PHCs, 6688 Sub-centres and 16537 hospital beds in the State). A similar situation is observed in private sector, there are 324 medical institutions with 1132 beds in the KBK region. In addition, 1,771 private sector medical institutions with 15,977 beds were functioning in the state as on 2015-16. Thus 3,715 allopathic medical institutions provided medical care in Odisha with 32,514 hospital beds. There are 6,688 sub-health centres in the public sector.

¹ In private sector, there are four medical college hospitals in Odisha such as Hi-Tech Medical College and Hospitals, Kalinga Institute of Medical Sciences and ISM & SUM hospital in Bhubaneswar and Hi-Tech Medical College in Rourkela.

3.11 System Load in Government Health Care Facilities

The system load in government health care facilities can be judged from bed turnover rate and bed occupancy rate. Bed turnover is the ratio of total inpatient discharged and number of beds, i.e., number of times there is a change of occupant for a bed in a year. There are 9.75 doctors per lakh population and less than 4 beds per 10000 population (see Table 3.17). It is observed from the table that the bed occupancy and bed turnover rate both are increasing during the period of 2005-06 to 2012-13. In the year 2012-13 inpatient and outpatient were 8.28 percent and 60.37 percent respectively of the total population. The bed turns over and bed occupant rates were 213.54 and 117 respectively in the same year.

Table 3.17: Work-loads in Government Hospitals of Odisha

Year	Doctors per lakh population	Beds per 10,000 population	Inpatient to total population	Outpatient to total population	Total patient to total population	Bed turnover rate	Bed occupant rate
2005-06	12.88	3.96	6.61	64.20	70.82	166.90	91.40
2006-07	12.71	3.91	6.59	64.01	70.61	168.60	92.40
2007-08	12.55	3.86	6.55	55.00	61.56	169.80	93.00
2008-09	12.39	3.81	7.30	58.04	65.34	191.50	104.93
2009-10	10.56	3.76	8.78	60.62	67.41	233.39	127.84
2010-11	8.24	3.71	9.45	64.42	73.88	254.26	139.32
2011-12	10.31	3.92	10.22	65.79	76.02	260.48	142.73
2012-13	9.75	3.87	8.28	60.37	68.65	213.54	117.01

Source: Compiled from Economic Survey of Odisha, 2017-18, Govt. of Odisha

3.12 Alternative System of Medicine (AYUSH) in Odisha

Many people of Odisha are observed preferring Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy (AYUSH) as the system of treatment for their indigenous, economical and gentler therapies for cure of diseases and improving quality of life (Economic Survey, 2017-18). Before the existence of allopathic hospitals in the late nineteenth century, people generally had either no access or were reluctant to accept modern medical systems due to various reasons (like educational backwardness, blind beliefs regarding infectious diseases, witchcraft and sorcery etc.). Ayurveda played a vital role in systematic treatment at that time. Hospitals and dispensaries were doing primarily curative works using modern medicines and hospitals were under the district boards. The growth of modern medical institutions in a more widespread manner and the increasing faith of the

people on modern systems happened insidiously after independence. The state patronage for modern medicine of ayurveda and homeopathy continued post 1947 (Gupta, 2002).

Table 3.18: Government A.Y.U.S.H. Medical Institutions & Services in Odisha

Year	Types of Inst.	Hospitals (No.)	Dispenseries (No.)	Doctors (No.)	Beds (No.)	Patient treated (Lakh Population)
2004	Homeopathic	4	533	494	125	79.9
	Ayurvedic	5	607	611	203	63.1
	Unani		9	8		0.93
2005	Homeopathic	4	560	512	125	82.8
	Ayurvedic	5	607	584	258	68.6
	Unani		9	8		1.04
2006	Homeopathic	4	560	494	125	79.2
	Ayurvedic	5	619	584	258	74.5
	Unani		9	9		1.07
2007	Homeopathic	4	560	468	125	78.7
	Ayurvedic	5	619	563	418	73.4
	Unani		9	7		1.09
2008	Homeopathic	4	560	488	125	75.71
	Ayurvedic	5	619	558	418	72.35
	Unani		9	6		1.13
2009	Homeopathic	4	560	475	125	82.7
	Ayurvedic	5	619	603	418	69.07
	Unani	0	9	6		1.02
2010	Homeopathic	4	561	475	125	71.56
	Ayurvedic	5	619	603	468	65.99
	Unani		9	6	0	1.15
2011	Homeopathic	4	561	401	125	56.34
	Ayurvedic	5	619	577	468	58.98
	Unani		9	5	0	0.8
2012	Homeopathic	4	561	338	125	48.53
	Ayurvedic	5	619	497	468	55.39
	Unani		9	5	0	0.77
2013	Homeopathic	4	561	319	125	44.94
	Ayurvedic	5	619	483	468	56.58
	Unani		9	5	0	0.62
2014	Homeopathic	4	561	304	125	44.96
	Ayurvedic	5	619	483	468	54.04
	Unani		9	4	0	0.63
2015	Homeopathic	4	561	304	125	41.72
	Ayurvedic	5	619	483	468	51.99
	Unani		9	4	0	5.01

Source: Compiled from Odisha Economic Survey, 2017-18, Govt. of Odisha

Apart from government and private allopathic systems, health care facilities in Odisha are also provided under the Alternative System of Medicine and Homeopathy. Data presented in Table 3.18 shows that by the end of 2015, 483 registered Ayurvedic doctors, 304 registered Homeopathic doctors, 5 Ayurvedic hospitals with 468 beds and 4 Homeopathic hospitals with 125 beds provide health services in the state. Besides 619 Ayurvedic, 561 Homeopathic and 9 Unani dispensaries provide primary health care services. During 2004, about 80 lakh patients availed treatment from Homeopathic, 63 lakh availed treatment from Ayurvedic and almost 1 lakh availed treatment from Unani facilities in these hospitals and dispensaries. The Table 3.18 shows the trend of government Ayurvedic and Homeopathic and Unani infrastructural facilities in Odisha for the period from 2004 to 2015. Though there are no significant changes in the hospitals, dispensaries and bed conditions in the government ayurvedic and homeopathic medical institutions during the period 2004 to 2015. However, the number of patients treated in these systems of medicine in total has declined drastically from 144 lakhs population in 2004 to 99 lakhs in 2015. Similarly, the number of registered doctors in total has declined from 1113 in 2004 to 791 in 2015 in this system of medicine in case of Odisha. These declining trends indicate that there is strong preference of the patients as well as health care providers towards the allopathic system.

3.13 Per Capita Public Health Expenditure in Odisha

Health being a state subject, it is the prime responsibility of the government to provide equitable and accessible health care to the people. The health situation of any country is influenced by both demand and supply factors. In supply side, the nature and pattern of public expenditure on health care not only determine the effectiveness of services delivery but also define the boundaries and capability of the system to achieve the stated goals. Since health status is determined by factors like medical care, socioeconomic status, lifestyle factors, environmental factors and technology etc., it is difficult to define health status and even it is more difficult to define the boundary of public health expenditure. However, health expenditure includes three major heads, i.e., medical and public health, family welfare and water supply and sanitation. Medical and public health mainly include curative and clinical services in hospitals, medical education and government support for ESIS, disease control programmes, services of non-allopathic system of medicine and some of the expenditure on rural primary health care services etc. The family welfare head includes family planning with maternal and child care. Water supply and sanitation head is primarily rural water supply and

sanitation and hygienic programmes. The relationships between public health expenditure and health indicators are well established. The Table depicts the trends and patterns of per capita public health expenditure over the period from 1991 to 2014. The per capita revenue expenditure on health care over the period from 1991 to 2014 shows an increasing trend and in absolute terms, it is higher than the per capita expenditure on capital heads of health care during the same period. Furthermore, the annual compound growth rate of per capita expenditure on capital heads of health care is almost double compared to per capita revenue expenditure on health care.² The per capita expenditure on health care has increased from Rs. 200 during 1991-2002 to Rs. 312 during 2003 to 2014 with an annual compound growth rate of 3.74 percent. However, the per capita health expenditure as a percent of per capita state gross domestic product has declined over the period from 1991 to 2014.

² Capital expenditure includes expenditure on building capital assets, renovations and expansion of buildings, purchasing vehicles, machines, equipment, medical/AYUSH/paramedical, education, research and development, training (except on job trainings), major repair works etc. (National Health Accounts, 2014-15)

Table 3.19: Per Capita Public Health Expenditure in Odisha during 1991-2014 (Rs.)

Year	PCREH	PCCEH	PC Plan Exp.	PC Non-Plan Exp.	PCHE	PCHE as % PCGSDP
1991	161.69	23.55	90.12	95.12	185.24	1.80
1992	172.27	13.35	82.98	102.64	185.62	1.85
1993	156.19	18.84	87.69	87.34	175.03	1.56
1994	158.53	26.10	97.46	87.16	184.62	1.59
1995	162.19	14.78	82.72	73.98	156.71	1.30
1996	164.49	20.29	93.63	91.15	184.78	1.64
1997	173.27	21.64	104.39	90.52	194.91	1.55
1998	221.88	15.06	113.17	123.77	236.94	1.86
1999	221.12	9.34	100.90	129.57	230.47	1.57
2000	197.20	26.52	107.24	116.48	223.71	1.57
2001	192.48	32.98	110.22	115.24	225.46	1.50
2002	196.96	24.64	87.79	133.80	221.60	1.50
1991-2002	181.52	20.59	96.53	103.90	200.42	1.61
2003	184.66	24.24	84.06	124.84	208.89	1.24
2004	224.78	13.21	113.42	124.57	237.99	1.17
2005	191.58	21.71	73.42	139.87	213.29	1.00
2006	195.07	37.39	89.50	142.96	232.46	0.98
2007	218.83	93.40	181.64	130.59	312.23	1.19
2008	224.30	136.95	205.76	155.48	361.24	1.29
2009	265.17	63.73	149.67	179.23	328.89	1.14
2010	275.46	14.34	105.10	184.70	289.80	0.94
2011	273.30	18.03	110.67	180.67	291.33	0.91
2012	298.04	34.15	146.05	186.14	332.18	1.01
2013	307.66	85.92	189.85	203.73	393.58	1.19
2014	437.52	108.50	330.49	215.54	546.02	1.54
2003-14	258.03	54.30	148.30	164.03	312.33	1.13
Mean	219.78	37.44	122.41	133.96	256.37	1.37
ACGR	3.21	6.10	3.44	4.02	3.74	

Source: Compiled from Various Issues of RBI Handbook of State Government Finance and Socio-economic Statistics, CSO, GoI

Note: ACGR- Annual compound growth rate

3.14 Summary

Chapter 3 has provided the demographic, socio-economic and health profiles of KBK region and Odisha. More than 60 percent of the population was in the age group of 15-59 in the KBK region of Odisha during the period, 1995-96 to 2014. This implies that a larger proportion of people are capable of working and earning income. Moreover, the percentage of urban people in this age group is more compared to the rural areas. The sex ratio in the

KBK region has decreased from 1028 in 1995-96 to 905 in 2014. Interestingly, the sex ratio in the rural areas is more compared to that of the urban areas except for the year 2014. Though the percentage of illiterate persons has decreased over the period of 1995-96 to 2014 in the KBK region, still more than 40 percent people are illiterate. Moreover, the percentage of illiterate is more in KBK region compared to the state average. More than 70 percent of the households belong to the category of labour and agricultural occupational class in the study. It has been found that the MPCE in the KBK region is lower than the state average in all the three rounds during 1995-2014. Moreover, the gap in the MPCE in between KBK region and Odisha is increasing during each round of the surveys. The chapter further reveals that MPCE in urban areas is significantly higher than rural areas. Moreover, there exists a high inequality in the monthly per capita consumption expenditure. Most of the districts in the KBK region stand at the tail end in terms of HDI in the state. Similarly, the performance of KBK districts in terms of GDI and IDI is alarmingly poor compared to other Non-KBK districts of the state.

Chapter 4

Morbidity Patterns and Curative Health Seeking Behaviour of Households

4.1 Introduction

The previous chapter described the demographic, socio-economic and health profile of the State and KBK region of Odisha in general. The present chapter examines the morbidity patterns, utilisation and choice of health care providers for KBK region in Odisha by using NSSO data. Broadly, the present chapter has two parts: first part discusses the morbidity patterns and second part explains the health care utilisation behaviour of the people of the study area.

As stated earlier, one of the most important parameters of development of a country is progressive improvement in health status of its population. Better health is a constituent part of human welfare and a factor of production. Better health increases labour productivity, thereby enhances the wealth and welfare of life. As an intrinsic element of well being, health is a good summary indicator of human development (Sen, A, 1995). Health is a multi-dimensional concept and there is no common consensus on how to summarize health in a precise manner. Hence wide range of proxy indicators such as life expectancy at birth, mortality, morbidity, anthropometric measure, nutritional status index etc. are used to measure health. Among these, life expectancy, mortality and morbidity are two important components generally used to capture population health. While the mortality measures are simplest ones and widely accepted health status at the community level, the morbidity measures are used to measure individual level health status. With the increase in awareness level, life style behaviour, food pattern and advancement of medical technology the life expectancy and mortality indicators like crude death rate, infant mortality, child mortality, maternal mortality etc. have improved significantly in many countries. In developing countries also the level of mortality is marked by high levels of child, female and maternal mortality. Therefore, the declines of mortality accompanied by an improvement in life expectancy have changed the focus toward morbidity indicators in order to reflect the population health. Moreover the mortality indicators are terminal event and do not always reflect the extent or severity of the burden of a particular disease and hence only captures one part of the burden of illness. Besides, people who suffer from disease like diarrhea, jaundice cause substantial burden of morbidity but little mortality.

Therefore, morbidity pattern provides a more realistic picture of health status of the population than only the mortality pattern. Though the measurement of morbidity is a difficult task, as pointed out by Murray and Chen (1993) morbidity is captured in two ways; (1) Self perceived morbidity and (2) Observed morbidity. Self perceived morbidity is subjective in nature and critically depends on the person's knowledge, perception of diseases and willingness and time to report to the interviewers. It is based on information about the incidence or prevalence rate, type of illness, functional disability and use of medical services. Similarly, the observed morbidity based on medical model of illness and independently assessed by medical professionals using specific methods and renders a certain degree of consistency. There is considerable debate among researchers regarding the measures of morbidity. Self reported morbidity has severe limitations and can be misleading conclusions and it is highly affected by person's knowledge and perception of the diseases (Sen, A, 2002). Observed morbidity is more useful in observing those diseases which are never felt in terms of pain and suffering and thus under reported like anemia, hypertension, disease of malnutrition (Gumber and Berman, 1995). Other researchers supported the measure of self reported morbidity (Visaria and Gumber, 1994; Duggal and Amin, 1989; George et al. 1994). Furthermore, morbidity or diseases also vary across space and time, what might have been declared by medical trainers healthy in the past may no longer remain healthy today because of advancement of technology.

Though the observed morbidity is more relevant, it is seldom used in practice because of resource constraints involved in collecting the data. In a study Belcher et al. (1976) estimated that the medical examination survey turned out to be eight times costlier than self reporting survey. Most of the large scale morbidity surveys depend on self perceived morbidity method. The functional consequences of disease like illness leading to bed ridden days, work or school days or normal activities loss etc. would yield more accurate measure of morbidity (Strauss and Thomas, 1998). Though NSSO survey mainly based on self perceived morbidity method, it also includes clinically observed morbidity, i.e., the patients who are diagnosed by a doctor for a particular ailment or illness during the reference period are taken into account. The patients who utilise health care know about the ailment as it has been diagnosed by a doctor. Although self reported morbidity is highly affected by level of educational attainment, standard of living, caste, religion, media exposure of the respondent, it gives an important insights into the health status of the population. Hence an attempt has

been made to present a detailed morbidity pattern for KBK region of Odisha by using NSSO 52nd, 60th and 71st round data.

The percentage of ailing people and hospitalisation is presented in Table 4.1. The percentage of people who suffered from any illness during the reference period of 15 days from the date of survey was 9.5, 6.5 and 9.6 percent of the total population in the year 1995-96, 2004 and 2014 respectively in the KBK region. However, the percentage of hospitalisation has increased from 0.9 percent to 4.6 percent of the total population during the period 1995-96 to 2014 in the KBK region. Despite putting up a very poor performance of the KBK region in terms of various health output indicators such as IMR, CMR, MMR and composite index like HDI and health input indicators, the percentage of people who suffered illness and hospitalisation in the KBK region is less compared to the state average and thus seem to be showing contradictory results. This can be possible in a socially and educationally backward KBK region, as already discussed above that morbidity reporting is highly influenced by education and person's knowledge regarding the diseases. Table 4.2 shows a profile of major diseases prevalent in the KBK region and Odisha. The diseases such as malaria, diarrhoea and dysentery, fever of short duration, other diagnosed and non diagnosed ailments and gynaecological disorders and complication in pregnancy and child birth constitute a major share in the total disease profile in KBK region and Odisha. India accounted for 80 percent of reported cases and 60 percent of malaria death of the world in the year 2016 (WHO, 2017). Odisha happens to be the highest endemic state of India, carrying more than 40 percent of malaria burden in the country. Hence, malaria continues to be a vexing issue for the state and it is more prevalent in the KBK region compared to the state average. The diarrhoea and dysentery are yet another disease that continued to be a problem for the state and mostly for KBK people, because of poor hygienic facilities like water supply and sanitation facilities in the region.

Table 4.1: Percentage of Ailments & Hospitalisation in KBK Region & Odisha

Ailments	KBK Region			Odisha		
	1995-96	2004	2014	1995-96	2004	2014
Percentage of Ailments case (15 days)	9.5	6.2	9.6	8.5	10.8	10.5
Percentage of Hospitalisation (365 days)	0.9	1.9	4.6	1.3	2.3	4.4

Source: Author's own compilations from NSSO data, 52nd, 60th & 71st Rounds

Table 4.2 Some Selected Ailments in KBK Region and Odisha, 1995 -2014

Different Diseases/Ailments Case	Hospitalised Ailments (%)						Non-hospitalised Ailments (%)					
	KBK Region			Odisha			KBK Region			Odisha		
	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Diarrhoea and Dysentary	15.4	9.8	6.7	14.6	9.9	6.3	5.6	4.8	8.2	6.2	8.0	5.7
Fever of Short Duration*	26.6	-	-	22.7	6.2	-	63.5	26.0	-	52.6	-	-
Malaria	-	25.1	22.0	-	14.2	13.7	-	10.2	27.3	-	7.5	32.1
other diagnosed ailments	22.3	16.4	-	17.2	16.5	-	19.7	39.0	-	20.1	17.5	-
Other nondiagnosed ailments	2.3	2.6	-	11.3	3.3	-	1.7	2.8	-	3.9	3.8	-
Fever of unknown origin	-	5.4	-	-	5.1	-	-	-	-	-	25.4	-
Whooping cough, cough and acute bronchitis	-	-	-	-	-	-	3.6	2.2	3.8	6.1	2.9	1.9
Fever due to Diphtheria, Whooping Cough	-	-	2.0	-	-	-	-	-	6.4	-	-	3.0
Respiratory including ear/nose/throat ailments	-	-	-	-	-	-	-	-	14.4	-	2.3	9.7
Pulmonary tuberculosis	5.4	4.7	2.3	2.9	4.5	1.7	-	-	-	-	1.3	-
Stroke/ hemiplegia/ sudden onset weakness	-	-	4.4	-	-	2.1	-	-	2.6	-	-	1.1
Disease of heart	1.4	-	1.4	-	2.2	1.7	-	-	3.8	-	-	1.6
Gastric/peptic ulcer	5.7	8.1	3.1	3.1	-	5.7	-	-	4.8	-	3.7	7.5
Disease of kidney/urinary system	-	2.4	4.0	1.9	2.6	1.8	-	-	-	-	-	1.1
Diabetes mellitus	0.2	-	-	-	1.4	-	-	-	-	-	-	2.9
Hypertension	-	0.8	-	-	1.1	-	0.3	0.8	-	0.9	1.5	7.1
Injury due to accident (including poisoning)	6.4	4.6	8.0	6.7	8.4	8.0	-	1.0	2.8	1.7	2.3	1.6
Cataract	1.9	1.3	-	1.7	1.3	-	-	-	-	-	1.9	-
Hydrocele	2.3	-	-	-	-	-	-	-	-	-	-	-
Hepatitis/Jaundice	-	2.9	1.5	-	-	-	-	-	-	-	-	-
Cancer and other tumours	-	-	-	-	4.0	1.7	-	-	-	-	-	-
Joint or bone disease/ pain or swelling	0.6	1.3	2.0	-	-	1.8	1.2	5.9	10.7	2.2	3.9	9.7
Diseases of skin	-	-	-	-	-	-	-	-	2.8	-	1.7	-
Headche and body aches	-	-	-	-	-	-	-	-	4.5	-	-	3.8
Gynaecological disorders and complication related pregnancy and child birth	2.7	-	31.9	2.6	-	38.1	-	-	-	-	2.9	-

Source: Author's Compilation from NSSO 52nd, 60th and 71st Round Data

Note: Total percentage may not be added to 100 because all ailments are not shown in the table,

* the information on malaria included in Fever of short duration for the year 1995-96

The available information on 58, 42 and 61 different kinds of diseases in the 52nd, 60th and 71st rounds surveys respectively, were classified into five broad categories - (i) infectious/communicable diseases, (ii) non-communicable diseases, (iii) cardiovascular diseases, (iv) disability and (v) other diseases based on World Health Organisation's International Classification of Diseases 2010. The details of the disease classification are given in **Appendix 4.A** at the end of this chapter.

4.2 Morbidity Patterns in the KBK Region of Odisha

4.2.1 Trends and Patterns of Morbidity in KBK Region of Odisha

As it has already been discussed, morbidity is considered to be a proxy measure to understand health status of the population. The trends in morbidity patterns give a clear picture of how

the health status of any given population changes over time. In order to examine the morbidity patterns the prevalence of morbidity as the total number of ailment cases during the reference period of last 15 days divided by the total number of persons alive in the sample households per thousand population has calculated. Table 4.1 shows that the prevalence of self reported morbidity has been increased from 62 to 74 per 1000 population over the period of two decades, i.e., 1995-96 to 2004 in Odisha. However, there is a marginal increment in the prevalence morbidity from 72 to 74 per 1000 population in the KBK region over these periods. Interestingly, the prevalence of morbidity among female population has increased over two decades; it has decreased for the male population over the same periods. It is also observed that the prevalence of morbidity in rural areas is greater than urban areas in KBK region as well as in Odisha during 2004 to 2014.

Table 4.3: Prevalance of Morbidity per 1000 persons in Odisha

NSS Rounds	Sector	KBK Region			Odisha		
		Male	Female	Total	Male	Female	Total
52nd Round (1995-96)	Rural	70	74	72	64	60	62
	Urban	48	108	77	54	70	62
	Total	67	79	73	62	61	62
60th Round (2004)	Rural	53	48	51	79	77	78
	Urban	46	32	40	53	53	54
	Total	52	47	50	76	74	75
71st Round (2014)	Rural	57	93	74	61	93	76
	Urban	89	56	72	54	72	62
	Total	60	90	74	60	90	74

Source: Compiled from NSSO 52nd, 60th and 71st round data

Table 4.4: Prevalence of Different Types of Diseases per 1000 population in Odisha

Disease Patterns	KBK Region			Odisha		
	1995-96	2004	2014	1995-96	2004	2014
Infectious Disease	6	9	28	6	20	19
Non-Communicable	2	2	3	4	10	5
Cardiovascular	0	0	5	1	2	7
Disabilities	2	5	15	3	8	14
Other Diseases	62	34	24	48	35	29
Total	73	50	74	62	75	74

Source: Author's compilation from NSSO round 52, 60 and 71

Table 4.3 and 4.4 represent the prevalence of different types of self reported morbidity per 1000 population from the period 1995-96 to 2014. Overall, morbidity prevalence rate has

increased marginally in the KBK region over the two decades. However, infectious diseases and disabilities have significantly increased within a period of two decades. Precisely, infectious disease increased by more than four times and disabilities increased by more than 7 times. Disabilities not only includes the disease of mouth, teeth and gum, locomotor, hearing, visual and speech disability but also include accidents, injury, burns, fractures and poisoning. Similarly, other category diseases constitute fever of short duration, fever of unknown origin and other diagnosed and undiagnosed ailments. Interestingly other diseases category has decreased from 62 per 1000 population to 24 per 1000 population during 1995 to 2014.

4.2.2 Trends and Patterns of Self Reported Morbidity Rate by Background Characteristics in KBK Region and Odisha

This section focuses on the ways various diseases are related to individual and household's background characteristics. Table 4.5 and 4.6 provide an overview of self reported morbidity rate by selected individual and household background characteristics from 1995 to 2014 for KBK region and Odisha respectively. Self reported morbidities are found to be higher among SCs and STs Caste groups. However, in the last round of survey, self reported morbidity was found to be highest, i.e., 85 per 1000 for OBCs population compared to other social groups. Prevalence of morbidities is higher for the population engaged in agriculture and labour occupational classes while infection and other diseases are more prevalent among those in the labour and agricultural activities. Proper drainage and latrine facilities, safe drinking water are utmost requirement to live a healthy life.

Table 4.5 Prevalence of different morbidities per 1000 population by background characteristics during 1995-96 to 2014 in KBK Region

Background Characteristics		Infectious Diseases			Non-Communicable			Cardiovascular			Disabilities			Others			Total		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Caste	ST	8	15	23	1	0	2	0	0	0	1	4	20	78	32	25	88	51	69
	SC	17	3	18	0	9	9	0	0	13	1	11	15	43	36	19	61	59	75
	OBC	0	4	38	0	2	1	0	1	5	0	4	12	0	41	29	0	53	85
	Others	1	10	30	4	1	0	1	0	2	4	1	2	52	16	14	62	28	48
Religion	Hinduism	NA	8	28	NA	2	3	NA	0	5	NA	5	15	NA	34	25	NA	49	75
	Islam	NA	0	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0	NA	0	1
	Christianity	NA	130	0	NA	0	0	NA	0	0	NA	0	0	NA	27	0	NA	157	0
	Others	NA	125	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0	NA	125	0
Occupational Class	Self employed	2	2	14	7	6	9	1	0	12	0	4	24	47	16	23	57	29	82
	Agriculture	11	7	36	1	2	1	0	1	5	2	2	5	57	43	19	70	55	67
	Labour	3	12	30	1	1	0	0	0	0	2	5	23	77	39	30	83	57	84
	Regular wage/Salaried	3	0	5	11	0	0	6	1	0	11	18	2	30	2	5	61	21	12
	Others	10	18	23	0	1	3	0	1	0	3	1	3	34	24	181	46	45	210
MPCE CLASS	Poorest	7	7	52	3	3	1	0	0	0	3	3	21	56	30	29	69	44	102
	Poor	10	2	30	1	2	9	0	0	0	2	10	15	80	34	18	92	48	72
	Middle	5	14	16	1	1	1	0	0	0	1	0	16	60	53	44	66	68	77
	Rich	1	17	4	4	0	0	2	9	12	2	23	0	53	17	8	62	66	24
	Richer	1	15	1	0	1	0	2	0	4	5	0	3	41	24	0	49	40	8
Source of Drinking	Safe	7	9	29	2	2	3	1	0	5	3	5	16	63	33	26	76	50	79
	Unsafe	5	1	3	2	3	0	0	4	0	0	6	0	59	40	0	66	54	3
Latrine Facilities	Service	0	0	0	124	0	0	0	11	0	0	0	0	15	20	0	139	31	0
	Pit	0	0	0	0	5	0	0	2	10	0	25	7	0	39	2		71	19
	Septic tank/flush system	3	2	20	2	2	3	6	0	24	1	2	2	25	14	21	37	21	70
	No Latrine	6	10	33	1	2	3	0	0	0	2	4	17	64	35	28	74	52	81
	Others	0	0	0	5	0	0	0	0	0	0	0	0	87	0	0	92	0	
Drainage Facilities	Open	4	2	2	10	2	1	4	1	13	1	10	0	28	17	1	47	31	18
	Covered	3	0	46	0	19	1	16	0	0	0	0	3	17	2	46	36	20	96
	No Drainage	6	10	31	1	2	3	0	0	2	2	4	17	64	36	27	75	52	82
Place of Residence	Rural	7	9	28	0	2	3	0	0	4	2	4	16	63	36	24	72	51	74
	Urban	4	4	24	14	6	2	3	1	19	4	12	2	52	17	25	77	40	72
Age Group	(0-5)	14	13	25	3	0	6	1	0	0	3	3	18	74	43	37	94	59	86
	(6-14)	5	5	23	2	2	4	0	0	0	1	2	7	54	18	17	61	27	51
	(15-30)	5	7	14	1	1	1	1	0	5	2	4	10	50	25	14	59	38	45
	(31-60)	5	8	39	2	3	2	0	1	7	3	4	16	64	39	31	74	54	95
	60 and above	6	20	45	10	11	1	0	4	11	8	32	46	135	69	27	159	137	129
Sex	Male	6	7	21	2	2	2	0	1	4	2	4	12	56	39	20	67	53	60
	Female	6	10	35	2	2	4	0	0	5	2	5	17	68	29	28	79	47	90
Educational Qualification	Illiterate	7	10	40	1	1	2	0	0	0	2	5	24	69	40	43	80	57	109
	Elementary	4	6	22	4	3	3	0	1	4	3	4	11	44	22	16	56	36	55
	Secondary	0	29	18	1	4	1	1	1	4	0	0	1	13	38	15	16	72	40
	Higher Secondary	0	0	8	0	1	0	18	0	18	0	3	6	33	4	5	51	8	36
	Higher Education		0	0		1	0		0	0		0	0		2	0		3	0
Marital Status	Never Married	7	7	19	2	2	3	0	0	4	2	3	10	63	22	18	74	34	54
	Married	5	8	30	2	3	3	0	1	4	2	5	16	58	42	26	68	58	79
	Widowed	6	27	67	4	0	2	0	0	13	6	33	48	93	61	57	109	121	186
	Separated	0	0	0	0	4	0	0	0	0	0	14	0	0	17	0	0	35	0

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round data

Table 4.5 Morbidity prevalence rate has seen upward trend during the period of two decades for those group lacking any form of latrine and drainage facility. In most of the cases, the diseases due to infection have increased from 6 per 1000 to 33 per 1000 during the period from 1995 to 2014 for the population having no latrine facilities and the said diseases have increased from 6 per 1000 to 31 per 1000 for people having no drainage facilities during period from 1995 to 2014. In the present study monthly per capita consumption expenditure is a proxy for standard of living. Higher the standard of living turns out to be lower becomes the morbidity rate and vice versa. Interestingly, the morbidity rate was found to follow an upward trend for the lower consumption quintile classes and it has shown a downward trend for higher consumption quintiles during the period from 1995-96 to 2014.

As far as the individual characteristics are concerned, morbidity rate is found to be higher among female than the male population and the difference was substantial in the latest 71st NSSO round particularly in reporting the infectious diseases. The relationship between age distribution and morbidity prevalence rate has been found to be U-shaped in nature. It means that morbidity rates are high among child age group (0-5 years) and old age (60 and above) population. Though overall morbidity trend has declined over the period, i.e., 1995-96 to 2014 for old age group it was substantially high compared to other age groups. Moreover, the morbidity of infectious and disabilities has been seen upward trend during the two decades for old age group. Educational attainment and morbidity rate are found to be negatively related in all the three periods. Disabilities and Infectious diseases have decreased with the increase in the level of education. Conversely, cardiovascular diseases are found higher among the rural and highly educated people. This may be due to the fact that unlike illiterate and less educated people, the nature of job for highly educated people is mostly mental work. These mental works sometimes result in stress and suffering which further lead to cardiovascular diseases like heart disease, hypertension, blood pressure etc. because of the obvious links between brain and heart. In the literature of medicine there is enormous evidence on psychological stress and cardiovascular disease (Dimsdale, 2008). Moreover, cardiovascular and non-communicable disease may be determined by food habits, life style behaviour and physical activities.

Table 4.6 depicts the morbidity trends and pattern for the State of Odisha during 1995-96 to 2014. Morbidity rate was substantially higher among SCs population group. Though, morbidity rate has been found to be higher among Muslim community compared to other religious groups, it witnessed a downward trend during 2004-2014. Morbidity among

the people belonging to self employed and labour occupational classes is higher than other occupational classes. Unlike KBK region, the morbidity prevalence rate was more among the persons in the higher consumption quintiles group, particularly the cardiovascular disease has revealed an upward trend in Odisha. Morbidity for people having no latrine facilities found an increasing trend. Like KBK region, the linkage between age group and morbidity rate in Odisha has seen a U pattern relationship. Educational attainment and morbidity prevalence rate are found to be inversely related, while there was a substantial decrease in the morbidity prevalence rate with the increase in the level of educational qualification.

Table 4.6 Prevalance of different morbidities per 1000 population by background characteristics during 1995-96 to 2014 in Odisha

Background Characteristics		Infectious Diseases			Non-Communicable			Cardiovascular			Disabilities			Others			Total		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Caste	ST	5	24	12	1	3	3	0	1	4	3	4	12	52	33	24	62	65	55
	SC	9	28	27	4	11	6	1	1	6	4	11	16	47	43	36	66	94	91
	OBC	0	15	19	0	12	4	0	2	8	0	8	15	0	33	27	0	70	73
	Others	5	16	19	5	17	11	1	2	11	4	11	11	46	35	33	61	80	86
Religion	Hinduism	NA	20	19	NA	11	5	NA	2	7	NA	8	14	NA	35	29	NA	75	75
	Islam	NA	36	2	NA	20	24	NA	0	2	NA	1	3	NA	84	60	NA	140	91
	Christianity	NA	20	3	NA	1	6	NA	2	0	NA	4	0	NA	10	14	NA	37	23
	Others	NA	125	8	NA	0	0	NA	0	0	NA	0	0	NA	0	0	NA	125	8
Occupational Class	Self employed	7	19	18	6	8	7	2	3	4	3	12	18	38	32	27	55	74	75
	Agriculture	7	14	18	3	13	5	1	2	12	3	10	11	46	31	22	60	70	68
	Labour	3	26	15	3	7	3	0	0	3	4	4	14	54	41	39	64	79	74
	Regular wage/Salaried	7	11	24	9	6	9	1	2	5	5	3	8	41	16	30	63	39	76
	Others	9	22	26	5	22	7	1	2	13	6	11	20	54	36	40	74	93	105
MPCECLASS	Poorest	5	14	23	2	5	2	0	1	6	2	8	9	46	36	29	56	64	70
	Poor	7	24	18	2	8	5	0	1	5	2	8	14	48	33	24	59	74	66
	Middle	8	22	16	2	11	6	0	0	2	3	8	19	38	32	34	51	73	77
	Rich	3	20	15	5	16	7	2	2	8	5	7	15	48	34	26	63	79	70
	Richer	6	20	21	10	16	8	1	4	17	6	9	10	55	41	36	78	90	93
Source of Drinking Water	Safe	7	21	20	5	11	5	1	1	8	4	7	14	42	37	30	58	77	77
	Unsafe	5	17	5	3	9	9	0	2	1	3	12	11	55	30	16	67	70	41
Latrine Facilities	Service	5	12	31	22	11	3	0	3	11	7	0	0	74	19	0	107	45	46
	Pit	N.A.	40	13	N.A.	27	4	N.A.	6	9	N.A.	19	11	N.A.	75	47	N.A.	167	85
	Septic tank /flush system	8	10	15	8	11	10	2	3	6	5	8	11	31	22	23	53	54	65
	No Latrine	6	20	20	4	10	4	1	1	7	3	8	15	48	35	30	62	74	76
	Others	3	30	0	0	23	0	0	3	11	9	2	0	51	103	16	63	161	27
Drainage Facilities	Open	4	16	11	6	20	8	1	2	13	4	12	8	47	26	28	61	75	68
	Covered	9	10	8	9	26	4	1	6	3	5	0	9	53	14	6	77	57	30
	No Drainage	6	21	21	4	9	5	1	1	7	3	8	15	48	37	31	62	76	78
Place of Residence	Rural	6	21	20	4	11	5	1	1	8	3	8	14	48	37	30	62	78	76
	Urban	6	14	13	8	9	8	1	3	4	5	9	11	42	19	25	62	54	62
Age Group	(0-5)	13	43	44	7	14	11	0	0	5	1	9	20	58	62	57	78	128	136
	(6-14)	3	12	22	1	6	6	0	1	3	0	4	10	38	21	28	43	44	69
	(15-30)	3	13	12	3	6	4	0	1	8	3	5	11	41	20	25	49	45	60
	(31-60)	4	18	16	5	12	5	1	2	6	7	8	12	53	38	25	71	78	64
	60 and above	22	37	24	12	28	12	4	8	12	7	31	32	76	70	34	121	174	114
Sex	Male	5	20	14	5	11	5	0	2	6	3	8	11	48	36	24	62	76	60
	Female	7	20	24	3	10	6	1	1	8	4	8	16	46	34	35	61	74	90
Educational Qualification	Illiterate	7	26	29	3	9	6	1	1	5	4	8	19	57	46	38	71	91	97
	Elementary	5	16	16	4	11	5	1	1	7	3	8	12	39	28	28	52	63	69
	Secondary	6	13	10	7	10	6	0	1	7	2	4	12	33	20	29	49	49	64
	Higher Secondary	8	11	10	1	9	4	1	2	10	5	5	7	22	16	17	37	44	48
	Higher Education	0	6	5	0	7	2	0	5	2	0	4	2	0	8	4	1	30	14
Marital Status	Never Married	5	18	19	4	9	6	1	1	9	3	7	14	41	30	31	53	65	79
	Married	7	20	16	4	11	5	1	2	6	4	8	12	50	37	25	65	78	64
	Widowed	8	43	33	5	25	7	4	6	9	7	21	27	101	59	48	125	154	125
	Separated	0	1	35	0	1	0	0	2	1	0	3	22	4	15	43	4	21	101

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round data

4.3 Trends and Patterns in Hospitalisation Rate in KBK Region of Odisha

All ailments or diseases do not require a hospitalised treatment. When a patient becomes more serious, he/she needs a hospitalised treatment. Hospitalisation rate is calculated as the total number of hospitalisation cases or total number of indoor treatment during the reference period of last 365 days divided by the total number of persons alive in the sample households per thousand population. Table 4.7 depicts that hospitalisation rate has increased from 7 to 46 per 1000 population during the periods from 1995 to 2014 in the KBK region of Odisha. A similar trend was observed for the state also as a whole. Unlike the morbidity patterns discussed earlier in Table 4.1, the hospitalisation rate is more in the urban areas than in the rural areas over the periods of two decades, i.e., 1995 to 2014 in KBK region and Odisha. Moreover, hospitalisation rate among male population is higher than female population in urban areas both in KBK region and Odisha.

Table 4.7: Hospitalisation rate per 1000 population in Odisha

NSS Rounds	Sector	KBK Region			Odisha		
		Male	Female	Total	Male	Female	Total
52nd Round (1995-96)	Rural	6	7	6	13	9	11
	Urban	18	11	14	15	12	13
	Total	8	7	7	14	10	12
60th Round (2004)	Rural	26	10	18	25	20	22
	Urban	30	21	26	33	25	29
	Total	26	11	19	26	20	23
71st Round (2014)	Rural	30	64	46	27	62	43
	Urban	49	46	48	39	62	50
	Total	32	63	46	29	62	44

Source: Author's compilations from NSSO data 52nd, 60th and 71st rounds

Table 4.8: Hospitalisation rate against different Types of diseases per 1000 population in Odisha

Disease Patterns	KBK Region			Odisha		
	1995-96	2004	2014	1995-96	2004	2014
Infectious Disease	2	9	8	3	8	8
Non-Communicable	0	3	10	1	5	9
Cardiovascular	0	0	4	0	1	3
Disabilities	1	2	7	2	3	9
Other Diseases	4	5	17	6	6	15
Total	7	19	46	12	23	44

Source: Same as in Table 4.7

Table 4.8 shows the different type of diseases for which hospitalisation was sought in the reference period of last one year by the individuals during the period 1995-96 to 2014. Hospitalisation rate due to non communicable, disabilities and other diseases has steadily increased in KBK region and in the state of Odisha during the last two decades. While the hospitalisation rate has increased almost four folds in Odisha, it has increased to six folds in the KBK region during the periods of two decades, i.e., 1995-96 to 2014.

4.3.1 Trends and Patterns of Hospitalisation Rate by Background Characteristics in KBK Region and Odisha

Table 4.9 demonstrates the hospitalisation rate in the KBK region of Odisha during the period of two decades, i.e., 1995 to 2014. Hospitalisation rate was high for SC and ST population groups compared to other social groups; it was very high especially in 2014 compared to the previous two periods. Urban people reported higher hospitalisation cases compared to the rural people for most of the diseases. Hospitalisation rate among persons belonging to the age group of 15-30 and 60 and above is higher compared to other age group. Males are found to be more hospitalised than their female counterparts in the year 1995-96 and 2014, however opposite result was observed in 2014. Interestingly hospitalisation rate has increased with the increase in the standard of living as measured by monthly per capita consumption quintiles. This result was observed for all the three periods. In most of the cases hospitalisation rate due to infectious and others category diseases are higher compared to that of non communicable and cardiovascular diseases. However, it has been observed that hospitalisation due to cardiovascular diseases occurred mostly among self employed, regular wages and salaried earning classes and rich people.

Table 4.10 shows that hospitalisation rate increased for all the social groups during the two decades, i.e., 1995-2014 in the state of Odisha. However hospitalisation because of non communicable diseases, disabilities and other diseases was found to be higher for other category social groups. Hospitalisation per 1000 of population was higher among urban residents compared to their rural counterparts. As expected, people of age group 60 and above are more vulnerable to disease; therefore hospitalisation rate was higher for old aged people compared to others groups in the age distribution. Moreover, hospitalisation due to non communicable diseases, cardiovascular diseases and disabilities were more in the case of people 60 and above. Interestingly, hospitalisation rate was positively associated with the standard of living of the people.

Table 4. 9 Hospitalisation rate per 1000 population for different diseases by background characteristics during 1995-96 to 2014 in KBK Region

Background Characteristics		Infectious Diseases			Non-Communicable			Cardiovascular			Disabilities			Others			Total		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Caste	ST	1	6	5	0	2	19	0	0	2	1	2	7	2	1	17	4	11	50
	SC	2	17	13	0	4	5	0	1	1	1	4	11	4	6	21	7	31	51
	OBC	NA	11	10	NA	4	5	NA	0	7	NA	1	4	NA	9	15	NA	25	39
	Others	3	5	4	0	4	7	0	1	3	2	1	16	6	4	18	11	15	47
Religion	Hinduism	NA	9	8	NA	3	10	NA	0	4	NA	2	8	NA	5	16	NA	19	46
	Islam	NA	0	3	NA	0	2	NA	0	3	NA	0	0	NA	0	34	NA	0	41
	Christianity	NA	5	0	NA	0	0	NA	0	0	NA	0	0	NA	4	31	NA	10	31
	Others	NA	125	0	NA	0	0	NA	0	0	NA	0	0	NA	0	167	NA	125	167
Occupational Class	Self employed	0	6	9	0	3	9	1	1	2	3	0	16	4	13	7	10	22	43
	Agriculture	1	12	8	0	3	15	0	0	8	1	3	5	4	2	19	6	20	54
	Labour	3	9	10	1	3	3	0	0	0	0	1	7	3	4	14	7	18	33
	Regular wage/Salaried	5	6	11	0	19	11	0	1	0	2	0	13	8	0	14	15	26	49
	Others	3	3	2	0	3	9	0	1	1	2	3	5	11	2	93	15	12	110
MPCECLASS	Poorest	1	8	7	1	2	13	0	0	2	0	1	4	1	4	11	2	16	37
	Poor	1	8	11	0	4	4	0	0	0	1	1	6	2	4	16	4	17	37
	Middle	3	11	4	0	1	8	0	0	0	1	3	11	6	4	26	11	19	49
	Rich	4	11	17	0	8	11	0	3	0	1	5	18	5	2	16	10	28	62
	Richer	5	9	8	0	4	10	1	0	45	2	0	4	15	13	24	25	27	91
Source of Drinking	Safe	2	9	7	0	3	10	0	0	4	1	2	7	5	5	18	9	19	47
	Unsafe	1	9	21	0	3	6	0	0	0	1	3	9	2	4	7	4	19	43
Latrine Facilities	Service	2	4	0	0	11	0	0	4	0	1	0	0	3	5	0	5	25	0
	Pit	0	5	16	0	1	2	0	3	0	0	0	6	0	11	10	0	19	35
	Septic tank /flush system	4	7	5	0	11	22	2	0	6	6	0	17	6	4	16	18	23	65
	No Latrine	2	9	9	0	2	11	0	0	1	1	2	8	4	5	19	7	18	47
	Others	1	0	0	13	0	0	0	0	0	0	0	0	20	0	0	35	0	0
Drainage Facilities	Open	3	8	2	1	8	4	0	1	1	3	0	5	10	7	34	17	24	45
	Covered	0	20	8	0	33	16	9	0	0	0	2	19	0	5	19	9	60	61
	No Drainage	2	9	9	0	2	11	0	0	4	1	2	7	4	4	15	7	18	46
Place of Residence	Rural	2	9	8	0	3	10	0	0	4	1	2	7	3	5	17	6	18	46
	Urban	2	11	6	2	9	13	1	1	1	3	0	11	7	5	17	14	26	48
Age Group	(0-5)	2	7	2	0	4	6	0	0	0	1	2	1	2	6	5	5	19	14
	(6-14)	1	10	3	0	4	2	0	0	0	0	2	2	2	4	7	4	21	14
	(15-30)	2	8	12	0	2	15	0	0	7	1	1	12	4	4	24	7	15	70
	(31-60)	3	10	9	0	3	8	0	1	6	1	2	9	5	5	17	9	21	50
	60 and above	7	8	6	1	3	22	0	0	1	8	1	8	7	4	17	24	16	54
Sex	Male	2	13	6	0	4	6	0	0	3	1	2	5	4	7	12	8	26	32
	Female	2	5	11	0	2	15	0	0	4	1	1	9	4	3	23	7	11	63
Educational Qualification	Illiterate	2	7	8	0	2	16	0	0	1	1	1	6	3	4	19	6	14	50
	Elementary	3	14	8	0	4	7	0	1	3	2	3	6	7	6	16	13	27	40
	Secondary	1	11	20	0	11	10	1	1	2	2	3	20	6	5	33	10	30	85
	Higher Secondary	1	5	2	0	8	1	2	1	14	1	5	3	3	4	2	7	23	23
	Higher Education	0	17	8	0	12	7	0	1	2	0	0	14	0	0	8	0	30	38
Marital Satus	Never Married	2	9	4	0	4	4	0	0	2	1	2	3	3	5	9	6	20	22
	Married	2	9	11	1	3	15	0	0	5	1	2	11	4	5	19	8	18	61
	Widowed	6	11	8	1	4	26	0	1	1	1	1	16	6	0	49	14	17	99
	Separated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Author's Own Calculation from NSSO 52nd, 60th and & 71st Round data

Table 4.10 Hospitalisation rate per 1000 population by background characteristics during 1995-96 to 2014 in Odisha

Background Characteristics		Infectious Diseases			Non-Communicable			Cardiovascular			Disabilities			Others			Total		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Caste	ST	2	8	8	1	3	9	0	0	3	1	2	6	7	3	13	11	16	39
	SC	3	11	9	1	7	8	0	1	3	1	3	8	6	7	16	12	28	44
	OBC	NA	9	8	NA	5	8	NA	0	4	NA	3	9	NA	7	15	NA	25	44
	Others	3	4	6	1	6	12	0	2	4	2	5	14	6	6	18	12	24	53
Religion	Hinduism	NA	8	7	NA	5	9	NA	1	3	NA	3	9	NA	6	15	NA	23	44
	Islam	NA	11	9	NA	4	16	NA	0	3	NA	4	4	NA	5	26	NA	24	58
	Christianity	NA	4	6	NA	2	1	NA	2	1	NA	1	21	NA	4	24	NA	12	53
	Others	NA	125	0	NA	0	0	NA	0	0	NA	0	0	NA	0	167	NA	125	167
Occupational Class	Self employed	2	8	8	1	5	8	0	0	4	2	3	10	10	8	12	15	24	42
	Agriculture	3	10	7	1	6	11	0	1	4	1	3	10	5	5	16	11	24	48
	Labour	3	8	6	1	3	5	0	0	2	1	2	7	5	5	15	10	19	35
	Regular wage/Salaried	2	10	9	1	9	11	1	5	3	2	1	11	5	7	15	12	33	49
	Others	4	7	9	2	8	16	1	2	6	3	9	4	6	5	28	16	32	63
MPCE CLASS	Poorest	1	7	6	0	3	10	0	0	2	1	2	5	2	5	12	4	17	33
	Poor	2	9	9	1	4	10	0	0	3	1	2	8	4	6	13	7	21	43
	Middle	3	7	6	0	6	9	0	1	2	1	4	13	6	5	19	10	22	49
	Rich	3	10	10	2	6	8	0	2	3	1	2	12	5	5	15	11	25	49
	Richer	5	8	6	2	9	10	1	2	8	4	6	8	12	9	18	23	34	51
Source of Drinking	Safe	3	8	7	1	6	9	0	1	4	1	3	9	5	6	16	11	23	45
	Unsafe	2	9	10	1	4	7	0	1	1	2	3	13	7	5	8	13	22	39
Latrine Facilities	Service	1	13	2	0	3	1	1	1	12	2	1	0	7	6	1	11	24	15
	Pit	0	7	9	0	3	10	0	8	2	0	2	6	0	10	19	0	29	47
	Septic tank /flush system	2	6	7	2	11	12	1	2	5	2	4	10	5	6	11	13	30	44
	No Latrine	3	9	8	1	5	9	0	0	2	1	3	10	6	5	17	12	22	45
	Others	0	14	0	3	15	0	0	2	15	0	0	0	6	16	18	9	46	34
Drainage Facilities	Open	1	8	9	1	11	9	0	1	2	3	1	7	5	5	16	11	25	43
	Covered	2	5	9	5	19	12	1	5	6	2	3	13	3	12	17	14	44	57
	No Drainage	3	9	7	1	4	9	0	1	3	1	3	9	6	6	15	12	22	44
Place of Residence	Rural	3	8	7	1	5	9	0	1	3	1	3	9	6	6	16	11	22	43
	Urban	3	10	9	2	8	13	1	2	4	2	3	11	6	7	13	13	29	50
Age Group	(0-5)	2	6	5	1	3	8	0	0	1	1	2	2	7	5	9	11	17	24
	(6-14)	1	5	2	0	3	2	0	0	1	0	2	3	2	3	5	3	13	12
	(15-30)	2	8	12	1	5	13	0	1	4	1	3	14	5	5	20	10	21	63
	(31-60)	3	10	7	2	7	8	0	1	4	2	4	9	8	8	15	15	30	43
	60 and above	12	14	9	3	11	16	1	2	6	4	6	16	12	9	18	32	42	66
Sex	Male	3	10	5	1	6	6	0	1	2	2	3	6	7	6	10	14	26	29
	Female	2	7	10	1	5	13	0	1	4	1	3	12	5	5	22	10	20	62
Educational Qualification	Illiterate	3	8	7	1	4	11	0	0	2	1	2	8	8	6	17	14	20	45
	Elementary	2	9	7	1	6	8	0	1	3	1	3	9	5	6	15	9	24	42
	Secondary	1	12	12	1	12	10	1	2	3	2	7	12	3	9	18	7	41	56
	Higher Secondary	2	7	4	1	12	6	1	3	8	2	4	9	2	7	10	8	32	37
	Higher Education	0	7	7	0	11	13	0	3	5	0	5	12	0	7	11	0	33	48
Marital Status	Never Married	1	6	3	1	3	4	0	0	1	1	2	4	3	4	7	7	15	19
	Married	4	11	11	2	7	15	0	1	5	2	4	13	8	8	22	17	31	65
	Widowed	5	12	9	1	8	13	0	1	5	1	5	15	10	8	20	18	35	62
	Separated	0	8	2	0	9	2	0	0	2	1	14	8	2	7	2	3	38	16

Source: Author's Own Calculation from NSSO 52nd, 60th and & 71st Round data

4.4 Health Care Utilisation and Choice of Health Provider in KBK Region of Odisha

The previous Section has discussed the morbidity patterns of the households over a period of 20 years, i.e., from 1995-96 to 2014 and it has been observed that the morbidity has increased significantly in the KBK region. Therefore, it is expected to augment the demand for curative health care in the region. Utilisation of health care is a complex outcome of both demand and supply side factors. In demand side, factors such as health need of the people, price and affordability of care etc. and in supply side availability of health care, responsiveness of health care system, reputation and behaviour of doctor, quality of health care services etc. are important dimensions of utilisation of health care services.

In many countries across the world, the private sector is increasingly becoming an important source of health care and India is not an exception to it. The share of private health expenditure in total health expenditure is more than 80 percent, which is one of the highest in the world. Despite considerable investments in developing and maintaining an extensive network of public health facilities, the utilisation of health services is still far from satisfactory (Peters et al., 2002). In India, the private sector accounts for 60 percent of inpatient care and 80 percent of outpatient care (NSSO, 2006). Although the public health care system provides curative services at nominal cost, a high demand for private health care facilities existed due to poor quality of care in public sector, no government facilities nearby, long waiting time etc (Dillip, 2010). Most of the health services in public sector are mainly provided at a very low cost or without monetary price at the point of access. However, substantial non-monetary costs due to long distance, high transportation and long waiting time generally restrict people from using public health facilities (Sarma, 2009). Very often, people choose private health facilities out of compulsion, which ultimately become catastrophic for them. Vaishnavi and Dash (2009) found that catastrophic health payment is significantly higher among those households taking treatment for private facilities in urban areas of Tamil Nadu. In the face of poor health care in the public facilities and highly expensive private care, the poor and the deprived people lack formal health care services. It is also seen that rural household receives health care from informal sector, i.e., non degree allopathic practitioners. In Odisha, 40.2 per cent chose first curative contact with non degree allopathic providers and 36.2 per cent with traditional healers (Gautham, et al. 2011). Sahoo and Madheswaran (2014) found that 22 percent of the ailing persons have not received any medical advice in Odisha, out of which 31 percent of cases do not seek medical advice because of financial constraints. Various reasons such as poor quality of public health

services, closed public facilities, non availability of staff at public facilities, high monetary payments for private care and informal payments for public care, inadequate and inappropriate care are responsible for low level of health care utilisation in India (Mishra et al., 2003; Banerjee et al., 2004; Ager and Pepper, 2005). Recent studies also found that there are substantial geographical and socio-economic related inequalities in healthcare utilization in India (Peters et al. 2002, Shivkumar et al. 2010, Mukherjee, 2010, Dillip, 2010, Mukherjee and Levesque, 2010).

4.4.1 Theoretical Framework

The economic rationale for utilisation of health care services is that it reduces the intensity of adverse health outcomes and financial catastrophe. Once illness is perceived, timely utilisation of curative health care reduces not only the length of illness days but also the income losses associated with morbidity and premature mortality. Anderson (1968) and Andersen and Newman (1973) developed a conceptual model (popularly known as health utilization behaviour model) to explain the factors that determine the use of health services. This model assumes that a person's use of health care services is a function of predisposing, enabling and need factors. Predisposing factors include education, occupation, marital status, in socio-cultural dimensions, age and sex in demographic characteristics and attitudes, value and knowledge about health care system in health belief characteristics of the individuals. Enabling factors are the attributes specific to the individual or the community such as income, social networks, health insurance and access to regular source of care etc. Need factors reflect the illness levels and lead to immediate use of health care. Needs can be perceived by the individual and are influenced by cultural beliefs and value (e.g. perceived health status, severity of illness, limitation of activity etc). Though these three factors combinely affect the health care utilisation, none of these factors alone is sufficient condition for the utilisation of health care to occur. For instance, predisposing and enabling factors are necessary but not sufficient one. Need must be perceived for the use of health care services. However, Grossman (1972a, 1972b) adopted a different approach to explain the health care utilisation behaviour. According to Grossman people utilise health care or demand health care because health care is a derived demand for the commodity health capital. Health capital directly enters into the utility function and augments the utility level of the individuals. It is assumed that individuals produce the commodity health capital by combining time, other marketable inputs or commodities including health care. Price, income, education, age and

other need factors are significantly affecting the demand for health care or utilisation of health services. Demand for health care services is closely associated with the health seeking behaviour of the households. Before consuming any health care services, a person must perceive the need for it and demand for it. When the need arises, individuals must decide whether or not to receive health care subject to availability and affordability (Sarma, 2009). From theoretical prospective, when the utility is derived from the utilisation of health care, net of utility from no care is positive it is rational on the part of individual to go for utilisation of health care¹. In this context an attempt has been made to examine the factors responsible for the choice of health care provider and also find out the reasons for untreated morbidity in the KBK region of Odisha.

¹ Here the standard assumption is that utilisation of health care augment the utility level of the individual. It means there is absence of iatrogenesis effect or any adverse impact resulting from medical treatment.

Table 4.11 Utilisation of Medical Care against No Care across Socioeconomic Characteristics

Background Characteristics		KBK Region						Odisha					
		1995-96		2004		2014		1995-96		2004		2014	
		Medical Care	No Care	Medical Care	No Care	Medical Care	No Care	Medical Care	No Care	Medical Care	No Care	Medical Care	No Care
Sector	Rural	66.9	33.1	62.2	37.8	84.7	15.3	72.7	27.2	79.7	20.3	83.6	16.4
	Urban	74.3	25.7	81.1	18.9	98.6	1.4	83.6	16.4	88.7	11.3	84.3	15.7
Occupational Status	Self Employed	76.3	23.7	62.4	37.6	99.2	0.8	76.3	23.7	87.1	12.9	84.3	15.7
	Agriculture	54.9	45.1	61.1	38.9	80.5	19.5	69.7	30.1	80.3	19.7	82.4	17.6
	Labour	74.4	25.6	60.5	39.5	78.5	21.5	74.1	25.9	73.4	26.6	81.4	18.6
	RWS	97.7	2.3	97.6	2.4	93.3	6.7	88.1	11.9	96.5	3.5	85.9	14.1
	Others	77.2	22.8	90.2	9.8	100	0	81	19	91.8	8.2	91.6	8.4
Religion	Hindu	-	-	65	35	85.7	14.3	-	-	80.9	19.1	83.4	16.6
	Muslim	-	-	20.3	79.7	100	0	-	-	75.5	24.5	94.6	5.4
	Christian	-	-	0	100	88.8	11.2	-	-	65.4	34.6	100	0
	Others	-	-	45.6	54.4	83.7	16.3	-	-	0	100	100	0
Caste	ST	61.3	38.7	67.7	32.3	82	18	68.8	31.2	58.1	41.9	78.8	21.2
	SC	53.6	46.4	78.8	21.2	100	0	71.2	28.8	85.7	14.3	91.7	8.3
	OBC	-	-	65	35	78.2	21.8	-	-	85.6	14.4	80.8	19.2
	Other	81.5	18.5	38.2	61.8	98	2	77.3	22.6	86.6	13.4	85.7	14.3
MPCE CLASS	Poorest	65.9	34.1	77.2	22.8	76.4	23.6	59.2	40.8	69	31	75	25
	Poor	70.9	29.1	82	18	99.9	0.1	73.4	26.6	72	28	85.8	14.2
	Middle	63.6	36.4	76.7	23.3	99	1	68.9	31.1	87	13	87.1	12.9
	Rich	58.1	41.9	96.1	3.9	85.7	14.3	77.6	22.4	86.7	13.3	86.8	13.2
	Richest	79.2	20.8	63	37	85.6	14.4	85.9	13.8	91.9	8.1	84.4	15.6
Sex	Male	67.4	32.6	64.5	35.5	84.4	15.6	73.7	26.2	80.3	19.7	83.8	16.2
	Female	68.4	31.6	55.6	44.4	87.9	12.1	74.4	25.6	80.8	19.2	83.5	16.5
Educational Status	Illiterate	63.9	36.1	78.6	21.4	71.8	28.2	68.5	31.5	74.2	25.8	85.8	14.2
	Elementary	81.5	18.5	95.8	4.2	77.3	22.7	79.8	20	86.5	13.5	83.5	16.5
	Secondary	90.3	9.7	100	0	100	0	82	18	91.9	8.1	79.3	20.7
	Higher Secondary	91.6	8.4	100	0	80.3	19.7	81.2	18.8	86.4	13.6	80.3	19.7
	Higher Education	-	-	-	-	85.1	14.9	-	-	95.4	4.6	85.1	14.9
Age Group	(0-5)	60.2	39.8	59.6	40.4	91.2	8.8	71.1	28.9	80.4	19.6	87.3	12.7
	(6-14)	71.5	28.5	60.2	39.8	91.7	8.3	76.0	24.0	80.4	19.6	83.3	16.7
	(15-30)	70.6	29.4	68.8	31.2	86.2	13.8	74.2	25.8	82.5	17.5	83.2	16.8
	(31-60)	67.9	32.1	66.5	33.5	84.2	15.8	74.8	25.2	80.9	19.1	83	17
	60 above	59.1	40.9	55.3	44.7	64.2	35.8	70.7	29.3	73.8	26.2	84.7	15.3
Total		67.9	32.1	63.7	36.3	85.7	14.3	74.1	25.9	80.6	19.4	83.7	16.3

Source: Author's Own Calculation from NSSO 52nd, 60th and & 71st Round data

4.4.2 Curative Health Seeking Behaviour for Non-hospitalisation cases in KBK Region

Table 4.11 demonstrates health care utilisation behaviour of the people against no care. Only 68 percent people suffering from any illness in the KBK region go for medical care against 74 percent in the state average for the year 1995-96. However, the percentage has increased from 68 to 85 percent in the KBK region and 74 to 84 percent in the state during the period from 1995-96 to 2014. With respect to socioeconomic characteristics, Table 4.11 shows that more rural and socioeconomically backward (SC and ST), agricultural and labour class households opt for no care rather than medical care. This result was found during the period, i.e., 1995-96 to 2014 for KBK region as well as Odisha. Furthermore, educational status and standard of living as measured by monthly per capita consumption expenditure are positively

related to medical seeking treatment of the people. Education is one of the important factors in the creation of health awareness and the choice between medical care against no care during the period of illness. It has been observed that with the increase in the level of education the medical seeking treatment increased in the KBK region and Odisha during the period of 1995- 2014. Interestingly, the percentage of people seeking medical care has increased from 68 percent in 1995-96 to 86 percent in the KBK region; this increase has been significant especially after 2004. This may be due to the increase in the awareness among people and a significant increase in the medical institutions after the introduction of NRHM in the state. However, when it is compared to medical seeking behaviour the KBK region is lagging behind the state average, because of both demand and supply side constraints. Apart from multi faceted backwardness characteristics like illiteracy, widespread poverty and hunger, there is inadequate economic infrastructure and low spread of medical facilities in the KBK region.

Table 4.12 Utilisation of Health Care Services from Non-government Sources in the KBK Region and Odisha

Background Characteristics		Outpatient Care						Inpatient Care					
		KBK Region			Odisha			KBK Region			Odisha		
		1995	2004	2014	1995	2004	2014	1995	2004	2014	1995	2004	2014
Sector	Rural	62.3	47.8	4.9	47.8	42.7	24.4	2.5	19.6	8.6	9.7	22.8	15.3
	Urban	64.1	54.1	40.9	59.7	38	48.3	6.7	10.3	21.2	12.9	26.9	37.2
Occupation	Self Employed	59.6	49.4	10	57.4	47.4	33.5	2.9	26.3	10.7	7.3	21.7	22.2
	Agriculture	63.7	55.8	4.6	43.7	45.6	23.8	3.6	21.6	10.1	12.6	24	15.2
	Labour	62	44.1	9.1	51.2	35.6	21.8	1.3	11.5	9.1	8	22.8	11
	RWS	58	9.1	10.8	59.5	28.1	39.4	8.2	11.1	11.2	17.3	26.1	34.2
	Others	94.6	63.3	10.2	44.2	50.1	27.8	16	26.4	2.5	9.9	24.4	24.1
Caste	ST	70.4	59.2	0.9	48.5	39.3	8.4	0	7.8	7.5	5.1	18.7	7.3
	SC	51.6	15.7	16.8	55.9	43.2	26.7	4.9	17.2	9.7	5.8	25.6	11.9
	OBC		53.1	8.8		42.3	29.3		20.9	9.2		22.4	19.9
	Others	56.9	65.8	11.5	47.9	42.7	39.9	4.9	39.4	20.3	13	26.5	32.7
MPCE CLASS	Poorest	60.8	30.6	2.6	35	26.1	17.8	0	23.1	6.9	3.2	26.6	9.6
	Poor	62.2	47.6	2.6	51.7	44.2	18.5	0.7	9.8	14.9	14.7	19.2	17.3
	Middle	73.7	57.2	4.9	48.1	33.5	34.4	2.5	17.5	8.8	3.3	20.3	18.7
	Rich	57.4	52.7	30.3	44.7	51.5	32.7	8.6	9	9.9	15.2	23.8	20.9
	Richest	60.3	50.9	39.7	59.2	53.2	37.2	6	26.3	12.5	10.9	26.8	33.1
Educational Status	Illiterate	62.7	45.2	5.2	49.8	42.7	24.6	3	18.5	7.6	8.2	23.2	13.4
	Elementary	64.4	50.5	5.7	48.7	39.8	25.8	3.9	18.6	9.6	11.8	23	18.8
	Secondary	43	76.7	26.9	52.6	54.6	35.4	11.8	14.4	17.4	12.4	22.2	28.4
	Higher Secondary	71.5	96.4	23.5	45.1	50.8	41.9	0	20.5	4.8	20.4	33.1	26.2
	Higher Education		65.4	55.9		43.7	48.6		30.3	22.3		26.2	39.6
	Total	62.6	48.5	7.8	49.3	42.2	28.1	3.8	18.5	9.7	10.1	23.4	19.1

Source: Author's Own Calculation from 52nd, 60th and 71st Round NSSO Data

4.4.3 Utilisation of Health Care Services from Private and Non-government sources

The percentage of treated cases of illness by non-government sources is shown in Table 4.12. The non-government sources (loosely private sources) include private hospital, private clinic/doctor, nursing home, charitable institution etc. Health care services are presumed to be available at a lower and affordable cost at the government institutions compared to private sources. However, when the patients/individuals are not satisfied with perceived quality of health care at the government facilities, individuals move to private sources for treatment. The perception is generally based on the information available to the individuals from personal experience, family members, friends and relatives and media. The health care utilisation from non government sources has decreased from 62.6 to 7.8 percent for outpatient cases during 1995-96 to 2014 in KBK region. It has decreased from 49.3 to 28.1 percent for

Odisha. Compared to the state average of 49.3 percent, percentage of treated illness in the KBK region from non government sources was 62.6 percent in 1995-96 and at the same time, people dependence on non government sources dramatically decreased in the KBK region to 7.8 percent in 2014 (28.1 percent for Odisha). The high percentage of dependence in private institutions for the year 1995-96 could be possible in two alternative situations. Either KBK people could able to afford health care from high cost private institutions or there was low base/unavailability of government health care institutions. The conclusion will be in favour of the latter reasoning as it has significantly decreased in the year 2014. With the increase in the standard of living, the preference of non government sources of treatment for outpatient cases increases, and this has been observed across all the time periods. Similarly, educational status and preference of non government sources of treatment are found to be positively related. Moreover, rural households are utilising less non-government sources for outpatient care due to non affordability and low base of private health care institutions in rural areas.

Inpatient care is a special care which requires a hospital stay, hence the monetary costs are expected to be significantly higher than the outpatient care, especially in the private institutions. Moreover, not all private hospital/clinic provide inpatient care, hence it is restricted in number than the outpatient health facilities. This means people's choice is limited by high cost of treatment and long distance facility for inpatient care. Hence, compared to outpatient care, less people are utilising inpatient care from private institutions. The data reveals that the percentage of people utilising non government sources for inpatient care in urban areas is more than the rural areas. This is because the private health facilities mostly concentrate on urban areas. Because of non availability of private inpatient facilities the share of people receiving inpatient care from non-government sources in KBK region is less compared to the state average during 1995-96 to 2014. Less percentage of people belonging to socially and economically disadvantaged groups (SC, ST, poor, illiterate and labour categories) are utilising inpatient care from private institutions.

Table 4.13: Reasons for not availing govt. health care services in KBK Region & Odisha

Reasons	KBK Region			Odisha		
	1995-96	2004	2014	1995-96	2004	2014
Govt. doctor/facility too far	26.2	32.0	11.1	30.9	25.1	11.0
Not satisfied with treatment	14.3	18.4	52.3	21.8	27.2	53.3
Long waiting	2.0	-	3.7	0.2	5.8	7.9
Required specific service not available	-	8.8	29.6	-	6.5	8.4
Others	57.5	40.8	3.3	47.1	35.3	19.5

Source: Similar to Table 4.12

Health is considered as a state subject and it is commonly argued that it is the prime duty of the state to provide equitable and affordable health care services to the people. Despite the continuous effort of the government, it fails to provide basic health care facilities to its citizen. Table 4.13 depicts the drawbacks of the public health care system in the KBK region and Odisha. It has observed that people's dissatisfaction toward government treatment has been increased from 14 percent in 1995-96 to 52 percent in 2014 and has become the prime reasons for not availing government health care services in the KBK region as well as in the State. It indicates that more than half of the ailing persons have not availed government health care services because of unsatisfactory treatment and poor quality services. Though there has been an increase in the government health care facilities, still the government is not able to provide the specific service required by people. Almost 30 percent are not availing because specific services are not provided in government health institutions. Other reasons for not availing government health services include lack of personal attention, doctors are not available, medicines are not available and private doctors are more easily available. Non availability of the doctor is one of the major reasons for not taking medical treatment in the KBK region of Odisha. Despite attractive packages in terms of higher salaries/incentives, the government fails to retain medical officers in the KBK region severely affecting the health services of the region (India Medical Times, 2014 and 2015).

4.4.4 Reasons for not Seeking Medical Treatment in KBK Region and Odisha

Table 4.14 and Table 4.15 depict the reasons for not seeking any medical treatment in the KBK region and Odisha. The data reveals that the trend for lack of medical facility as a reason for not availing medical treatment has decreased from 48.6 percent in the year 1995-96 to 5.1 percent in 2014 in the KBK region and the same figure has decreased from 15.5 percent to 5.5 percent during the same period for the State. This implies that there is an increase in the health infrastructure over the two decades and this improvement in the medical facilities has happened in the state especially after the NRHM. It is interesting to note that there is a dramatic increase in the proportion of people reporting illness not serious as the reason for not seeking treatment in the two decades for both KBK region and Odisha.² This indicates that the awareness regarding medical condition has not improved in the state

² Contrary to this, Mukherjee and Karmakar (2008) found that "people reporting illness was not serious" as a reason for not seeking treatment has been decreased significantly over the period of 1986-87 to 2004.

and the KBK region; further this point can be justified from the Table 4.11 that in Odisha as well as KBK region with the increase in the level of education the medical seeking behaviour has increased over the period from 1995-96 to 2014. One of the main reasons for not availing medical treatment is the financial constraint especially in the rural areas. In India, more than one fourth are not receiving medical treatment because of financial problem (Mukherjee A N and K Karmakar, 2008). Similar to this, 22 percent people are not taking medical treatment because of financial constraint in the KBK region against 9 percent for Odisha. More interestingly, the data shows that the financial reasons for not seeking treatment has increased from 10 percent to 22 percent for KBK region during the period from 1995-96 to 2014, the case is more severe especially among labour class households. Hence, affordability is a major issue in the KBK region, as discussed already in Table-3.6 more than 70 percent of the households in the KBK region belongs to labour and agricultural households. The last category which includes 'other reasons' reveals a decreasing trend in KBK region and Odisha, may be interesting one, because it includes the treatment from informal sources such as either from family members, from untrained and unregistered practitioners but not considered as medical treatment. Rural, socially and economically backward people pointed out that the lack of medical facility and financial problems is the major reasons for not taking care.

Table 4.14 Reasons for Not Seeking Medical Treatment in the KBK Region of Odisha

Background Characteristics		No Medical Facility			Lack of faith/Not Satisfied			Long waiting			Financial Constraint			Ailment is not serious			Others		
		1995	2004	2014	1995	2004	2014	1995	2004	2014	1995	2004	2014	1995	2004	2014	1995	2004	2014
Sector	Rural	54.4	22.7	5.1	15	0	14.7	0			4.9	1.2	21.9	19	37.7	50.1	6.7	38.3	8.1
	Urban	0	0	0	0	18.9	0	6.1			51.8	34.5	0	32.5	0	100	9.6	46.6	0
Occupational Class	Self Employed	5.4	6.2	0	0	0	92.3	0			29.9	0	0	51.7	0	7.7	13	93.8	0
	Agriculture	75.3	54.8	8	8.2	0	0	0			0	0	0.7	13.9	41.7	75.8	2.6	3.6	15.4
	Labour	20.3	7.5	1.9	24.2	1.4	29.1	1.8			18.2	4.2	46.8	23.4	44.6	22.1	12.1	42.2	0
	RWS	0		0	0		0	0			0		0	100		100	0		
	Others	0	0		0	0		0			84.2	18		0	0		15.8	82	0
Religion	Hindu	-	20.5	5.1	-	0.8	14.6	-			-	2.7	21.8	-	35.8	50.5		40.2	8.1
	Muslim	-			-			-			-			-					
	Christian	-	50		-	0		-			-	0		-	50			0	
	Others	-	0		-	0		-			-	0		-	0			100	
Caste	ST	55.9	39.2	13.5	21.7	0	0	1.1			3.3	2.9	83.9	9.4	46.8	1.6	8.7	11.1	0.9
	ST	49.6	0	0	0	0	57.9	0			26.9	4	0	23.5	15.8	7	0	80.2	35.1
	OBC		4.2	3.1		3.4	3.3					1.6	0		0	93.6		90.8	0
	Others	26.6	0		0.1	0		0			15.6	0		49.7	100		7.9	0	
MPCECLAS S	Poorest	48.8	21.7	0	0	1.1	0	2.3			25.3	1.9	34.7	18.1	43.3	52.2	5.6	32.1	13.1
	Poor	57.3	22.6	97.7	20.8	0	0	0			6.4	0	0	15.6	33.1	2.3	0	44.3	0
	Middle	36.7	30.9	4.6	0	0	42.5	0			0	1.2	0	30.4	0	52.9	32.9	67.9	0
	Rich	42.9	0	0	36.4	0	0	0			0	28.7	0	17.3	28.7	100	3.4	42.6	0
	Richest	0	0	0	0	0	0	0			0	0	100	77.2	0	0	22.8	100	0
Educational Status	Illiterate	51.1	23.1	5.1	12.5	0.8	10.4	0.7			10.4	1.8	31.8	18.5	40.5	34.6	6.7	33.8	18
	Elementary	30.7	16.3	6.7	20.9	0.7	23.3	0			7	6.1	18	34.4	19.1	52	7	57.9	0
	Secondary	0	100	0	0	0	2.9	0			0	0	0	51.2	0	97.1	48.8	0	0
	Higher Sec.	0		0	0		0	0			0		0			100	100		0
Total		48.6	21.8	5.1	13.4	0.8	14.6	0.7			10	2.6	21.8	20.4	36.3	50.5	7	38.6	8.1

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round data

Table 4.15 Reasons for Not Seeking Medical Treatment in the State of Odisha

Background Characteristics		No Medical Facility			Lack of faith/Not Satisfied			Long waiting			Financial Constraint			Ailment is not serious			Others		
		1995	2004	2014	1995	2004	2014	1995	2004	2014	1995	2004	2014	1995	2004	2014	1995	2004	2014
Sector	Rural	16.8	7.8	6.1	5.3	1.6	3.2	1		4.6	22.8	23.1	9.8	41.1	35.9	70	14.5	31.5	6.3
	Urban	0	2.7	1.9	0	4.3	0.8	3.3		13.9	47.2	59.7	1.5	37.6	14	75.3	11.9	19.2	6.5
Occupational Class	Self Employed	4.1	1.9	1.3	1.4	0	2.5	0.6		5.1	33.8	24.9	0	47.2	27.5	87.5	12.9	45.7	3.6
	Agriculture	25.6	16.1	2.8	3.8	2	0	2.2		10.5	19.8	10.1	11.5	36	49.1	65.9	12.6	22.7	9.2
	Labour	9.2	4	16.1	9.1	2.2	9	0.5		0	25	35	15.8	43.9	28.3	52.6	13.4	30.4	6.6
	RWS	0		0	0		0	0		7.8	72.5		0.7	27.5		88.3	0		3.2
	Others	14.6	0	0	0	0	0	0		0	14.8	23.7	4.4	46.8	22	92.8	41.5	54.3	2.8
Religion	Hindu	-	7.2	5.5	-	1.9	2.7	-		6	-	23	8.6	-	35.4	70.8	-	32.5	6.4
	Muslim	-	0	0	-	0	49.6	-		0	-	81.5	0	-	18.5	50.4	-	0	0
	Christian	-	30.9		-	0		-			-	31.9		-	37.2		-	0	
	Others	-	0		-	0		-			-	0		-	0		-	100	
Caste	ST	33.3	16.2	20.3	11.4	0	0	0.5		0	23	31	34.1	17.9	30.8	38.4	14	22	7.3
	ST	11	0	0	1.4	4.3	23.9	0		9.8	28.2	21.2	0	51.6	26.2	33.4	9.3	48.2	32.9
	OBC		3	0.6		3.3	0.9			0		16.6	1.1		43.3	95.3		33.8	2
	Others	5.8	0	2.7	2.1	0	1	2.2		23	24.3	29.1	1.6	51.1	45.1	68.4	16.6	25.9	3.2
MPCE Quintile	Poorest	14.1	14.8	0	0.6	0.6	0	0.6		6.2	35.3	28	12	38.9	29.8	77.2	10.6	26.8	4.6
	Poor	29.4	3.9	27.7	9.7	3.1	0	4.3		0	10	27.2	22.6	37.1	30	39.3	9.5	35.8	10.4
	Middle	8.9	7.2	1.8	1.9	0	17.6	0		0	28.7	19.6	0.6	41	40	78.2	19.6	33.2	1.8
	Rich	12	0	1.9	8.1	0	1.3	0.6		23.1	18.6	14.2	2.1	46.9	69.7	58.8	19.4	16.2	12.8
	Richest	9.9	0	0	6	9.8	0	0		0	30	31.3	1.2	42.7	0	95.5	14.1	58.9	3.3
Educational Status	Illiterate	19.6	9.2	4.8	6.2	1.5	3.2	0.7		6.9	26.6	29.6	12.9	34.9	31.9	59.3	12.7	27.8	12.9
	Elementary	7	3.9	5.5	2.4	2.6	3.7	2.5		5.9	21.4	14.5	7.2	51.9	40.9	73	17.3	38.1	4.6
	Secondary	8.9	6.6	11.8	0.9	0	0.6	0		7.8	0.6	3.9	6.2	77	77.1	70.4	12.5	12.4	3.1
	Higher Sec	22.7	0	0	0	0	0	0		3.6	58.9	10.7	11.7	14.3	48.6	83.1	4.1	40.7	1.6
	Higher Education		0	0		0	0.6			0		7.5	0		0	95.5		92.5	3.9
Total		15.5	7.6	5.5	4.9	1.8	2.9	1.2		6	24.7	24.9	8.6	40.8	34.8	70.8	12.9	30.9	6.4

Source: Author's Own Calculation from NSSO 52nd, 60th and & 71st Round data

4.5 Modelling Choice of Health Care Provider in the KBK Region of Odisha

In this study the demand for curative health care is the choice of health care provider³. Choice of health care provider is most powerful for health care demand modelling when health expenditure questionable dependent variable due to free or highly subsidised health care services (Havemann and Berg, 2002). The choice of health care provider is a complex process where a set of individual as well as household level characteristics interact with each other to determine the final outcome. Moreover, the difference in the quality of health care

³ By following the discrete choice model of Gertler, Locay and Sanderson (1987); Dor, Gertler and Gaag (1987); Mwabu et al. (1993) and Gupta and Dasgupta (2000).

services and the returns to health investments are considered to be important component of health seeking behaviour. From theoretical prospective, choice of health care is also determined by 3As, i.e., availability, affordability and acceptability. Knowledge on the choice of health care providers separately for inpatient and outpatient services help the policy makers better evaluate the policies and design a more cost effective health care system and to improve the health care utilisation from formal sources. The first condition is that the individual must perceive the illness, then the individual or any other family member must take a decision whether to seek treatment or not. The next decision is the choice of health care providers among the available alternatives. In this section an attempt has been made to examine factors influencing the choice of inpatient and outpatient health care provider with the help of binary logistic model and multinomial logistic model.

Variable Descriptions and its Measurement:

Monthly Per Capita Consumption Expenditure (MPCE): Standard of living or economic status of the household is considered to be a significant enabling factor in order to purchase health care services. In the absence of income or wealth variable, monthly per capita consumption expenditure is used as better proxy for economic status of the household. With increase in the economic status, there is a greater chance of the household to opt for better health care compared to no care in the event of illness. High income individuals prefer formal treatment, mostly the private care due to their affordability. Many studies have shown that untreated morbidities are higher for lower consumption quintiles compared to their counterparts in India (Mukherjee and Karmaker, 2008; Iyer et al. 2007; Nayar, 2007; Acharya, 2010). Empirical evidence also supports that choice of health care provider differs significantly between low income earner and high income earner. Moreover, the probability of choosing private health care services increases and that of public health services decreases with the increase in income (Heller, 1982). Monthly per capita consumption expenditure has been used as a continuous variable.

Doctor fee or price of health care: The price of health care is found to have left significantly negative impact on the quantity demand for health care, i.e., physician visits and hospital visits (Newhouse and Phelps, 1974; Manning et al., 1987; Zhou et al. 2011). Similarly studies like Akin et al. (1995) and Mwabu et al., (1993) found that price and quality of care are significant determinants of health care choices and higher prices tend to reduce usage of

health care and quality increase the health care choice. The own price elasticities of demand for all health care options are very high and there is a very high degree of substitution between private and public care was found in Rural Tanzania (Sahn et al. 2003). On the other hand, Dor et al. (1987) and Gertler and Van Der Gaag (1990) study found that economic variables such as income and prices do not influence the health care choices. There is no difference in the price responsiveness of different income groups. In this study doctor's/surgeon's fees (hospital staff and other specialists) are taken as price of health care and it is a continuous variable.

Opportunity cost of time: Non monetary factors like distance and cost of time found to be significant determinant of demand for health care services is well established in the past studies (Acton, 1975 and Mwabu, 1989). Moreover, patient's waiting time in the clinic or hospital is considered to be an important indicator of quality of services offered by hospitals (Maxwell, R., 1984; Adamu, and Oche, 2013). The amount of time a patient waits to avail health care is perceived as a barrier to obtain services. The time cost of the patient not only includes cost of travelling time and waiting time to access health care, but also includes the other dimensions of time, i.e., indirect cost of illness or earning loss. Therefore, high opportunity cost of time is associated with higher wages or earnings; therefore greater will be the preference for private or better health facilities compared to no care in order to reduce the opportunity cost of health shock. However, if time cost is measured by considering distance and waiting time only, then those who do not access health care are not taken into account⁴. Opportunity cost of time is difficult to measure but it can be related to earning of the individual. Hence, in this study opportunity cost of time is measured in terms of earning loss of the patient and it is a continuous variable.

Severity of Illness: Severity of illness is one the need factor which compel the individual or the patient to seek treatment and choice of health care providers. Longer the duration of reported illness, the greater the probability of demanding all treatment options except public clinics and dispensaries. This may reflect that treatment from public clinics is sought for relatively minor cases of illness, or in the earlier stages of disease (Sahn et al. 2003). Similarly patient with severe or life threatening illness preferred larger urban or rural

⁴ The percentage of patient not availing medical treatment varied from 34.3 to 14.3 percent during 1995-96 to 2014 in KBK Region of Odisha.

hospitals over smaller or nearest hospitals (Jintanakul and Otto, 2009). Severity of illness is continuous variable measured in terms of total duration of ailment days in non-hospitalisation case and total duration of stay in the hospital in hospitalisation case.

Patterns of Diseases: All the reported ailments or diseases are classified into five categories in this study; hence it is a categorical variable⁵. The health seeking behaviour may be influenced by different type of diseases. For instance, more advanced and severe illness may be require intense care and treated differently than early stage disease, where home remedies may initially suffice. Illness type and severity are found to be most significant determinant of health seeking behaviour (Wang, M. et al. 2010; Wenya Yu et al. 2017). Due to non-availability of required treatment, there is a substitution between public and private health care. Some of the diseases like hypertension, blood pressure, diabetes, joint pain etc. require regular check up or visit to a doctor/clinic; hence the health seeking behaviour of the individuals do not change frequently.

Residence Status: Place of residence is used as a dummy variable and it is basically an indicator of geographic access to health care facilities. Urban sector does have a better access to both public and private health care services. Distance is a strong barrier to access to health care and health seeking behaviour of the rural people. However patients are likely to travel further for better treatment when provider quality and reputation is a particular concerned for the rural people (Qian et al. 2009). Distance increases the likelihood of a patient opting for informal health care providers rather than any of the formal health care providers (Audu et al. 2014). Distance increases the access cost of health care services in the form of longer travel time and high transportation cost, which ultimately discourage utilisation of health care services.

Caste: Caste is an important indicator of social status that constitutes an essential component of the social system itself. Lower castes are economically and socially disadvantaged, and these caste gaps exist in both rural and urban India. (Ayres and Simon 2003, Deshpande 2002). Several micro level studies have demonstrated the discrimination or unequal access to health care services on the basis of caste, for instance, socially and marginalised are least access to both preventive and curative health care services (Govender and Kekana 2007;

⁵ The details of disease classification are given in **Appendix 4.A** of this chapter.

Peters et al 2002). Choices of medical treatment vary from one caste to another caste due to differences in beliefs and practices on health, discrimination practices by health care providers, and differences in returns and benefits to investments in health. It is observed that lower caste households may invest less in health issues simply because they cannot afford to pay for treatment or because they live in remote places, far away from good locations of health facilities (Luke and Munshi, 2007).

Sex of the Patient: There exists biological difference in terms of the attitudes, life styles and health behaviour of men and women. The role of gender and health seeking behaviour is highlighted by many authors (Viera et al. 2006; Mwabu et al., 1993; Sahn et al., 2003 and Saurborn et al. 1996; Qian et al., 2010). However, the results are inconclusive in nature. For instance, Saurborn et al. (1996) reported that not gender, but age difference in the resource allocation for health care, whereas, Viera et al. (2006) found that the difference exists between male and female in health care utilisation and females are less likely to avail treatment, where the opposite results were found, showing men less likely to seek out available treatments (Sahn et al., 2003). Sex or gender of the patient is included as a dummy variable to examine the gender discrimination in choosing health care providers.

Age Structure and Household Size: Age is generally considered to be an important component of health and illness as the stock of individual's health greatly vary with the age. Age structure is a categorical variable, classified into three groups such as 0-14 years, 15-59 years and above 60 years, to examine its differential impact on choice of health care. For instance, children or elderly persons are more vulnerable to health risks and thus child age group and elderly persons are likely to utilise more health care in order to restore their health stock. Interestingly, for elderly people the probability of visiting lower level providers or self care is higher than accessing higher level care rural china (Qian, et al., 2009). Moreover, patients above 85 years, choose a health care closer to their home (Jintanakul and Otto, 2009). This implies that elderly patients are the ignorance groups in the household. Apart from age structure household size is also an important determinant of health and illness. The probability of someone being ill is more in a larger household (O' Donnell et al. 2005). Moreover, if the disease is contagious or communicable in nature then it is more likely that more number of persons will be sick in larger household. Similarly, the decision to utilise health care facilities and choice of health care provider also gets affected by the size of the

household. Larger households are less likely to seek care, in an illness event because of competition for resources in the household. Empirical evidence also suggests unmet need of health care increases, in relation to the household size (Olaniyan and Sunkanmi, 2012). Household size is the total member in a family which is a continuous variable in the present research.

Educational Status of the Household Head: Education is an enabling factor that helps in the production of stock health. Educated people are more aware and will be more likely to relate symptoms with the presence of disease in better ways. Better educated individuals are more efficient producers of health than less educated individuals (Grossman, 1972). Similarly, there is a close association between health seeking behaviour or choice of health care and the level of education, particularly the education of the household head. The education of the household head plays a key role in the choice of health care providers for other family members. Hence, the education of the head of the household is taken into account. Moreover the information cost and search cost for better health care services of an educated individual will be different from uneducated one. The individuals with higher education are found to have higher odds of utilising care from a private healthcare provider than their illiterate counterparts (Ghosh, 2014). Contrary to this, Sahn et al. (2003) found that education increases the choice of health care for all options, but the rate of increase in demand with more education is the greatest for public hospitals and next for private hospitals. In this study education of the household head is a categorical variable and is positively associated with both public and private health care choice compared to no care.

Insurance Status: Like income and education, health insurance is also an enabling factor that pushes the individual or household to seek treatment from formal sources. Health Insurance removes the cost related barriers to access health care. Hence, the health seeking behaviour of insured individual will be different from uninsured individual. Insurance status has a significant impact on the choice of health care providers relative to self-treatment (Qian et al. 2009; Wang, M. et al. 2010; Dou, W. J et al. 2015). There are few studies which show that Insurance coverage has no power in explaining visit choices or healthcare-seeking preference (Akin et al. 1986; Wenya Yu et al. 2017). Health insurance status of the patient is taken into account and it is a dummy variable having and not having health insurance.

4.5.1 Choice of Inpatient Health Care Providers

The dependent variable is the choice of inpatient health care provider and it is classified into two categories such as public health care and private health care. Since the dependent variable is a binary variable, a binomial logistic model can be applied. The dependent variable is qualitative in nature; takes value 1 or 0 for the choice of public health care provider and choice of private health provider respectively.

Let the probability distribution of Y_i be:

$$P_i = \text{Prob}(Y_i = 1) = \text{Choice of public health care provider}$$

$$1 - P_i = \text{Prob}(Y_i = 0) = \text{Choice of private health care provider}$$

Characteristics of Logit Model

The logistic probability distribution function can be:

$$P_i = \frac{1}{1 + e^{-(\beta_0 + \beta_i X_i)}} \quad \text{----- (4.1)}$$

$$P_i = \frac{1}{1 + e^{-z_i}} = \frac{e^z}{1 + e^z} \quad \text{----- (4.2)}$$

Where

$$Z_i = \beta_0 + \beta_i X_i \quad \text{----- (4.3)}$$

Equation (3) represents what is known as the (cumulative) logistic distribution function.

$$1 - P_i = \frac{1}{1 + e^{z_i}} \quad \text{----- (4.4)}$$

Therefore, we can write

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{z_i}}{1 + e^{-z_i}} = e^{z_i} \quad \text{----- (4.5)}$$

Now $P_i/(1 - P_i)$ is simply the odds ratio in favour of choice of public health care provider (or the ratio of probability that the individual will choose public health care provider to the probability that the individual will not choose public health care provider.

$$L_i = \ln \left(\frac{P_i}{1 - P_i} \right) = Z_i = \beta_0 + \beta_i X_i \quad \text{----- (4.6)}$$

Here, L_i is the log of odd ratios, which is not only linear in X , but also linear in the parameters. L is called the Logit function.

The Logistic Regression Model

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_i X_i + u_i \text{ -----(4.7)}$$

where X = vector of explanatory variables.

The coefficient vector ‘ β ’ measures the impact of independent variables on the log odds (Logit) of the choice of public health care providers compared to private health care providers.

Table 4.16 Estimated Binomial Logistic Model for Choice of Inpatient Health Care Providers (Pvt. Health Care is the Base Category) in KBK Region

Dep. Variable (Choice of Outpatient Health Care Providers)	52nd Round(1995-96)				60th Round(2004)				71st Round(2014)			
	Public Health Care				Public Health Care				Public Health Care			
Independent Variables	Coef.	OR	Std.Err.	Sig.	Coef.	OR	Std.Err.	Sig.	Coef.	OR	Std.Err.	Sig.
Constant	39.180	1E+17	16618	0.998	3.638	38.000	1.158	0.00*	-0.028	0.972	0.986	0.977
Household Size	0.556	1.74	0.159	0.00*	-0.268	0.765	0.053	0.00*	-0.216	0.806	0.079	0.00**
MPCE	-0.051	0.95	0.001	0.612	-0.031	0.969	0.001	0.03**	0.001	1.001	0.000	0.612
Doctor Fee					-0.007	0.993	0.002	0.00*	-0.004	0.996	0.000	0.00*
Severity of Illness	-0.035	0.97	0.014	0.01*	-0.040	0.961	0.017	0.01*	-0.045	0.956	0.023	0.05**
Opportunity cost of time	0.005	1.00	0.000	0.04**	-0.001	0.999	0.000	0.00*				
Sector (Rural)#												
Sector (Urban)	0.045	1.05	0.502	0.928	-0.804	0.447	0.359	0.02**	-1.320	0.267	0.434	0.00**
Caste (ST)#				0.354				0.00*				0.00*
Caste (SC)	19.190	2E+08	3560	0.996	1.802	6.063	0.445	0.00*	1.089	2.971	0.428	0.01*
Caste (OBC)					1.012	2.752	0.390	0.00*	1.652	5.216	0.457	0.00*
Caste (Other)	-0.763	0.47	0.530	0.150	0.764	2.146	0.326	0.01*	0.426	1.531	0.427	0.318
Disease Patteerns (Infectious)#				0.00*				0.00*				0.00*
Disease Patteerns (NCD)	0.783	2.19	0.647	0.226	1.176	3.241	0.295	0.00*	1.079	2.943	0.404	0.00*
Disease Patteerns (Cardiovascular)	-2.692	0.07	1.158	0.02**	1.524	4.592	0.430	0.00*	0.807	2.241	0.355	0.02*
Disease Patteerns (Disabilities)	-5.853	0.00	2.374	0.01*	-0.573	0.564	0.592	0.333	-1.102	0.332	0.537	0.04**
Disease Patteerns (Other Diseases)	-1.187	0.31	0.613	0.05**	2.503	12.220	0.640	0.00*	1.965	7.131	0.458	0.00*
Age Group (0-14)#				0.01*				0.00*				0.697
Age Group (15-59)	16.474	1E+07	3670	0.996	1.115	3.050	0.634	0.07***	-0.433	0.649	0.564	0.443
Age Group (60 and above)	-2.885	0.06	0.983	0.00*	-0.563	0.569	0.559	0.313	-0.340	0.712	0.428	0.427
Sex of the Patient (Male)#												
Sex of the Patient (Female)	0.820	2.27	0.427	0.05**	-0.341	0.711	0.246	0.166	-0.052	0.949	0.251	0.835
Education of Head(Illiterate)#				0.265				0.08***				0.540
Education of Head(Elementary)	-18.789	0.00	11216	0.999	0.711	2.036	0.664	0.285	0.881	2.414	0.652	0.177
Education of Head(Sec.)	-18.357	0.00	11216	0.999	0.998	2.712	0.646	0.122	1.012	2.751	0.632	0.10***
Education of Head(Hr. Sec.)	-19.656	0.00	11216	0.999	1.668	5.303	0.744	0.02**	0.584	1.793	0.659	0.376
Education of Head(Hr. Edn)		1.00			-0.102	0.903	0.918	0.912	1.030	2.801	0.818	0.208
Insurance_Status (No)#		1.00										
Insurance_Status (Yes)	-18.566	0.00	12262	0.999					-0.223	0.800	0.273	0.414
Source: Author's Own Estimation	Number of obs = 507				Number of obs = 969				Number of obs = 624			
from NSSO 52nd, 60th and 71st	Cox and Snell R Square = 0.223				Cox and Snell R Square = 0.286				Cox and Snell R Square = 0.382			
Round Data	Nagelkerke R Square = 0.494				Nagelkerke R Square = 0.498				Nagelkerke R Square = 0.547			
Note: # is Reference Category	(-2 Log Likelihood)= 176.15				(-2 Log Likelihood)= 501.57				(-2 Log Likelihood)= 447.46			

Note: *, ** and *** indicate 1%, 5% and 10% significance level

Table 4.17 Estimated Binomial Logistic Model for Choice of Inpatient Health Care Providers (Pvt. Health Care Reference Category) in Odisha

Dep. Variable (Choice of Outpatient Health Care Providers)	52nd Round(1995-96)				60th Round(2004)				71st Round(2014)			
	Public Health Care				Public Health Care				Public Health Care			
Independent Variables	Coef.	OR	Std.Err.	Sig.	Coef.	OR	Std.Err.	Sig.	Coef.	OR	Std.Err.	Sig.
Constant	21.142	2E+09	9328	0.998	1.029	2.800	0.269	0.00*	0.961	2.614	0.379	0.01*
Household Size	-0.027	0.973	0.017	0.110	0.018	1.018	0.013	0.166	-0.044	0.957	0.024	0.06**
MPCE	-0.003	0.997	0.000	0.00*	-0.004	0.996	0.000	0.00*	-0.001	0.999	0.000	0.00*
Doctor Fee					0.000	1.000	0.000	0.00*	0.000	1.000	0.000	0.00*
Severity of Illness	0.003	1.003	0.003	0.351	0.000	1.000	0.003	0.956	0.010	1.010	0.004	0.02**
Opportunity cost of time	0.000	1.000	0.000	0.116	0.000	1.000	0.000	0.00*				
Sector (Rural)#												
Sector (Urban)	0.210	1.234	0.119	0.07***	-0.001	0.999	0.102	0.993	-0.050	0.951	0.131	0.700
Caste (ST)#				0.00*				0.552				0.00*
Caste (SC)	-0.178	0.837	0.156	0.254	-0.045	0.956	0.129	0.730	0.720	2.054	0.168	0.00*
Caste (OBC)					-0.144	0.866	0.115	0.210	0.597	1.816	0.154	0.00*
Caste (Other)	0.490	1.633	0.182	0.00*	-0.111	0.895	0.097	0.254	-0.313	0.731	0.125	0.01*
Disease Patteerns (Infectious)#				0.00*				0.00*				0.00*
Disease Patteerns (NCD)	0.434	1.543	0.163	0.00*	0.612	1.845	0.091	0.00*	0.416	1.516	0.151	0.00*
Disease Patteerns (Cardiovascular)	-1.057	0.347	0.145	0.00*	0.461	1.585	0.099	0.00*	0.056	1.057	0.138	0.687
Disease Patteerns (Disabilities)	-0.540	0.583	0.250	0.03**	0.542	1.719	0.192	0.00*	-0.431	0.650	0.213	0.04*
Disease Patteerns (Other Diseases)	0.221	1.247	0.166	0.185	1.117	3.055	0.142	0.00*	-0.131	0.878	0.135	0.334
Age Group (0-14)#				0.00*				0.00*				0.453
Age Group (15-59)	0.916	2.500	0.233	0.00*	0.758	2.134	0.140	0.00*	-0.209	0.812	0.181	0.248
Age Group (60 and above)	-0.207	0.813	0.156	0.183	-0.105	0.900	0.101	0.299	-0.139	0.870	0.129	0.281
Sex of the Patient (Male)#												
Sex of the Patient (Female)	-0.199	0.819	0.114	0.08***	0.007	1.007	0.073	0.924	0.021	1.021	0.097	0.831
Education of Head(Illiterate)#				0.359				0.137				0.143
Education of Head(Elementary)	0.414	1.512	0.278	0.136	0.195	1.216	0.184	0.289	0.449	1.566	0.236	0.05**
Education of Head(Sec.)	0.476	1.609	0.270	0.07***	0.111	1.117	0.178	0.533	0.276	1.317	0.223	0.216
Education of Head(Hr. Sec.)	0.456	1.578	0.311	0.143	0.290	1.336	0.210	0.169	0.070	1.073	0.246	0.775
Education of Head(Hr. Edn)					-0.222	0.801	0.240	0.354	0.183	1.201	0.277	0.508
Insurance_Status (No)#												
Insurance_Status (Yes)	-19.019	0.000	9328	0.998					-0.692	0.501	0.118	0.00*
Source: Author's Own Estimation	Number of obs = 3441				Number of obs = 5280				Number of obs = 2120			
from NSSO 52nd, 60th and 71st	Cox and Snell R Square = 0.067				Cox and Snell R Square = 0.121				Cox and Snell R Square = 0.165			
Round Data	Nagelkerke R Square = 0.127				Nagelkerke R Square = 0.185				Nagelkerke R Square = 0.221			
Note: # is Reference Category	(-2 Log Likelihood)= 2367.57				(-2 Log Likelihood)= 4901.78				(-2 Log Likelihood)= 2517.20			

Note: *, ** and *** indicate 1%, 5% and 10% significance level

The estimated binomial logistic regression results for KBK region and Odisha are presented in Table 4.16 and 4.17 respectively. It has been found that in KBK region, probability of the choice of public health care providers over private health care providers is statistically significant and remarkably influenced by factors such as MPCE, household size, disease patterns, severity of illness, User fee and opportunity cost of time. The negative coefficients of MPCE in different periods indicate that the likelihood of the choice of public health care decreases with the increase in MPCE. Higher the MPCE, greater the affordability of private health care providers and therefore lower the probability of choice of public health care providers in case of inpatient care. The likelihood of public health care choice decreases with higher user fee or doctor fee. The result shows that the coefficients of severity of illness turned out to be negative in all the three periods; it implies that the likelihood of the choice of private health care over public health care increases with the increase in severity of illness as measured by number of sickness days. When the illness is more severe, then the patient requires more attention and intense care, hence the probability of choice of private health care is high on better quality ground. Moreover, the access cost of care (waiting time and opportunity cost of time etc.) is low in private facilities compared to public health care facilities. Caste and disease patterns are other statistically significant determinants of the probability of the choice of public health care providers over the choice of private health care providers in the KBK region. The odd ratios (OR) are turned out to be greater than one for SC, OBC and other category. This indicates that odds are favouring the choice of public health care over private health care for the patients belonging to these social groups. It means compared to ST category the choice of public health care provider is higher among the patients belonging to SC, OBC and other category. The chances of preferring public health care providers over private providers is found to be more (as the odd ratios are greater than one) for those patients suffering from non communicable diseases, cardiovascular diseases and other diseases, particularly for the period 2004 and 2014. However, this finding is inconsistent for the year 1995-96 (the odd ratios are found to be less than one), because most of the people preferred private informal care for most of the diseases due to non availability of public health care facilities in the KBK region.

Similar to the KBK region, the estimated signs and statistical significance are almost same for most of the variables and it can be observed from Table 4.17 that variables such as MPCE, household size, disease patterns, age group, severity of illness and insurance status of the patient are statistically significant determinant of choice of public health care providers in

the state Odisha. For instance, Insurance status of the individual patient is found to be statistically significant at 1 percent level in the year 2014 for Odisha. The negative value of the coefficient and the odd ratio (0.8) indicates that other thing remaining constant, the likelihood of the choice of public health care provider decreases for person having insurance facilities.

Table 4.18 Estimated Mean Predicted Probabilities for Choice of Inpatient Health Care Providers in the KBK Region and Odisha

Dep. Variable (Choice of Inpatient Health Care Providers)	Choice of Inpatient Health Care Providers KBK Region			Choice of Inpatient Health Care Providers Odisha		
	52nd Round(1996)	60th Round(2004)	71st Round(2014)	52nd Round(1996)	60th Round(2004)	71st Round(2014)
Independent Variables	Public Health Care	Public Health Care	Public Health Care	Public Health Care	Public Health Care	Public Health Care
Sector (Rural)	0.924	0.884	0.791	0.893	0.789	0.491
Sector (Urban)	0.892	0.834	0.343	0.835	0.742	0.311
Caste (ST)	1.000	0.950	0.833	0.882	0.845	0.684
Caste (SC)	0.867	0.883	0.870	0.929	0.783	0.612
Caste (OBC)		0.805	0.725		0.763	0.362
Caste (Other)	0.895	0.657	0.325	0.859	0.755	0.318
MPCE (Poorest)	0.970	0.891	0.809	0.909	0.824	0.579
MPCE (Poor)	0.972	0.894	0.686	0.901	0.806	0.485
MPCE (Middle)	0.925	0.806	0.667	0.894	0.789	0.458
MPCE(Rich)	0.900	0.810	0.691	0.873	0.763	0.375
MPCE(Richest)	0.810	0.712	0.370	0.844	0.716	0.251
Disease Patteerns (Infectious)	0.953	0.894	0.858	0.928	0.835	0.588
Disease Patteerns (NCD)	0.708	0.873	0.611	0.723	0.744	0.385
Disease Patteerns (Cardiovascular)	0.909	0.577	0.265	0.773	0.729	0.288
Disease Patteerns (Disabilities)	0.907	0.939	0.826	0.898	0.857	0.376
Disease Patteerns (Other Diseases)	0.909	0.700	0.698	0.892	0.701	0.466
Age Group (0-14)	1.000	0.922	0.848	0.950	0.883	0.504
Age Group (15-59)	0.876	0.803	0.701	0.854	0.750	0.429
Age Group (60 and above)	0.968	0.863	0.596	0.867	0.770	0.389
Sex of the Patient (Male)	0.924	0.824	0.724	0.880	0.776	0.429
Sex of the Patient (Female)	0.889	0.864	0.702	0.867	0.782	0.433
Education of Head(Illiterate)	0.930	0.870	0.790	0.891	0.806	0.529
Education of Head(Elementary)	0.901	0.840	0.748	0.875	0.768	0.451
Education of Head(Sec.)	0.800	0.774	0.574	0.817	0.777	0.349
Education of Head(Hr. Sec.)	1.000	0.600	0.632	0.738	0.661	0.313
Education of Head(Hr. Edn)		0.667	0.265		0.725	0.242
Insurance_Status (No)	0.909	0.843	0.622		0.779	0.383
Insurance_Status (Yes)	1.000		0.823			0.581

Source: Author's Own Estimation from NSSO 52nd, 60th and 71st Round Data

Predicted Probabilities

Though predicted probability of the choice of public health provider for inpatient care in both rural and urban areas are found to be high, the choice of rural people for public health care is more and they are less likely to prefer private facilities for inpatient care compared to urban people. This is mainly because of two reasons, firstly, non availability of private health facilities having inpatient care in the rural sector and secondly, the high access cost of care⁶ for rural people compared to their urban counterpart make them to choose public health care providers. Compared to ST and SC households, individuals belonging to OBC and other social group households are less likely to prefer inpatient health care from public health facilities. With the increase in MPCE, the probability of choice of public health care decreases and alternatively one can reasonably argue that probability of choice of private health care provider increases as the reference category is private health care,. Hence, it can be concluded as MPCE increases, there is a tendency of the people to shift from public health care provider to private health care provider for inpatient care (the probability for the choice of public health care provider has decreased from 0.81 to 0.37 for highest MPCE quintile during 1995 to 2014 in the KBK region). Moreover, it has been found that the preference for private health care providers for inpatient care has increased during the period from 1995-96 to 2014. The probability of the choice of public health care for inpatient care in the KBK region in both rural and urban areas for all the three periods is higher compared to the state average. This is mainly because of low concentration or non-availability of private health facilities having inpatient care in the KBK region.

4.5.2 Choice of Outpatient Health Care Providers

The dependent variable is the choice of outpatient health care provider which is classified into three categories such as public health care, private health care and no care. The dependent variable takes on three categories without any ordering hence, a multinomial logistic model can be applied. The multinomial logit model is widely accepted and used to model discrete choice behaviours (Greene, 2000). No health care is taken as a base or reference category for comparison purposes.

⁶ Access cost of health care includes distance or transportation cost, waiting time or opportunity cost of time etc.

$Y_{ij} = 1$, if the i^{th} individual/ patient chooses j alternatives (j =Public care, Private care and No care)
 $= 0$, otherwise

Let $P_{ij} = P(Y_{ij} = 1)$, where P is the probability. Hence P_{i1} , P_{i2} and P_{i3} indicate that individual i chooses alternatives 1, 2 and 3 respectively. It is to be noted that alternative 1 indicates “public health care”, alternative 2 represents “private health care” and alternative 3 denotes no care. Further, if these three are the only alternatives available to the individuals then the sum of probabilities of mutually exclusive and exhaustive events are added together must be 1. Hence, $P_{i1} + P_{i2} + P_{i3} = 1$.

The multinomial logistic model estimates the following probabilities

$$P_{ij} = \frac{e^{\alpha_j + \beta_j X_i}}{\sum_{j=1}^3 e^{\alpha_j + \beta_j X_i}} \text{-----(4.8)}$$

Since the last category, i.e., No Care is the base or reference or comparison category, once set $\alpha_3 = 0$ and $\beta_3 = 0$ is set, then the following estimates of probabilities for three choices will be:

$$P_{i1} = \frac{e^{\alpha_1 + \beta_1 X_i}}{e^{\alpha_1 + \beta_1 X_i} + e^{\alpha_2 + \beta_2 X_i} + 1} \text{-----(4.9)}$$

$$P_{i2} = \frac{e^{\alpha_2 + \beta_2 X_i}}{e^{\alpha_1 + \beta_1 X_i} + e^{\alpha_2 + \beta_2 X_i} + 1} \text{-----(4.10)}$$

$$P_{i3} = \frac{1}{e^{\alpha_1 + \beta_1 X_i} + e^{\alpha_2 + \beta_2 X_i} + 1} \text{-----(4.11)}$$

The probabilities expressions given in equations 4.9, 4.10 and 4.11 are nonlinear functions of X_i

$$\ln\left(\frac{P_{i1}}{P_{i3}}\right) = \alpha_1 + \beta_1 X_i \text{-----(4.12)}$$

$$\ln\left(\frac{P_{i2}}{P_{i3}}\right) = \alpha_2 + \beta_2 X_i \text{-----(4.13)}$$

$$\text{and } P_{i3} = 1 - (P_{i1} + P_{i2}) \text{-----(4.14)}$$

The coefficient vector ‘ β ’ is the impact of explanatory variables on the log odds (logit) of choosing public (private) health care providers compared to no health care.

Table 4.19 Estimated Multinomial Logistic Model for Choice of Outpatient Health Care Providers (No Care is the Base or Reference Category) in KBK Region

Dep. Variable (Choice of Outpatient Health Care Providers)	52nd Round(1995-96)						60th Round(2004)						71st Round(2014)					
	1			2			1			2			1			2		
	Public Health Care			Private Health Care			Public Health Care			Private Health Care			Public Health Care			Private Health Care		
Independent Variables	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.
Constant	-14.214	0	0.00*	-0.506	0.60	0.80	14.884	3E+06	1.00	12.81	4E+05	1.00	48.53	1E+21	0.99	49.56	3.3E+21	0.99
Household Size	0.048	1.05	0.06***	0.107	1.11	0.00*	-0.031	0.97	0.62	0.05	1.05	0.46	0.36	1.43	0.33	0.42	1.53	0.26
MPCE	0.404	1.50	0.00*	0.55	1.73	0.00*	0.133	1.14	0.00*	0.24	1.28	0.00*	0.01	1.01	0.32	0.16	1.17	0.27
Doctor Fee							1.21	3.35	0.97	1.26	3.53	0.97	0.00	1.00	0.82	0.00	1.00	0.74
Severity of Illness	0.097	1.10	0.00*	0.09	1.09	0.00*	0.002	1.00	0.20	0.00	1.00	0.09***	0.30	1.35	0.23	0.46	1.58	0.07**
Opportunity cost of time	0.005	1.01	0.00*	0.004	1.00	0.00*	0.008	1.01	0.00*	0.01	1.01	0.00*	0.01	1.01	0.03**	0.01	1.01	0.03**
Sector (Rural)	-0.187	0.83	0.46	-0.345	0.71	0.13	1.373	3.95	0.00*	-1.62	0.20	0.00*	4.68	107.88	0.19	-1.72	0.18	0.63
Sector (Urban)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Caste (ST)	-0.99	0.37	0.00*	0.009	1.01	0.96	-2.346	0.10	0.00*	-1.87	0.15	0.00*	-17.29	0.00	0.00*	-18.92	0.00	0.00*
Caste (SC)	-0.265	0.77	0.32	-0.232	0.79	0.35	-0.688	0.50	0.23	-1.48	0.23	0.02**	-15.37	0.00	0.00*	-16.12	0.00	0.00*
Caste (OBC)							-1.41	0.24	0.01*	-0.72	0.48	0.21	-19.76	0.00	0.00*	-20.02	0.00	
Caste (Other)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Disease Patteerns (Infectious)	-0.291	0.75	0.27	-1.226	0.29	0.00*	-0.897	0.41	0.01*	-0.93	0.40	0.02**	-18.68	0.00	0.99	-16.89	0.00	0.99
Disease Patteerns (NCD)	-0.649	0.52	0.11	-1.357	0.26	0.00*	0.608	1.84	0.42	2.39	10.86	0.00*	-52.30	0.00	0.99	-32.85	0.00	0.99
Disease Patteerns (Cardiovascular)	-21.661	0.00	0.98	-7.35	0.00	0.00*	18.597	1E+08	0.00*	17.98	6E+07	0.41	-9.04	0.00	1.00	-9.87	0.00	1.00
Disease Patteerns (Disabilities)	0.054	1.06	0.90	-0.577	0.56	0.21	-0.919	0.40	0.08***	-0.58	0.56	0.36	-21.31	0.00	0.99	-21.46	0.00	0.99
Disease Patteerns (Other Diseases)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Age Group (0-14)	-0.803	0.45	0.00*	-0.355	0.70	0.17	0.296	1.34	0.57	0.77	2.16	0.17	-6.42	0.00	0.04**	-6.79	0.00	0.03**
Age Group (15-59)	-0.316	0.73	0.23	0.189	1.21	0.46	-0.618	0.54	0.2	-0.73	0.48	0.16	-2.98	0.05	0.24	-2.35	0.10	0.36
Age Group (60 and above)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Sex of the Patient (Male)	0.198	1.22	0.26	-0.042	0.96	0.78	-0.158	0.85	0.56	-0.27	0.76	0.36	0.61	1.84	0.35	0.28	1.32	0.69
Sex of the Patient (Female)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Education of Head(Illiterate)	-3.755	0.02	0.07***	-3.632	0.03	0.06***	-15.427	0.00	1.00	-15.03	0.00	1.00	-17.66	0.00	1.0	-17.91	0.00	1.00
Education of Head(Elementary)	-2.638	0.07	0.21	-3.189	0.04	0.09***	-15.019	0.00	1.00	-14.16	0.00	1.00	-17.48	0.00	1.0	-17.79	0.00	1.00
Education of Head(Sec.)	-3.252	0.04	0.12	-3.183	0.04	0.10***	-13.926	0.00	1.00	-13.13	0.00	1.00	-0.78	0.46	1.0	-0.67	0.51	1.00
Education of Head(Hr. Sec.)	0 ^b			0 ^b			0.086	1.09	1.00	2.16	8.70	1.00	-6.35	0.00	1.0	-5.59	0.00	1.00
Education of Head(Hr. Edn)#	1.00			1.00			0 ^b			0 ^b			0 ^b			0 ^b		
Insurance_Status (No)	15.98	9E+06		1.759	5.81	0.00*							-0.10	0.91	0.95	-1.98	0.14	0.19
Insurance_Status (Yes)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Source: Author's Own Estimation	Number of obs = 1193						Number of obs = 532						Number of obs = 321					
from NSSO 52nd, 60th and 71st	Cox and Snell R Square = 0.276						Cox and Snell R Square = 0.478						Cox and Snell R Square = 0.592					
Round Data	Nagelkerke R Square = 0.313						Nagelkerke R Square = 0.538						Nagelkerke R Square = 0.716					
Note: # is Reference Category	McFadden R Square = 0.152						McFadden R Square = 0.297						McFadden R Square = 0.511					
	(-2 Log Likelihood)= 2150.72						(-2 Log Likelihood)= 821.095						(-2 Log Likelihood)= 274.80					

Note: *, ** and *** indicate 1%, 5% and 10% significance level

Table 4.20 Estimated Multinomial Logistic Model for Choice of Outpatient Health Care Providers (No Care is the Base or Reference Category) in Odisha																		
Dep. Variable (Choice of Outpatient Health Care Providers)	52nd Round(1995-96)						60th Round(2004)						71st Round(2014)					
	1			2			1			2			1			2		
Health Care Providers)																		
Health Care Providers)	Public Health Care			Private Health Care			Public Health Care			Private Health Care			Public Health Care			Private Health Care		
Independent Variables	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.	Coef.	RRR	Sig.
Constant	-17.5	0.00	0.00*	-4.07	0.02	0.00*	14.80	3E+06	0.95	0.79	2.20	0.06***	2.54	12.67	0.08***	3.45	31.52	0.01*
Household Size	0.10	1.11	0.00*	0.11	1.12	0.00*	0.09	1.09	0.01*	0.02	1.02	0.36	0.02	1.02	0.70	0.15	1.16	0.01*
MPCE	0.61	1.84	0.00*	0.83	2.29	0.00*	0.47	1.60	0.00*	0.53	1.70	0.20	0.00	1.00	0.24	0.29	1.34	0.76
Doctor Fee							0.00	1.00	0.00*	0.01	1.01	0.00*	0.00	1.00	0.05**	0.01	1.01	0.00*
Severity of Illness	0.06	1.06	0.00*	0.07	1.07	0.00*	0.00	1.00	0.40	0.1	1.11	0.27	-0.06	0.94	0.06***	-0.02	0.98	0.52
Opportunity cost of time	0.00	1.00	0.00*	0	1.00	0.09***	0.00	1.00	0.01*	0.18	1.20	0.41	0.00	1.00	0.00*	0.00	1.00	0.00*
Sector (Rural)	0.18	1.20	0.10***	-0.17	0.84	0.10***	-0.27	0.76	0.07***	-0.22	0.80	0.13	0.51	1.66	0.20	-1.28	0.28	0.00*
Sector (Urban)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Caste (ST)	-0.18	0.84	0.05**	0.09	1.09	0.33	-1.46	0.23	0.00*	-1.15	0.32	0.00*	1.28	3.61	0.01*	0.36	1.43	0.45
Caste (SC)	-0.32	0.73	0.00*	0.05	1.05	0.62	-0.34	0.71	0.03**	-0.23	0.79	0.17	1.41	4.10	0.00*	1.20	3.30	0.01*
Caste (OBC)		1.00			1.00		-0.27	0.76	0.06***	0.15	1.16	0.30	0.17	1.19	0.62	0.27	1.30	0.40
Caste (Other)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Disease Patteerns (Infectious)	-0.68	0.51	0.00*	-0.55	0.58	0.00*	0.73	2.08	0.00*	0.38	1.46	0.00*	-0.55	0.58	0.08***	-0.40	0.67	0.18
Disease Patteerns (NCD)	-0.04	0.96	0.77	-0.18	0.84	0.24	0.56	1.75	0.00*	0.46	1.58	0.01*	1.53	4.61	0.01*	0.75	2.11	0.20
Disease Patteerns (Cardiovascular)	-1.21	0.30	0.00*	-0.34	0.71	0.28	0.40	1.49	0.18	0.46	1.58	0.13	19.20		0.00*	18.55	1E+08	
Disease Patteerns (Disabilities)	-0.01	0.99	0.93	-0.13	0.88	0.43	-0.40	0.67	0.01*	-0.29	0.75	0.07***	0.88	2.41	0.07***	0.01	1.01	0.99
Disease Patteerns (Other Diseases)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Age Group (0-14)	0.63	1.88	0.00*	0.51	1.67	0.00*	0.32	1.38	0.03*	0.64	1.90	0.00*	0.67	1.94	0.11	0.41	1.50	0.30
Age Group (15-59)	0.64	1.90	0.00*	0.3	1.35	0.01*	0.67	1.95	0.00*	0.73	2.08	0.00*	0.51	1.66	0.22	0.95	2.59	0.02**
Age Group (60 and above)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Sex of the Patient (Male)	-0.01	0.99	0.91	0.02	1.02	0.78	-0.13	0.88	0.18	-0.07	0.93	0.47	0.38	1.46	0.15	0.18	1.20	0.48
Sex of the Patient (Female)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Education of Head(Illiterate)	-1.06	0.35	0.01*	-0.6	0.55	0.12	-1.00	0.37	0.00*	-0.88	0.41	0.01*	-1.74	0.18	0.11	-1.99	0.14	0.06***
Education of Head(Elementary)	-0.64	0.53	0.10***	-0.45	0.64	0.24	-0.59	0.55	0.09***	-0.45	0.64	0.21	-1.94	0.14	0.07***	-2.15	0.12	0.04**
Education of Head(Sec.)	-0.86	0.42	0.04**	-0.73	0.48	0.09***	-0.36	0.70	0.39	-0.05	0.95	0.90	-1.86	0.15	0.11	-1.49	0.23	0.18
Education of Head(Hr. Sec.)	0 ^b			0 ^b			-0.72	0.49	0.12	-0.34	0.71	0.47	-1.85	0.16	0.14	-1.60	0.20	0.18
Education of Head(Hr. Edn)#							0 ^b			0 ^b			0 ^b			0 ^b		
Insurance_Status (No)	15.88	8E+06		1.9	6.69	0.00	-12.84	0.00	0.95	0.26	1.30		-1.42	0.24	0.00*	-1.04	0.35	0.04**
Insurance_Status (Yes)#	0 ^b			0 ^b			0 ^b			0 ^b			0 ^b			0 ^b		
Source: Author's Own Estimation	Number of obs = 5486						Number of obs = 3753						Number of obs = 1412					
from NSSO 52nd, 60th and 71st	Cox and Snell R Square = 0.153						Cox and Snell R Square = 0.117						Cox and Snell R Square = 0.291					
Round Data	Nagelkerke R Square = 0.172						Nagelkerke R Square = 0.133						Nagelkerke R Square = 0.371					
Note: # is Reference Category	McFadden R Square = 0.076						McFadden R Square = 0.060						McFadden R Square = 0.225					
	(-2 Log Likelihood)= 11094.24						(-2 Log Likelihood)= 7270.39						(-2 Log Likelihood)= 1676.46					

Note: *, ** and *** indicate 1%, 5% and 10% significance level

The estimated multinomial logistic regression results of choice of health care providers for the year 1995-96, 2004 and 2014 have been shown in Table 4.19 and 4.20 for KBK Region and Odisha respectively. The results are arranged column wise for year. The first column in each year gives the values of various coefficient of choice of public health care providers in relation to no health care, i.e., it gives estimates of the logit odd ratio (equation-4.12) and the second column gives similar information for choice of private health care providers in relation to no choice of health care (equation-4.13). When the choice is public health care providers, the variables such as MPCE, severity of illness, opportunity cost of time, caste (ST), age group (0-14) and education of the head (illiterate) turned out to be statistically significant in the KBK Region of Odisha. For instance, coefficient of the variables caste (ST), age group (0-14) and education of the head (illiterate) are negative indicating that the odds favouring choice of no health care over the choice of public health care providers, holding all other regressors constant. Even though the public health care facilities are available at lower cost, due to transportation cost and other access costs, poor and other vulnerable households such as SC, ST fail to afford public health care facilities. Poor knowledge regarding the diseases, deter the individual patient belonging to household with illiterate head from taking treatment of public health care providers. Similarly, with the higher MPCE, opportunity cost of time and severity of illness, the chance of preferring public health care providers' increases over no health care. However, when the choice is private health care providers, the variables such as MPCE, severity of illness, opportunity cost of time, castes ST and SC, and disease patterns are found to be statistically significant in the KBK region. Negative coefficient of the variable ST and SC for private health care providers implies that the odds favouring choice of no health care over the choice of private health care, holding all other regressors constant. It is interesting to note that as MPCE increases the choice of both public and private health care providers' increases, but the relative risk ratio (RRR) for private health care providers is greater than the public health care providers in each period. It implies there is a greater preference for private care with increase in MPCE. This may be due to fact that MPCE basically increases the affordability of health care services, hence people prefer private care on quality ground. Furthermore, the RRR for MPCE variable has decreased over the period 1995-96 to 2014. It implies two alternative situations either the role of MPCE for choosing both private and public health care has decreased over time or there is an improvement in the health utilisation of the people in this period. The conclusions favour the latter reasoning as observed from Table 4.11 that there is an increase in the health care utilisation from 68

percent to 86 percent in the region, especially after the introduction of NRHM in the state. Similarly the longer the duration of reported illness or severity illness, higher the opportunity cost of time which brings disutility and more devastating economic consequence to the individual and households. Hence, an individual seek treatment and there is greater probability of demanding all treatment options over no care.

Table 4.20 shows that the estimated multinomial logistic regression results for the state of Odisha. In case of Odisha, when the choice is public health care providers, the independent variables such as MPCE, user fee, severity of illness, opportunity cost of time, caste (ST), age group, education of the head turned out to be statistically significant and when the choice is private health care provider MPCE, opportunity cost of time, household size, sector, age group, are found to be statistically significant. The estimated sign of the coefficients for Odisha are almost same as KBK region. Insurance status of the individual patient is found to be statistically significant at 5 percent for the year 2014 (71st round) in Odisha. The negative value of the coefficients indicates that the odds favouring the choice of no care over the choice of both private and public health care for the persons who don't have health insurance, other thing remaining constant.

Predicted Probabilities

The estimated mean predicted probabilities of the outpatient health care providers of the KBK region and Odisha are shown in Table 4.21. Due to better availability of both private and public health care facilities, the access cost of health care⁷ is low, hence, the probabilities of choice of both public and private health care providers in urban areas has been found to be higher compared to rural areas from 1995-96 to 2014 in KBK region and the state of Odisha. Compared to the State average, the predicted probability of no care is found to be more in the KBK region both in rural and urban areas. This is mainly because of multi facet backwardness, i.e., the poor base of both public and private health facilities in the region, mass illiteracy and non-affordability of health care of the people of this region. The predicted probabilities of preferring no care has been found to be more among the individuals belonging to SC and ST in all the three periods. However, it is noted that over the period of 1995-2014, the preference for no health care has decreased for all the social groups including

⁷ Access cost of health care includes distance or transportation cot, waiting time or opportunity cost of time, corruption etc. Generally long distance and longer waiting time, increases the earning loss of the productive persons, which lead to high access cost care. It is presumed that the access cost in public health care is more compared to private health care.

the SC and ST. The predicted probabilities for MPCE variables reveal that the choice of no health care is higher among lower consumption quintile and it is found in both KBK region and the State. However, with the increase in MPCE, the probability of choice of no health care significantly decreases. Interestingly, the probability of choice private health care providers increases with the increase in the MPCE. If it is assumed that the direct cost of health care in the private health care is more than public health facilities, then the individual's choice of private health care may be due to lower access cost of care and better quality of services. However, better quality of services is more intensify the argument with the increase in MPCE. Similarly the probability of choice of no health care is found to be higher among individual patient belong to a household with illiterate head of the household. With the increase in the level of education of the head of household, the probability of patient preference for private care provider increases in KBK region and Odisha.

Table 4.21 Estimated Mean Predicted Probabilities for Choice of Outpatient Health Care Providers in the KBK Region and Odisha

Dep. Variable (Choice of Outpatient Health Care Providers)	Choice of Outpatient Health Care Providers in KBK Region									Choice of Outpatient Health Care Providers in Odisha								
	52nd Round (1995-96)			60th Round (2004)			71st Round(2014)			52nd Round (1995-96)			60th Round (2004)			71st Round(2014)		
	Pub HC	Pvt HC	No HC	Pub HC	Pvt HC	No HC	Pub HC	Pvt HC	No HC	Pub HC	Pvt HC	No HC	Pub HC	Pvt HC	No HC	Pub HC	Pvt HC	No HC
Sector (Rural)	0.19	0.34	0.47	0.33	0.33	0.34	0.72	0.19	0.09	0.35	0.33	0.32	0.46	0.35	0.19	0.35	0.59	0.07
Sector (Urban)	0.29	0.44	0.28	0.41	0.39	0.20	0.11	0.84	0.05	0.32	0.49	0.19	0.46	0.39	0.14	0.06	0.90	0.04
Caste (ST)	0.11	0.34	0.55	0.19	0.27	0.54	0.77	0.12	0.10	0.29	0.31	0.40	0.37	0.26	0.37	0.52	0.43	0.06
Caste (SC)	0.26	0.29	0.45	0.57	0.19	0.24	0.60	0.37	0.03	0.29	0.36	0.35	0.51	0.33	0.16	0.30	0.66	0.04
Caste (OBC)				0.33	0.47	0.20	0.60	0.26	0.14				0.44	0.42	0.14	0.22	0.71	0.07
Caste (Other)	0.28	0.40	0.32	0.45	0.45	0.11	0.22	0.78	0.00	0.38	0.38	0.23	0.52	0.35	0.12	0.15	0.79	0.05
MPCE (Poorest)	0.18	0.27	0.55	0.28	0.24	0.48	0.71	0.24	0.05	0.29	0.27	0.44	0.46	0.31	0.24	0.34	0.61	0.06
MPCE (Poor)	0.22	0.38	0.40	0.42	0.27	0.31	0.75	0.12	0.13	0.34	0.33	0.34	0.48	0.34	0.18	0.32	0.62	0.06
MPCE (Middle)	0.22	0.35	0.43	0.40	0.46	0.14	0.45	0.40	0.15	0.36	0.34	0.31	0.49	0.35	0.16	0.21	0.74	0.05
MPCE(Rich)	0.27	0.40	0.32	0.36	0.42	0.22	0.38	0.55	0.08	0.37	0.39	0.24	0.46	0.38	0.15	0.20	0.75	0.06
MPCE(Richest)	0.26	0.59	0.16	0.36	0.50	0.14	0.38	0.59	0.03	0.37	0.47	0.15	0.43	0.42	0.15	0.20	0.74	0.06
Disease Patterns (Infectious)	0.21	0.19	0.60	0.31	0.29	0.40	0.58	0.27	0.15	0.26	0.34	0.39	0.53	0.33	0.14	0.24	0.69	0.08
Disease Patterns (NCD)	0.35	0.26	0.39	0.22	0.58	0.19	0.00	0.69	0.31	0.40	0.39	0.20	0.49	0.39	0.12	0.23	0.74	0.03
Disease Patterns (Cardiovascular)	0.00	0.33	0.67	0.75	0.25	0.00	0.25	0.75	0.00	0.22	0.53	0.25	0.44	0.42	0.14	0.23	0.77	0.00
Disease Patterns (Disabilities)	0.42	0.32	0.26	0.35	0.18	0.47	0.67	0.32	0.02	0.39	0.38	0.23	0.39	0.34	0.28	0.31	0.64	0.05
Disease Patterns (Other Diseases)	0.20	0.40	0.40	0.36	0.37	0.27	0.77	0.23	0.00	0.35	0.36	0.29	0.44	0.37	0.20	0.26	0.68	0.06
Age Group (0-14)	0.15	0.29	0.56	0.30	0.42	0.28	0.67	0.17	0.16	0.31	0.38	0.31	0.43	0.39	0.17	0.30	0.62	0.08
Age Group (15-59)	0.25	0.43	0.32	0.42	0.27	0.30	0.56	0.40	0.03	0.38	0.35	0.27	0.50	0.36	0.14	0.21	0.75	0.03
Age Group (60 and above)	0.33	0.34	0.32	0.24	0.37	0.38	0.53	0.45	0.02	0.29	0.37	0.34	0.42	0.32	0.26	0.27	0.66	0.06
Sex of the Patient (Male)	0.23	0.36	0.41	0.35	0.35	0.30	0.62	0.30	0.09	0.35	0.37	0.29	0.46	0.37	0.17	0.27	0.68	0.05
Sex of the Patient (Female)	0.20	0.36	0.44	0.35	0.33	0.32	0.59	0.33	0.08	0.34	0.36	0.30	0.47	0.35	0.18	0.23	0.70	0.06
Education of Head(Illiterate)	0.17	0.33	0.50	0.34	0.28	0.38	0.67	0.23	0.10	0.30	0.34	0.36	0.44	0.33	0.23	0.34	0.60	0.06
Education of Head(Elementary)	0.36	0.41	0.23	0.35	0.41	0.24	0.65	0.25	0.11	0.40	0.38	0.22	0.48	0.38	0.14	0.26	0.67	0.06
Education of Head(Sec.)	0.19	0.61	0.20	0.45	0.50	0.05	0.35	0.65	0.00	0.39	0.42	0.19	0.47	0.44	0.09	0.12	0.84	0.04
Education of Head(Hr. Sec.)	0.17	0.67	0.17	0.14	0.86	0.00	0.33	0.67	0.00	0.41	0.50	0.09	0.43	0.44	0.13	0.14	0.82	0.04
Education of Head(Hr. Edn)				0.60	0.40	0.00	0.30	0.70	0.00				0.53	0.39	0.08	0.10	0.89	0.01
Insurance_Status (No)	0.22	0.36	0.42	0.35	0.34	0.31	0.65	0.26	0.09	0.35	0.36	0.29	0.46	0.36	0.18	0.24	0.70	0.06
Insurance_Status (Yes)	0.00	0.22	0.78				0.45	0.48	0.06	0.00	0.22	0.78	1.00	0.00	0.00	0.33	0.64	0.02

Source: Author's Own Estimation from NSSO 52nd, 60th and 71st Round Data

It is worth mentioning that although the choice of private health provider has been increasing with the increase in MPCE, the mean predicted probability for choice of private health providers in case of inpatient care is quite low when we compared it with the outpatient case in study region. Thus, the tendency of shifting from public health care to private health care is

low for inpatient care compared to outpatient care. This is mainly due to the fact that there is a huge price gap between public and private sector especially for inpatient care.

4.6 Summary

This chapter has examined the morbidity patterns, health seeking behaviour and choice of health care providers in KBK region of Odisha by using NSSO data. The following are the main findings of this chapter. The morbidity rate is found to be more in rural areas than in the urban areas. Though there is a marginal increment in the prevalence of morbidity rate from 72 to 74 per 1000 population in the KBK region during 1995-96 to 2014. However the infectious diseases and disabilities have turned out to be significantly increasing within a period of two decades. Prevalence of morbidities is found to be higher among SC and ST population, persons belonging to agriculture and labour occupational classes. The percentage of people seeking medical treatment has increased from 68% in 1995-96 to 86% in 2014 in the KBK region. This may be possible due to an increase in the awareness among people and a significant increase in the medical institutions especially in rural areas after the introduction of NRHM in the state. The estimated binomial logistic regression model for the choice of inpatient health care providers predicts that the choice of public health care over private health care is significantly influenced by MPCE, severity of illness, opportunity cost of time, household size, Similarly the multinomial logistic regression model for the choice of outpatient care providers predicts that when the choice is public health care providers over no care, variables such as MPCE, severity of illness, opportunity cost of time, caste, age group and education of the household head are statistically significant in the KBK region. When the choice is private health care providers over no care, the variables such as MPCE, severity of illness, caste, diseases pattern and opportunity cost of time significantly determine the choice of private health care. It is interesting to note that the tendency of shifting from public health care to private health care is low for inpatient care compared to private care. This is mainly due to the fact that there is a huge price gap between public and private sector especially for inpatient care.

Appendix 4.A: Disease Classification based on ICD-10

1995-96	2004	2014
Infectious diseases		
Diarrhoea/dysentery, tetanus, diphtheria, whooping cough, meningitis and viral encephalitis, Chicken Pox, Measles/German Measles, Mumps, Acute Respiratory Infection, Pulmonary Tuberculosis, Chronic Amoebiasis (including Pneumonia), Sexually Transmitted Diseases, Guinea worm filariasis(elephantiasis), gastritis or hyper acidity gasteric/peptic ulcer	Diarrhoea/Dysentery, Gastritis/Gasteric or peptic ulcer, Worm infestation, Amoebiasis, Tuberculosis, Diseases of skin, Sexually Transmitted Diseases(STD), Malaria, Eruptive, Mumps, Diphtheria, Whooping cough, Tetanus, filariasis/elephantiasis	Fever with loss of/alterd consciousness, fever with rash/eruptive lesions, fever due to diphtheria, whooping cough, tuberculosis, filariasis, tetanus, HIV/AIDS, other sexually transmitted diseases, all other fevers (malaria, typhoid & fevers of unknown origin), diarrheas/dysentery etc., worm infestation, discomfort/pain in eye with redness or swelling /boils, acute upper respiratory infections(cold/runny nose etc.), cough with sputum with/without fever & not diagnosed as tuberculosis, skin infection(boil/abscess/itching)
Non communicable diseases		
Cerebral Stroke, Cough/Acute Bronchitis, Ailment relating to pregnancy and child birth, Jaundice, Cancer, Other Tumours, (General debility) anemia, Goitre and thyroid disorders, Diabetes, Beri-Beri, Rickets, Other malnutrition diseases, Epilepsy, Other diseases of nerves, Piles, Diseases of kidney/ urinary system, Prostatic Disorder	Hepatitis/jaundice, respiratory & ear, bronchitis asthma, diseases of kidney/urinary system, prostatic disorders, gynaecological disorders, neurological disorders, psychiatric disorders, conjunctivitis, glaucoma, cataract, goitre, diabetes mellitus, under nutrition, anaemia, cancer and other tumours	Jaundice, cancer, anaemia(any cause), bleeding disorders, diabetes, under nutrition, goitre and other diseases of the thyroid, others(including obesity), high cholesterol, cataract, glaucoma, earache with discharge or bleeding from ear/infection, bronchial asthma etc., abnormality in urination, pelvic region/reproductive tract infection, change /irregularity in menstrual cycles, pregnancy with complicitaions before or during labour, complications in mother after birth of child, Illenss in the newborn/sick newborn
Cardio vascular diseases		
Heart failure, diseases of heart, high/low blood pressure	Heart diseases, hypertension	Stroke/hemiplegia, hypertension, heart disease: chest pain, breathlessness, cardio vascular diseases
Disability diseases		
Diseases of eye, Acute diseases of ear, Diseases of mouth, teeth and gums, Injury due to accident and violence, Mental and behavioural disorder, Visual disability (other than cataract), cataract, Hearing disability, Other Diseases of ear, Speech disability, Diseases of mouth, teeth and gums, Hydrocele, Pains in joints, Other disorder of bones and joints, Locomotor Disability, Other Congenital deformities (excluding disability)	Disorders of Joint and bones, Locomotor, Visual including blindness(excluding cataract), Speech, Hearing, Diseases of Mouth/ Teeth/Gum, Accidents/ Injuries/ Burns/ Fractures	Mental retardation, mental disorders, headache, seiures or known epilepsy, weakness in limb muscles and difficulty in movements, other including impaired cognition, memory loass, confusion, decreased vision, others including disorders of eye movements, decreased hearing/loss of hearing, diseases of mouth/teeth/gums, Joint/bone disease/pain or swelling in any of the joints, back or body aches, accidental injury,road traffic accidents and falls, accidental drowning and submersion, burns and corrosions, poisoning, intentional self-harm, assault
Other diseases		
Fever of short duration, other diagnosed ailment (of < 30 days), undiagnosed ailment (of < 30 days), other diagnosed ailment (of > 30 days), undiagnosed ailment (of > 30 days)	Fever of unknown origin, Other Diagnosed ailments, Other Undiagnosed ailments	Pain in abdomen, gasteric & peptic ulcers/acid reflux/acute abdomen, lump or fluid in abdomen/scrotum, gastrointestinal bleeding, contact with venomous/harm-causing animals & plants, symptom not fitting into any of above categories, could not even state main symptom

Source: World Health Ogranisation, 2011

Chapter 5

Out of Pocket Health Payments and Its Catastrophic Impacts on Households

5.1 Introduction

In this chapter, an attempt has been made to examine the burden of direct and indirect costs of illness in the KBK region of Odisha. The available literature on the catastrophic health care payments till date focused on two approaches: (a) expenditure approach and (b) impoverishment approach. The current chapter is an exploration of the expenditure approach. The critical examination of the second approach (i.e., the impacts of health payments/illness on poverty levels) will be done in the next chapter 6. The current chapter is organised broadly into two parts – first part (starting from section 5.2) discusses the burden of catastrophic health payments and second part (starting from section 5.9) discusses indirect cost of illness.

5.2 Out of Pockets Health Expenditure in the KBK Region of Odisha

Health care financing in developing and low income countries is predominantly determined by households' out of pocket payment. In the absence of prepayment mechanisms like health insurance, an illness not only reduces welfare directly through work loss and earning lost, it also increases the impoverishment due to high health care cost. As a consequence of high illness costs (earning loss and high health care cost) individuals and households move into poverty. Ill health often leaves devastating effects upon the household economies. While the loss of earnings or indirect cost may be considerable, direct cost of payments for health services alone can throw households into poverty. The World Health Organisation (WHO) estimated that about 180 million persons suffer from financial catastrophe every year due to the high costs in health care (WHO, 2005). The financial burdens for health care payments affect everyone negatively, it is particularly overburden for economically poor households (Benett and Gilson, 2008). In India, 3/4th of total health spending comes from household out of pocket; the situation is even more severe in the case of backward state like Odisha where the share of households in total health expenditure is more than 80 percent (NHA, 2004-05). Moreover, most of this spending is on primary care and within primary care, on curative care: households' spending 92 percent on primary curative care (Berman, 1998). According to National Health Accounts, more than 90 percent of households' health expenditure is spent on curative services, of which 48 percent is towards primary curative care, which is also defined as ambulatory or outpatient treatment of illness (NHA, 2004-05). In India, more than

90 percent of rural and over 75 percent of urban households lack insurance coverage (NSSO, 1998). The situation has not improved, only 14.1 percent of rural and 18.1 of urban population covered under both private and government insurance schemes (NSSO, 2014). In the state of Odisha 779 per 1000 number of persons are not covered under any health insurance scheme (NSSO, 2014). Therefore this research found it interesting and pioneering in examining the out of pocket health payments and effect of illness on households well being for a State like Odisha in general and KBK region in particular where more than half of the population is still reeling under the shadow of morbid poverty.

Table 5.1 Monthly Per Capita Out of Pocket Health Expenditure in KBK Region and Odisha, 1995-2014

Consumption Quintile		1995-96						2004						2014					
		Rural		Urban		Total		Rural		Urban		Total		Rural		Urban		Total	
		PCOOP	% of CE	PCOOP	% of CE	PCOOP	% of CE	PCOOP	% of CE	PCOOP	% of CE	PCOOP	% of CE	PCOOP	% of CE	PCOOP	% of CE	PCOOP	% of CE
KBK Region	Poorest	14.0	8.4	11.8	5.4	13.7	7.9	9.9	5.1	13.5	5.2	10.2	5.1	190.0	36.0	41.0	6.2	178.0	33.6
	Poor	19.9	9.5	14.9	5.1	19.4	9.0	10.1	3.8	23.2	4.3	10.9	3.9	630.3	84.9	227.5	21.5	595.4	79.4
	Middle	19.9	8.5	9.1	2.6	18.7	7.8	28.5	8.8	7.2	1.1	27.0	8.3	74.2	8.5	178.8	11.7	83.7	8.8
	Rich	8.5	3.0	24.2	4.8	10.1	3.2	18.0	4.3	35.9	4.1	20.4	4.3	53.1	4.9	532.4	25.5	99.8	6.9
	Richest	38.8	9.2	119.8	14.1	48.5	9.8	37.3	5.9	135.5	7.4	45.5	6.0	350.1	19.9	279.8	7.0	340.0	18.0
	All	19.2	7.9	28.8	5.9	20.3	7.6	17.3	5.5	33.3	4.4	18.5	5.4	236.2	32.5	216.3	13.3	234.4	30.7
	C.I	-0.0626		0.1488		-0.0393		0.0579		-0.0035		0.0511		-0.2314		0.1109		-0.2214	
	SE(C.I)	0.0795		0.1587		0.0833		0.0511		0.1263		0.0454		0.1696		0.1514		0.1569	
Odisha	Poorest	8.8	5.6	5.8	2.6	8.3	5.1	23.7	13.5	28.2	8.3	24.1	13.0	144.3	26.5	85.2	12.0	136.3	24.5
	Poor	11.0	5.4	12.3	4.2	11.2	5.2	32.7	12.6	45.1	8.9	34.0	12.2	380.8	52.0	230.6	21.1	357.2	47.1
	Middle	9.8	4.2	20.3	5.5	11.3	4.4	47.0	14.6	90.7	12.4	52.3	14.3	153.6	17.7	214.8	14.4	164.6	17.1
	Rich	11.1	3.9	24.0	5.0	13.0	4.1	55.5	13.3	42.1	4.3	53.4	11.9	192.2	17.9	333.1	13.4	220.7	17.0
	Richest	40.7	8.9	70.7	7.5	45.3	8.6	112.6	17.1	63.9	4.5	104.4	15.0	280.4	16.6	367.4	8.3	301.1	14.6
	All	18.7	5.9	32.2	5.3	20.7	5.8	53.5	14.2	54.9	7.2	53.7	13.3	226.4	25.8	268.4	13.3	234.1	23.5
	C.I	0.1076		0.1739		0.1171		0.0434		-0.1593		0.0223		-0.1602		-0.1104		-0.165	
	SE(C.I)	0.07		0.0581		0.0585		0.025		0.0607		0.0205		0.0693		0.0715		0.0676	

Note: PCOOP: Per Capita Out of Pocket Health Expenditure (Rs.), % of CE: PCOOP as a percentage of Monthly Consumption Expenditure

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Unit Level Data

5.2.1 Out of Pocket Health Payment and its Coping Strategies of the Households

Table 5.1 reveals household average per capita out of pocket health payments in KBK Region and the state of Odisha. The data show that the per capita OOP health payments stands at Rs.20 in 1995-96 and increased to Rs. 234 in 2014 for KBK Region as well as in Odisha. On an average, the per capita health expenditure in urban areas was more than rural areas during the period from 1995-2014. This has become possible because higher proportion of the

people in the urban areas is availing treatment from non-government sources and the cost of treatment is generally higher in private and non-governmental sources. It is interesting to note that out of pocket health payments is progressive regardless of the residence status, as average monthly out of pocket is found to increase by household consumption quintiles. However, PCOOP as a share of total consumption expenditure decreases with the increases in income and for each consumption quintiles the percentage share of health payment to total consumption expenditure is more in the rural areas compared to urban areas. This indicates that the poorest and poor households are more severely affected by health payment and they are hardly able to afford health care payment. On many occasions health care payment are made at the cost of their material standard of living. The concentration index which is a bi-variate analogue to the Lorenz curve indicates that there is the presence of inequality in the out of pocket health spending across consumption classes. Although out of pocket health payment in rural areas is less compared to urban counterpart, the percentage share of health expenditure is more among rural people particularly for the poorest and poor households, indicating that rural population is less capable of affording health care services.

Table 5.2 Avg. Monthly Per Capita Inpatient, Outpatient, Medical and Non-Medical Health Expenditure in the KBK Region of Odisha (Rs.)

Background Characteristics		1995-96					2004					2014				
		PIHE	POHE	PMHE	PNMHE	PCHE	PIHE	POHE	PMHE	PNMHE	PCHE	PIHE	POHE	PMHE	PNMHE	PCHE
Sector	Rural	1.1	18.1	17.3	1.9	19.2	5.3	12.0	14.6	2.7	17.3	36.3	199.9	181.7	54.5	236.2
	Urban	5.9	23.0	27.0	1.9	28.8	8.6	24.6	29.3	4.0	33.3	71.3	145.0	186.6	29.8	216.3
Occupation	Self Employed	4.6	8.7	10.5	2.8	13.3	11.0	12.1	21.0	2.2	23.1	32.6	607.6	516.8	123.4	640.2
	Agriculture	0.9	16.7	15.8	1.8	17.6	6.5	12.0	14.9	3.5	18.4	52.6	107.5	120.0	40.0	160.1
	Labour	0.5	16.7	15.8	1.4	17.2	4.4	11.6	13.7	2.3	16.0	17.9	101.8	95.1	24.6	119.7
	RWS	3.5	27.1	28.7	1.9	30.6	5.2	15.2	17.0	3.3	20.4	65.9	44.1	85.2	24.8	110.0
	Others	2.5	21.3	23.4	0.4	23.8	2.1	20.9	19.0	3.9	22.9	69.3	341.9	267.3	143.9	411.2
Caste	ST	0.4	13.2	12.8	0.8	13.6	3.6	6.5	8.0	2.2	10.1	41.9	84.5	91.9	34.5	126.4
	SC	0.5	6.6	6.8	0.3	7.1	5.8	19.7	22.2	3.3	25.4	26.1	512.4	431.1	107.5	538.5
	OBC						7.7	18.6	22.7	3.6	26.2	33.1	143.4	136.2	40.4	176.5
	Other	2.4	24.3	23.6	3.1	26.7	7.4	15.0	19.6	2.9	22.4	87.2	129.2	170.7	45.7	216.4
MPCE	Poorest	0.3	7.4	6.8	0.9	7.7	5.3	4.8	8.8	1.3	10.2	11.3	166.7	128.4	49.7	178.0
CLASS	Poor	0.2	18.7	17.1	1.7	18.9	3.5	7.4	9.9	1.0	10.9	35.0	560.4	465.0	130.3	595.4
	Middle	0.7	17.5	17.3	0.9	18.2	4.6	22.4	20.3	6.7	26.9	31.7	52.0	66.0	17.7	83.7
	Rich	1.1	7.2	7.7	0.6	8.3	8.5	11.8	18.7	1.7	20.4	44.5	55.3	84.7	15.1	99.8
	Richest	5.4	39.0	39.5	4.9	44.4	9.7	35.8	39.7	5.8	45.5	174.4	165.6	283.7	56.3	340.0
Total		1.5	18.8	18.4	1.9	20.3	5.6	12.9	15.7	2.8	18.5	39.5	194.8	182.2	52.2	234.4

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Data

Note: PIHE: Monthly per capita inpatient health expenditure, POHE: Monthly per capita outpatient health expenditure

PMHE: Monthly per capita medical health expenditure, PNMHE: Monthly per capita nonmedical health expenditure

PCHE: Monthly per capita health expenditure

Table 5.3 Avg. Monthly Per Capita Inpatient, Outpatient, Medical and Non-Medical Health Expenditure in Odisha (Rs.)

Background Characteristics		1995-96					2004					2014				
		PIHE	POHE	PMHE	PNMHE	PCHE	PIHE	POHE	PMHE	PNMHE	PCHE	PIHE	POHE	PMHE	PNMHE	PCHE
Sector	Rural	2.3	16.4	17.3	1.5	18.7	12.2	41.3	49.1	4.4	53.5	47.9	178.5	186.5	39.9	226.4
	Urban	7.3	24.9	28.6	3.6	32.2	19.7	35.2	50.2	4.7	54.9	89.7	178.7	241.9	26.4	268.4
Occupation	Self Employed	4.5	15.7	18.7	1.5	20.2	16.9	52.0	64.6	4.4	69.0	57.6	216.0	229.9	43.7	273.6
	Agriculture	2.8	13.9	15.0	1.7	16.7	16.7	36.6	48.9	4.4	53.3	59.0	129.5	148.7	39.8	188.5
	Labour	1.2	14.3	14.5	1.0	15.5	6.4	27.5	30.6	3.4	34.0	27.7	101.3	106.5	22.6	129.1
	RWS	8.0	12.7	16.7	4.0	20.7	27.6	24.0	47.7	3.9	51.6	74.2	174.8	209.8	39.2	248.9
	Others	3.7	18.3	19.5	2.5	22.0	15.6	74.9	82.6	7.8	90.5	90.2	531.9	564.4	57.7	622.1
Caste	ST	0.8	10.9	11.2	0.5	11.8	5.2	12.2	15.1	2.3	17.4	36.1	83.6	93.7	26.0	119.7
	SC	2.7	13.1	15.0	0.7	15.7	13.0	55.5	63.6	4.9	68.6	33.0	225.3	211.8	46.5	258.3
	OBC						15.9	41.4	53.1	4.2	57.3	52.2	199.6	214.2	37.7	251.9
	Other	4.1	17.2	18.8	2.5	21.3	18.1	58.8	69.9	7.1	76.9	101.9	207.9	267.9	41.9	309.8
MPCE	Poorest	0.3	5.9	5.7	0.5	6.2	6.9	17.3	22.9	1.2	24.1	21.9	114.4	108.9	27.4	136.3
CLASS	Poor	0.7	10.0	9.9	0.8	10.7	8.2	25.8	30.2	3.8	34.0	39.7	317.5	302.6	54.6	357.2
	Middle	1.2	8.9	9.2	0.9	10.1	10.9	41.4	47.3	5.0	52.3	48.3	116.3	133.2	31.3	164.5
	Rich	1.3	9.6	10.2	0.7	10.9	13.2	40.2	49.6	3.8	53.4	51.4	169.3	189.0	31.7	220.7
	Richest	8.0	30.1	34.2	4.0	38.2	26.8	77.6	96.1	8.3	104.4	117.0	184.1	256.5	44.6	301.1
Total		3.9	16.8	18.8	1.9	20.7	13.2	40.5	49.2	4.4	53.7	55.6	178.5	196.7	37.4	234.1

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Data

Note: PIHE: Monthly per capita inpatient health expenditure, POHE: Monthly per capita outpatient health expenditure

PMHE: Monthly per capita medical health expenditure, PNMHE: Monthly per capita nonmedical health expenditure

PCHE: Monthly per capita health expenditure

Information related to various heads of health expenditure is considered to be the basic input of targeted policy intervention and policy makers can find the mechanism of health payment vulnerability through the detailed analysis of out of pocket health expenditure. Table 5.2 and 5.3 show the different headings of out of pocket health payments in the KBK region and Odisha. The share of per capita medical expenditure in terms of doctor's fee, medicines, diagnostic tests, bed charges and other medical expenses including attendance charges, personal medical appliances, blood, oxygen etc. in the total health expenditure is more in the KBK region as well as in Odisha regardless of any background characteristics. Similarly, the data reveals that the average monthly per capita expenditure on outpatient care is found to be more than that of inpatient care. This is due to the fact that majority of the people are receiving inpatient care than outpatient care from government hospital/medical institutions. Per capita expenditure on outpatient as well as inpatient care is more in the urban areas compared to rural areas in KBK region and Odisha. Most of the people from urban areas prefer private health facilities and the cost of care in private institutions is more due to higher fees of doctor, diagnostic test and medicine costs. Moreover, these institutions are generally

located in commercial and urban areas to earn more profit. Similarly, from rural side, illiteracy and financial constraints restrict them to opt for no care against medical care. Hence, one can expect a higher inpatient and outpatient health expenditure in urban areas. The amount of per capita health expenditure is less for SC, ST labour and poor households compared to any other households in the KBK region.

Table 5.4 Sources of Finance for expenses in health care in the KBK Region of Odisha, 1995-2014

Sources of Finance for expenses made in Inpatient Care																
Background Characteristics		HH Income/Saving			Borrowings			Sale of Assets			FR Contributions			Other Sources		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Sector	Rural	35.5	54.5	70.1	48	26.2	25.5	10.1	9.2	2.8	-	10.1	1.1	6.3	-	0.5
	Urban	54.6	70.9	61.1	16.6	23.1	38.9	22.4	0	0	-	6	0	6.4	-	0
Occupation	Self Employed	45.6	72.5	78.6	16.5	19.8	14.8	29.1	2.7	0	-	5.1	5.4	8.8	-	1.3
	Agriculture	41.5	53.6	67.8	44.3	25.2	26	11.3	12.9	5.8	-	8.2	0.2	2.9	-	0.1
	Labour	23.2	49.4	71.9	56.2	30.7	27.4	7.7	7.4	0.1	-	12.6	0	13	-	0.6
	RWS	74.4	80.3	59.5	13.4	16.2	39	5.5	0	1.5	-	3.5	0	6.7	-	0
	Others	65.5	72.1	43.4	16.1	9.3	56.6	18.3	9.3	0	-	9.3	0	0	-	0
Caste	ST	16.4	47.2	67.3	56.7	28.1	30.2	10.3	10.4	2.3	-	14.2	0.3	16.6	-	0
	SC	36.3	58.8	71.3	25.9	22.8	21.2	29.1	10.2	5.2	-	8.2	0	8.7	-	2.3
	OBC		57.9	66.6		28.1	28.7	0	6.8	2.2	-	7.1	2.5		-	0.1
	Others	49.8	67.6	83.5	31.8	13.6	16.5	14.5	4.7	0	-	14.2	0	3.9	-	0
MPCE CLASS	Poorest	26.3	47.7	60.5	46.5	28.2	34.2	22.7	12.6	2.6	-	11.5	2.8	4.5	-	0
	Poor	65.9	57.2	64.4	26.7	29.4	29	4.9	3.3	5	-	10.1	0.5	2.6	-	1.2
	Middle	43.8	55	66.4	26	25.1	29.7	23.8	9.4	3.1	-	10.4	0	6.4	-	0.8
	Rich	24.5	57.1	85.6	39.3	25.8	14.4	19.8	8.8	0	-	8.4	0	16.4	-	0
	Richest	55.6	80.4	95	42	14.6	4.5	2	1	0	-	4	0	0.4	-	0.5
	Total	43.4	55.9	69.2	35	26	26.7	15.2	8.4	2.5	-	9.7	1	6.3	-	0.4
Sources of Finance for expenses made in Outpatient Care																
Background Characteristics		HH Income/Saving			Borrowings			Sale of Assets			FR Contributions			Other Sources		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Sector	Rural	55.2	88.4	93.6	27.7	8.2	5.7	10.3	-	0.6	-	3.4	-	6.7	-	0.1
	Urban	96.6	86.6	100	2	7.3	0	0.4	-	0	-	6.1	-	1	-	0
Occupation	Self Employed	93.6	92.7	94.1	3.8	7.3	0	0.7	-	5.9	-	0	-	1.8	-	0
	Agriculture	72.2	100	88.5	25.8	0	11.5	1.1	-	0	-	0	-	0.9	-	0
	Labour	46.5	81	100	29.2	13.5	0	14.7	-	0	-	5.5	-	9.6	-	0
	RWS	100	100	99.2	0	0	0	0	-	0	-	0	-	0	-	0.8
	Others	100	96	100	0	0	0	0	-	0	-	4	-	0	-	0
Caste	ST	63.8	78.3	96.1	31.8	10.2	3.7	0.6	-	0	-	11.5	-	3.8	-	0.2
	SC	60.8	96.8	96.1	23	3.2	0.9	4.3	-	3	-	0	-	11.9	-	0
	OBC	0	90.2	89.6		9.8	10.4	0	-	0	-	0	-		-	0
	Others	56.5	100	100	19.5	0	0	16.9	-	0	-	0	-	7.1	-	0
MPCE CLASS	Poorest	83.1	84	98.9	16.3	0	1.1	0	-	0	-	16	-	0.6	-	0
	Poor	49.7	79.5	52.9	23.8	20.5	42.2	18.5	-	4.9	-	0	-	8	-	0
	Middle	60.5	89.9	99.7	34.9	10.1	0	3.3	-	0	-	0	-	1.3	-	0.3
	Rich	77.1	100	100	18.6	0	0	0	-	0	-	0	-	4.3	-	0
	Richest	44.2	100	98.8	34.6	0	1.2	0.9	-	0	-	0	-	20.3	-	0
	Total	59.9	88.3	94.1	24.9	8.1	5.3	9.2	-	0.6	-	3.6	-	6.1	-	0.1

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Data

Note: FR Contributions: Contribution from friends and relatives

Table 5.5 Sources of Finance for expenses in health care in Odisha, 1995-2014

Sources of Finance for expenses made in Inpatient Care																
Background Characteristics		HH Income/Saving			Borrowings			Sale of Assets			FR Contributions			Other Sources		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Sector	Rural	43	46.8	63.8	38.2	33.4	31.2	12.1	8.4	2.1	-	11.4	2.5	6.7	-	0.4
	Urban	52.4	64.3	74.2	27.3	24.6	22.8	12.3	3.2	0.7	-	8	0.7	7.9	-	1.6
Occupation	Self Employed	39	53.3	70.9	42.2	30.7	24.4	13.1	7.3	0.9	-	8.7	2.8	5.7	-	1
	Agriculture	42.4	49.6	59.7	35.7	30.6	36.4	16	8.4	1.8	-	11.4	1.7	5.9	-	0.4
	Labour	45.9	42.5	71.5	39.5	38	23.2	6.9	8.9	3.7	-	10.6	0.8	7.7	-	0.7
	RWS	65.3	79	66.5	18	16	31.9	7.9	3	0.4	-	2.1	0.1	8.8	-	1
	Others	53.4	48.1	60	20.4	28.7	28.8	15	5.5	1	-	17.7	10.1	11.3	-	0.1
Caste	ST	38.8	50.1	70.7	52.7	29.2	27.3	3.2	10.5	0.8	-	10.2	1.1	5.2	-	0
	SC	48.2	45.3	65.2	29.9	37.2	29.9	12.8	7.7	2.8	-	9.9	0.9	9.2	-	1.2
	OBC		49.6	62.2		32.4	29.8	0	7.6	2.7	-	10.4	4.6		-	0.7
	Others	47.2	51.5	66.8	29.4	28.2	31.6	16.1	6	0.6	-	14.3	0.1	7.3	-	0.8
MPCE CLASS	Poorest	35.8	44.6	62.6	49.7	32.4	32.4	9.2	10.6	1.2	-	12.4	3.3	5.3	-	0.4
	Poor	47	45.5	69.4	36.9	34.4	25.3	10.1	7.7	1.5	-	12.3	3.5	6	-	0.3
	Middle	48.4	46.9	64	36	34.8	29.7	11.4	6.9	2.3	-	11.4	3.6	4.2	-	0.5
	Rich	48.3	51.1	66.9	36.7	33.2	29	8.4	7.2	2.8	-	8.6	0.3	6.6	-	1
	Richest	43	55.3	65.8	33.2	27.3	31.6	15	7.2	0.9	-	10.3	0.7	8.8	-	1
	Total	45.1	48.9	65.7	35.8	32.3	29.6	12.1	7.8	1.8	-	10.9	2.2	7	-	0.6
Sources of Finance for expenses made in Outpatient Care																
Background Characteristics		HH Income/Saving			Borrowings			Sale of Assets			FR Contributions			Other Sources		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
Sector	Rural	69.6	71.1	91.1	22.5	18.7	8.4	4.2	3.6	0.1	-	6.6	0.3	3.7	-	0.1
	Urban	83.4	87	78.1	8.7	10.4	20.7	4.2	0.5	0	-	2.1	1.3	3.7	-	0
Occupation	Self Employed	81.5	73.4	89.8	14.5	20.6	7	2.3	2.3	0.6	-	3.6	2.6	1.7	-	0
	Agriculture	77.7	79.3	92.1	20.5	12.1	7.8	1.2	3.6	0	-	5	0.1	0.6	-	0
	Labour	59.6	65.1	94.6	26.6	23.6	5.2	7.3	3.6	0	-	7.7	0.1	6.6	-	0.1
	RWS	82.7	96.5	79.4	4.7	1.2	20.6	8	1.2	0	-	1.2	0	4.6	-	0.1
	Others	84.6	75.8	71.7	12	11.3	28.3	0	3.9	0	-	9	0	3.3	-	0
Caste	ST	72.9	71.6	86.1	21.5	17.7	12	2.7	4.7	0	-	6	1.9	2.9	-	0.1
	SC	65.4	69.9	89.9	22.6	21.8	9.6	2.3	1.5	0.5	-	6.8	0	9.7	-	0
	OBC		70.2	89.4		18.5	10.4		4.1	0	-	7.2	0.1		-	0.1
	Others	72.9	81.9	88.1	19.4	11.9	11.9	5.4	2.9	0	-	3.3	0	2.3	-	0
MPCE CLASS	Poorest	78.9	73.1	94.8	13.7	14.1	5.2	3.9	5.3	0	-	7.6	0	3.5	-	0
	Poor	59.2	72.2	82.4	20.8	19.4	15.9	11.2	3.7	0.6	-	4.7	1.2	8.8	-	0
	Middle	71.4	71.8	88.6	26.9	19.8	9.7	1	2.4	0	-	6.1	1.5	0.7	-	0.2
	Rich	76.1	75.2	87.7	21.2	21.1	12.3	1.4	1.5	0	-	2.2	0	1.2	-	0
	Richest	75.6	70.4	88.4	18.6	15.6	11.6	2.6	4.1	0	-	9.9	0	3.2	-	0
	Total	71.6	72.4	88.4	20.4	18.1	11	4.2	3.3	0.1	-	6.2	0.5	3.7	-	0

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Data

Note: FR Contributions: Contribution from friends and relatives

In low income countries like India, 3/4th of health care is financed through household out of pocket payment. Odisha is no exception to it, where out of pocket payments of the households account for 73.6 percent of total health financing (NHA, 2016-17). Such high share of out of pocket health payments results in catastrophic and impoverishment effects on

households (O'Donnell et al. 2008; Wagstaff and Van Doorslaer, 2003; Flores et al. 2008; Berman et al. 2010; Ghosh, 2011 and Gupta and Joe, 2013). In order to finance health care, households adopt different strategies like use of current income/saving, borrowing, sale of household assets, contribution from friends and relatives etc. to cope with high health care costs. The coping sources such as borrowing (with or without interest), sale of household assets and contribution from friends and relatives (with or without repayments) become hardship or distress and even the process of arrangement for all these financing turn burdensome for the households. Hence, these financing sources are called “distress financing” of the households for health care expenses (Kruk et al. 2009, Dillip and Duggal, 2002 and Joe, 2015). Table 5.4 and 5.5 reveal sources of finance for the expenses in health care for KBK region and Odisha respectively. The data shows that the dependence of household on income and savings as a source of financing health care (both outpatient and inpatient care) has increased during the period from 1995-96 to 2014 in the KBK region and Odisha. This implies that the ability to pay for health care out of current income and saving for the people has improved and people's dependence on distress sources of financing has reduced over the same period. However, 31 percent and 6 percent of the households in the KBK region and 35 percent and 12 percent of the households in Odisha rely on borrowing, sale of assets and contributions of friends and relatives for the expenses of inpatient and outpatient care respectively. It is interesting to note that less percentage of households in the KBK region depend on distress source of financing for health care compared to the state average. It does not necessarily mean that the ability to pay is more in the KBK region. Rather, the utilisation of medical care is less in the KBK region compared to the state average. The other reason could be that a less percentage of people in the KBK region are receiving treatment from private sources. Under the presumption of high treatment cost in the private sector and people opt no care against medical care; one can reasonably expect that a less percentage of households in the backward KBK region depend on distress financing sources for health care. Looking across consumption classes, the dependence of household on current income and saving for health care expenses increases, as households move on the consumption expenditure ladder. Similarly higher the proportion of rural households, SC, ST and labour class households depend on distress financing sources for health care compared to their counterparts. Sometimes the most vulnerable households like SC, ST, poor and labour class households choose no care rather than opt for distress financing due to lack of collaterals to get loan or borrowing and any other household assets to sell it. Hence,

ultimately households suffer from catastrophic payments burden and illness induced impoverishment.

5.3 Burden of Catastrophic Health Care Payment: Some Evidences

Health care payments become catastrophic when it is high enough to endanger a household's customary living standards (Berki, 1986). The idea behind this approach is that if a household spend a larger share of its income of expenditure on health care, it disrupts the material living standards or affects the consumption of other items of the households. Wagstaff and Doorslaer (2003) measure the incidence and intensity of catastrophic health payments in Vietnam using share of out of pocket health payment in household budget. Wagstaff and Doorslaer (2003), Health care payments become catastrophic when it exceeds some fixed proportion of household budget. The fixed proportion or threshold levels are arbitrary and exogenously determined and set at 10 percent of total household budget. Wagstaff and Doorslaer (2003) used different threshold levels to compare the incidence of catastrophic payment. However, setting same threshold level for both rich and poor leads to misleading conclusion, hence they computed concentration index in order to capture the distribution of the incidence of catastrophic health payment. They found that at a higher threshold the incidence of catastrophic health payment is concentrated among the poor, but when the threshold was considered at lower level, the incidence of catastrophic health payments was also observed within the rich households.

Russell (1996) and Xu et al. (2003) measure catastrophic health payment in terms of household ability to pay for health care. Household ability to pay is defined as the income after paying out for food expenditure. Xu et al. (2003) considered health payment to be catastrophic if it exceeds 40 percent of households' capacity to pay. Xu et al. (2003) argued that there are three essential conditions for catastrophic payments: (a) availability of health care services requiring payment (b) low capacity to pay (c) lack of prepayment or insurance. Van Doorslaer et al. (2007) used both household total expenditure and household ability to pay as denominators to measure the incidence of catastrophic health payments on Consumption Expenditure Survey data of India for 1999-2000. Van Doorslaer et al. (2007) observed significant difference in the incidence of catastrophic health payments when measured by two denominators. The results suggested that at 25 percent threshold level there is 2 percent of households that incurred catastrophic health payment when prepayment income was used as denominator, while around 10 percent of households incurred

catastrophic health payment when capacity to pay was used as denominator. Wagstaff (2008) argued that the ‘ability-to-pay’ approach developed by Xu et al. (2003) is problematic in this sense: if a household’s pre-payment income falls short of the poverty line, the household’s estimated ‘ability-to-pay’ becomes negative and it falls below the catastrophe threshold automatically whatever its medical care outlays. Therefore, Xu et al. (2003) considered household actual food expenditure, provided the household total expenditure is below the subsistence level. Flores et al. (2008) employed a different approach to calculate the catastrophic health payment on NSSO health care survey data of India for 1995-96. Flores et al. (2008) measured catastrophic health payment after adjustment for the sources used to finance health care. If the household is able to cope with its health care expenses from savings, borrowing and selling assets then present consumption have a lower impact of out of pocket payment than a situation when household cannot borrow. Ignoring financing coping mechanisms leads to serious biased estimates of the relative impact of health expenditure on current consumption. Hence, the coping adjusted health expenditure ratio is the amount of health expenditure that was financed by curtailing current consumption to total consumption expenditure in the absence of medical spending.

Following Wagstaff and Van Doorslaer (2003), Garg and Karan (2009) used Consumer Expenditure Survey data of 1999-2000 to measure catastrophic health payments. They found that the increase in poor due to OOP health expenditure was higher in rural areas compared to urban areas in India. Joglekar (2008) argued that for households below poverty line any expenditure on health care is catastrophic because these households are unable to meet their subsistence level of consumption, similarly for above poverty line households the threshold level should vary with the income level. Hence, Joglekar (2008) used zero percent as the threshold limit, the global minimum to define catastrophic health payment for all the households. However, zero percent threshold level for all the households may not be theoretically justified at least on economic grounds and it results household health payment is always welfare reducing in nature for all the households. Pal (2010) measured catastrophic health expenditure as OOP health expenditure that resulted in consumption deprivation of necessities.

Thus, it becomes evident that though the concepts of catastrophic health payments gained momentum after the work of Berki (1986), much of the debate concentrated on the methodology developed by Wagstaff and Doorslaer (2003) and Xu et al. (2003). World Bank (2008) developed a similar methodology like the one offered by Wagstaff and Van Doorslaer

(2003) to calculate the catastrophic health payment. The predetermined threshold levels vary from 5 percent to 40 percent of household expenditure or non food expenditure. For instance, Wagstaff and Van Doorslaer (2003) used 5 percent, 10 percent, 15 percent and 25 percent threshold level to measure catastrophic health payment whereas Xu et.al (2003) study considered 40 percent of non-food expenditure on health care as catastrophe. There is dearth of common consensus among health researchers that the level at which the threshold should be fixed, however a threshold of 10 percent is commonly used with the rationale that above this level the household may be forced to sacrifice other basic needs, selling of assets, incur debt or become impoverished (Pradhan and Prescott, 2002; Ranson, 2002; Wagstaff and Van Doorslaer, 2003 and Russell, 2004). The present research analysis followed Pradhan and Prescott, 2002; Ranson, 2002; Wagstaff and Van Doorslaer, 2003 and Russell, 2004. The present study has used 10 percent of total consumption expenditure to be the threshold at which households expose themselves to significant catastrophe. The capacity to pay approach has not been used due to the limitations of NSSO health surveys data in providing food and non-food expenditure at disaggregate level.

5.4 Measurement of Catastrophic Health Payment

Catastrophic health expenditure refers to high levels of out of pocket health spending affecting the standard of living of the households. The empirical methodology used in this chapter is an adoption of World Bank (2008). The two important variables used in this methodology are total household health expenditure (or household OOP health care payments) and a measure of living standard. Normally, household income or consumption expenditure is used as a proxy for living standards of the household. Generally consumption expenditure is preferred over household income, because only income variable is not responsible for health payments. For instance, if there are two households A and B with same level of income and health payments, say, household A has savings and finances health care from their savings whereas B has no savings and must cut back on current consumption to pay for health care. In terms of ratio of health payments to income, both households A and B are same. However, the difference is reflected in the ratio of health payments to consumption expenditure and it is more for household B. Assuming that the opportunity cost of current consumption is greater; the catastrophic impact is bound to be greater for household B without saving. Similarly when consumption expenditure is used as a proxy for standard of living, rich households who do not have to borrow money or sell assets and poor households

that rely on such coping mechanisms to finance health care treated equally. The debate of better indicator of standard of living will always be there, however most of the researchers preferred consumption expenditure over income to reflect the standard of living due to the issue of accurate measurement of income in case of large informal economy where a large share of income remains unregistered or unreported (Wagstaff and Van Doorslaer, 2003; Xu et al. 2003; World Bank, 2008; Arsenijevic et al. 2013). Hence, the current study has used consumption expenditure as a proxy for standards of living of the household.

A household is said to have incurred catastrophic health payments if the ratio $H/E > Z$, where 'H' is the household OOP health care payments, 'E' is the consumption expenditure of the households and Z is the pre-determined threshold level, more than this level of health spending is considered to impose a severe disruption to household standard of livings. The number of such households as a fraction of the total households, measures the incidence of catastrophic health payments analogous to poverty head count called catastrophic payment headcount (CHC).

Symbolically,

$$CHC = \frac{1}{N} \sum_{i=1}^N D_i \text{ -----(5.1)}$$

where CHC is the catastrophic payment headcount, N is the sample size and $D_i=1$ if the ratio $H/E > Z$ and 0 otherwise.

However, this measure captures the incidence or prevalence of catastrophic health payment, but does not reflect the amount by which households exceed the thresholds (severity of catastrophic payments). The average degree by which payments as a fraction of total expenditure exceed the threshold Z is measured by catastrophic payment gap (CPG). Similar to poverty gap, catastrophic payment gap (or overshoot) measures the severity of catastrophic health payments.

Symbolically,

$$CPG = \frac{1}{N} \sum_{i=1}^N O_i \text{ -----(5.2)}$$

Where

$O_i = D_i \left[\left(\frac{H_i}{E_i} \right) - Z \right]$ is the overshoot or excess amount by which the payment fraction (H/E) exceeds the threshold level Z.

Moreover, the mean positive gap (MPG) can be calculated as the ratio of CPG and CHC measures the intensity of catastrophic health payments. Hence catastrophic payment gap

equals the fraction with catastrophic health payments times the mean positive gap; the incidence times the intensity. It is the amount of excess payments by which households exceeds the catastrophic threshold Z .

Symbolically,

$$MPG = \frac{CPG}{CHC} \text{ -----(5.3)}$$

The measures demonstrated above are insensitive to the distribution of catastrophic health payments. In the CHC measure all households exceeding the threshold level are treated equally. Similarly, the CPG measure counts all rupees spent on health care in excess of threshold equally, irrespective of whether they are made by rich or poor people. If the assumption of a diminishing marginal utility holds true for income, then the opportunity cost of health spending will be more for the poor than that of the rich people. For further insight into the severity aspects of catastrophic health payments, distribution sensitive measures of catastrophic payments can be calculated. Therefore the measures demonstrated above must be weighted in order to reflect the differential opportunity cost.

One significant way to capture the incidence and intensity of the impact catastrophic health payments in relation to standard of living is through concentration indices for D_i and O_i which is defined as CI_D and CI_O in the present study. The concentration index is used to measure and compare the socioeconomic related inequality in a health variable.¹ (Kakwani, Wagstaff and Van Doorslaer, 1997; Wagstaff and Van Doorslaer, 2003; and Wagstaff and Watanabe, 2003). The concentration index is analogous to Gini coefficient and its value depends on the area between the 45⁰ line (line of perfect equality) and the concentration curve, which provides the distribution of catastrophic health payments in relation to a measure of standard of living. The values of concentration index ranges between -1 to +1. A positive (negative) value of CI_D indicates the greater tendency for the rich (the poor) to exceed the threshold. Similarly a positive (negative) value of CI_O indicates a greater intensity of payment gap amongst the better off (worse off). Zero value of concentration index indicates perfect equality and one indicates perfect inequality. Wagstaff and Van Doorslaer (2003) suggested weighted indices in order to understand whether the catastrophic payment burden is concentrated among the poor or the better off. The weighted index is a simple summary measure defined as the catastrophic payment headcount multiplied by the complement of the concentration index. Thus, the catastrophic payments headcount is

¹ A note on concentration curve and concentration index is given in **Appendix 5.A** at the end of this chapter.

weighted by the household's rank in the distribution of their standard of living, hence, giving larger weight to poor people.

The rank weighted headcount: $CHC^w = CHC(1 - CI_D)$. If those who exceed the threshold tend to be poorer, the concentration index CI_D will be negative and this will make CHC^w greater than CHC . Thus, the catastrophic payment problem is worse than it appears simply by looking at the fraction of households exceeding the threshold, since it overlooks the fact that it tends to be poor who exceed the threshold. The opposite will happen if it is better off individual who exceed the threshold, CI_D will be positive and CHC will be greater than CHC^w . Similar weighted approach can be developed for catastrophic payment gap.

The rank weighted payment gap: $CPG^w = CPG(1 - CI_O)$. The difference between CPG^w and CPG depends on the distribution of the payment gaps; CPG^w will be larger than CPG to the extent that a greater share of the payment gap occurs amongst the poor households.

Following the methodology as demonstrated above, the catastrophic headcount, payment gap and rank weighted indices for headcount and payment gap were calculated for KBK Region and Odisha by using NSSO 52nd, 60th, and 71st round health surveys data in the present study. Moreover, the study has also examined the catastrophic headcount, payment gap for some of the socioeconomic variables like social group, religion, occupation and place of residence by using latest health survey 71st round data.

5.5 Incidence, Intensity and Distribution of Catastrophic Health Payments

Table 5.6 to 5.8 reveals the incidence, intensity and distribution of catastrophic health payments at 10 percent threshold level across consumption quintiles in the KBK region and Odisha for the period 1995-96 to 2014. The empirical findings suggest that the size of catastrophic health payments vary considerably across rural-urban and consumption quintiles. An inter temporal analysis indicates that the burden of catastrophic health payment as measured by catastrophic head count shows an increasing over time in all the rounds except the 60th round for KBK region. The percentage of households experiencing catastrophic head count in KBK region was 12.9 percent in 1995-96 which augmented by 33 percent in 2014. Except for the year 2004, the burden of catastrophic health payment was very high in the KBK region compared to the state average. Looking across consumption quintiles, it is observed that there exists high inequality in the burden catastrophic head count. A negative of value of concentration index indicates a greater tendency for the poor households to cross

the threshold level and the problem of catastrophic health payments is more common among the poor households in the KBK region. This may be due to the fact that poor households spend a larger proportion of their consumption expenditure on food items and they are left with a small proportion for non-food items. Hence, their capacity to afford health care is very low and a little high amount of health expenditure make them catastrophe. However, in 2004 the prevalence of catastrophic health count has been found to be more among higher quintile groups. Another significant observation arising from inter temporal analysis that higher proportion of rural households in both KBK region as well as Odisha encountering catastrophic health payments in all the periods. Contrary to this result, the catastrophic health count is higher among upper consumption quintiles in case of Odisha. The intensity of catastrophic health payments, i.e., average degree by which the health payment exceeds the threshold level, is higher among poorest and poor quintiles than the rich and richest consumption quintiles in the KBK region over time. Interestingly, this intensity is more among rich and richest consumption quintiles in Odisha as evident from the fact that the rank weighted payment gap is less than catastrophic payment gap.

Table 5.6 Incidence, Intensity and Distribution of Catastrophic Impact of OOP Health Payment in KBK Region and Odisha in 1995-96

	Consumption Quintile	Rural			Urban			Total		
		CHC	CPG	MPG	CHC	CPG	MPG	CHC	CPG	MPG
KBK Region	Poorest	13.6	6.6	48.4	16.6	3.4	20.5	14.1	6.1	43.3
	Poor	13	7.4	57.3	25.4	2	7.7	14.3	6.9	48.2
	Middle	13.6	6.8	50.1	10.1	1.5	14.7	13.2	6.2	47
	Rich	9.8	1.9	19	15.1	2.4	15.9	10.4	1.9	18.5
	Richest	9.8	7.9	80.6	22	11.5	52.1	11.3	8.4	73.9
	All	12.3	6.2	50.7	18	3.7	20.7	12.9	5.9	45.7
	C.I	-0.0624	-0.056	0.0081	-0.0045	0.2272	0.1758	-0.0561	-0.0295	-0.0244
	SE(C.I)	0.0263	0.0955	0.1134	0.0591	0.2155	0.1813	0.0176	0.1024	0.1102
	RWI	13	6.6	50.3	18	2.9	17	13.7	6.1	46.8
Odisha	Poorest	8.4	4.3	51.6	7.3	1.3	17.6	8.2	3.8	46.5
	Poor	10.3	3.9	37.4	17	1.9	11	11.2	3.6	32.3
	Middle	10.5	2.7	25.4	13.5	3.5	25.8	10.9	2.8	25.5
	Rich	10.9	2.2	20.4	17.1	2.2	12.9	11.8	2.2	18.7
	Richest	16.4	6.6	40.3	20.1	4.2	21.1	17	6.3	36.8
	All	11.9	4.1	34.8	15.6	2.8	18.1	12.4	3.9	31.7
	C.I	0.1257	0.1093	-0.0484	0.1369	0.1912	0.0425	0.1284	0.1184	-0.0428
	SE(C.I)	0.0316	0.0953	0.0928	0.0701	0.072	0.0504	0.0344	0.0823	0.0885
	RWI	10.4	3.7	36.5	13.5	2.3	17.3	10.8	3.5	33.1

Note: CHC: Catastrophic Head Count (%), CPG: Catastrophic Payment Gap (%), MPG: Mean Positive Gap (%), C.I: Concentration Index, S.E (C.I): Standard Error of C.I and RWI: Rank Weighted Index (RWCHC, RWCPG, RWMPG)

Source: Author's Own Calculation from NSSO 52nd Round Unit Level Data

Table 5.7 Incidence, Intensity and Distribution of Catastrophic Impact of OOP Health Payment in KBK Region and Odisha in 2004

	Consumption Quintile	Rural			Urban			Total		
		CHC	CPG	MPG	CHC	CPG	MPG	CHC	CPG	MPG
KBK Region	Poorest	6.9	4.1	59.3	7.1	4.2	59.2	6.9	4.1	59.3
	Poor	9.7	2.5	25.5	8	2	24.7	9.6	2.4	25.5
	Middle	16.2	6.9	42.4	1.8	0	2.4	15.2	6.4	42.1
	Rich	11.4	2.7	23.6	16.1	2.5	15.7	12	2.7	22.2
	Richest	12.7	3.9	30.4	14	5.6	40.2	12.8	4	31.3
	All	10.4	4.1	39.5	8.7	2.9	33.7	10.3	4	39.1
	C.I	0.1502	0.0254	-0.1505	0.1594	-0.0447	-0.2389	0.1482	0.0175	-0.1525
	SE(C.I)	0.0384	0.0704	0.0427	0.08	0.1934	0.1338	0.031	0.0634	0.0441
	RWI	8.8	4	45.4	7.3	3.1	41.7	8.7	3.9	45.1
Odisha	Poorest	16.6	11.5	69.4	12.6	6.6	52.5	16.2	11	68
	Poor	17.6	10.5	59.4	17	6.3	36.9	17.6	10	57.1
	Middle	22	12	54.6	14.8	10.6	71.9	21.1	11.8	56
	Rich	20.4	10.9	53.1	8.5	2.9	33.8	18.6	9.6	51.7
	Richest	26.6	14	52.5	7.8	3.2	40.6	23.5	12.2	51.8
	All	20.6	11.7	57	11.5	5.5	47.9	19.4	10.9	56.3
	C.I	0.088	0.0352	-0.0555	-0.1389	-0.1762	0.0573	0.064	0.014	-0.0525
	SE(C.I)	0.026	0.0262	0.0173	0.0421	0.0753	0.0474	0.0236	0.0218	0.018
	RWI	18.8	11.3	60.2	13.1	6.5	45.1	18.1	10.8	59.3

Note: CHC: Catastrophic Head Count (%), CPG: Catastrophic Payment Gap (%), MPG: Mean Positive Gap (%), C.I: Concentration Index, S.E (C.I): Standard Error of C.I and RWI: Rank Weighted Index (RWCHC, RWCPG, RWMPG)

Source: Author's Own Calculation from NSSO 60th Round Unit Level Data

Table 5.8 Incidence, Intensity and Distribution of Catastrophic Impact of OOP Health Payment in KBK Region and Odisha in 2014

	Consumption Quintile	Rural			Urban			Total		
		CHC	CPG	MPG	CHC	CPG	MPG	CHC	CPG	MPG
KBK Region	Poorest	37.7	31.6	83.7	15.4	4.3	28.2	35.9	29.4	81.7
	Poor	40.6	80.3	197.6	68.4	14.2	20.8	43	74.6	173.2
	Middle	30.2	4.6	15.1	19.2	9.3	48.4	29.2	5	17.1
	Rich	14.1	2.3	16.5	51.5	19.8	38.4	17.8	4	22.7
	Richest	43.3	15.3	35.3	3	5.8	194.9	37.5	13.9	37.1
	All	33.4	28.4	85.2	29.6	9.9	33.4	33	26.7	80.9
	C.I	-0.0788	-0.2569	-0.2434	-0.0035	0.141	0.3839	-0.0719	-0.2475	-0.2313
	SE(C.I)	0.0835	0.1973	0.1727	0.2033	0.1457	0.1411	0.0605	0.1836	0.1443
	RWI	36	35.7	105.9	29.7	8.5	20.6	35.4	33.3	99.6
Odisha	Poorest	28.8	22.9	79.4	22.9	8.6	37.7	28	20.9	74.7
	Poor	36.2	47.8	132.1	38.6	16.6	43	36.6	42.9	117.4
	Middle	34.4	13.5	39.2	32.1	10.6	32.9	34	13	38.1
	Rich	30.8	14.2	46.1	26.5	9.9	37.3	29.9	13.3	44.5
	Richest	37.3	12.1	32.5	10.2	6.6	64.8	30.9	10.8	35
	All	33.2	21.8	65.6	24.8	10	40.5	31.7	19.6	62
	C.I	0.0262	-0.1939	-0.2116	-0.1555	-0.1049	0.108	-0.0034	-0.197	-0.1944
	SE(C.I)	0.0272	0.0811	0.0645	0.1065	0.0733	0.0531	0.0275	0.0779	0.0494
	RWI	32.4	26	79.5	28.6	11.1	36.2	31.8	23.5	74.1

Note: CHC: Catastrophic Head Count (%), CPG: Catastrophic Payment Gap (%), MPG: Mean Positive Gap (%), C.I: Concentration Index, S.E (C.I): Standard Error of C.I and RWI: Rank Weighted Index (RWCHC, RWCPG, RWMPG)

Source: Author's Own Calculation from NSSO 71st Round Unit Level Data

5.6 Catastrophic Burden of Health Payments across Socioeconomic Characteristics of the Households

5.6.1 Catastrophic Health Count and Payment Gap across Social Groups

The incidence, intensity and distribution of catastrophic health payments across caste, religion and occupation etc. are discussed in this section. Table 5.9 shows the catastrophic head count was highest among OBCs followed by Schedule Caste (SC) and Schedule Tribe (STs) household in the KBK region. However it is the STs and SCs household in urban areas and SCs and OBCs household in rural areas experiencing highest catastrophic head count (CHC) in the KBK region. A negative value of concentration index for rural SCs and STs household (or rank weighted CHC is greater than CHC) implying that relatively poorer households tends to exceeds the catastrophic payments threshold in the rural areas. Contrary to this result SCs and STs belong to higher consumption quintiles class in urban areas exceeds the threshold level. Similar to this a positive value of concentration index for OBC category indicates a higher CHC among the rich consumption quintiles households. The same was found for the state, i.e., SC and OBC households incurred a higher catastrophic payment and relatively poor households exceed the thresholds.

Table 5.10 reveals that the depth of the burden of catastrophic health payments was highest for SC (66 percent) and OBC (20 percent) households compared to other social groups in KBK as well as Odisha. However in urban KBK region the intensity of catastrophic health payment is more among SC and ST households. Irrespective of social groups the intensity of catastrophic gap is more among rural households compared to its counterpart urban households in KBK region and the state. The rank weighted payment gap and concentration index show that in rural areas the intensity of catastrophic health payments is more among the lower consumption quintiles and in urban areas it is among the higher consumption quintiles.

Table 5.9 Castewise Catastrophic Head Count (%) at 10 Precent Threshold Level, 2014

Sector	Consumption Quintile	Social Group							
		KBK Region				Odisha			
		ST	SC	OBC	Others	ST	SC	OBC	Others
Rural	Poorest	34.1	48.7	31	100	22.2	40.4	33.5	30.1
	Poor	40.6	23.9	67.6	61.1	30.7	28.7	49.4	39.5
	Middle	10.2	43.9	34.4	49.1	27.4	36.3	38.6	26.9
	Rich	22.6	8.6	13.6	0.5	26.4	21.5	29	43.9
	Richest	80	100	62	4	43	49.8	34.4	32.5
	All	31.7	30.9	38.1	27.3	27.5	33.4	36.1	35.8
	C.I	-0.0486	-0.1825	0.0093	-0.6437	0.0875	0.0091	-0.0452	-0.0005
	SE(C.I)	0.149	0.1596	0.1245	0.0938	0.0538	0.0928	0.039	0.047
	RWHC	33.2	36.5	37.7	44.9	25.1	33.1	37.8	35.9
Urban	Poorest	29.8	31.8	6.7	4.3	19.5	29.5	18.5	28.1
	Poor	85	36.5	10.7	82.8	18.4	47.6	38.4	49.8
	Middle	100	62.9	4.9	70.4	14	71.3	31.9	34.5
	Rich	100	80.6	33.4	25.1	6.6	18.7	22	37.8
	Richest	0	100	0.7	0.9	64.7	20.2	7.6	7.6
	All	68.9	54.6	6.5	32.2	20.6	32.7	24.8	23.8
	C.I	0.1706	0.2257	-0.0229	-0.1555	0.1133	-0.0944	-0.1043	-0.3117
	SE(C.I)	0.0943	0.0306	0.3115	0.2893	0.2409	0.103	0.114	0.1194
	RWHC	57.2	42.3	6.6	37.3	18.2	35.8	27.4	31.2
Total	Poorest	34	46.2	28.2	63.9	22	38.5	31	29.4
	Poor	43.9	24.2	63.7	81.3	29.5	30.7	47.4	44
	Middle	10.3	44.6	30.7	57.3	25.6	37.5	37.3	29.6
	Rich	22.7	18.3	14.4	9.8	25	21.1	27.4	42.2
	Richest	80	100	54	3.4	44.8	48.2	31.2	22.2
	All	32.5	32.9	34.7	29	26.9	33.3	34.1	31.5
	C.I	-0.0421	-0.1135	0.0094	-0.5138	0.0874	-0.004	-0.052	-0.0943
	SE(C.I)	0.1442	0.1181	0.1158	0.1475	0.0653	0.0852	0.0424	0.0601
	RWHC	33.9	36.6	34.3	44	24.6	33.5	35.8	34.5

Source: Author's Own Calculation from NSSO data

Note: RWHC-Rank Weighted Head Count (%), C.I-Concentration Index, SE (C.I)-Std error of C.I

Table 5.10 Castewise Catastrophic Payment Gap (%) at 10 Percent Threshold Level, 2014

Sector	Consumption Quintile	Social Group							
		KBK Region				Odisha			
		ST	SC	OBC	Others	ST	SC	OBC	Others
Rural	Poorest	18	27	62	60	11	19	44	20
	Poor	19	195	19	18	17	65	69	45
	Middle	2	7	5	4	8	15	14	16
	Rich	3	2	2	0	3	8	19	20
	Richest	45	17	14	4	15	13	11	12
	All	14	70	22	15	11	27	28	18
	C.I	-0.1307	-0.2297	-0.4843	-0.5981	-0.0517	-0.267	0.3023	-0.1539
	SE(C.I)	0.2385	0.3024	0.0824	0.0314	0.1195	0.1521	0.0588	0.0996
	RWPG	16.4	86.2	33.1	23.5	11.9	34.2	19.9	20.8
Urban	Poorest	12	6	2	4	12	4	7	14
	Poor	19	16	2	15	4	26	15	22
	Middle	15	11	3	42	28	34	6	8
	Rich	36	37	3	6	2	8	5	18
	Richest	0	101	0	6	2	5	3	8
	All	17	21	2	11	10	14	7	12
	C.I	0.0945	0.4154	-0.0665	-0.0223	-0.0155	-0.0073	-0.2029	-0.146
	SE(C.I)	0.0554	0.1232	0.1585	0.2018	0.2239	0.2006	0.0988	0.0776
	RWPG	15.2	12	2.2	11.7	10.6	13.6	8.2	13.6
Total	Poorest	17	24	55	39	11	17	38	18
	Poor	19	192	18	15	16	60	59	35
	Middle	2	7	5	19	11	16	13	13
	Rich	3	7	2	2	3	8	15	20
	Richest	45	37	13	5	14	12	10	10
	All	15	66	20	14	11	26	24	16
	C.I	-0.1275	-0.1973	-0.4781	-0.4784	-0.0522	-0.2417	-0.2981	-0.1546
	SE(C.I)	0.235	0.2927	0.0776	0.0435	0.1099	0.1594	0.0543	0.0879
	RWPG	16.4	78.9	29.7	20	11.8	31.7	31.8	18.2

Source: Author's Own Calculation from NSSO data

Note: RWPG-Rank Weighted Payment Gap (%), C.I-Concentration Index, SE (C.I)-Standard error of C.I

5.6.2 Catastrophic Health Count and Payment Gap across Religion

Chapter-3 exhibited that majority of the population in KBK region belong to Hindu religion. The proportion of Muslim and Christian is very negligible especially in rural areas. Table 5.11 demonstrates that more than one third of the total Hindu households experiencing catastrophic health payments, while the incidence of catastrophic health payments was higher among Hindu households (33.5 percent) compared to Muslim households (3.5 percent) in KBK region, but the reverse result was found in case of Odisha. As evident from concentration index, the burden of catastrophic health payments was higher among upper consumption quintiles in case of Muslim households and lower among upper consumption quintiles in case of Hindu households. The catastrophic payment gap also reveals a similar pattern for KBK region. Interestingly, the intensity of catastrophic payment was more for

Hindu households compared to Muslim households, though the incidence was higher for Muslim households in the State.

Table 5.11 Religionwise Catastrophic Head Count (%) at 10 Percent Threshold Level, 2014

Sector	Consumption Quintile	KBK Region			Odisha		
		Religion			Religion		
		Hinduism	Islam	Christianity	Hinduism	Islam	Christianity
Rural	Poorest	37.7	0	0	29.3	0	12.3
	Poor	40.4	0	0	36.6	0	22.1
	Middle	30.2	0	0	34.3	100	19.2
	Rich	14.9	0	0	30.8	80.6	0
	Richest	43.3	0	0	37.1	46.9	88.8
	All	33.6	0	0	33.3	81.1	17.7
	C.I	-0.0737			0.0221	-0.1141	0.1274
	SE(C.I)	0.0795			0.0263	0.0513	0.3207
	RWHC	36.1			32.6	90.4	15.5
Urban	Poorest	19.4	2.2	0	23.5	18.2	0
	Poor	68.4	100	0	37.7	56.5	0
	Middle	19.6	0	0	33.5	15	100
	Rich	54.2	6.6	0	26.6	6.6	1.4
	Richest	2.5	52.9	0	9.9	93.8	0
	All	32	3.5	0	24.7	27.7	69.6
	C.I	-0.0568	0.3426		-0.1677	0.1535	-0.3026
	SE(C.I)	0.1994	0.5822		0.1067	0.1779	0.2007
	RWHC	33.8	2.3		28.9	23.5	90.6
Total	Poorest	36.6	2.2	0	28.6	18.2	12.3
	Poor	42.8	100	0	36.7	56.5	22.1
	Middle	29.3	0	0	34.1	48.7	28
	Rich	18.7	6.6	0	29.9	74.9	0.1
	Richest	37.5	52.9	0	30.6	62.2	88.8
	All	33.5	3.5	0	31.8	42.1	18.8
	C.I	-0.0709	0.3426		-0.0083	0.2578	0.1439
	SE(C.I)	0.0559	0.5822		0.0259	0.0793	0.2931
	RWHC	35.8	2.3		32.1	31.3	16.1

Source: Author's Own Calculation from NSSO data

Note: RWHC-Rank Weighted Head Count (%), C.I-Concentration Index

SE (C.I)-Standard error of C.I

Table 5.12 Religionwise Catastrophic Payment Gap (%) at 10 Percent Threshold Level, 2014

Sector	Consumption Quintile	KBK Region			Odisha		
		Religion			Religion		
		Hinduism	Islam	Christianity	Hinduism	Islam	Christianity
Rural	Poorest	32	0	0	23	0	5
	Poor	81	0	0	49	0	13
	Middle	5	0	0	13	44	3
	Rich	2	0	0	14	32	0
	Richest	15	0	0	12	24	8
	All	29	0	0	22	34	7
	C.I	-0.2519			-0.1994	-0.1133	-0.0629
	SE(C.I)	0.1969			0.0809	0.0291	0.1942
	RWPG	35.9			26.4	38.2	7.3
Urban	Poorest	6	0	0	9	3	0
	Poor	14	22	0	16	20	0
	Middle	9	0	0	11	8	5
	Rich	21	1	0	10	1	1
	Richest	2	378	0	6	75	0
	All	10	7	0	10	10	3
	C.I	0.0595	0.9128		-0.1243	0.398	-0.2556
	SE(C.I)	0.1778	0.1784		0.0683	0.2868	0.1579
	RWPG	9.6	0.6		11.4	6	4.2
Total	Poorest	30	0	0	22	3	5
	Poor	75	22	0	44	20	13
	Middle	5	0	0	13	22	3
	Rich	4	1	0	13	29	0
	Richest	13	378	0	11	41	8
	All	27	7	0	20	17	7
	C.I	-0.2496	0.9128		-0.2053	0.3942	-0.0737
	SE(C.I)	0.1833	0.1784		0.0769	0.1277	0.1947
	RWPG	33.8	0.6		24	10	7.3

Source: Author's Own Calculation from NSSO data

Note: RWPG-Rank Weighted Payment Gap (%), C.I-Concentration Index

SE (C.I)-Standard error of C.I

Table 5.13 Occupationwise Catastrophic Head Count(%) at 10 Percent Threshold Level, 2014

Sector	Consumption Quintile	KBK Region					Odisha				
		Occupation					Occupation				
		Self Employed	Agriculture	Labour	RWS	Others	Self Employed	Agriculture	Labour	RWS	Others
Rural	Poorest	79.2	32.5	29.5	0	97.6	30.4	24.5	28.9	36.6	52.1
	Poor	71.2	41.9	11.8	16.6	85.6	31.8	45	28.4	7.7	60.4
	Middle	35.9	12.8	47.1	6.2	100	31.8	32.5	37.9	40.3	37
	Rich	3.1	16.2	6.6	50	0.7	25.9	35.8	20.7	35.3	57.6
	Richest	10	77.6	57.4	3.2	12.4	34.5	45	37.7	32.1	35.3
	All	43.6	31	29.6	23.3	66.7	30.5	35	29.4	31.4	47.1
	C.I	-0.3749	-0.0147	0.0234	-0.0784	-0.003	0.0024	0.0753	0.0003	0.0379	-0.0735
	SE(C.I)	0.1448	0.1917	0.1466	0.2487	0.0361	0.0288	0.0569	0.0564	0.0979	0.04
	RWHC	60	31.5	28.9	25.2	66.9	30.5	32.4	29.4	30.2	50.5
Urban	Poorest	5.8		39.4	26.6	0	23.5	0	18.1	35.7	5.8
	Poor	78.9		65.7	39	100	33.2	0	46.1	30.8	79.9
	Middle	41.3		0	8.5	100	52.8	0	14.6	15.7	30.5
	Rich	72.1		0	19	100	43	0	4.3	22.6	17.7
	Richest	52.9		0	4.5	0	13.1	0	0	9.5	15.8
	All	42.4		29.3	13.5	21	36.4	0	27.4	17.4	19.5
	C.I	0.3211		-0.3734	-0.2414	0.7903	0.0463		-0.0509	-0.2187	-0.0892
	SE(C.I)	0.1799		0.2501	0.1667	0.1821	0.1163		0.1892	0.0841	0.2154
	RWHC	28.8		40.3	16.8	4.4	34.7		28.8	21.2	21.2
Total	Poorest	49	32.5	30.1	26.6	76.4	27.3	24.5	27.6	36	46
	Poor	72.3	41.9	19.6	20.8	86.5	32.2	45	31.2	18.3	62.3
	Middle	36.9	12.8	43.3	7.2	100	38.7	32.5	35.8	23.1	36.4
	Rich	17.9	16.2	6.6	43.3	4	30.3	35.8	20.4	28.8	38.9
	Richest	10.4	77.6	44.1	3.6	12.4	31	45	36.1	21.1	31.7
	All	43.4	31	29.6	20.4	60.4	32.3	35	29.2	24.1	40.5
	C.I	-0.225	-0.0147	-0.0053	-0.0873	-0.2256	0.0023	0.0753	-0.0045	-0.0443	-0.0943
	SE(C.I)	0.1154	0.1917	0.1194	0.2231	0.1933	0.0312	0.0569	0.0554	0.0539	0.031
	RWHC	53.2	31.5	29.7	22.1	74	32.2	32.4	29.3	25.1	44.3

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Rounds data

Note: RWHC-Rank Weighted Head Count (%), C.I-Concentration Index, SE (C.I)-Standard error of C.I

5.6.3 Catastrophic Health Count and Payment Gap across Occupational Classes

Table 5.13 and 5.14 present the catastrophic head count and catastrophic payment gap respectively across different occupational status of the households. It has been found that catastrophic head count is considerably higher for self employed (43.4 percent) and other category (60.4 percent) of the households in the KBK region. However, labour class and self employed type household had higher burden of catastrophic health payment in the urban areas and it was common for both KBK region and Odisha. Though households belonging to regular wages and salary class were least affected compared to all other occupational classes, surprisingly the incidence of catastrophic health payment is more than one fifth for them. Almost one third of labour and agricultural households are burdened with catastrophic health payment. In rural KBK region, a negative value of concentration index for self employed, regular wage and salary class and agricultural household indicates that the catastrophic health payments is more prevalent among the poor consumption quintiles. Similarly, positive value

of concentration index for self employed in urban KBK areas shows that the catastrophic head count is more among upper consumption quintiles. Catastrophic payment gap implies that the intensity of catastrophic payment was found in similar pattern and was highest among self employed and other category of occupational classes. The distribution of catastrophic gap was also high among the lower consumption quintiles. Here, the catastrophic payment gap for some consumption quintiles was more than 100 percent indicating that the health expenditure is more than 100 percent of their consumption expenditure for these quintiles.

Table 5.14 Occupationwise Catastrophic Payment Gap(%) at 10 Percent Threshold Level, 2014

Sector	Consumption Quintile	KBK Region					Odisha				
		Occupation					Occupation				
		Self Employed	Agriculture	Labour	RWS	Others	Self Employed	Agriculture	Labour	RWS	Others
Rural	Poorest	31	20	30		147	10	13	24	39	86
	Poor	256	26	7	23	71	98	30	12	6	291
	Middle	6	2	6	3	13	11	15	8	61	7
	Rich	0	5	2	3	0	13	14	5	11	63
	Richest	5	34	7	4	1	14	15	11	8	11
	All	90	17	15	6	71	29	17	12	14	74
	C.I	-0.3957	-0.1344	-0.3991	-0.3276	-0.2793	-0.3131	-0.0296	-0.2603	-0.2608	-0.3636
	SE(C.I)	0.2895	0.1973	0.0941	0.2043	0.1706	0.1746	0.077	0.0763	0.1855	0.1728
	RWPG	124.9	18.7	21.4	8.4	91.4	37.5	17.9	15.7	17.6	101.4
Urban	Poorest	3		6	17	0	8		4	17	11
	Poor	15		15	8	7	12		18	15	72
	Middle	21		0	2	68	9		7	13	14
	Rich	30			4	32	12		1	6	17
	Richest	378		0	4		9		0	6	6
	All	16		6	5	11	10		10	9	17
	C.I	0.4339		-0.3301	-0.1761	0.7692	0.0378		0.0319	-0.1939	-0.1865
	SE(C.I)	0.3213		0.2686	0.2617	0.2063	0.045		0.2188	0.0667	0.1996
	RWPG	9.3		7.9	5.4	2.6	9.6		9.6	10.2	19.8
Total	Poorest	19	20	29	17	115	9	13	22	25	77
	Poor	224	26	8	20	67	71	30	13	10	269
	Middle	9	2	6	3	18	10	15	8	27	7
	Rich	7	5	2	4	1	13	14	5	8	41
	Richest	9	34	6	4	1	14	15	11	7	10
	All	74	17	14	6	63	23	17	12	11	61
	C.I	-0.2995	-0.1344	-0.4019	-0.2835	-0.4375	-0.23	-0.0296	-0.2434	-0.2206	-0.3925
	SE(C.I)	0.2911	0.1973	0.0912	0.2078	0.1923	0.1757	0.077	0.0638	0.0948	0.1538
	RWPG	96.5	18.7	20.3	7.4	90.7	28.4	17.9	15.2	13.6	84.4

Source: Author's Own Calculation from NSSO data

Note: RWPG-Rank Weighted Payment Gap (%), C.I-Concentration Index, SE (C.I)-Standard error of C.I

Table 5.15 Different Diseases and Catastrophic Health Payments at 10 percent in the KBK Region and Odisha

Different Diseases				KBK Region						Odisha					
				1995-96		2004		2014		1995-96		2004		2014	
				OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)
Place of Residence	Rural	Hospitalised Ailment cases	Infectious Disease	32	29.4	65	42.3	150	8.6	58	24.8	125	30.2	346	12.1
			Non-Communicable	8	0	143	14.7	228	26.5	163	12.5	315	26.5	691	24.1
			Cardiovascular			355	2.3	819	13.7	157	1.8	160	3	1044	8.9
			Disabilities	22	13.4	52	9.7	320	19.2	52	10.1	258	15.3	759	25.2
			Other Diseases	69	57.2	180	31.1	232	32.1	88	50.8	204	25	384	29.7
		Non-hospitalised Ailment cases	Infectious Disease	30	2.9	97	32.1	288	33.1	34	6.1	155	31.3	415	22.2
			Non-Communicable	23	0.7	39	3	6472	5.6	170	9.5	293	15.7	1547	7.7
			Cardiovascular			245	2	466	4.2	68	1.2	168	2.3	479	10.9
			Disabilities	413	3.3	36	2.6	265	21.7	114	8.1	206	9.4	483	19.6
			Other Diseases	49	93.2	59	60.4	309	35.4	51	75.1	126	41.4	354	39.7
	Urban	Hospitalised Ailment cases	Infectious Disease	22	5	64	34.3	336	17.9	64	13.4	118	29	344	13
			Non-Communicable	119	4.2	216	42.6	1027	40.6	229	16.8	472	30.7	2055	31.4
			Cardiovascular	282	10.8	570	13.1	15434	2.6	730	7.5	580	9.5	2185	9.1
			Disabilities	52	5.9	32	0	339	18.4	117	18.6	201	12.4	829	24.2
			Other Diseases	94	74.1	38	10.1	160	20.4	75	43.8	136	18.5	397	22.3
		Non-hospitalised Ailment cases	Infectious Disease	7	0.3	176	30.8	301	27.7	31	2	234	36.5	418	15.7
			Non-Communicable	99	18	278	29.9	246	3.1	150	15.6	629	21	1868	12.5
			Cardiovascular	151	7.4	768	5.7	1584	29.3	113	3.9	277	5.4	1290	9.2
			Disabilities	76	9.1	69	15.2	1934	2.9	145	14	485	12.8	794	18.7
			Other Diseases	70	65.2	50	18.5	308	37.1	83	64.5	131	24.3	337	43.9
	Total (Combined)	Hospitalised Ailment cases	Infectious Disease	30	20.4	65	41.7	161	9.3	59	22.7	124	30	346	12.3
			Non-Communicable	93	1.5	161	16.8	315	27.6	178	13.3	343	27	1012	25.4
			Cardiovascular	282	4	422	3	1064	12.8	377	2.8	303	3.8	1283	8.9
			Disabilities	35	10.6	51	9	322	19.1	66	11.6	252	15	773	25.1
			Other Diseases	76	63.4	169	29.5	226	31.2	86	49.5	195	24.2	386	28.4
		Non-hospitalised Ailment cases	Infectious Disease	28	2.4	101	32	289	32.7	34	5.6	162	31.7	415	21.2
			Non-Communicable	88	3.7	104	4.9	6158	5.4	165	10.3	329	16.1	1637	8.4
			Cardiovascular	151	1.3	340	2.3	788	6.4	78	1.5	192	2.5	567	10.6
			Disabilities	337	4.3	45	3.5	280	20	120	8.8	245	9.6	529	19.4
			Other Diseases	51	88.3	58	57.3	309	35.6	55	73.8	127	40.1	351	40.3

Source: Author's own calculation from NSSO 52nd, 60th and 71st Round data

Table 5.16 Type of Health Care Institutions and Catastrophic Health Payments at 10 percent in the KBK region and Odisha

				KBK Region						Odisha					
				1995-96		2004		2014		1995-96		2004		2014	
				OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)	OOP (Rs.)	CHC(%)
Place of Residence	Rural	Inpatient Care	Public	31	93.4	67	67.5	196	85.9	82	83.8	191	74.6	343	77.8
			Private	363	6.6	275	32.5	931	14.1	110	16.2	254	25.4	1037	22.2
		Outpatient Care	Public	170	21.8	124	46.9	638	93.9	64	41.9	202	58.8	545	75.8
			Private	70	78.2	126	53.1	915	6.1	80	58.1	215	41.2	535	24.2
	Urban	Inpatient Care	Public	75	84.6	140	90.9	293	64.7	91	77.7	198	66.8	353	46.1
			Private	243	15.4	117	9.1	1588	35.3	457	22.3	431	33.2	1681	53.9
		Outpatient Care	Public	58	14.5	117	46.6	332	57.2	81	27.7	361	64.2	458	48.8
			Private	116	85.5	189	53.4	1298	42.8	116	72.3	311	35.8	1170	51.2
	Total (Combined)	Inpatient Care	Public	43	90.3	77	69.2	204	84.2	83	82.7	192	73.6	344	72.9
			Private	300	9.7	265	30.8	1057	15.8	181	17.3	284	26.4	1253	27.1
		Outpatient Care	Public	139	20.4	123	46.9	622	90.5	66	40.1	220	59.2	535	71.7
			Private	77	79.6	135	53.1	1074	9.5	85	59.9	224	40.8	703	28.3

Source: Author's own calculation from NSSO 52nd, 60th and 71st Round data

Note: OOP: Out of Pocket Payment, CHC: Catastrophic Health Payment

5.7 Catastrophic Health Payments across Different Diseases and Types of Health Care Institutions

Not all illness brings equal consequences and become hardship to the households. The economic consequences (both direct cost and indirect cost) of non communicable diseases or chronic diseases significantly differ from that of infectious or acute diseases. Moreover, the health care needs vary to a great extent across diseases. For instance, the treatment of diseases such as cancer, heart diseases, diabetes, blood pressure and accidents and injuries is not only expensive but it also requires longer treatment and hospitalisation. A disease specifically out of pocket health payment and its catastrophic impact across both hospitalised and non-hospitalised cases have been shown in Table-5.15. The data show that the out-of-pocket payment is highest for those who have suffered from cardiovascular diseases (heart failure, high/low blood pressure, hypertension, chest pain, breathlessness, other heart disease) and lowest for infectious diseases compared to any other diseases. This is observed in both hospitalised (inpatient care) and non-hospitalised (outpatient care) cases, during the period from 1995 to 2014 in the KBK region of Odisha. Interestingly, it came to be noticed that out of total catastrophic households, the catastrophic head count is found to be highest for infectious and other disease category and lowest for cardiovascular disease case. This may be due to the fact that cardiovascular diseases are found more among those who belong to rich

and richer class household; hence there is less risk of suffering from catastrophic payment. On the other hand infectious diseases and other diseases (fever of short duration, other diagnosed and non diagnosed ailments etc) are more among those who belong to vulnerable households like poor, SC, ST and labour class households due to their poor sanitation and hygienic practices, therefore more risks of catastrophic payments. Similarly in the state Odisha the out of pocket health expenditure is more for those who have suffered from cardiovascular diseases in hospitalised case and in case of non hospitalised it is more for non communicable diseases (jaundice, cancer, disease of kidney/urinary system, neurological disorders, gynaecological disorders etc.) However, in Odisha people who are catastrophic because of health payment belong to other diseases, non communicable and infectious disease categories. This is not surprising since diseases like gynaecological problems, hepatitis, cancer, disease of kidney/urinary system involve expensive and prolonged medication.

There is wide variation in the out of pocket payment across the sources of treatment. Table 5.16 depicts that the out of pocket payment in private sector was significantly higher than that of public sector for inpatient as well as outpatient care in KBK region and Odisha during 1995-96 to 2014. The treatment from private sources involves high consultation/doctor's fees, medicines, diagnostic test and other expenses; hence it is expected to be high in private sector. After medicine costs, consultation fees is the second largest component, representing 22 percent of out of pocket payment in public facilities and 40 percent of out of pocket at private facilities (Saksena et al., 2010). During the period from 1995-96 to 2014, it has been observed that though the OOP health payment in the private sources is more compared to public sources, the catastrophic health counts are found to be more (out of the total catastrophic households) for those who have received inpatient care in the public sources for both KBK region and Odisha. This has happened because the percentage of dependence on the private institutions is very less in case of inpatient care (See Table 4.10). At the same time, those who have received treatment from private institutions belong to non vulnerable or better off class household category. Similarly, in case of outpatient care, the out of pocket payment as well as catastrophic head count is more among those who have availed treatment from private sector. It has been noted that irrespective of background characteristics a significant proportion of ailing people have received outpatient care from private institutions in KBK region and Odisha. Hence, there is high possibility of catastrophic payment burden for them. Interestingly, in rural areas it has been seen that out of

the total catastrophe households, the proportion of catastrophic head count is more among those who have received treatment (inpatient and outpatient care) from public sources. This is due to low base of private health care institutions in rural areas, whenever the rural people move out of the village for treatment mostly they visit public hospital especially for inpatient care.

5.8 Determinants of Out of Pocket Health Payments: An Econometric Analysis

Drawing upon the results presented in previous section, it could be observed that very high incidence of catastrophic health payments are made by both rural and urban households. Therefore, it is imperative to examine the major risk factors responsible for out of pocket health payments among households. In this section an attempt has been made to carry out an econometric analysis on the determinants of out of pocket health payments based Two-Part Model.

Specification of Two-Part Model (2PM)

Out of pocket health expenditure data is usually non-normal, right skewed and heteroscedastic with variance that increase with mean, hence, in large scale data set, OLS regression on untransformed data (including the zeros) provide unbiased estimates of the regression parameters (Diehr, P et al. 1999). Two-Part Model is widely used in health economics and health research in such data set (Duan et al. 1983). The use of Two-Part Model assumes that the decision to spend (the participation equation) is independent of the decision on the level of spending (Mocan, H. N et al., 2004). Although the model has been criticised on the grounds of restrictive assumption, two-part model provides a good estimate (Manning et al., 1987). If the objective is to predict conditional means and not to make inferences about individual parameters, then Two-Part Model performs reasonably well (Duan et al. 1983). The Two-Part Model has a methodological advantage over other models in case of skewed data on health expenditure (Deb and Trivedi, 2002)². Part one of the Two Part Model fit the data for all the households, irrespective of whether they spend any amount on health care. It is usually a binary outcome model that distinguishes the households with

² The model which deals with such skewed health expenditure data is Sample Selection model. However the main criticism of the sample selection model is based on bi-variate normality assumption between the errors (Duan, N et al. 1983).

and without health expenditure. Hence, the first part is modelled by using logit or probit regression, i.e.,

$$P(Y > 0 | X) = \frac{e^{\alpha + \beta X}}{1 + e^{\alpha + \beta X}} \text{ -----(5.4)}$$

$$\log\left[\frac{P(Y > 0 | X)}{1 - P(Y > 0 | X)}\right] = \alpha + \beta X + \varepsilon \text{ -----(5.5)}$$

where $y=0$ for household without out of pocket health expenditure respectively. P and $1-P$ denote the probability of positive and zero health expenditure respectively. X is a set of explanatory variables.

The second part of the model predicts the level of health expenditure conditional on positive value by using OLS regression or Generalised Linear Model (Belotti, F. et al., 2015). However, in health economics literature, the second part is specified as OLS regression of $\ln(Y|Y > 0, X)$, i.e., a log-transformation of Y written as $\ln(Y) = \beta X + e$ can overcome heteroscedasticity problem (Duan et al. 1983; Manning, 1998). Matsaganis et al. (2009) found that the histogram of the log transformation of non-zero health expenditure data seems to be symmetrical compared to non transformed data. Hence, the two part log-transformed OLS model could be a good estimator. Following Matsaganis et al. (2009) an attempt has been made to estimate the determinants of household health expenditure, where the first and second parts are logit model and log linear model respectively.

Variable Descriptions and its Measurement:

The descriptions and measurement for some of the variables are same as discussed in Chapter-IV for almost all the variables used in this Chapter.

Total Number of Children and Old Persons in the Household: In this model the total number of children and total number of old persons have incorporated separately in order to observe their impact on out of pocket health expenditure of the household. Since, the sum of all age categories is added up to the size of the household, the variable size of the household has been dropped to avoid multicollinearity problem. Household with higher number of children and elderly persons are likely to spend more on health care because children and old persons are more vulnerable to health risks compared to the young population (Cavagnero et al. 2006, Mishra et al. 1993, Hotchkiss et al. 1998). Number of children (0-5 years) and number of old persons (above 60) are two continuous variables and they are expected to be positively related to the household health expenditure.

Age and Sex of the Household Head: Age and sex are two important demographic factors which determine the health need of the individual and ultimately the health expenditure. However, it is difficult to capture the age and sex of all the members in the model, hence sex and age of the household head are taken into account at the household level. While age of household head is a continuous variable, the sex of the head is a dummy variable with male as a reference or base category.

Severity of Illness: Severity of Illness is measured in the same way as discussed in Chapter-4. However, while measuring the severity of illness at the household level, total number of sickness days of all the members in a household are added. Since the dependent variable is monthly household health expenditure, the severity of illness or sickness days must also be measured in monthly units. Hence, the total inpatient and outpatient sickness days are converted into monthly units for an individual before adding it to measure at the household level. Severity of illness is a continuous variable. Higher the sickness days, the more severe is the illness, and expected to be higher health expenditure.

Opportunity cost of time: The opportunity cost of time is also measured in the same way as discussed in Chapter-4. There are different ways of capturing opportunity cost of time. For instance, waiting time, distance or transportation cost and work or earning loss can be used. However, it is difficult to add these three dimensions of cost of time because of different units of measurement. Hence, earning loss is used as a proxy for cost of time of an individual. For the calculation of opportunity cost of time at the household level, earning loss (in terms of monthly units) of all the members in a family is added. Similar to severity of illness, the opportunity cost of time is also a continuous variable. It is expected that higher the opportunity cost of time, higher will be the health expenditure because households not only augment the health stock of the family member by investing more on health care, but also avoid future catastrophic consequences of illness due to earning loss.

Residence Status: Residence status also determines the health expenditure of the households. However, the literature shows that the relationship between residence status and health expenditure is inclusive. Urban households have higher health care expenditures compared to rural households (Hjortsberg, 1999 and Rout, 2008). Hotchkiss et al. (1998) found the reverse result. Residence status is a dummy variable with rural households as the base category. It is assumed that the health expenditure of a rural household is more compared to that of urban household because of higher access cost of health care in terms of distance and transportation cost.

Caste and Religion: Caste variable is a categorical variable in this study and unlike Chapter-4, ST category is the reference category in this Chapter. Similarly, religion is also used as a dummy variable with two categories, such as Hindu and others. Hindu has been taken as the base category.

Latrine facilities, Drainage facilities, Drinking Water and Cooking Methods: These are the environmental or health risk factors which determine illness and health expenditure of the household. For instance, lack of basic requirements for good hygiene, viz., safe drinking water, adequate sanitation and drainage facilities etc. leads to water borne diseases like diarrhoea, malaria, typhoid, cholera etc. Similarly, unhygienic cooking methods, viz., firewood, charcoal, kerosene oil, cow dung cake etc discharge carbon dioxide, other toxic gases which pollute the air inside house causing adverse impact on the health. Greater the extent of such health risk, greater will be the level of out of pocket health payment. Latrine facilities, Drainage facilities, Drinking water and cooking methods are categorical variables. Thus, No latrine facilities, No drainage facilities, unsafe drinking water sources and No cooking method are reference or base category.

Monthly Per Capita Consumption Expenditure (MPCE): MPCE variable is used as a proxy for income of the household. In this Chapter MPCE is a categorical variable with poorest MPCE class as the reference category. Higher income households have more freedom and choice to purchase health care. Thus, households with high income are likely to utilise health care from private facilities because of better quality in terms of shorter waiting time, clean facilities etc. even though price is high. Hence, it is expected that higher income of the households lead to higher health care expenditure. There exists a mixed evidence about the relationship between income and health expenditure. Some studies revealed that health care is a “luxury” good, (i.e., income elasticity is greater than one) whereas the other studies showed that health care is a “necessity” (Gerdtham, 1992; Livio, 2005; Okunade, 2005; Xu and Saksena, 2011; Farag et al. 2012, Khan and Mahumud, 2015).

Education of the Household Head: Education of the household head is a categorical variable with illiterate is the base or reference category. Education of the household head is used as a proxy for the education level of the household. Education plays a key role in health care utilisation and expenditure, because it increases the ability to acquire information related to health care utilisation. Households with higher educated head spend more on health care (Rout 2008; Su et al. 2006; Qian et al. 2009; Parker and Wong, 1997). The other studies show that education has a negative impact on the health expenditure (Pal, 2010; Mishra,

2010). Educated people are more likely to take care of their health and considered to be efficient producers of health. Therefore, they are less prone to diseases which further lead to decrease in curative health expenditure. Moreover, educated people are generally associated with higher wages, thus in order to reduce adverse impact of illness, they spend more on health care.

Insurance Status: Insurance is an enabling factor which helps the household to access to health care as reimbursements from insurance providers to reduce health expenditure. Economic theory on insurance explains that health insurance may lead to moral hazard. Hence, individual having health insurance may not have incentive to take care of their health and consequently more vulnerable to diseases. Moreover, insured individuals opt better quality and expensive care, therefore higher health expenditure. Insurance is individual variable; however, in this Chapter insurance of the household head has been considered into account. Health insurance is a dummy variable with no health insurance is the base or reference category.

Table 5.17 Estimated Two Part Model for Household Health Expenditure (First Part: Logit Model, Second Part: Log Linear Model) in KBK Region

Dep. Var (Hhd. Health Expn.)	52nd Round(1995-96)						60th Round(2004)						71st Round(2014)					
	First Part			Second Part			First Part			Second Part			First Part			Second Part		
	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z
Constant	-3.278	0.613	0.00*	3.999	0.417	0.00*	-2.970	1.815	0.10***	0.929	1.486	0.53	-2.247	0.757	0.00*	5.627	0.414	0.00*
No. of child	0.364	0.173	0.035**	0.193	0.107	0.07***	0.403	0.218	0.06***	0.071	0.098	0.47	0.315	0.159	0.04***	0.178	0.072	0.01*
No. of old	0.448	0.245	0.068***	-0.055	0.172	0.75	-0.284	0.330	0.39	0.203	0.152	0.18	0.546	0.221	0.01*	0.048	0.108	0.66
Age of head of HH	-0.027	0.011	0.01*	0.000	0.008	0.97	-0.007	0.014	0.64	0.007	0.007	0.32	0.028	0.012	0.01*	0.003	0.005	0.54
Severity of Illness	0.635	0.056	0.00*	0.137	0.031	0.00*	0.500	0.076	0.00*	0.161	0.031	0.00*	0.369	0.116	0.00*	0.248	0.024	0.00*
Opportunity cost of time	0.021	0.003	0.00	0.102	0.020	0.01*	0.029	0.003	0.00*	0.080	0.030	0.00*	0.030	0.002	0.15	0.043	0.000	0.08***
Sector (Rural)#																		
Sector (Urban)	0.621	0.386	0.10***	0.114	0.272	0.67	-0.594	0.524	0.26	-0.275	0.252	0.28	0.277	0.390	0.48	0.192	0.190	0.31
Religion (Hindu)#	-	-	-	-	-	-												
Religion (Other)	-	-	-	-	-	-	0.024	0.940	0.98	-0.749	0.552	0.17	0.927	0.751	0.22	-0.087	0.331	0.79
Caste (ST)#																		
Caste (SC)	0.306	0.398	0.44	0.108	0.288	0.71	0.475	0.441	0.28	-0.348	0.222	0.12	0.470	0.302	0.12	-0.219	0.148	0.14
Caste (OBC)	-	-	-	-	-	-	0.419	0.393	0.29	0.062	0.198	0.76	0.436	0.303	0.15	0.056	0.136	0.68
Caste (Other)	0.973	0.314	0.00*	-0.021	0.228	0.93	-0.605	0.652	0.35	-0.165	0.312	0.60	-0.057	0.478	0.91	0.521	0.231	0.02**
Latrine_facilities (No)#																		
Latrine_facilities (Yes)	0.523	0.617	0.40	-0.272	0.439	0.54	1.552	0.709	0.02**	0.437	0.352	0.22	-0.467	0.424	0.27	0.165	0.205	0.42
Drainage_facilities (No)#																		
Drainage_facilities (Open)	-0.531	0.612	0.39	0.007	0.459	0.99	-0.987	0.682	0.15	0.651	0.341	0.05**	-0.031	0.364	0.93	-0.712	0.183	0.00*
Drainage_facilities (Covered)	0.319	1.314	0.81	0.271	0.826	0.74	-0.818	1.373	0.55	1.049	0.581	0.07***	1.317	0.787	0.09***	-0.137	0.274	0.62
Drinking water(Unsafe)																		
Drinking water (Safe)	0.472	0.290	0.10***	0.195	0.220	0.38	0.222	0.612	0.72	0.138	0.368	0.71	0.984	0.460	0.03**	0.006	0.307	0.98
Cooking methods (No Fuel)	-	-	-	-	-	-												
Cooking methods (Unclean Fuel)	-	-	-	-	-	-	0.547	1.688	0.75	3.329	1.433	0.02**						
Cooking methods (Clean Fuel)	-	-	-	-	-	-	0.247	1.609	0.88	2.953	1.411	0.03**	-0.524	0.531	0.32	0.313	0.245	0.20
MPCE Quintile (Poorest)#																		
MPCE Quintile (Poor)	0.726	0.377	0.05**	-0.076	0.261	0.77	0.075	0.442	0.86	0.085	0.230	0.71	0.697	0.334	0.03**	0.313	0.150	0.03**
MPCE Quintile (Middle)	0.985	0.417	0.01*	0.391	0.298	0.19	0.061	0.492	0.90	0.013	0.228	0.96	0.870	0.338	0.01*	0.090	0.149	0.55
MPCE Quintile (Rich)	1.097	0.466	0.01*	0.528	0.319	0.09***	0.728	0.504	0.15	0.107	0.276	0.70	0.698	0.374	0.06***	0.264	0.180	0.14
MPCE Quintile (Richest)	1.680	0.498	0.00*	0.939	0.361	0.00*	1.579	0.553	0.00*	0.223	0.302	0.46	0.977	0.505	0.05**	0.763	0.225	0.00*
Sex of HH Head (Male)#																		
Sex of HH Head (Female)	0.397	0.407	0.33	-0.612	0.328	0.06***	0.364	0.549	0.51	-0.231	0.354	0.51	-0.311	0.431	0.47	0.202	0.236	0.39
Education of Head(Illiterate)#																		
Education of Head(Elementary)	-0.045	0.301	0.88	0.501	0.210	0.01*	0.152	0.379	0.69	0.449	0.185	0.01*	0.382	0.274	0.16	0.215	0.132	0.10***
Education of Head(Sec.)	-0.620	0.661	0.35	0.329	0.515	0.52	-0.421	0.837	0.62	0.721	0.402	0.07***	0.837	0.498	0.09***	0.483	0.218	0.02**
Education of Head(Hr. Sec.)	0.342	0.900	0.70	1.211	0.682	0.07***	0.629	1.330	0.64	0.676	0.530	0.20	0.689	0.978	0.48	-0.554	0.436	0.20
Education of Head(Hr. Edn)							0.141	1.159	0.90	-0.393	0.655	0.55	0.659	0.628	0.29	0.407	0.265	0.13
Insurance_Status (No)#																		
Insurance_Status (Yes)				-4.789	0.455	0.00*	-5.861	49.246	0.91	-0.595	1.291	0.65	0.409	0.250	0.10***	-0.205	0.115	0.07***
Source: Author's Own Estimation	Number of obs = 853			Number of obs = 255			Number of obs = 550			Number of obs = 233			Number of obs = 560			Number of obs = 440		
from NSSO 52nd, 60th and 71st	LR chi2(20) = 530.82			F(21, 233) = 8.62			LR chi2(26) = 438.38			F(26, 206) = 3.92			LR chi2(25) = 87.69			F(25, 414) = 10.68		
Round Data	Prob > chi2 = 0.0000			Prob > F = 0.0000			Prob > chi2 = 0.0000			Prob > F = 0.0000			Prob > chi2 = 0.0000			Prob > F = 0.0000		
	Log likelihood = -246.08			R-squared = 0.4371			Log likelihood = -155.60			R-squared = 0.3312			Log likelihood = -247.11			R-squared = 0.3921		
	Pseudo R2 = 0.5189			Adj R-squared = 0.3864			Pseudo R2 = 0.5848			Adj R-squared = 0.2468			Pseudo R2 = 0.1507			Adj R-squared = 0.3553		

*, ** and *** indicate 1%, 5% and 10% respectively

Table 5.18 Estimated Two Part Model for Household Health Expenditure (First Part: Logit Model, Second Part: Log Linear Model) in Odisha

Dep. Var (Hhd. Health Expn.)	52nd Round(1995-96)						60th Round(2004)						71st Round(2014)					
	First Part			Second Part			First Part			Second Part			First Part			Second Part		
	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z	Coef.	Std.Err.	P>z
Constant	-3.213	0.247	0.00*	3.748	0.189	0.00*	-2.942	0.531	0.00*	3.679	0.478	0.00*	-1.534	0.351	0.00*	5.607	0.171	0.00*
No. of child	0.070	0.058	0.23	0.079	0.040	0.05**	0.095	0.072	0.19	0.045	0.042	0.29	0.690	0.092	0.00*	0.095	0.036	0.00*
No. of old	0.163	0.094	0.08***	0.108	0.067	0.10***	0.282	0.111	0.01*	0.004	0.067	0.96	-0.008	0.111	0.94	0.070	0.048	0.15
Age_head_HH	-0.003	0.004	0.40	-0.002	0.003	0.42	0.013	0.005	0.01*	0.006	0.003	0.06***	0.019	0.006	0.00*	0.005	0.003	0.05**
Severity of Illness	0.609	0.024	0.00*	0.115	0.011	0.00*	0.489	0.029	0.00*	0.165	0.012	0.00*	0.786	0.093	0.00*	0.209	0.010	0.00*
Opportunity cost of time	0.029	0.001	0.00*	0.120	0.000	0.00*	0.018	0.001	0.00*	0.170	0.010	0.00*	0.022	0.001	0.16	0.083	0.000	0.00*
Sector (Rural)#																		
Sector (Urban)	0.825	0.144	0.00*	0.543	0.110	0.00*	-0.276	0.205	0.18	-0.112	0.128	0.38	0.218	0.188	0.25	0.193	0.087	0.02**
Religion (Hindu)#	-	-	-	-	-	-												
Religion (Other)	-	-	-	-	-	-	0.319	0.262	0.23	-0.138	0.191	0.47	0.502	0.318	0.12	-0.222	0.148	0.13
Caste (ST)#																		
Caste (SC)	0.307	0.156	0.04**	0.176	0.123	0.15	0.386	0.193	0.04**	0.235	0.127	0.06***	0.280	0.182	0.13	0.016	0.091	0.86
Caste (OBC)	-	-	-	-	-	-	0.265	0.176	0.13	0.378	0.117	0.00*	0.469	0.161	0.00*	0.262	0.081	0.00*
Caste (Other)	0.175	0.133	0.19	0.338	0.105	0.00**	0.298	0.203	0.14	0.385	0.134	0.00*	0.088	0.195	0.65	0.266	0.094	0.00*
Latrine_facilities (No)#																		
Latrine_facilities (Yes)	0.602	0.178	0.00*	-0.214	0.139	0.12	0.133	0.237	0.57	0.071	0.141	0.61	-0.219	0.184	0.24	-0.001	0.083	0.99
Drainage_facilities (No)#																		
Drainage_facilities (Open)	0.019	0.158	0.90	0.197	0.117	0.09***	0.230	0.233	0.32	0.116	0.147	0.43	-0.100	0.195	0.61	-0.170	0.094	0.06**
Drainage_facilities (Covered)	0.503	0.213	0.01*	0.207	0.164	0.21	0.613	0.313	0.05**	0.242	0.206	0.24	0.080	0.258	0.76	-0.315	0.117	0.00*
Drinking water(Unsafe)																		
Drinking water (Safe)	-0.050	0.100	0.62	0.037	0.078	0.64	0.094	0.144	0.52	0.004	0.092	0.97	0.353	0.198	0.07***	-0.015	0.102	0.88
Cooking methods (No Fuel)	-	-	-	-	-	-												
Cooking methods (Unclean Fuel)	-	-	-	-	-	-	-0.063	0.465	0.89	0.633	0.460	0.17						
Cooking methods (Clean Fuel)	-	-	-	-	-	-	-0.484	0.476	0.31	0.567	0.481	0.24	0.141	0.225	0.53	0.260	0.099	0.00*
MPCE Quintile (Poorest)#																		
MPCE Quintile (Poor)	0.554	0.184	0.00*	0.180	0.143	0.21	0.195	0.198	0.32	0.169	0.126	0.18	0.599	0.182	0.00*	0.210	0.089	0.01*
MPCE Quintile (Middle)	0.929	0.182	0.00*	0.374	0.142	0.00*	0.327	0.204	0.11	0.332	0.128	0.01*	0.721	0.189	0.00*	0.306	0.089	0.00*
MPCE Quintile (Rich)	1.137	0.184	0.00*	0.512	0.143	0.00*	0.482	0.203	0.01*	0.266	0.130	0.04**	0.649	0.186	0.00*	0.312	0.091	0.00*
MPCE Quintile (Richest)	1.744	0.188	0.00*	1.095	0.144	0.00*	0.857	0.216	0.00*	0.673	0.136	0.00*	0.742	0.218	0.00*	0.739	0.103	0.00*
Sex of HH Head (Male)#																		
Sex of HH Head (Female)	-0.038	0.165	0.82	-0.369	0.142	0.00*	-0.240	0.202	0.23	0.199	0.156	0.20	0.029	0.187	0.88	-0.111	0.094	0.24
Education of Head(Illiterate)#																		
Education of Head(Elementary)	-0.087	0.103	0.40	-0.098	0.078	0.21	0.305	0.138	0.02**	0.289	0.087	0.00*	0.250	0.145	0.08*	0.145	0.071	0.04**
Education of Head(Sec.)	-0.098	0.182	0.59	0.051	0.146	0.73	0.432	0.256	0.09***	0.364	0.164	0.02**	0.470	0.237	0.04*	0.288	0.109	0.00*
Education of Head(Hr. Sec.)	-0.719	0.303	0.01*	-0.565	0.276	0.04**	0.530	0.352	0.13	0.640	0.243	0.00*	0.510	0.355	0.15	0.124	0.156	0.43
Education of Head(Hr. Edn)				1.269	1.373	0.36	0.272	0.336	0.42	0.277	0.225	0.22	0.043	0.293	0.88	0.275	0.139	0.04**
Insurance_Status (No)#																		
Insurance_Status (Yes)	3.742	1.045	0.00*	-3.275	0.369	0.00*	0.404	0.745	0.59	-0.023	0.611	0.97	0.587	0.150	0.00*	-0.318	0.065	0.00*
Source: Author's Own Estimation	Number of obs = 4318			Number of obs = 1483			Number of obs = 2652			Number of obs = 1282			Number of obs = 2398			Number of obs = 1967		
from NSSO 52nd, 60th and 71st	LR chi2(21) = 2559.96			F(22, 1460) = 20.76			LR chi2(26) = 1797.52			F(26, 1255) = 15.73			LR chi2(25) = 498.01			F(25, 1941) = 36.03		
Round Data	Prob > chi2 = 0.0000			Prob > F = 0.0000			Prob > chi2 = 0.0000			Prob > F = 0.0000			Prob > chi2 = 0.0000			Prob > F = 0.0000		
	Log likelihood = -1497.11			R-squared = 0.2383			Log likelihood = -938.00			R-squared = 0.2458			Log likelihood = -880.42			R-squared = 0.3170		
	Pseudo R2 = 0.4609			Adj R-squared = 0.2268			Pseudo R2 = 0.4893			Adj R-squared = 0.2302			Pseudo R2 = 0.2205			Adj R-squared = 0.3082		

*, ** and *** indicate 1%, 5% and 10% respectively

Table 5.17 and 5.18 reveal the results of estimated two part model in KBK region and Odisha respectively. The estimated results (coefficients, standard errors and p-value) of the participation or logit model have shown in the first part of 2PM in each round. The estimates of spending equation of each round are presented in the second part of 2PM in each round. The likelihood of incurring out of pocket health expenditure of the household is influenced by a number of factors such as number of children, number of old persons, severity of illness, opportunity cost of time, per capita consumption expenditure, caste and insurance status of head in the KBK region of Odisha. As expected, coefficients of number of children and old persons are positive in both parts of the model, hence the probability of incurring positive and on an average the level of out of pocket health expenditure are found to be higher among household having more number of children and old persons. This is mainly because these groups are more vulnerable to health risk and as observed from Table 4.4, the morbidity prevalence rates were found to be higher for these age groups. The severity of illness and opportunity cost of time turned out to be statistically significant determinant of probability of positive and the amount of health expenditure in the KBK region across the years. The coefficients of MPCE quintile in first part as well as second part of the Two-Part model are statistically significant in all the three periods. This implies that the probability of incurring a positive and on an average, amount of health expenditure increases with the increase in MPCE. As already discussed, monthly per capita consumption expenditure is generally considered as an economic status of the household. The increase in monthly per capita consumption expenditure basically increases the ability to pay of the household. Moreover, an increase in the household income/improvement in economic status leads to an increase in the choice to purchase health care and quality of care. As far as the education status of the head is concerned, it has been observed that the magnitude of out of pocket health expenditure increases with the increase in education level of the head compared to the illiterate head of the household. The other social and environmental factors such as caste, latrine facilities, drinking water and drainage facilities and cooking practices turn out to be making a mixed conclusion over the years. It is observed that household with health insurance is found to be statistically significant and has a negative impact on out of pocket health expenditure. More interestingly, the probability of incurring a positive out of pocket health expenditure is higher for insured households compared to uninsured households, however the level of out of pocket health expenditure is higher for uninsured households. This implies that health insurance is established as an enabling factor for the households

which help them to purchase health care at the same time reducing the magnitude of out of pocket expenditure.

Table 5.18 shows that the likelihood of incurring and the magnitude of out of pocket health expenditure of the household is determined by a number of factors such as number of children, number of old persons, age of the household head, severity of illness, opportunity cost of time, sector or residence status, per capita consumption expenditure, caste and insurance status of head for the state Odisha. Interestingly, the sign of the variables are almost same for the state as a whole. Hence, a similar conclusion can be derived for the state. However, residence status and age of the household are statistically significant and they leave a positive impact on out of pocket health payments for the state Odisha. Compared to rural households, the probability of incurring positive health expenditure and the level of health expenditure is found to be more among urban households. This may be due to the fact that there is a greater preference for private care due to the easy availability in the urban areas compared to the rural setting.

5.9 Burden of Indirect Cost of Illness in KBK Region of Odisha

Indirect costs can be defined as the work or income losses resulting from an injury or illness. Indirect economic costs estimate the potential resources that are lost due to illness. These include societal cost of morbidity, disability and premature mortality. Ailment of a working member of the household causes loss of household income. Ailment of a non-working member too, may cause disruption of usual activity of the working members of the household, which in turn may result in loss of household income. The nature of ailment, severity of illness and working or occupational status of the ailing member and escort persons determine the size or extent of indirect cost. Although the measurement of indirect cost of illness is a difficult and debatable issue, there are three primarily basic approaches to measure the burden of indirect cost. They are: (i) *Human capital method*: Human capital method is the traditional valuation method used for the calculation of the indirect cost of illness. In this approach indirect costs are calculated in terms of current and future earnings lost to the patient or care giver as a result of illness. Each person's output is considered equal to his market earning at that time. Present value of the future earnings are calculated by using a discount rate; however the discount rate is selected at the discretion of the researcher. For mortality or permanent disability costs, the approach multiplies the earnings lost at each age by the probability of the deceased person's longevity span. This approach often includes the

value of household work, usually valued as the opportunity cost of hiring a replacement from the labour market. (Rice, D, 1966, Cooper, B. S and Rice, D, 1976, Hartunian, N. S et al. 1980 and Rice, D et al. 1985) (ii) *Willingness to pay method*: As per the willingness to pay approach, life and lifestyle changes are valued as equal to the amount that the individual is willing to spend to reduce their risk of death or illness. This approach measures the amount an individual would pay to reduce the probability of illness or morbidity and mortality. There are various methods for determining an individual's willingness to pay, for instance, surveys, examining the additional wages for jobs with high risks, estimating the demand for products that leads to greater health or safety and other related methods (Cooper, B. S and Rice, D, 1976; Rice, D et al. 1985). According to the health researchers subscribing to this approach, it is conceptually comprehensive since it enumerates potential costs of illness and disease. At the same time, the approach is grounded on the optimality theory of Vilfredo Pareto. This approach helps the policy makers to assess the changes in welfare that would accompany changes in the probability of occurrence of specific events such as diseases and assist in determining social preferences for public toward control of diseases. (Hodgson, T. A and M.R Meiners, 1982) (iii) *Friction cost method*: This method developed as a reaction against the human capital approach. It measures the production losses during the time it takes to replace a sick worker, training costs of a new worker and the costs associated with any decreases in productivity during temporary work absence of the sick employee (Sam K G et al., 2009). This method assumes that short-term work losses can be made up by an employee and the loss incurred by the employee invariably results in costs during the time it takes a new employee to be hired and trained and this is commonly known as the friction period. The work that would have been undertaken by the sick individuals can be absorbed through labour pooling and adjustment in the workplace structures. The proponents of friction cost approach believe that this approach measures the actual production losses as opposed to the potential losses measured by the earlier approaches. The indirect costs estimated by friction cost method is lower than the estimates based on traditional human cost approach, however, it reflects the economic impact of illness better (Koopmanschap et al. 1995, Goodchild et al. 2002 and Sam, K G et al. 2009).

Scitovsky (1982) interestingly points out that most of the discussions and controversies about estimating the cost of illness revolve around the relative advantages and disadvantages of two basic methodologies used or proposed: the 'human capital' method and the 'willingness to pay' method. The 'human capital' approach advocates that besides

estimating direct cost, it estimates the indirect cost as well. For instance, it not only estimates the direct costs of illness, i.e., costs of prevention, detection, treatment and rehabilitation but also indirect costs to the society due to loss of earning resulting from morbidity and premature mortality. The human capital approach has often been criticised on the ground that it is an incomplete measure of the value of life because it excludes the psychological costs one of the important dimensions of burden of illness. Moreover, this approach completely ignores the psychological dimensions of the ailing members whose economic contribution to the family is substantial. At the same time, this approach appears to be discriminatory and biased in nature as it accords undue importance to some groups, distinctly makes discriminatory provision where human capital values are higher for men than for women, even whites compared to blacks are in more advantageous position and middle-aged is underprivileged compared to the young and elderly (Hodgson and Meiners, 1982). Besides, such human capital values are highly sensitive to discount rate and the problem related to the issues of imputed wage rate make it difficult to measure indirect cost. On the other hand, the 'willingness to pay' approach estimates are based on the amount a person would be willing to pay to reduce the risk of incurring or dying from a given disease. This approach becomes further delimited owing to the difficulty in controlling the biased responses generated by expectations about the use of data. Moreover, marginal adjustments at risk levels do not seem to be practically feasible as the respondents are often unwilling to explicitly express their attitude rationally and consistently. In addition to the limitations discussed above, the application of willingness to pay must consider the ability to pay which reintroduces the valuation on the basis of income and wealth. Hence, those who may be at greatest risk are least able to pay (Hodgson and Meiners, 1982). Scitovsky argues that willingness to pay approach is undoubtedly more satisfactory on theoretical grounds; however, lack of appropriate data has so far limited its use in practice and most estimates of the cost of illness made to date have used the human capital approach (Scitovsky, 1982). In this connection it remains a fact that the value of time lost from work and other productive activities is an undeniable loss to individuals and society. Therefore, if one's objective is to know the amount of resources that will be saved by preventive measures which reduce the incidence of disease or what the economic impact of improved survival rate will be, the human capital method provides an appropriate, although partial measure. (Hodgson and Meiners, 1982) Thus, it becomes evident that various scholars in the area under discussion have put forward differing views on the human capital method.

Direct costs of illness are more dominant and data on direct costs are often readily available. One of the most neglected aspects of illness is indirect cost because of its measurement issues and data availability. Fortunately, the NSSO morbidity and health care surveys collect information on indirect cost of illness. The 52nd and 60th round National Sample Survey provide information regarding morbidity or illness related earnings, loss of the households for both inpatient and outpatient episodes separately. Unlike 52nd and 60th round, NSSO 71st round health survey provides information on loss of household income for outpatient episode only. One must combine both direct cost as well as indirect cost while measuring the economic burden of illness. The above section has depicted the details of direct cost or health expenditure of the household. Here, in this section an attempt has been made to measure the indirect cost of illness at the household level separately by using the traditional human capital approach for the KBK region of Odisha.

Table 5.19 Burden of Indirect Cost of Illness in KBK Region and Odisha, 1995-2014

Consumption Quintile		1995-96						2004						2014					
		Rural		Urban		Total		Rural		Urban		Total		Rural		Urban		Total	
		ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE
KBK Region	Poorest	62	8.9	40	6.2	59	8.5	11	1.1	17	1.9	11	1.2	315	16.4	72	3	295	15.3
	Poor	86	9.8	31	3	80	9.1	35	3.3	721	14.9	78	4	611	20.2	246	5.9	579	18.9
	Middle	62	8.8	33	2	59	8.1	64	5.4	27	0.5	61	5	311	9.5	57	0.8	288	8.7
	Rich	26	2.7	19	0.7	26	2.5	61	4.6	1	0	53	4	3552	59.4	1463	14.6	3348	55
	Richest	37	3.9	44	1.1	38	3.5	30	1.1	1061	17.9	116	2.5	11	0.3	395	1.3	66	0.5
	All	59	7.4	34	3.2	56	6.9	33	2.7	278	5.7	52	3	831	20.6	364	4.6	788	19.1
	C.I	-0.1721		-0.3591		-0.1772		0.1911		0.2034		0.1946		0.1302		0.1467		0.124	
	SE(C.I)	0.0899		0.074		0.0891		0.1585		0.2948		0.1263		0.2144		0.2114		0.2153	
Odisha	Poorest	32	4.5	14	2	29	4.1	42	4.5	48	2.5	43	4.3	402	13.7	118	3.6	363	12.3
	Poor	48	5	22	1.5	44	4.5	75	6.1	166	5.3	85	6	232	7.6	181	4	224	7
	Middle	38	4	16	0.8	35	3.6	126	7.5	65	1.5	118	6.8	240	6.5	141	2.3	223	5.7
	Rich	29	2.4	14	0.5	27	2.1	136	7.7	37	1.8	120	6.7	743	12.8	203	3.2	633	10.8
	Richest	66	3.7	37	1	62	3.3	98	4.1	1104	30.6	266	8.6	296	4.4	103	0.5	250	3.5
	All	45	3.8	22	1.1	42	3.4	95	6	337	9.8	127	6.5	403	9.3	151	2.6	356	8.1
	C.I	-0.0784		-0.1643		-0.0832		0.0149		0.519		0.1141		-0.105		-0.2255		-0.1275	
	SE(C.I)	0.0337		0.0836		0.0346		0.0816		0.0538		0.0405		0.1084		0.1351		0.1111	

Note: ICI: Indirect Cost of Illness (Rs.), of CE: Indirect Cost of Illness as a percentage of Monthly Consumption Expenditure

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Unit Level Data

Here indirect cost is measured in terms of loss of household income due to illness for both patient as well as accompanying persons. In NSSO health surveys, the indirect cost of illness or income foregone was reported separately with a reference period of 365 days and 15 days for inpatient and outpatient cases respectively. The research endeavour has converted

these figures into monthly unit and added it to get the total indirect cost of illness at the household level. Table 5.19 depicts the indirect cost of illness or injury at the household level in absolute terms and as a percentage to the monthly consumption expenditures. An inter temporal analysis shows that on an average indirect cost of illness is increasing over time and the burden is disproportionately higher for rural households compare to urban households in all the rounds except the 60th round. This is true for KBK region as well as at the state level. The average indirect cost was 19 percent of monthly consumption expenditure in KBK region in 2014, Moreover the indirect cost burden is 21 percent of the total monthly consumption expenditure in rural areas which is more than four times that of the urban households. Except for the year 2004, the burden of indirect cost has been very high in the KBK region compared to the state average. Looking across consumption quintiles, it can be observed that there exists high inequality in the burden of indirect cost of illness. The positive value of concentration index in both rural and urban areas for the year 2014 indicates that indirect cost burden was higher among the higher consumption quintiles in the KBK region. Similarly, negative value of concentration index in both rural and urban areas implies that the cost burden was higher among lower consumption quintiles for Odisha.

Table 5.20 Burden of Indirect Cost of Illness for Inpatient and Outpatient Care in KBK Region of Odisha, 1995-96 to 2014

Period	Sector	MPCE Quintile	KBK Region					Odisha					
			Inpatient Care		Outpatient Care		Total	Inpatient Care		Outpatient Care		Total	
			IC (Rs.)	% of MCE	IC (Rs.)	% of MCE	IC (Rs.)	IC (Rs.)	% of MCE	IC (Rs.)	% of MCE	IC (Rs.)	
1995-96	Rural	Poorest	0	0	62	8.9	62	0	0	32	4.5	32	
		Poor	0	0	85	9.8	86	1	0.1	47	4.9	48	
		Middle	0	0	62	8.8	62	1	0.1	37	3.9	38	
		Rich	1	0.1	25	2.7	26	1	0.1	28	2.3	29	
		Richest	1	0.1	36	3.8	37	8	0.3	58	3.4	66	
		All	0	0	58	7.3	59	3	0.1	42	3.7	45	
	Urban	Poorest	5	2.4	35	3.8	40	2	0.7	12	1.2	14	
		Poor	1	0	31	3	31	1	0	21	1.5	22	
		Middle	3	0.2	30	1.8	33	3	0.1	12	0.7	16	
		Rich	19	0.7	0	0	19	3	0.1	11	0.4	14	
		Richest	20	0.6	24	0.4	44	4	0.1	34	0.9	37	
		All	8	1	26	2.2	34	3	0.2	20	0.9	22	
	Combined (Rural+ Urban)	Poorest	1	0.4	58	8.1	59	0	0.1	29	3.9	29	
		Poor	0	0	80	9.1	80	1	0.1	43	4.5	44	
		Middle	1	0.1	58	8	59	1	0.1	34	3.5	35	
		Rich	3	0.1	23	2.4	26	1	0.1	26	2	27	
		Richest	3	0.1	35	3.4	38	8	0.3	54	3	62	
		All	1	0.2	54	6.7	56	3	0.1	39	3.3	42	
	2004	Rural	Poorest	2	0.2	9	0.9	11	3	0.3	39	4.1	42
			Poor	3	0.2	32	3.1	35	5	0.3	70	5.8	75
			Middle	2	0.2	62	5.2	64	7	0.4	118	7.1	126
			Rich	4	0.2	57	4.4	61	5	0.3	131	7.4	136
			Richest	5	0.2	25	0.9	30	13	0.5	85	3.6	98
			All	3	0.2	30	2.5	33	7	0.4	88	5.6	95
Urban		Poorest	3	0.2	14	1.7	17	10	0.6	38	2	48	
		Poor	7	0.2	715	14.7	721	6	0.2	160	5.1	166	
		Middle	3	0.1	24	0.4	27	11	0.2	54	1.3	65	
		Rich	1	0	0	0	1	4	0.1	33	1.7	37	
		Richest	56	1.1	1005	16.7	1061	10	0.2	1094	30.5	1104	
		All	10	0.3	268	5.5	278	8	0.2	329	9.6	337	
Combined (Rural+ Urban)		Poorest	2	0.2	9	1	11	4	0.3	39	3.9	43	
		Poor	3	0.2	75	3.8	78	5	0.3	80	5.7	85	
		Middle	2	0.2	59	4.8	61	8	0.4	111	6.4	118	
		Rich	3	0.2	50	3.8	53	5	0.2	115	6.5	120	
		Richest	9	0.3	107	2.2	116	12	0.4	254	8.1	266	
		All	3	0.2	49	2.8	52	7	0.3	120	6.1	127	
2014		Rural	Poorest			315	16.4	315			402	13.7	402
			Poor			611	20.2	611			232	7.6	232
			Middle			311	9.5	311			240	6.5	240
			Rich			3552	59.4	3552			743	12.8	743
			Richest			11	0.3	11			296	4.4	296
			All			831	20.6	831			403	9.3	403
	Urban	Poorest			72	3	72			118	3.6	118	
		Poor			246	5.9	246			181	4	181	
		Middle			57	0.8	57			141	2.3	141	
		Rich			1463	14.6	1463			203	3.2	203	
		Richest			395	1.3	395			103	0.5	103	
		All			364	4.6	364			151	2.6	151	
	Combined (Rural+ Urban)	Poorest			295	15.3	295			363	12.3	363	
		Poor			579	18.9	579			224	7	224	
		Middle			288	8.7	288			223	5.7	223	
		Rich			3348	55	3348			633	10.8	633	
		Richest			66	0.5	66			250	3.5	250	
		All			788	19.1	788			356	8.1	356	

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Unit Level Data

Household having hospitalisation cases need at least one or more escort or accompanying persons, therefore it is expected that household earning or income loss may be more for inpatient cases than outpatient cases. If a member of the families suffers from chronic disease, then earning loss of outpatient cases may be higher. Table 5.20 reveals the contradictory result that the burden of indirect cost of illness for outpatient cases is significantly higher than the inpatient cases in both KBK region as well as Odisha over time. This might be possible when most of the hospitalised members are not in the work force and hence belong to old age and child age group or it may give rise to the recall error/bias of the respondents while reporting indirect cost in case of inpatient episodes due to 365 days of reference period. However, the conclusions favour the former reasoning. Though the direct cost or health expenditure in the urban areas is more than rural areas in the KBK region and Odisha, the indirect cost of illness in absolute terms as well as a percentage to the total monthly consumption expenditure in rural areas is more compared to urban areas. The possible reason is that in many occasion rural people delayed or neglect treatment because of ignorance and other financial constraints. Generally they wait until the disease become aggravate which further leads to higher illness days or work loss days in the rural areas.

5.10 Indirect Cost of Illness across Socioeconomic Characteristics of the Households

Caste and religion are important indicators with respect to any dimensions of vulnerability in India. There is a ‘social gradient’ to health outcomes in India and people’s health outcomes are significantly affected by their social group (Borooah, 2010). Agrawal and Patel (2017) found that morbidity prevalence was highest among the Muslims than Hindu population and among the Hindu SC and ST population was at the topped. The loss of income due to sickness was highest among Muslim older adults. In the case under discussion, the current section presented the indirect cost of illness across caste, religion and occupation of the households using NSSO 71st round data. Table 5.21 shows the burden of indirect cost across social groups. Schedule Caste and Schedule Tribe households are found to be more vulnerable to indirect cost burden of illness in KBK region as well as in Odisha. Though in absolute amount the indirect cost is higher for OBC and Others category of social groups, when expressed in percentage of total monthly consumption expenditure, it has been observed that the ratio is higher for SCs and STs. Moreover, the burden is disproportionately higher in the rural areas as compared to urban areas. The monthly loss of income has been found to be 61 percent of the total monthly consumption expenditure (with 65 percent for

rural and 16 percent for urban households) for the Schedule Caste population in KBK region. The positive concentration index shows that indirect burden of illness is higher among the higher consumption quintiles for SC households and similarly a negative value concentration index indicates the indirect cost burden is more among the lower consumption quintiles for ST households.

Table 5.22 demonstrates that the indirect cost burden of illness was higher for Hindu households. Rural households comparatively bore a higher burden than the urban households. The concentration index witnessed the higher burden of earning loss was among the upper consumption quintiles households.

Table 5.21 Castewise Burden of Indirect Cost of Illness in KBK Region and Odisha, 2014

		KBK Region								Odisha							
		Social Group								Social Group							
Consumption Quintile		ST		SC		OBC		Others		ST		SC		OBC		Others	
		ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE
Rural	Poorest	279	18.6	200	10	440	14.9	478	16.1	193	11.6	196	8.1	872	21.5	210	4.5
	Poor	298	8	1118	38.5	428	15.5	622	16.1	122	3.3	396	13.2	217	7.8	180	5.6
	Middle	22	0.8	1023	36.8	237	5.5	0	0	154	4.1	395	13.2	167	3.7	337	7.3
	Rich	59	1.6	11192	186.5	0	0	0	0	83	1.8	2962	50.4	129	2.6	432	6.9
	Richest	71	2.2	0	0	0	0	0	0	324	4.4	365	4.7	318	6.1	230	2.6
	All	209	11.1	3213	65.5	258	7.9	100	3.3	165	6.4	948	19.8	317	7.6	312	5.1
	C.I	-0.3687		0.4749		-0.4084		-0.2556		-0.3104		0.1925		-0.3457		-0.1576	
	SE(C.I)	0.1494		0.09		0.1501		0.1951		0.0572		0.1851		0.1228		0.0946	
Urban	Poorest	103	3.5	159	7.7	0	0	71	1.8	14	0.4	119	5.2	121	2.9	216	6.4
	Poor	413	10.3	0	0	0	0	234	5.2	92	2.3	207	4.1	213	5.2	195	3.7
	Middle	800	8	0	0	0	0	343	5	4	0	811	14.2	119	1.8	146	2.6
	Rich	400	8.9	3223	32.2	0	0	0	0	2	0	698	7	75	1.2	204	4.8
	Richest			0	0	0	0	698	2.3	0	0	0	0	1	0	133	0.7
	All	326	8.3	1321	16	0	0	269	2.6	33	0.8	373	5.7	106	2.1	163	2.6
	C.I	0.167		0.3356		-		-0.108		-0.2209		0.0247		-0.3314		-0.3352	
	SE(C.I)	0.098		0.0864		-		0.1459		0.2954		0.1225		0.123		0.1447	
Total (Rural+Urban)	Poorest	276	18.4	194	9.7	388	13.2	325	10.7	182	11	183	7.6	746	18.3	212	5.2
	Poor	307	8.1	1098	37.8	398	14.4	261	5.9	119	3.2	375	12.2	216	7.3	186	4.8
	Middle	23	0.8	985	35.5	207	4.8	132	1.9	134	3.6	409	13.3	158	3.4	270	5.6
	Rich	59	1.6	10122	165.8	0	0	0	0	77	1.6	2616	43.8	117	2.3	370	6.3
	Richest	71	2.2	0	0	0	0	140	0.5	296	4	346	4.4	281	5.4	190	1.8
	All	211	11	3052	61.2	230	7	159	3.1	154	6	886	18.2	278	6.6	258	4.2
	C.I	-0.2635		0.465		-0.4064		-0.6324		-0.3158		0.193		-0.3446		-0.2032	
	SE(C.I)	0.1474		0.0941		0.1493		0.1003		0.0547		0.1778		0.1194		0.1026	

Note: ICI: Indirect Cost of Illness (Rs.), of CE: Indirect Cost of Illness as a percentage of Monthly Consumption Expenditure

Source: Author's Own Calculation from NSSO 71st Round Unit Level Data

Table 5.22 Religionwise Burden of Indirect Cost of Illness in KBK Region and Odisha, 2014

Sector	Consumption Quintile	KBK Region				Odisha					
		Religion				Religion					
		Hinduism		Islam		Hinduism		Islam		Christianity	
		ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE
Rural	Poorest	315	16.4			410	14			114	4
	Poor	613	20.3			236	7.7			99	3.3
	Middle	311	9.5			241	6.5	600	11.5	0	0
	Rich	3749	62.7			753	12.9	0	0	69	1.4
	Richest	11	0.3			298	4.5	94	0.5	0	0
	All	838	20.8			408	9.5	219	4	84	2.8
	C.I	0.1356				0.0772		-0.6283		-0.2573	
	SE(C.I)	0.2214				0.2289		0.1773		0.1345	
Urban	Poorest	81	3.6	42	0.8	123	3.9	90	1.6		
	Poor	246	5.9	0	0	190	4.2	0	0		
	Middle	58	0.8	0	0	152	2.5	0	0		
	Rich	1546	15.5	0	0	204	3.3	0	0		
	Richest	0	0	42353	141.2	80	0.5	5575	18.6		
	All	336	4.8	707	3	150	2.6	228	1.5		
	C.I	0.0852		0.7071		-0.2506		0.1106			
	SE(C.I)	0.256		0.6916		0.1409		0.798			
Total (Rural+Urban)	Poorest	300	15.6	42	0.8	374	12.7	90	1.6	114	4
	Poor	581	19	0	0	229	7.2	0	0	99	3.3
	Middle	288	8.8	0	0	226	5.8	238	4.6	0	0
	Rich	3534	58.1	0	0	641	11	0	0	66	1.3
	Richest	9	0.3	42353	141.2	246	3.5	1882	6.4	0	0
	All	795	19.4	707	3	362	8.2	225	2.2	83	2.7
	C.I	0.1252		0.7071		-0.1329		0.1783		-0.2702	
	SE(C.I)	0.2233		0.6916		0.1124		0.2009		0.1365	

Source: Author's Own Calculation from NSSO 71st Round Unit Level Data

Table 5.23 Occupationwise Burden of Indirect Cost of Illness in KBK Region and Odisha, 2014

Sector	Consumption Quintile	Occupational Classification of the Households																			
		KBK Region										Odisha									
		Self Employed		Agriculture		Labour		RWS		Others		Self Employed		Agriculture		Labour		RWS		Others	
		ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE	ICI	% of CE
Rural	Poorest	1369	50.7	267	18.7	254	10.2			0	0	439	15.5	202	11.3	771	19.9	486	14.5	0	0
	Poor	1590	51.2	260	7	305	14	199	6.6	0	0	611	19.6	143	3.9	176	6.1	70	2	221	12.5
	Middle	289	7.4	127	2.8	618	21.1	77	1.8	0	0	127	2.8	167	3.9	293	10	1512	35	59	1.5
	Rich	15669	261.2	0	0	0	0	132	3.6	0	0	3234	54.1	237	4	90	2.4	68	1.6	0	0
	Richest	64	2	0	0	0	0	0	0	0	0	166	2.5	527	7.9	337	4.6	277	4.5	0	0
	All	4394	85.9	192	9.7	299	11.3	90	2.5	0	0	1138	21.8	230	6.4	339	9.1	294	6	38	1.9
	C.I	0.2679		-0.4319		-0.0676		-0.3659		-		0.056		-0.1568		-0.3398		-0.2347		-0.4056	
	SE(C.I)	0.1928		0.1468		0.2122		0.2157		-		0.2238		0.1203		0.0865		0.2747		0.3547	
Urban	Poorest	24	0.8			169	7.9	204	5.9	0	0	96	2.9			52	2.1	143	4.5	448	11.2
	Poor	220	4.9			326	8.1	0	0	0	0	70	1.5			252	6	281	5.2	125	5.7
	Middle	52	0.8			0	0	0	0	1095	0.15	184	3.4			128	2.4	94	1.2	211	2.9
	Rich	2554	25.6					0	0	0	0	512	5.9			0	0	137	3.4	0	0
	Richest	42353	141.2			0	0	0	0			198	0.7			0	0	105	0.6	1	0
	All	813	8			138	4.5	16	0.5	151	0.02	220	3.2			142	3.5	128	2.1	63	1.6
	C.I	0.6129		-		-0.4388		-0.9225		0.7338		0.0987		-		-0.0262		-0.3099		-0.846	
	SE(C.I)	0.1647		-		0.2238		0.1196		0.2542		0.1435		-		0.198		0.1502		0.1369	
Total (Rural+Urban)	Poorest	817	30.2	267	18.7	249	10.1	204	5.9	0	0	281	9.7	202	11.3	687	17.8	256	7.8	59	1.5
	Poor	1407	45	260	7	308	13.1	161	5.4	0	0	442	14	143	3.9	188	6	167	3.5	212	11.9
	Middle	244	6.1	127	2.8	568	19.4	43	1	111	1.5	146	3	167	3.9	279	9.3	521	11.4	73	1.6
	Rich	12846	210.4	0	0	0	0	103	2.8	0	0	2530	41.7	237	4	88	2.4	103	2.5	0	0
	Richest	456	3.3	0	0	0	0	0	0	0	0	171	2.2	527	7.9	322	4.4	193	2.6	0	0
	All	3648	69.7	192	9.7	286	10.8	68	1.9	21	0.3	866	16.3	230	6.4	321	8.6	207	3.9	44	1.8
	C.I	0.3145		-0.4319		-0.081		-0.3652		0.2351		0.1186		-0.1568		-0.3195		-0.2378		-0.5312	
	SE(C.I)	0.1739		0.1468		0.2089		0.2302		0.3887		0.2116		0.1203		0.0858		0.1071		0.29	

Note: ICI: Indirect Cost of Illness (Rs.), of CE: Indirect Cost of Illness as a percentage of Monthly Consumption Expenditure, RWS: Regular Wage/Salaried Earning Class

Source: Author's Own Calculation from NSSO 71st Round Unit Level Data

Occupations of patients as well as the care givers play significant role in determining the indirect cost burden of the households. Individuals or households belonging to regular wage or salary earning class may receive medical leave and in a way their salary stands almost protected during the period of illness. Likewise, households belonging to casual and agricultural labour lack any form of social and economic protection such households lose their entire earning due to inability to work during the period of illness and to some extent this is true for self employed and farming households. However, the degree of severity of indirect cost burden may be less in self employed and agricultural households due to the possibility of intra households' labour substitution. In Odisha, the indirect cost of illness was

higher for labour and farmer class households compare to business and salaried class households (Nag et al. 2015). Table 5.23 adequately exhibited that the indirect cost burden is highest among self employed households followed by labour and agricultural households. It becomes evident from the Table 5.24 that rural households witnessed a higher burden of indirect cost when compared to its counterpart's urban households. In KBK region the indirect cost is as high as 70 percent of monthly consumption expenditure for self employed type of households. Furthermore, the indirect cost burden is more for higher consumption quintile groups as evident from the positive value of concentration index in both rural and urban areas. The other category and regular wage and salary earning classes are least affected by indirect cost burden of illness. In case of labour, agriculture and regular wage and salary earning class, the concentration index witnessed a negative value implying that indirect cost burden is higher on the lower ladder of consumption quintiles.

5.11 Summary

Chapter 5 has examined the out of pocket health payment and its catastrophic impact on the households in KBK region of Odisha by using 52nd, 60th and 71st rounds NSSO data. Main observations and findings in this chapter are given here. The percentage of households experiencing catastrophic head count in KBK region was 12.9 percent in 1995-96 which augmented to 33 percent in 2014. Moreover, a negative value of concentration index indicates a greater tendency for the poor households to cross the threshold level and the problem of catastrophic health payments is more common among the poor households in the study region. Inter temporal analysis shows that there are higher proportions of rural households in both KBK region as well as Odisha encountering catastrophic health payments during 1995-96 to 2014. Furthermore, the burden of catastrophic health payment was very high in the KBK region compared to the state average. The intensity of catastrophic health payments, i.e., average degree by which the health payment exceeds the threshold level, is higher among the poorest and poor quintiles than the rich and richest consumption quintiles in the KBK region over time. The result of the estimated Two-Part Model shows that the likelihood of incurring out of pocket health expenditure of the household is influenced by a number of factors such as number of children, number of old persons, severity of illness, opportunity cost of time, per capita consumption expenditure, caste and insurance status of head in the KBK region of Odisha. The severity of illness and opportunity cost of time turned out to be statistically significant determinant of probability of positive and the level of health

expenditure in the KBK region across the years. The probability of incurring a positive and the magnitude of health expenditure increases with the increase in MPCE. It is worth mentioning that the probability of incurring a positive out of pocket health expenditure is higher for insured households compared to uninsured households, however the level of out of pocket health expenditure is higher for uninsured households. On an average, the indirect cost of illness is disproportionately higher for rural households compared to urban households. On many occasions, rural people delay or neglect treatment because of ignorance and other financial constraints and they wait until the disease aggravates which further leads to higher days of illness or work loss days in the rural areas.

Appendix 5.A:

A Note on Concentration Curve (CC) and Concentration Index (CI)

Concentration indices measure inequality in one variable over the distribution of another variable (Kakwani et al., 1997). Concentration index has become the standard measure to quantify the income related inequality in health economics (Wagstaff, 2000). Concentration index can be calculated by using individual/grouped/aggregated data or micro data sets that contain information on an individual's income/expenditure and his/her health variable. This can be clarified with the help of example such as: if the population is divided into N different groups (Quantiles, Deciles and Percentiles) on the basis of their economic status, then concentration curve plots the cumulative percentage of the health variable (Y-axis) against the cumulative percentage of the population, ranked by living standards (consumption expenditure) beginning from the poorest to the richest (X-axis). The concentration curve is the bi-variate analogue of the Lorenz curve³. Unlike the Lorenz curve, the concentration curve may lie above the 45⁰ lines. If concentration curve coincides with the diagonal or 45⁰ lines then all groups irrespective of their socioeconomic status shows the same rate of health or health variable or there is no socioeconomic related inequality. If CC lies above (below) the diagonal then health variable favours the poor (rich) and in such case it is pro-poor (pro-rich) inequality. The farther the CC curve lies from the diagonal the greater the degree of

³ For instance, if there is a scalar measure of health and it increases in good health status. As one ranks the individual by his/her health, beginning with the least healthy, and plot the cumulative proportion of individuals ranked by health on x-axis and the cumulative proportion of health on the y-axis, Lorenz curve for health can thus be obtained. Twice the area between the diagonal (or line of equality) and the Lorenz curve equals the Gini coefficient, G, is being measure of overall or pure health inequality. The value of G lies between 0 and 1. Zero indicates perfect equality and one indicates perfect inequality.

inequality health variable across socioeconomic class. To cite another example, if the concentration curve of two regions 'A' and 'B' lies below the diagonal, so that CC of region 'A' lies everywhere above the CC of region 'B', it can be concluded that the CC of 'A' dominates that of 'B'. In such cases, one can reasonably argue that there is less socioeconomic related health inequality in Region 'A' compared to that of 'B'. However, non-dominance arises when two concentration curves intersect each other, necessitating a single measure to test their dominance. Therefore, Concentration Index has been calculated in such case in the present research work.

Concentration Index is defined with reference to the concentration curve. Twice the area between diagonal (or line of equality) and concentration curve is concentration index (C.I). Here C.I is a measure of socioeconomic health inequality.

In grouped data sets, if it is supposed that the households are classified into N groups on the basis of their per capita consumption expenditure quintiles (E), where E=1.....N groups. The Concentration Index can be calculated as follows

$$CI = (E_1L_2 - E_2L_1) + (E_2L_3 - E_3L_2) + \dots + (E_{T-1}L_N - E_NL_{N-1}) \text{ -----}(5.6)$$

Where E is the cumulative percentage of the households ranked by their per capita consumption quintiles, L(E) is the corresponding concentration curve ordinate and N is the number of socioeconomic groups.

The concentration index can also be calculated as $CI = \frac{2}{\mu} Cov(H, R)$, where μ is mean of health variable, H is health variable and R is households' fractional ranked in their socioeconomic distribution.

The values of concentration index ranges between -1 and +1. When the CI value is zero, there is no socioeconomic related health inequality. The concentration index takes a negative (positive) value, when the concentration curve lies above (below) the line of equality, indicating a disproportionate concentration of health variable among the poor (rich). Here health variable can be health expenditure, utilisation of health care, morbidity, catastrophic health payment, indirect cost of illness etc. If the health variable is catastrophic health payment, a negative value of concentration index means catastrophic health payment is higher among the poor.

Chapter 6

Illness Induced Impoverishment in KBK Region of Odisha

6.1 Introduction

The present chapter provides an analysis and examination of how illness induced impoverishment has impacted people of KBK region of Odisha. The analysis has been carried out by applying different suitable methodologies adopted by different health researchers and an attempt has been made to improve the existing methodologies to measure illness induced impoverishment in KBK region of Odisha.

Good health is crucial for the well being of the individuals as well as for the nation. According to World Development Report (1993) improved health contributes to economic growth in four ways (1) its reduces productivity losses caused by worker's illness, (2) it permits the use of natural resources that had been totally or nearly inaccessible because of disease; (3) it increases the enrollment of children in school and makes them better able to learn; and (4) it frees for alternative uses of resources that would otherwise have to be spent on treating illness. Illness on the other hand is a factor of social and economic stagnation and considered to be a key determinant of poverty. In a developing country like India, health expenditure accounts for only 5 percent of GDP out of which public health expenditure constitutes about 1 percent of GDP. Hence health expenditure is dominated by private spending with household out of pocket (OOP) health payments constituting the single largest component of total health expenditure. In a cross country analysis of 11 Asian countries, Van Doorslaer et al. (2006) found that the poverty head count has increased after accounting for out of pocket health payments and the poverty impact varies from 1.2 percent in Vietnam to 3.8 percent in Bangladesh. The absence of proper health protection mechanisms like health insurance and high health payments leads to catastrophe and a major cause of debt and poverty in India (Peters et al. 2002; Van Doorslaer et al. 2006 and Garg and Karan 2009). Kumar et al. (2015) estimated that yearly 63 million people, i.e., about 7 percent population is pushed below the poverty line because of OOP health care payments alone in India.

6.2 Illness Induced Poverty: Conceptual Framework

Ill health not only affects an individuals' quality of life or life expectancy, but also leaves an important impact on the resource allocation in the household, which could jeopardize both short and long term economic welfare (Gertler and Gruber, 2002). Even small costs for

common illnesses can be financially disastrous for poor households with no insurance coverage (Xu et al. 2003). The presence and perception of illness, leads to an individual's or household's decision whether to receive treatment or not and more often households are the primary decision making unit, about treatment and coping strategies which are based on negotiations within the household. A person may ignore an illness or might not seek care when ill due to lack of economic access or when the ailments are not serious. An injury or illness episode imposes direct costs, indirect costs and psychological costs. Direct costs in the form of medical and non medical costs are incurred if treatment is sought and it may lead to an increase in the household's usual consumption expenditure. The indirect cost includes the opportunity costs of expenditure decisions and income forgone of illness event. If the household member is economically active, illness can result in loss of household income. Other household members may also be required to devote time to the care of the ill household member, leading to loss of income.

The third dimension is psychological costs, i.e., stress, pain, suffering etc. to the patients as well as to other household members, but it is often ignored due to difficulty in its measurement. (Cooper and Rice, 1976 and Hodgson and Meiners, 1982). Different illnesses have different impacts on the households. For instance, common acute illnesses such as cough and cold usually pose least threat to household budget and assets, whilst chronic illnesses such as diabetes, blood pressure and tuberculosis impose higher direct costs over time and may prevent people from working over extended periods. Long term terminal illnesses such as HIV/AIDS are likely to cause sustained production and income losses, high treatment costs that lead to impoverishment (Russell, 2008). Households adopt different strategies to cope with the economic consequences of illness and use of health services. However the ability to cope with illness depends upon households' asset portfolios and their management and social networks. Social network includes friends and relatives, work colleagues and employers, influential contacts and access to local finances such as money lenders, saving groups, credit societies etc. These social networks play vital role in providing loans at acceptable interest rates and for accepting mortgages assets (Nag et al. 2015). The most immediate response to illness is to use the available income and mobilise savings, but these strategies are only feasible for a small proportion of households. (Russell, 1996, Sauerborn et al. 1996, Wilkes et al., 1997). Studies show that the most common coping strategies to illness are borrowing from friends and relatives, credit societies and money lenders etc. and selling off productive assets (Babu et al. 2002, Wilkes et al., 1997, Russell, 2004, Nag et al. 2015). Others emphasize on the reduction of consumption of basic

necessities, sacrificing investment in future productivity by curtailing children's education (Foster 1994, Whitehead et al., 2001, Damme et al., 2004).

In relation to coping with indirect cost of illness, households adopt intra labour substitution (allocate the work to other household members) or inter labour substitution (hire labour from outside). Sometimes intra labour substitution may yield adverse consequences on the household welfare, particularly when children are withdrawn from school to join their household activities (Attanayake et al. 2000 and D McIntyre, et al. 2006). These illness consequences depend upon households' ability to cope with these costs and vary across socioeconomic status of the households. The burden of disease in India is inversely related to economic status of the households and the poor households are found to be the worst victims because of their thin household budget in terms of payments made for health care and inability to earn during the period of illness (Visaria and Gumber, 1994 and Gumber, 1997). Illness and coping strategies bring significant implications for the households like reduction in income and consumption levels, working days lost, reduction in household assets, debts, vulnerable to future shocks which lead to threat in their livelihood (Scoones, 1998 and Russell, 2008). These high illness costs result in catastrophic consequences for families, which may include falling into poverty or being pushed into deeper poverty (Wagstaff and Doorslaer 2003, Flores et al. 2008; Garg and Karan, 2009; Berman et al., 2010).

Figure 6.1: A Simplified Framework on Illness Induced Impoverishment

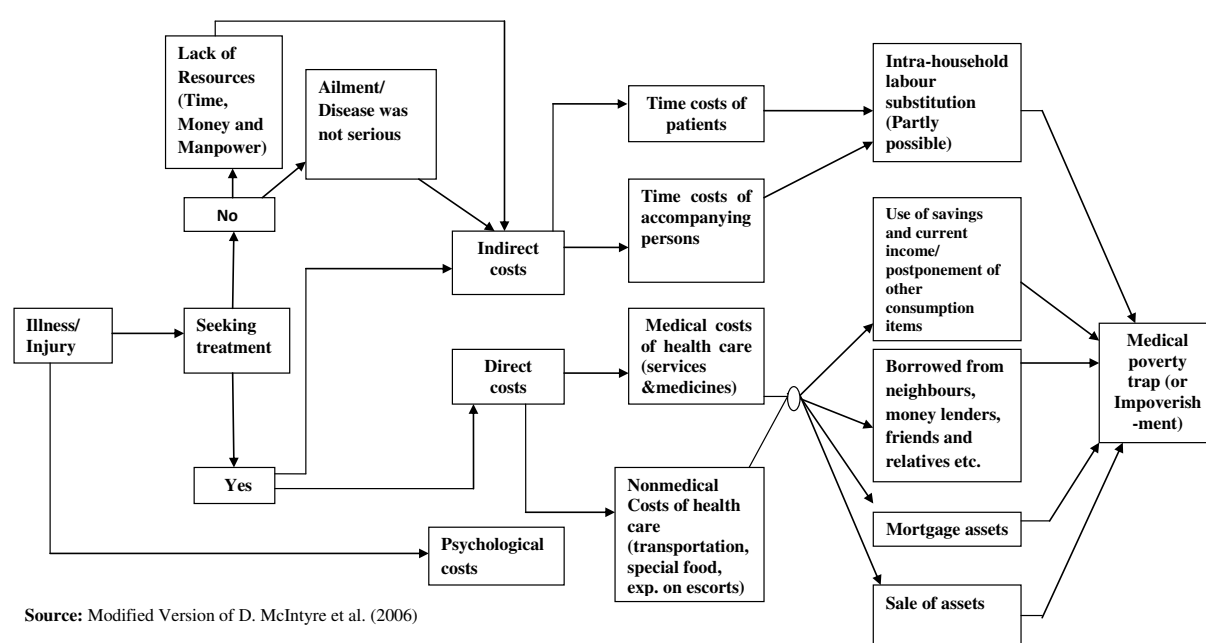
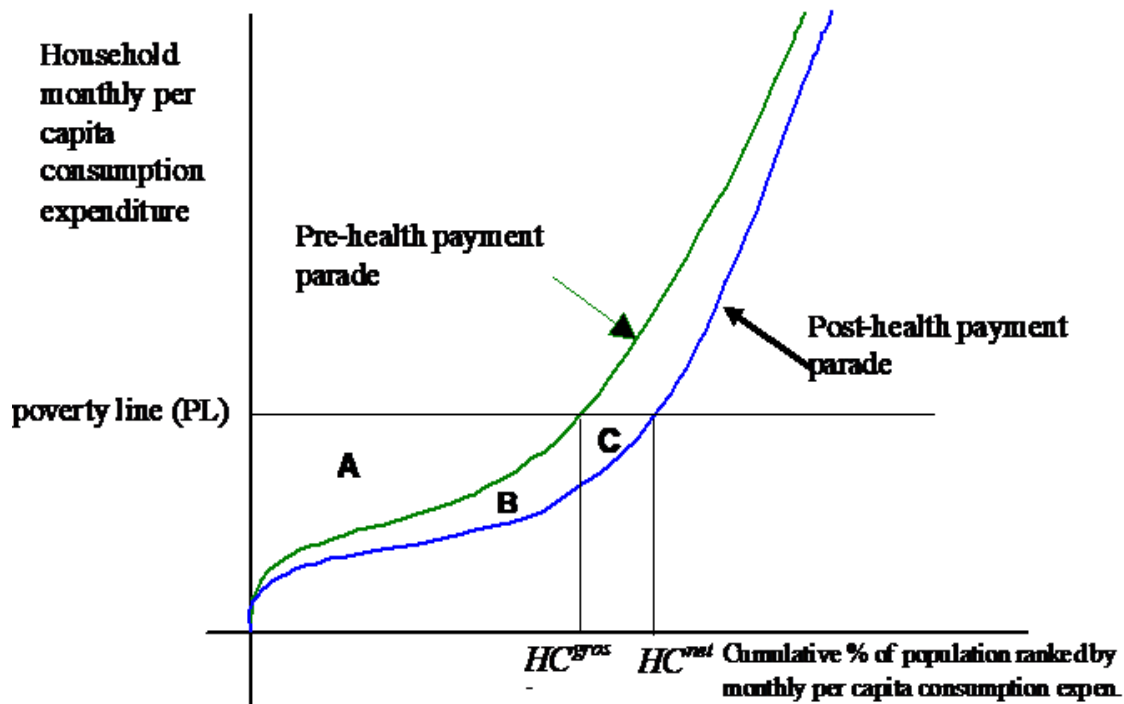


Figure 6.2: Diagrammatic Representation of Illness Induced Poverty Methodology



Source: Adapted from World Bank (2008)

6.3 Diagrammatic Representation of Illness Induced Poverty Methodology

The above figure describes a simple framework for examining the impact of OOP payments on two measures of poverty, i.e., health count ratio and poverty gap ratio. This figure is a variant of Pen's Parade, named after the Dutch economist Jan Pen Parade who invented it. The Pen Parade or Income Parade is a concept described in his book "*Income Distribution*". The two Pen's Parade plots monthly per capita consumption expenditure before and after health care payment is on the Y-axis and cumulative proportion of population ranked by their monthly per capita expenditure is on the X-axis. The standard assumption here is that the rank of the households before and after health payment will remain same in the distribution, however in reality, the rank may vary. The point on the X-axis at which the curve crosses the poverty line HC^{gross} (HC^{net}) gives the fraction of people living in poverty, the head count before (after) health payments. But this measure does not capture the intensity or depth of poverty, i.e., the amount by which poor households fall short of reaching the poverty line. Poverty gap defined by the area below the poverty line and above the parade is a measure which takes this issue into account. HC^{gross} and the area "A" give prepayment poverty head count and poverty gap respectively. In the post health payment situation, a new parade can be drawn at a lower level. The head count ratio is increased by the distance between HC^{net} and

HC^{gross} and the poverty gap has increased from the area “A” to the area “A+B+C”. The addition in the poverty gap indicated by area “B” represents those who are already poor in the prepayment situation become even poorer and the area “C” indicates those who were not counted as poor, become poor after health payment.

6.4 Measurement of Illness Induced Poverty Impact

The present research has examined the illness induced poverty using the methodology propounded by Wagstaff and Doorslaer (2003). The methodology one offered by Wagstaff and Doorslaer (2003) subsequently modified by Flores et al (2008) and Berman et al (2010). However, an attempt has been made to modify the said methodology, besides modifying the methodology proffered by Flores et al (2008) and Berman et al. (2010). Thus poverty impact of illness has been examined by using both the methodologies and to comprehend the difference if any in the results of these two methodologies.

Although the proposed methodology in Chapter-5 has discussed the incidence and distribution of catastrophic health payments among households, it could not measure to what extent the catastrophic payments cause hardship to the population. In extreme case, the catastrophic health payments could lead to poverty. The methodology adopted in this section is one offered by Wagstaff and Doorslaer (2003). This methodology is considered to be the most commonly used methodology for the measurement of poverty impact of OOP health payments.

Suppose e_i be the per capita total expenditure of household i and PL be the official poverty line defined by planning commission (Niti Aayog), then poverty head count is calculated as

$$HC^{gross} = \frac{\sum_{i=1}^N S_i p_i^{gross}}{\sum_{i=1}^N S_i} \quad \text{-----} \quad (6.1)$$

Where $p_i^{gross} = 1$, if $e_i < PL$ and is zero otherwise. s_i =Size of household and N is the number of households in sample. This HC^{gross} measures the individuals/households which are below the threshold poverty line in the pre-health payments situations. Therefore it is pre-head count ratio (or pre-HC).

Similarly, the net health payments head count is obtained by replacing p_i^{gross} with $p_i^{net} = 1$, if $(e_i - H_i) < PL$ and zero otherwise. H_i is OOP health expenditure. HC^{net} measures the individuals/households which are pushed below the threshold poverty line in the post-health payments situations. Therefore, it is post-head count ratio (or Post-HC).

$$HC^{net} = \frac{\sum_{i=1}^N S_i p_i^{net}}{\sum_{i=1}^N S_i} \text{-----} \quad (6.2)$$

The intensity of poverty can be captured by poverty gap measure. The poverty gap is equal to the percentage of population are poor (HC) multiplied by the average deficit of the poor from the poverty line. The poverty gap gross of health payments is $g_i^{gross} = p_i^{gross} (PL - e_i)$ and the mean of this gap is:

$$PG^{gross} = \frac{\sum_{i=1}^N S_i g_i^{gross}}{\sum_{i=1}^N S_i} \text{-----} \quad (6.3)$$

This PG^{gross} measures the intensity of poverty, i.e., how far the individuals/households are below the poverty threshold in the pre health payments situations. Therefore we call it pre-payments poverty gap (Pre-PG).

Similarly the net of health payment poverty gap (PG^{net}) can be measured by using $g_i^{net} = p_i^{net} \{PL - (e_i - H_i)\}$ in equation (4). Here H_i is OOP health expenditure.

$$PG^{net} = \frac{\sum_{i=1}^N S_i g_i^{net}}{\sum_{i=1}^N S_i} \text{-----} \quad (6.4)$$

Here PG^{net} measures the intensity of poverty, i.e., how far the individuals/households are below the poverty threshold in the post health payments situations. Therefore it is called post-payments poverty gap (Post-PG).

One of the objectives of the present study is to examine the illness induced poverty across rural and urban sector and given the fact that the poverty lines are different across sectors. Therefore, the poverty gap measure must be normalized with respect to poverty threshold line. The normalized poverty gap can be measured by

$$NPG^{gross/net} = \frac{PG^{gross/net}}{PL} \text{-----} \quad (6.5)$$

$$\text{And the mean of this normalized gap is } MPG^{gross/net} = \frac{PG^{gross/net}}{HC^{gross/net}} \text{-----} \quad (6.6)$$

The poverty impact (PI) of health payments are simply defined as the difference between the post payment and pre payment measures for the head count, poverty gap and normalize poverty gap.

However, the methodology offered by Wagstaff and Doorslaer (2003) was criticised by Flores et al. (2008) and Berman et al. (2010) on the ground that it is not adjusted for Financial Coping Mechanisms such as past savings, sale of assets, borrowings and contributions from friends and relatives etc. of the households. The argument offered by Flores et al (2008) and Berman et al. (2010) can be put in an illustration. They rightly argued that, if there are two households, household 'A' is able to finance some or all of its health expenditure by running down its stock of financial and physical assets or by borrowings, in such cases, household consumption expenditure (which is the base of poverty calculation in India) is higher with health expenditure than another household 'B' with similar situation but without health expenditure. Clearly, some households may cross the predefined poverty line because of health care payments. Therefore, disregarding the funding sources in meeting health care costs by selling physical assets and borrowing would lead to an underestimation of prepayment health care poverty situation and overestimation of impoverishment effect of health care payments. Uncorrected measures would make households with high OOP spending appear to be better off than without such expenditure, other thing being equal. Flores et al (2008) and Berman et al. (2010) rightly argued that household expenditure must be corrected for financial coping mechanisms (FCMs) while measuring the impoverishment effect of health care payment (Berman, P et al. 2010).

The methodology proposed by Flores et al. (2008) and Berman et al. (2010) studies considered to be improved over the earlier methodology as developed by O' Donnell et al. (2008) at least for theoretical grounds. However, the major limitation of the previous studies is that none of them have considered indirect impact of illness while measuring impoverishment impact of health payment on the households. During the time of illness, households bear earning loss at the time when it needs extra amount for treatment. In addition to medical expenses, illness shocks have catastrophic economic consequences through loss of earnings. In a study conducted by Gertler and Gruber (2002) found that in Indonesia earnings losses are more important than medical spending in disrupting household living standards following a health shock. The indirect costs were 73 percent of the total cost of illness and time lost by healthy care givers was almost equal to the time lost by the sick in rural Burkina Faso (Sauerborn et al., 1995). Rajeswari et al. (1999) found that the indirect cost of illness for Tuberculosis patients are almost twice of the direct costs of illness in India. A similar study in Tanzania revealed that indirect cost illness was 90 percent of the total cost (Wyss et al. 2001). Moreover, if we examine the impoverishment impact of health payment alone, then those households that cannot afford to meet health care payments are ignored. It means the

untreated cases of ailments or morbidity are not captured in the earlier methodology. Once the indirect cost of illness is incorporated, those households/ individuals that cannot afford to meet their health care payments can be partially included. For Instance, in KBK region and Odisha a significant proportion of household finance their health care from borrowings, selling assets and friends and relatives contributions (as observed from Table 5.5 and 5.6). Similarly, indirect cost of illness/forgone income constitutes a significant proportion of household consumption expenditure (observed from Table 5.19). Hence, it is imperative to adjust for both components while measuring illness induced impoverishment. Therefore, the present research endeavour strongly argues that these double cost burdens make the households more vulnerable and leave a significant impact on their livelihoods and push them into more intense poverty. Moreover, for the estimation of detailed impact of illness burden one need to consider outpatient as well. It is quite possible that one household might have faced both inpatient and outpatient expenditure or households might have spent a huge amount on outpatient care without facing a hospitalized case. In general, the incidence and prevalence rate is higher for outpatient case than that of inpatient case. The present study has attempted to fill this gap by taking into consideration of total illness cost on household poverty by using NSSO data for the periods 1995-96, 2004 and 2014.

At the backdrop of the above stated discussion, an attempt has been made to improve the existing methodology by incorporating indirect cost while measuring impoverishment effect of illness.

6.5 An Overview of Poverty Measurement in India

Planning Commission (and its successor the Niti Aayog) is the nodal agency for the calculation of poverty line and poverty ratio in India since the 1960s. It estimates the incidence of poverty at the national and state level separately in rural and urban areas using large sample survey of consumer expenditure data of National Sample Survey Office (NSSO). Traditionally, poverty measures in India are computed in comparison to a threshold level of monthly per capita consumption expenditure (MPCE) necessary for providing a minimum nutritional diet in terms of calorie intake. Policy makers and economic experts have been changing, revising or modifying these methods and criteria the last 50 years to appropriately adjust the measures of poverty line and poverty ratio. The constitution of a Working Group in 1962, recommended that the national minimum consumption expenditure should not be less than Rs. 20 per capita per month in rural areas and Rs. 25 per capita per month in urban areas at 1960-61 prices. The poverty line excluded expenditure on health and

education on the presumption that health and education shall be provided by the State. The Task Force in 1979 under the Chairmanship of Dr Y.K. Alagh, provided a quantitative measure of poverty. The Task Force poverty was defined in terms of calorie intake and per day average calorie requirements of 2400 and 2100 estimated separately for the all-India rural and urban areas. Based on the consumer behaviour in 1973-74, Rs. 49.09 per capita per month (rural) and Rs. 56.64 per capita per month (urban) were calculated for poverty line. This defined line was updated by the planning commission to estimate poverty for later years. However, the choice of deflator represents price changes in the poverty line, application of same poverty line in all the states, use of fixed basket over time and the uniform consumption basket for all the states called for alternative poverty line.

The Expert group in 1989 under the chairmanship of Prof. D.T. Lakdawala was constituted by the Planning Commission to revisit the poverty line in India. The Expert Group submitted its report in the year 1993. The Expert group retained the poverty line as defined by the Task Force at the national level. This Expert Group disaggregated the national poverty lines into state specific poverty lines. These state specific poverty lines for base year 1973-74 were updated by using state specific price indices especially constructed by taking weighted average of commodity group wise CPI-AL (rural) and CPI-IW (urban) of food, fuel and light, clothing and footwear and miscellaneous with their respective weights in the national consumption basket of the poor in 1973-74. Subsequently the same methodology was used to estimate the poverty line for the years 1999-2000 and 2004-05 and official estimate of poverty was derived by using Lakdawala methodology (GoI, 2014). However the poverty line as defined by Lakdawala Expert Group was questioned on the ground that it excludes the cost of minimum basic needs like education and health. This issue gained importance due to increase in the private expenditure on education and health in the recent years (Dev and Ravi, 2008). An Expert Group under the chairmanship of Prof. S.D. Tendulkar in 2005 was constituted to examine the issues related to comparability of various consumption expenditure data and to review the poverty line. The Expert Group submitted its report in 2009. The expert group adopted the poverty line of 2004-05 as estimated by the Lakdawala Expert Group, but converted this poverty line which was Uniform Recall Period (URP) based into Mixed Recall Period (MRP) based. In URP consumption, consumption data are collected from households using 30 days recall period for all the items whereas in MRP consumption data are collected using 365 days recall period for five non food items, viz., clothing, footwear, durable goods, education and institutional medical expenses and 30 days recall period for the remaining items. Finally the Expert Group under the chairmanship of C.

Rangarajan was constituted in the year 2009. These were significant committees constituted by Planning Commission for the revisions and modifications of poverty line to reflect changing socio-economic conditions of the nation, particularly of the poor.

The official poverty line in India is determined on the basis on monthly per capita consumption expenditure as required to fulfil the minimum diet 2400 and 2100 calories in rural and urban areas respectively in addition to an allowance of basic non-food needs. However these lines vary from state to state as well in rural and urban areas. Subsequent to Tendulkar Methodology, poverty line typically includes basic non food items like clothing, footwear, durable goods, education and institutional medical expenses; therefore it takes care of health care payment. However this threshold line takes little accounts of health care needs of the people (Flores et al. 2008; Gupta, 2009; Berman et al. 2010 and Chowdhury, 2011).

6.6 Justification of Adjustment of OOP health expenditure in Poverty Line

The official poverty line is based on monthly per capita consumption expenditure. Adjustment of poverty line is justified if health care need does not reflect in poverty line. Conventional estimates of poverty do not take into account out of pocket payments to finance health care (Van Doorslear, 2006). Given the fact that uncertainty and heterogeneity of health care needs regarding the timing and amount of health expenditure, it becomes difficult to adjust poverty line by taking into account health needs of the people. Therefore, OOP payments must be adjusted in poverty line. Moreover, during illness a household may divert expenditure to health care to an extent that its spending on basic necessities falls below the poverty threshold and hence, it will not be counted as poor similarly a household that falls below the poverty threshold but borrows to cover health care expenses so that its total expenditure is raised above the poverty threshold will not be considered as poor. However, not all OOP payments are nondiscretionary; therefore subtracting them from household resources will overestimate poverty. But leaving OOP payments in resources will underestimate poverty. Poverty impact of OOP payments given by difference between poverty assessed on resources gross and net of OOP payments only if; all payments are nondiscretionary and total household resources are fixed.

The standard planning commission poverty line is used in order to calculate the prepayment poverty in this study. However, poverty line for three periods, viz., 1995-96, 2004 and 2014 for the state Odisha is needed in this study. Since the poverty lines are not available for the year 1995-96 and 2014, the official poverty line numbers for the years 1993-94 and 2011-12 were updated for 1995-96 and 2014 respectively for rural and urban Odisha.

Following Flores et al. (2008) these updating were done by using consumer price index for agricultural labourer, consumer price index for industrial worker, consumer price index for rural areas and urban areas separately. However Flores et al. (2008) used consumer price index agricultural labourers for rural areas and consumer price index for industrial workers for urban areas to update the poverty line figures whereas Berman et al. (2010) used the consumer price index agricultural labourers for rural areas and consumer price index for non manual employee for urban areas.

Table 6.1 Impact of Out of Pocket Health Expenditure on Poverty for KBK Region and Odisha during 1995-96 to 2014

		Rural			Urban			Total		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
KBK Region	Poverty Headcounts (%)									
	PreHC	78.9	78.2	53	62.9	42	37	77	71.6	51.5
	PostHC	80.1	84	64.7	65.2	47	52.6	78.4	77.3	63.6
	PIHC	1.2	5.8	11.7	2.3	5	15.6	1.4	5.7	12.1
	Poverty Gaps (Rs.)									
	Pre-PG	66	134	120	62	79	99	66	125	118
	Post-PG	84	164	327	76	97	197	83	152	315
	PIG	18	30	207	14	18	98	17	27	197
	Normalized Poverty Gaps (%)									
	Pre-NG	22.9	32.8	14.5	17.3	15.9	9.7	-	-	-
Odisha	Post-NG	29.1	40.2	39.5	21.1	19.5	19.4	-	-	-
	PING	6.1	7.4	25	3.9	3.6	9.6	-	-	-
	Poverty Headcounts (%)									
	PreHC	62.3	60.2	39.8	38.4	35.6	21.3	58.7	56.7	36.4
	PostHC	66	65.3	54.1	42.1	40	28.4	62.5	61.4	49.3
	PIHC	3.7	5.1	14.3	3.7	4.4	7.1	3.8	4.7	12.9
	Poverty Gaps (Rs.)									
	Pre-PG	48	84	78	35	36	42	46	74	72
	Post-PG	60	152	247	45	86	180	58	138	235
	PIG	12	68	169	10	50	138	12	64	163
	Normalized Poverty Gaps (%)									
	Pre-NG	17	20.6	9.5	9.7	7.2	4.1	-	-	-
	Post-NG	20.8	37.3	29.9	12.5	17.3	17.7	-	-	-
	PING	4.3	16.7	20.3	2.8	10.1	13.6	-	-	-

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Unit Data

6.7 Poverty Impact of Health Care Payments in KBK Region of Odisha

Table-6.1 presents the various measures for poverty impact before and after out of pocket payments for health care in KBK region and Odisha for the period 1995-96 to 2014. As already discussed, in Chapter-4, the KBK region is known for mass poverty, hunger and malnutrition etc. and it is observed from the above table that the poverty head count is very high in the KBK region. Although the poverty head count ratio has been reduced from 77 percent to 51.5 percent over the period 1995-96 to 2014, it is substantially high in KBK region compared to that of the State average. The increase in the number of poor after

adjustment for health payments from total consumption expenditure is 12.1 percent with 11.7 percent in rural areas and 15.6 percent in urban areas. The poverty impact of health payment (PIHC), i.e., the difference between post health payment head count and pre health payment head count has been increasing over the period from 1.4 percent in 1995-96 to 12.1 percent in 2014. Moreover, the poverty impact of health payment is more in urban areas compared to rural areas. A similar poverty impact of health payment was found for the state Odisha as well, however PIHC is more intense in the rural areas (14.3 percent) compared to urban areas (7.7 percent). The poverty gaps measure the amount of financial resources required to remove the consumption poverty with reference to predetermined poverty line. The consumption expenditures of the poor dips by an average amount of Rs. 197 after health payments. This poverty gap has increased over the period from Rs. 17 in 1995-96 to Rs.197 in the year 2014. However the intensity of poverty gap is higher in rural areas (Rs. 207) than in urban areas (Rs. 98). This result is also true for the state average. Since the poverty lines for rural and urban areas are different, in order to facilitate comparisons of poverty gaps it is useful to express the mean gap as a multiple of the poverty line known as the normalised poverty gap. This gap is also standardized with the head count and this is known as the mean positive poverty gap which depicts the average consumption shortfall because of health payment for the poor. The normalized poverty gap is much higher in the rural areas (25 percent) than in the urban areas (9.6 percent) thus it indicates that the relative burden of health payments is much greater in the rural areas. The same conclusion can be derived for the state and it has been found increasing over time for both KBK region and Odisha.

6.8 Poverty Impact of Illness in KBK Region of Odisha

In order to examine the poverty impact of illness after the adjustment of financial coping mechanisms (FCMs) and indirect cost of illness, the above stated equations are modified as follows:

In equation-(6.1) and equation-(6.3)

$$p_i^{gross} = 1, \text{ if } (e_i - FCMs) < PL \text{ and is zero otherwise.}$$

$$\text{and } g_i^{gross} = p_i^{gross} [PL - (e_i - FCMs)] \text{ respectively.}$$

where FCMs is the households' per capita amount due to sell of household assets, borrowing and contribution from friends and relatives. Similarly in equation-(6.2) and equation-(6.4)

$$p_i^{net} = 1, \text{ if } [e_i - (H_i + ICP)] < PL \text{ and zero otherwise}$$

and

$g_i^{net} = p_i^{net} [PL - \{e_i - (H_i + ICP)\}]$ respectively. Where H_i is OOP health expenditure and ICP is the indirect cost of illness in per capita terms.

Table 6.2 Poverty Impact of Illness in the KBK Region and Odisha

		Rural			Urban			Total		
		1995-96	2004	2014	1995-96	2004	2014	1995-96	2004	2014
KBK Region	Poverty Headcounts (%)									
	PreHC	79.4	79.2	53	63.1	42.5	37	77.4	72.5	51.5
	PostHC	81.1	85.6	66.9	65.9	48.4	53.8	79.3	78.6	65.7
	PIHC	1.7	6.4	13.9	2.8	5.9	16.8	1.9	6.1	14.2
	Poverty Gaps (Rs.)									
	Pre-PG	76	137	120	64	83	99	74	133	118
	Post-PG	89	153	508	81	137	270	88	152	486
	PIG	13	16	388	17	54	171	14	19	368
	Normalized Poverty Gaps (%)									
	Pre-NG	26.3	33.6	14.5	17.8	16.7	9.7	-	-	-
	Post-NG	30.8	37.5	61.4	22.5	27.6	26.6	-	-	-
	PING	4.5	3.9	46.9	4.7	10.9	16.8	-	-	-
Odisha	Poverty Headcounts (%)									
	PreHC	63.4	62.5	39.8	39.2	36.7	21.3	59.8	58.4	36.4
	PostHC	66.8	66.3	56	40.6	41	29.3	62.9	62.4	51.1
	PIHC	3.4	3.8	16.2	1.4	4.3	8	3.1	4	14.7
	Poverty Gaps (Rs.)									
	Pre-PG	53	114	78	38	36	42	51	104	72
	Post-PG	63	136	326	43	150	205	60	138	303
	PIG	10	22	248	5	114	163	9	34	231
	Normalized Poverty Gaps (%)									
	Pre-NG	18	27.9	9.4	10.6	7.2	4.1	-	-	-
	Post-NG	21.8	33.3	39.4	11.9	30.2	20.2	-	-	-
	PING	3.5	5.4	30	1.4	22.9	16	-	-	-

Source: Author's Own Calculation from NSSO 52nd, 60th and 71st Round Unit Data

The previous Table-6.1 measures the number of households below poverty line before and after the health payments. However, if a household is able to finance its health expenditure by selling its stock of financial or physical assets or by borrowings, in such cases household consumption expenditure with health payment is greater than the usual consumption expenditure without health payments. If consumption expenditure with health payments is greater than poverty line then household is considered to be above the poverty line, therefore disregarding such funding sources potentially lead to an overestimation of poverty impact of health payments (PIHC). Similarly, out of pocket health payments alone is not the only factor responsible for pushing the household below poverty line, the indirect cost of illness or burden of income forgone during the period of illness significantly impact the livelihood of the households. Therefore, sources of funding for health care and indirect cost of illness need to be adjusted before measuring the poverty impact of health payments. Table-6.2 presents poverty impact of illness with an adjustment for financial coping mechanisms and indirect cost of illness. In the given case, the pre payment poverty head count is adjusted for financial

coping mechanisms and the post payment poverty head count is adjusted for cost of illness, i.e., household health payments plus income foregone. It is seen that both pre and post health payment head counts ratio as well as poverty impact of health payment has been increased over time after the adjustment. The poverty impact of illness has increased from 1.4 percent in 1995-96 to 14.2 percent in 2014 in the KBK region. It has been seen that the poverty impact increased from 12.1 percent (without adjustment) to 14.2 percent (with adjustment). When compared with Table-6.1 it is found that there is an increase of 2.1 percentage points in the poverty impact with an increase of 2.2 percentage points in the rural areas and 1.2 percentage points in the urban areas after adjustment and hence PIHC is more intense in the rural areas compared to that of urban areas. This could be due to the fact that in rural areas borrowing is the main coping mechanisms in order to meet health care expenses. Similar result can be derived for the state as a whole. The poverty impact gap measure also suggests a visible increase in poverty gap during 1995-96 to 2014 after the adjustment. The poverty gap comparisons are more meaningful when normalized poverty gaps are used, i.e., poverty gaps divided by poverty lines. The rural people are more vulnerable due to health payment as the impact of normalized poverty gap in rural areas is 46.9 percent which is almost three times higher than that of urban areas for KBK region and twice greater than for Odisha in the year 2014.

6.9 Poverty Impact of Illness in Socioeconomic Characteristics of the Households

The following section discusses the poverty impact of illness across some of the selected household characteristics like caste, religion, occupation (household type), place of residence and consumption expenditure quintile classes etc. by using the 71st round NSSO data.

Table 6.3 presents the poverty head count, poverty gap and normalised poverty gap across social groups for KBK region of Odisha. Scheduled Caste households are the most vulnerable to medical poverty trap as evident from the poverty impact of illness, (i.e., the difference in the head count between after and before illness situations) payment head count is much higher for this category of households. The poverty impact of illness was 19.5 percent in KBK region implying that there is an increase of 19.5 percentage points head count ratio among Scheduled Castes due to illness. Moreover, the urban Schedule Caste households are more vulnerable to health shocks as poverty impact of illness (38.3 percentage point) is more than twice that of the rural households (17.7 percentage point) in the KBK region. Although the poverty head count is highest in the pre illness scenario for Schedule Tribe households, they are least affected by illness compared to other social groups and this was true for the

state as well. The poverty gap however, was found to be very high for Schedule Caste households. Unlike poverty head count; the poverty gap for SCs households in rural areas (Rs. 1211) is extremely high compared to urban areas (Rs.377). This indicates that though relatively lesser SC households in rural areas are pushed into poverty (compared to urban SC households in KBK region); their ability to pay for other necessities was reduced considerably due to illness. The normalised poverty gap (which is adjusted for poverty line) is higher in rural areas compared to urban areas for all social groups and it was seen for both KBK region as well as Odisha.

Information about the poverty impact of illness across religious groups in KBK region of Odisha is given in Table 6.4. In the state of Odisha majority of the population belong to Hinduism. Among the religious groups, the Hindu households experienced the highest in the incidence and depth of poverty in the KBK region. Though in case of Sikhism, the pre and post illness poverty head count is 100 percent, their proportion is negligible in total population in KBK region. However it is the Muslim households especially the rural households who are more vulnerable to medical poverty trap in the state.

Table 6.3 Castewise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014

			KBK Region			Odisha		
			Rural	Urban	Total	Rural	Urban	Total
			2014	2014	2014	2014	2014	2014
Poverty Headcount (%)	ST	PreHC	68.8	88	69.2	63.6	56.1	63
		PostHC	74.4	88	74.7	69.6	58.7	68.7
		PIHC	5.6	0	5.5	6	2.6	5.7
	SC	PreHC	56.1	51	55.6	42.2	32.3	41.1
		PostHC	73.8	89.3	75.1	56.9	51.4	56.3
		PIHC	17.7	38.3	19.5	14.6	19	15.1
	OBC	PreHC	37.9	29	36.9	33.2	21.3	31
		PostHC	53.7	29.2	51.1	50.3	26.1	45.9
		PIHC	15.9	0.2	14.2	17.1	4.8	14.9
	Others	PreHC	21.1	23.9	22.1	13.4	9.4	12
		PostHC	30.5	49.9	37.3	34.2	16.6	27.9
		PIHC	9.4	26	15.2	20.8	7.1	15.9
	Total	PreHC	53	37	51.5	39.8	21.3	36.4
		PostHC	66.9	53.8	65.7	56	29.3	51.1
		PIHC	13.9	16.8	14.2	16.2	8	14.7
Poverty Gap (Rs.)	ST	Pregap	176	81	174	140	81	135
		Postgap	340	374	341	262	211	258
		PIG	164	293	166	121	130	122
	SC	Pregap	96	130	99	72	70	72
		Postgap	1307	506	1239	479	273	456
		PIG	1211	377	1140	406	204	384
	OBC	Pregap	81	94	82	60	47	57
		Postgap	273	120	256	335	127	297
		PIG	192	26	174	275	80	239
	Others	Pregap	44	92	61	28	21	25
		Postgap	229	288	249	225	252	235
		PIG	185	196	189	197	231	209
	Total	Pregap	120	99	118	78	42	72
		Postgap	508	270	486	326	205	303
		PIG	388	171	368	247	163	232
Normalized Poverty Gap (%)	ST	Pregap	21.7	8	-	17.3	8	-
		Postgap	41.8	37.1	-	32.2	20.9	-
		PING	20.1	29.1	-	14.9	12.9	-
	SC	Pregap	11.8	12.9	-	8.9	6.9	-
		Postgap	160.8	50.3	-	58.9	27.1	-
		PING	149	37.4	-	50	20.2	-
	OBC	Pregap	9.9	9.3	-	7.3	4.6	-
		Postgap	33.6	11.9	-	41.2	12.6	-
		PING	23.6	2.6	-	33.8	8	-
	Others	Pregap	5.4	9.1	-	3.4	2.1	-
		Postgap	28.1	28.6	-	27.7	25	-
		PING	22.7	19.5	-	24.3	22.9	-
	Total	Pregap	14.8	9.8	-	9.6	4.2	-
		Postgap	62.5	26.8	-	40	20.3	-
		PING	47.7	17	-	30.4	16.1	-

Source: Author's Own Calculation from NSSO 71st Round Unit Data

Table 6.4 Religionwise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014

Religious Group		Poverty Headcount (%)				Poverty Gap (Rs.)				Normalized Poverty Gap (%)			
			Rural	Urban	Total		Rural	Urban	Total		Rural	Urban	Total
KBK Region	Hinduism	PreHC	53.4	32.9	51.6	PrePG	121	77	117	PreNPG	14.9	7.6	-
		PostHC	68.3	49.8	63.9	PostPG	512	234	488	PostNPG	63	23.2	-
		PIHC	14.9	16.9	12.3	PIG	391	157	371	PING	48.1	15.6	-
	Islam	PreHC	0	87.1	87.1	PrePG		363	363	PreNPG	0	36.1	-
		PostHC	0	88.3	88.3	PostPG		704	704	PostNPG	0	69.9	-
		PIHC	0	1.2	1.2	PIG	0	341	341	PING	0	33.9	-
	Christianity	PreHC	1.6	0	1.5	PrePG	5	0	5	PreNPG	0.6	0	-
		PostHC	1.6	0	1.5	PostPG	5	0	5	PostNPG	0.7	0	-
		PIHC	0	0	0	PIG	0	0	0	PING	0.1	0	-
	Sikhism	PreHC	100	0	100	PrePG	63		63	PreNPG	7.7	0	-
		PostHC	100	0	100	PostPG	202		202	PostNPG	24.8	0	-
		PIHC	0	-	-	PIG	139		139	PING	17.1	0	-
	Others	PreHC	-	-	-	PrePG				PreNPG	0	0	-
		PostHC	-	-	-	PostPG				PostNPG	0	0	-
		PIHC	-	-	-	PIG	-	-	-	PING	-	-	-
	Total	PreHC	53	37	51.5	PrePG	120	99	118	PreNPG	14.8	9.8	-
		PostHC	66.9	53.8	65.7	PostPG	508	270	486	PostNPG	62.5	26.8	-
		PIHC	13.9	16.8	14.2	PIG	388	171	368	PING	47.7	17	-
Odisha	Hinduism	PreHC	39.4	19.8	35.9	PrePG	78	37	71	PreNPG	9.6	3.7	-
		PostHC	53.7	27.1	48.9	PostPG	328	201	305	PostNPG	40.3	19.9	-
		PIHC	14.3	7.3	13	PIG	250	163	234	PING	30.7	16.2	-
	Islam	PreHC	0	67.5	49.3	PrePG	0	189	138	PreNPG	0	18.8	-
		PostHC	77	70	71.9	PostPG	296	369	349	PostNPG	36.5	36.6	-
		PIHC	77	2.5	22.6	PIG	296	180	211	PING	36.5	17.8	-
	Christianity	PreHC	69.8	0	68.3	PrePG	126	0	123	PreNPG	15.5	0	-
		PostHC	73	9.9	71.7	PostPG	195	15	192	PostNPG	24	1.4	-
		PIHC	3.2	9.9	3.4	PIG	69	15	68	PING	8.5	1.4	-
	Sikhism	PreHC	100	0	100	PrePG	63		63	PreNPG	7.7	0	-
		PostHC	100	0	100	PostPG	202		202	PostNPG	24.8	0	-
		PIHC	0	0	0	PIG	139	0	139	PING	17.1	0	-
	Others	PreHC	0	1.6	1.6	PrePG		2	2	PreNPG	0	0.2	-
		PostHC	0	1.6	1.6	PostPG		4	4	PostNPG	0	0.4	-
		PIHC	0	0	0	PIG	0	2	2	PING	0	0.2	-
	Total	PreHC	39.8	21.3	36.4	PrePG	78	42	72	PreNPG	9.6	4.2	-
		PostHC	56	29.3	51.1	PostPG	326	205	303	PostNPG	40	20.3	-
		PIHC	16.2	8	14.7	PIG	247	163	232	PING	30.4	16.1	-

Source: Author's Own Calculation from NSSO 71st Round Unit Data

Occupational status can greatly affect the morbidity patterns and health care utilisation in many ways. Certain occupations may increase an individual's risk of becoming sick. At the same time occupation status also determines the access and utilisation of health care services. Hence occupational status is strongly associated with morbidity, access and utilisation and illness induced poverty. Table 6.5 shows the illness induced poverty across different occupational status of the households. In rural areas the casual labour class and agricultural

labour are added to a single category called labour class. Household belonging to other category of occupations, self employed in non agriculture and labour class are among whom the incidence of illness induced poverty is very high in KBK region. However the intense of poverty impact of illness is more in urban areas (36.3 percentage point) than in rural areas (14 percentage point) for households belonging to self employed in non-agriculture category whereas diametrically opposite result was found, (i.e., illness induced poverty is more intense in rural areas than urban areas) for labour and other category of households in KBK region. The depth of poverty as measured by poverty gap is also very high for self employed in non agricultural occupational classes. In case of Odisha poverty impact of illness is more for agricultural and self employed in non-agricultural households among different occupational classes and rural households are more vulnerable to illness induced poverty irrespective of occupational classes.

Table 6.5 Occupationwise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014

		Poverty Headcount (%)				Poverty Gap (Rs.)				Normalized Poverty Gap (%)			
			Rural	Urban	Total		Rural	Urban	Total		Rural	Urban	Total
KBK Region	Self Employed in Non-agri	PreHC	46.9	41.5	45.7	PrePG	69	106	76	PreNPG	8.5	10.5	-
		PostHC	60.9	77.8	64.4	PostPG	1648	409	1390	PostNPG	202.7	40.6	-
		PIHC	14	36.3	18.7	PIG	1579	303	1313	PING	194.2	30.1	-
	Agriculture	PreHC	60.1	0	60.1	PrePG	140		140	PreNPG	17.2	0	-
		PostHC	69.8	0	69.8	PostPG	314		314	PostNPG	38.6	0	-
		PIHC	9.7	0	9.7	PIG	174		174	PING	21.4	0	-
	Labour	PreHC	54.7	46.7	54.1	PrePG	135	84	131	PreNPG	16.6	8.3	-
		PostHC	68.2	46.9	66.4	PostPG	319	202	309	PostNPG	39.2	20.1	-
		PIHC	13.4	0.2	12.4	PIG	184	118	179	PING	22.7	11.7	-
	Regular Wage/Salaried	PreHC	13.1	9.5	12	PrePG	16	20	17	PreNPG	2	2	-
		PostHC	18.1	12.5	16.4	PostPG	96	59	85	PostNPG	11.8	5.9	-
		PIHC	5	3.1	4.4	PIG	80	39	67	PING	9.8	3.8	-
	Others	PreHC	47.9	79	52.2	PrePG	137	445	180	PreNPG	16.9	44.2	-
		PostHC	67.8	92.9	71.3	PostPG	554	618	563	PostNPG	68.1	61.4	-
		PIHC	20	13.8	19.1	PIG	416	174	383	PING	51.2	17.2	-
	Total	PreHC	53	37	51.5	PrePG	120	99	118	PreNPG	14.8	9.8	-
		PostHC	66.9	53.8	65.7	PostPG	508	270	486	PostNPG	62.5	26.8	-
		PIHC	13.9	16.8	14.2	PIG	388	171	368	PING	47.7	17	-
Odisha	Self Employed in Non-Agri	PreHC	30.2	26.1	29	PrePG	44	59	48	PreNPG	5.4	5.8	-
		PostHC	49.2	37	45.6	PostPG	496	181	403	PostNPG	61	18	-
		PIHC	19	10.9	16.6	PIG	452	122	354	PING	55.6	12.2	-
	Agriculture	PreHC	46.3	0	46.3	PrePG	98		98	PreNPG	12	0	-
		PostHC	62.8	0	62.8	PostPG	285		285	PostNPG	35	0	-
		PIHC	16.5	0	16.5	PIG	187		187	PING	23	0	-
	Labour	PreHC	46.6	57.1	47.6	PrePG	92	99	93	PreNPG	11.3	9.8	-
		PostHC	57.5	67.1	58.4	PostPG	245	249	245	PostNPG	30.1	24.7	-
		PIHC	10.9	10	10.8	PIG	153	150	152	PING	18.8	14.9	-
	Regular Wage/Salaried	PreHC	13.1	10	11.5	PrePG	18	14	16	PreNPG	2.2	1.4	-
		PostHC	21.4	13.2	17.1	PostPG	170	169	169	PostNPG	20.9	16.7	-
		PIHC	8.3	3.2	5.6	PIG	152	154	153	PING	18.7	15.3	-
	Others	PreHC	34.9	11.4	29.3	PrePG	78	43	70	PreNPG	9.6	4.2	-
		PostHC	47.8	20.5	41.3	PostPG	659	375	591	PostNPG	81.1	37.3	-
		PIHC	12.9	9.1	12	PIG	581	333	522	PING	71.4	33	-
	Total	PreHC	39.8	21.3	36.4	PrePG	78	42	72	PreNPG	9.6	4.2	-
		PostHC	56	29.3	51.1	PostPG	326	205	303	PostNPG	40	20.3	-
		PIHC	16.2	8	14.7	PIG	247	163	163	PING	30.4	16.1	-

Source: Author's Own Calculation from NSSO 71st Round Unit Data

Table 6.6 Consumption Classwise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014

Table 6.6: Consumption Classwise Poverty Headcount, Poverty Gap and Normalized Poverty Gap for KBK Region of Odisha, 2014													
Region/State	Consumption Quintiles	Poverty Headcount (%)				Poverty Gap (Rs.)				Normalized Poverty Gap (%)			
			Rural	Urban	Total		Rural	Urban	Total		Rural	Urban	Total
KBK Region	Poorest	PreHC	100	100	100	PrePG	295	331	298	PreNPG	36.3	32.8	-
		PostHC	100	100	100	PostPG	568	391	554	PostNPG	69.9	38.8	-
		PIHC	0	0	0	PIG	272	60	255	PING	33.5	6	-
	Poor	PreHC	100	42.4	95	PrePG	99	3	90	PreNPG	12.1	0.3	-
		PostHC	100	75.5	97.9	PostPG	878	247	824	PostNPG	108	24.6	-
		PIHC	0	33.1	2.9	PIG	780	244	733	PING	95.9	24.3	-
	Middle	PreHC	0.1	0	0.1	PrePG	0	0	0	PreNPG	0	0	-
		PostHC	42.5	15	40	PostPG	134	105	131	PostNPG	16.4	10.5	-
		PIHC	42.4	15	39.9	PIG	134	105	131	PING	16.4	10.5	-
	Rich	PreHC	0	0	0	PrePG	0	0	0	PreNPG	0	0	-
		PostHC	4	37.2	7.3	PostPG	715	350	679	PostNPG	87.9	34.8	-
		PIHC	4	37.2	7.3	PIG	715	350	679	PING	87.9	34.8	-
	Richest	PreHC	0	0	0	PrePG	0	0	0	PreNPG	0	0	-
		PostHC	12.2	2.7	10.8	PostPG	127	225	141	PostNPG	15.6	22.4	-
		PIHC	12.2	2.7	10.8	PIG	127	225	141	PING	15.6	22.4	-
	Total	PreHC	53	37	51.5	PrePG	120	99	118	PreNPG	14.8	9.8	-
		PostHC	66.9	53.8	65.7	PostPG	508	270	486	PostNPG	62.5	26.8	-
		PIHC	13.9	16.8	14.2	PIG	388	171	368	PING	47.7	17	-
Odisha	Poorest	PreHC	100	100	100	PrePG	286	281	286	PreNPG	35.2	27.9	-
		PostHC	100	100	100	PostPG	504	390	489	PostNPG	62	38.7	-
		PIHC	0	0	0	PIG	218	109	203	PING	26.8	10.8	-
	Poor	PreHC	100	42.6	91	PrePG	99	6	84	PreNPG	12.2	0.6	-
		PostHC	100	65.2	94.5	PostPG	535	240	489	PostNPG	65.8	23.8	-
		PIHC	0	22.5	3.5	PIG	436	234	405	PING	53.7	23.3	-
	Middle	PreHC	0.7	0	0.6	PrePG	0	0	0	PreNPG	0	0	-
		PostHC	51.4	9.7	44	PostPG	184	126	174	PostNPG	22.7	12.5	-
		PIHC	50.7	9.7	43.4	PIG	184	126	174	PING	22.6	12.5	-
	Rich	PreHC	0	0	0	PrePG	0	0	0	PreNPG	0	0	-
		PostHC	14.9	5.8	13	PostPG	259	124	231	PostNPG	31.8	12.4	-
		PIHC	14.9	5.8	13	PIG	259	124	231	PING	31.8	12.4	-
	Richest	PreHC	0	0	0	PrePG	0	0	0	PreNPG	0	0	-
		PostHC	7.8	1.2	6.2	PostPG	134	217	154	PostNPG	16.5	21.5	-
		PIHC	7.8	1.2	6.2	PIG	134	217	154	PING	16.5	21.5	-
Total	PreHC	39.8	21.3	36.4	PrePG	78	42	72	PreNPG	9.6	4.2	-	
	PostHC	56	29.3	51.1	PostPG	326	205	303	PostNPG	40	20.3	-	
	PIHC	16.2	8	14.7	PIG	247	163	232	PING	30.4	16.1	-	
Source: Author's Own Calculation from NSSO 71st Round Unit Data													

Table 6.6 reveals the distribution of illness induced poverty across monthly per capita consumption expenditure quintiles. It is seen that the illness induced poverty decreases as one makes up the ladder of consumption classes. As it is observed, the illness induced poverty is highest among middle consumption quintile (40 percentage point and 44 percentage point for KBK region and Odisha respectively). This incidence of poverty impact is more intense in rural areas. This could be due to the fact that these are the people who are very close to the poverty lines. Even a small health shock drives them into the poverty. Although it has been

observed from the Table 6.6 that the poorest and poor are least affected by medical poverty trap, they are the people who are more vulnerable to health shocks. These are the people who are already below the poverty line; hence there is little scope to push them further below the poverty line because of health shocks. Unexpected illness events in the households are found to push even the richer households into poverty. One of the interesting observations that emanates from Table 6.6 is that illness induced poverty is found even among the higher per capita expenditure quintiles. However, they might be relatively at ease with this burden largely due to their corpus of savings and as such may not have to adopt drastic coping measures which are inevitable in case of poorer households.

Table 6.7 Impoverishment across Different Diseases in the KBK Region and Odisha (%)

Different Diseases				KBK Region			Odisha		
				1995-96	2004	2014	1995-96	2004	2014
Place of Residence	Rural	Hospitalised Ailment Cases	Infectious Disease	0	0	3.6	23.4	17.9	11.6
			Non-Communicable	0	6.7	14.7	6.9	28.2	20.7
			Cardiovascular		22.6	1.3	3.4	4.5	6
			Disabilities	40.9	0	15.7	11.7	35.2	29.9
			Other Diseases	59.1	70.7	64.7	54.7	14.2	31.7
		Non-hospitalised Ailment Cases	Infectious Disease	1	74.2	37.7	3.2	25.8	22.1
			Non-Communicable	0	0	1.6	10	20.9	14.2
			Cardiovascular		8.9	0.4	1.1	7.2	5.7
			Disabilities	0.8	0	16.9	9.2	12.5	25.6
			Other Diseases	98.3	17	43.5	76.6	33.7	32.4
	Urban	Hospitalised Ailment Cases	Infectious Disease	4.5	5.8	0	6.4	24.6	6.2
			Non-Communicable	6.9	78.6	48.5	22.7	37.3	38.3
			Cardiovascular	37.7	4.8	4.1	32.2	9.9	12.3
			Disabilities	37.6	0	45.8	17.3	2.2	27.9
			Other Diseases	13.3	10.9	1.7	21.3	26	15.4
		Non-hospitalised Ailment Cases	Infectious Disease	22.4	0	6.8	10.1	25.4	17.7
			Non-Communicable	3.2	14.6	0	13.7	24.8	14
			Cardiovascular	17.6	2.5	47.8	3.5	1.2	17
			Disabilities	7.9	73.6	3.8	6.1	32.4	17.9
			Other Diseases	48.9	9.3	41.6	66.5	16.2	33.4
	Total (Combined)	Hospitalised Ailment Cases	Infectious Disease	2.7	2.6	3.3	21.4	19.4	10.7
			Non-Communicable	4	39.2	17.8	8.7	30.2	23.7
			Cardiovascular	22.3	14.5	1.6	6.7	5.7	7.1
			Disabilities	38.9	0	18.5	12.3	27.8	29.6
			Other Diseases	32	43.7	58.9	50.8	16.8	29
		Non-hospitalised Ailment Cases	Infectious Disease	5.4	54.9	30.2	3.8	25.7	21.4
			Non-Communicable	0.7	3.8	1.2	10.3	21.6	14.1
			Cardiovascular	3.7	7.2	11.8	1.3	6.1	7.3
			Disabilities	2.3	19.2	13.8	8.9	16.1	24.5
			Other Diseases	87.9	15	43	75.7	30.5	32.5

Source: Author's own calculation from NSSO 52nd, 60th and 71st Round data

Table 6.8: Type of Health Care Institutions and Impoverishment in Odisha (%)

Type of Health Care Institutions				KBK Region			Odisha		
				1995-96	2004	2014	1995-96	2004	2014
Place of Residence	Rural	Inpatient Care	Public	100	37.6	84.4	77.2	69.0	73.5
			Private	0.0	62.4	15.6	22.8	31.0	26.5
		Outpatient Care	Public	13.0	38.5	94.3	38.6	60.3	64.3
			Private	87.0	61.5	5.7	61.4	39.7	35.7
	Urban	Inpatient Care	Public	79.6	94.2	33.5	54.9	67.6	45.0
			Private	20.4	5.8	66.5	45.1	32.4	55.0
		Outpatient Care	Public	25.6	85.4	36.0	36.2	66.4	43.4
			Private	74.4	14.6	64.0	63.8	33.6	56.6
	Total (Combined)	Inpatient Care	Public	87.9	63.2	78.8	74.5	68.7	68.9
			Private	12.1	36.8	21.2	25.5	31.3	31.1
		Outpatient Care	Public	18.6	50.7	74.5	38.3	61.5	61.1
			Private	81.4	49.3	25.5	61.7	38.5	38.9

Source: Same as in Table 6.7

6.10 Illness Induced Impoverishment in Morbidity Patterns & Health Care Institutions

Different diseases have different impacts on the concerned individuals/households through both direct cost and indirect cost of illness and push the households towards the below poverty line. For instance, diseases like cancer, tuberculosis, jaundice and injuries/accidents not only require more medical care and health expenditure but also lead to larger income loss due to illness, which combinely draw the individuals/households towards below poverty line. Impoverishment is a situation where above poverty line households slip into below poverty line (Wagstaff and Doorslaer, 2003, Flores et al., 2008, Berman et al., 2010 and Chowdhury, 2011). The data of Table 6.7 reveals that in non-hospitalised case (outpatient care) the impoverishment is highest for those who have suffered from infectious and other diseases in the total impoverished individuals/households. Hence, it is noticed that even the most common and reasonably inexpensive diseases such as diarrhoea/dysentery, malaria, fever of short duration and other diagnosed and non-diagnosed ailments impose a financial burden and push the individuals/households below poverty line in the KBK region.

Despite continuous effort of the Odisha government to eradicate the five diseases malaria, diarrhoea, scabies, leprosy, acute respiratory infection (called panchavyadhi chikitsa), still malaria and diarrhoea are considered to be most prevalent diseases in Odisha, especially in the KBK region (malaria and diarrhoea account for almost 30 percent of patient load in KBK region). These five diseases account for more than 70 percent of patient load in Odisha (Odisha Economic Survey, 2011-12). Similarly, in hospitalised case (inpatient care) impoverishment is found to be higher among those who have suffered from non-

communicable diseases, other diseases and disabilities in the KBK region and Odisha¹. Surprisingly, the data in Table 6.8 show that public sources of treatment contributed largely to the impoverishment due to illness for inpatient as well as outpatient care in KBK region and Odisha². One interpretation of this finding could be that the share of private sector in hospitalised treatment is very less, i.e., 9.7 percent in the KBK region as against 19 percent in the state average³. In most cases, higher consumption classes' people are found seeking inpatient treatment from private institution, hence they run less risk of getting health care burden and impoverishment. Similarly, in case of non-hospitalised treatment (outpatient care) except for the year 1995-96, public sources of treatment contributed to the impoverishment effect of illness. This may be due to the fact that the preferences of public source of treatment largely by the poor people and even a small amount of health expenditure push them below the poverty line. The year 1995-96 has been found to be an exception and private source treatment contributed more to illness induced impoverishment, because 62.6 percent received treatment from non-government sources (see Table 4.12) and the percent has decreased subsequently in 2004 and 2014. This has happened due to non-availability/low concentration of public institutions in the KBK region. Ailing individuals were treated in private sources, particularly from informal sources like traditional healers, vaid or quack. The cost of treatment may be lower in these private informal sources; however, the illness burden will be more when it includes indirect cost or income foregone.

6.11 Econometric Modelling: Illness Induced Impoverishment

Impoverishment occurs when the households are pushed below poverty line due to combined effect of health payment and indirect cost of illness. Drawing upon the results presented in previous Section-2 and 3, it has been observed that illness induced impoverishment was on the increase over the period from 1995-96 to 2014 for both rural as well as urban households. Thus, it became imperative to examine the major risk factors responsible for illness induced poverty. An econometric analysis based on a Binary Logistic Regression model has been attempted. The dependent variable is qualitative in nature; it takes value 1 or 0 for occurrence of impoverishment and non-occurrence of impoverishment respectively.

¹ Chowdhury (2011) found that 37 percent of the individuals were impoverished in the post health care payments situation due to non-communicable diseases like gynaecological problems in slum areas of Delhi. Similarly individuals suffering from tuberculosis were worst affected due to health high health care treatment.

² Except the case of outpatient care for the year 1995-96.

³ See Table 4.12

Let the probability distribution of Y_i be

$$P_i = \text{Prob}(Y_i = 1) = \text{Occurrence of Impoverishment due to illness}$$

$$1 - P_i = \text{Prob}(Y_i = 0) = \text{Non-occurrence of Impoverishment due to illness}$$

Characteristics of Logit Model

The logistic probability distribution function can be

$$P_i = \frac{1}{1 + e^{-(\beta_0 + \beta_i X_i)}} \quad \text{-----} \quad (6.7)$$

$$P_i = \frac{1}{1 + e^{-z_i}} = \frac{e^z}{1 + e^z} \quad \text{-----} \quad (6.8)$$

Where

$$Z_i = \beta_0 + \beta_i X_i \quad \text{-----} \quad (6.10)$$

Equation (3) represents what is known as the (cumulative) logistic distribution function.

$$1 - P_i = \frac{1}{1 + e^{z_i}} \quad \text{-----} \quad (6.11)$$

Therefore, we can write

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{z_i}}{1 + e^{-z_i}} = e^{z_i} \quad \text{-----} \quad (6.12)$$

Now $P_i/(1 - P_i)$ is simply the odds ratio in favour of occurrence of Impoverishment- ratio of probability that the household will be impoverished due to illness to the probability that the household will not be impoverished due to illness.

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = Z_i = \beta_0 + \beta_i X_i \quad \text{-----} \quad (6.14)$$

Here, L_i is the log of odd ratios. It is not only linear in X , but also linear in the parameters. L is called the Logit and hence the name Logit Model for models like equation.

The Logistic Regression Model

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_i X_i + u_i \quad \text{-----} \quad (6.15)$$

Where X is a vector of explanatory variables. The coefficient vector ' β ' measures the impact of independent variables on the log odds (logit) of occurrence of impoverishment compared to non-occurrence of impoverishment.

Variable Description and its Measurement: All the variables used in the Logistic Regression to estimate the determinants of impoverishment are same as discussed in Chapter-5.

Table 6.9 Variable Description and its Expected Sign for the Occurrence of Impoverishment

Variable Name	Variable Description	Expected Sign
No. of Child	Total number of children below five years of age in the household	Positive
No. of Old	Total number of persons above 60 years in the household	Positive
Age of the head HH	Total complete years of age of the household head	Positive/Negative
Severity of Illness	Total number of sickness days of all the member of the household	Positive
Opportunity cost of time	Total amount of earning loss of the household	Positive
Residence Status	Place of residence of the household (Rural = 0, Urban = 1)	Negative
Religion	Religion of the household have classified into Hindu and Others (Hindu = 0, Others =1)	Positive/Negative
Caste	Social Group (ST=1, SC=2, OBC=3 and Other=4)	Positive/Negative
Education of Head	Education of household head, highest level of schooling completed (Illiterate, elementary, secondary, Higher secondary, higher education)	Negative
Latrine facilities	Latrine in the household (No=0, Yes=1)	Negative
Drinking facilities	Safe drinking water (No=0, Yes=1)	Negative
Drainage facilities	Drainage facilities of the household (Open=1, Kachha=1, Pucca=3)	Negative
Cooking methods	Cooking practices (no fuel=1, hygienic=2, hygienic=3)	Negative
Sex of Head	Gender of the household head (Male=0, Female=1)	Positive/Negative
MPCE Quintile	Monthly Per Capita Consumption Expenditure Quintile, Poorest=1, Poor=2, Middle=3, Rich=4 and Richest=5)	Negative
Insurance Status	Health Insurance of the household head (No=1, Yes=1)	Negative

Source: Author's Calculation from NSSO 52nd, 60th and 71st Round

Table 6.10 Estimated Logistic Regression Results for Illness Induced Impoverishment in the KBK Region
Dep. Variable (1=Occurrence of Impoverishment, 0= Non-occurrence of Impoverishment)

Dep. Variable (1=Occurrence of Impoverishment, 0= Non-occurrence of Impoverishment)												
Independent Variables	1995-96				2004				2014			
	Coeff.	OR	Std. Err	Sig.	Coeff.	OR	Std. Err	Sig.	Coeff.	OR	Std. Err	Sig.
(Constant)	-5.427	0.004	4.276	0.204	-22.231	0.000	21576.4	0.999	1.987	7.293	1.827	0.277
No. of child HH	1.515	4.549	0.615	0.01*	1.222	3.396	0.628	0.05**	0.258	1.294	0.260	0.322
No. old person HH	1.411	4.101	0.581	0.01*	-0.659	0.517	0.953	0.489	0.271	1.311	0.343	0.430
Age of Head HH	0.019	1.019	0.026	0.476	0.012	1.012	0.043	0.791	-0.025	0.975	0.016	0.123
Severity of Illness	0.492	1.635	0.205	0.01*	0.233	1.262	0.244	0.339	-0.127	0.880	0.234	0.586
Opportunity cost of time	0.211	1.235	0.004	0.00*	0.152	1.164	0.001	0.00*	0.090	1.094	0.002	0.638
Residence Status (Rural)#												
Residence Status (Urban)	-2.071	0.126	1.128	0.06***	-2.288	0.102	1.172	0.05*	0.530	1.699	0.660	0.421
Religion (Hindu)#	-		-	-								
Religion (Other)	-		-	-	-1.357	0.258	1.987	0.495	-0.168	0.845	1.139	0.883
Caste (ST)#				0.358				0.645				0.05**
Caste (SC)	0.144	1.155	0.880	0.870	-1.220	0.295	1.391	0.380	-1.558	0.210	0.634	0.01*
Caste (OBC)	-		-	-	-0.316	0.729	1.211	0.794	-0.926	0.396	0.601	0.124
Caste (Other)	1.126	3.083	0.816	0.167	-1.431	0.239	1.216	0.239	-1.569	0.208	0.610	0.01*
Latrine Facilities (No)#												
Latrine Facilities (Yes)	-4.736	0.009	1.633	0.00*	-0.398	0.672	1.469	0.786	-0.076	0.927	0.682	0.911
Drainage facilities (No Drainage)#				0.414				0.677				0.257
Drainage facilities (Open)	-1.071	0.343	3.422	0.754	2.770	15.965	17.818	0.876	0.961	2.614	0.772	0.213
Drainage facilities (Coverded)	-2.762	0.063	3.300	0.403	3.938	51.318	17.789	0.825	0.119	1.127	0.713	0.867
Drink water facilities (Unsafe)#												
Drink water facilities (Safe)	-1.803	0.165	0.855	0.03**	-3.926	0.020	1.414	0.00*	-0.421	0.656	0.775	0.587
Cooking facilities (No Cooking)#	-		-	-				0.365				
Cooking facilities (Unclean)	-		-	-	-18.343	0.000	16514	0.999		1.000		
Cooking facilities (Clean)	-		-	-	1.975	7.205	1.390	0.155	0.144	1.155	0.859	0.867
MPCE Quintile (Poorest)#				0.00*				0.739				0.00*
MPCE Quintile (Poor)	-21.458	0.000	1810	0.991	-22.421	0.000	1845	0.990	-19.570	0.000	2466.770	0.994
MPCE Quintile (Middle)	-22.374	0.000	1945	0.991	-1.433	0.239	1.071	0.181	-1.188	0.305	0.703	0.09***
MPCE Quintile (Rich)	-5.791	0.003	1.606	0.00*	-21.395	0.000	2980	0.994	2.635	13.944	0.607	0.00*
MPCE Quintile (Richest)	-0.371	0.690	0.614	0.545	-0.927	0.396	0.972	0.340	0.321	1.378	0.588	0.585
Sex of Head HH (Male)#												
Sex of Head HH (Female)	1.438	4.213	1.127	0.202	16.800	19776403	4222	0.997	-0.848	0.428	0.617	0.169
Education of Head (Illiterate)#				0.797				0.608				0.116
Education of Head (Elementary)	-0.907	0.404	1.632	0.578	0.990	2.691	1.812	0.585	0.380	1.462	0.733	0.604
Education of Head (Secondary)	-0.220	0.803	1.543	0.887	1.365	3.916	1.688	0.419	0.238	1.269	0.655	0.716
Education of Head (Hr Sec.)	-0.689	0.502	1.960	0.725	-0.717	0.488	1.927	0.710	1.348	3.848	0.692	0.05**
Education of Head (Hr. Edn)	-		-	-	1.700	5.474	2.162	0.432	-1.220	0.295	1.439	0.397
Insurance Status (No)#												
Insurance Status (Yes)	2.174	8.789	1.572	0.167	3.111	22.446	21159.216	1.000	0.275	1.317	0.363	0.449
Cox and Snell R Square= 0.170				Cox and Snell R Square= 0.190				Cox and Snell R Square= 0.359				
Nagelkerke R Square = 0.651				Nagelkerke R Square = 0.685				Nagelkerke R Square = 0.596				
(-2 Log Likelihood= 100.177)				(-2 Log Likelihood= 62.667)				(-2 Log Likelihood= 267.041)				
N= 863				N= 550				N= 560				

Source: Author's Estimation from NSS 52nd, 60th and 71st Round data

Note: *, ** and *** indicate 1%, 5% and 10% significance level

Table 6.11 Estimated Logistic Regression Results for Illness Induced Impoverishment for the Odisha
Dep. Variable (1=Occurrence of Impoverishment, 0= Non-occurrence of Impoverishment)

Independent Variables	1995-96				2004				2014			
	Coeff.	OR	Std. Err	Sig.	Coeff.	OR	Std. Err	Sig.	Coeff.	OR	Std. Err	Sig.
(Constant)	-17.594	0.000	40192	1.000	-18.665	0.000	10493.691	0.999	-2.142	0.117	0.644	0.00*
No. of children	0.113	1.120	0.112	0.313	0.275	1.316	0.124	0.02**	0.325	1.385	0.097	0.00*
No. of old person	0.359	1.431	0.153	0.01*	-0.071	0.932	0.161	0.661	0.088	1.092	0.110	0.425
Age of Head HH	0.000		0.007	0.952	-0.001	0.999	0.008	0.919	-0.002	0.998	0.006	0.738
Severity of Illness	-0.004	0.996	0.045	0.935	0.011	1.011	0.045	0.804	-0.046	0.955	0.041	0.266
Opportunity cost of time	0.233	1.263	0.003	0.00*	0.175	1.191	0.004	0.00*	0.120	1.127	0.050	0.03**
Residence Status (Rural)#												
Residence Status (Urban)	-0.684	0.505	0.285	0.01*	-0.834	0.434	0.316	0.00*	0.475	1.608	0.221	0.03**
Religion (Hindu)#	-	-	-	-								
Religion (Other)	-	-	-	-	-0.245	0.783	0.491	0.618	0.461	1.586	0.405	0.255
Caste (ST)#				0.04**				0.488				0.00*
Caste (SC)	-0.317	0.728	0.300	0.290	-0.546	0.579	0.398	0.170	-0.749	0.473	0.224	0.00*
Caste (OBC)	-	-	-	-	-0.163	0.850	0.290	0.574	-0.238	0.788	0.209	0.254
Caste (Other)	0.451	1.571	0.233	0.05**	0.008	1.009	0.226	0.970	-0.192	0.826	0.162	0.238
Latrine Facilities (No)#												
Latrine Facilities (Yes)	-1.564	0.209	0.368	0.00*	-0.266	0.766	0.296	0.369	0.098	1.103	0.187	0.600
Drainage facilities (No Drainage)#				0.898				0.291				0.01*
Drainage facilities (Open)	0.153	1.165	0.443	0.730	-0.182	0.833	0.444	0.681	0.686	1.986	0.286	0.01*
Drainage facilities (Covered)	0.195	1.215	0.424	0.646	0.276	1.318	0.399	0.489	0.135	1.144	0.289	0.641
Drink water facilities (Unsafe)#												
Drink water facilities (Safe)	0.163	1.177	0.179	0.363	0.531	1.700	0.202	0.00*	-0.143	0.866	0.230	0.533
Cooking facilities (No Cooking)#	-	-	-	-				0.04**	-	-	-	-
Cooking facilities (Unclean)	-	-	-	-	-18.330	0.000	6078.068	0.998	-	-	-	-
Cooking facilities (Clean)	-	-	-	-	-0.923	0.397	0.365	0.01*	-0.405	0.667	0.235	0.08***
MPCE Quintile (Poorest)#				0.00*				0.00*				0.00*
MPCE Quintile (Poor)	-18.451	0.000	1324.712	0.989	-19.347	0.000	1580.791	0.990	-19.284	0.000	1644.161	0.991
MPCE Quintile (Middle)	-18.863	0.000	1323.122	0.989	-1.746	0.174	0.309	0.00*	-0.514	0.598	0.242	0.03**
MPCE Quintile (Rich)	-1.558	0.211	0.302	0.00*	-2.090	0.124	0.320	0.00*	2.478	11.918	0.210	0.00*
MPCE Quintile (Richest)	0.021	1.021	0.195	0.915	-0.612	0.542	0.220	0.00*	0.769	2.158	0.194	0.00*
Sex of Head HH (Male)#												
Sex of Head HH (Female)	-0.220	0.802	0.294	0.454	-0.454	0.635	0.316	0.151	0.270	1.310	0.225	0.231
Education of Head (Illiterate)#				0.940				0.05**				0.814
Education of Head (Elementary)	17.391	35720084	40192.090	1.000	0.584	1.793	0.484	0.227	0.073	1.076	0.330	0.824
Education of Head (Secondary)	17.283	32066503	40192.090	1.000	0.982	2.670	0.440	0.02**	0.156	1.169	0.293	0.595
Education of Head (Hr. Sec.)	17.199	29462695	40192.090	1.000	0.473	1.606	0.497	0.341	0.273	1.314	0.314	0.384
Education of Head (Hr. Edn)	16.881	21449892	40192.090	1.000	0.128	1.137	0.594	0.829	-0.065	0.937	0.399	0.871
Insurance Status (No)#												
Insurance Status (Yes)	-0.851	0.427	0.922	0.356	18.944	168785253	10493.69	0.999	-0.315	0.730	0.153	0.03**
Cox and Snell R Square= 0.140					Cox and Snell R Square= 0.147				Cox and Snell R Square= 0.341			
Nagelkerke R Square = 0.440					Nagelkerke R Square = 0.377				Nagelkerke R Square = 0.519			
(-2 Log Likelihood= 1000.179)					(-2 Log Likelihood= 888.677)				(-2 Log Likelihood= 1566.740)			
N= 4319					N= 2652				N= 2398			

Source: Author's Estimation from NSS 52nd, 60th and 71st Round data

Note: *, ** and *** indicate 1%, 5% and 10% significance level

Table 6.12 Estimated Mean Predicted Probabilities for Impoverishment in KBK Region and Odisha

Socioeconomic Characteristics		KBK Region			Odisha		
		1995-96	2004	2014	1995-96	2004	2014
Residence Status	Rural	0.030	0.027	0.176	0.048	0.063	0.166
	Urban	0.053	0.090	0.164	0.047	0.084	0.258
Religion	Hindu	-	0.037	0.175	-	0.068	0.233
	Others	-	0.083	0.111	-	0.056	0.138
Caste	ST	0.011	0.014	0.126	0.015	0.017	0.128
	SC	0.037	0.042	0.145	0.053	0.054	0.228
	OBC	-	0.047	0.215	-	0.085	0.262
	Others	0.058	0.083	0.269	0.061	0.099	0.271
Latrine Facilities	No	0.061	0.167	0.169	0.049	0.113	0.240
	Yes	0.035	0.133	0.185	0.042	0.125	0.211
Drainage Facilities	No Drainage	0.030	0.079	0.173	0.044	0.092	0.257
	Open	0.075	0.019	0.145	0.069	0.056	0.158
	Covered	0.143	0.035	0.257	0.046	0.061	0.134
Drink Water Sources	Unsafe	0.020	0.167	0.160	0.050	0.064	0.216
	Safe	0.041	0.027	0.174	0.046	0.103	0.231
Cooking Practices	No Cooking	-	0.019	-	-	0.055	0.386
	Unclean Fuel	-	0.140	0.165	-	0.119	0.174
	Clean Fuel	-	0.000	0.216	-	0.000	0.241
MPCE Quintile	Poorest	0.000	0.000	0.000	0.000	0.000	0.000
	Poor	0.000	0.051	0.057	0.000	0.037	0.105
	Middle	0.006	0.000	0.550	0.022	0.030	0.576
	Rich	0.100	0.072	0.179	0.085	0.097	0.267
	Richest	0.138	0.159	0.234	0.102	0.173	0.191
Insurance_Status	No	0.033	0.038	0.047	0.047	0.068	0.239
	Yes	0.200	0.000	0.133	0.133	0.000	0.198
Sex of Head HH	Male	0.035	0.041	0.170	0.046	0.066	0.233
	Female	0.032	0.000	0.216	0.062	0.081	0.196
Education of Head HH	Illiterate	0.026	0.009	0.124	0.039	0.037	0.188
	Elementary	0.051	0.071	0.182	0.060	0.092	0.264
	Secondary	0.079	0.061	0.293	0.056	0.077	0.268
	Higher Sec.	0.111	0.091	0.100	0.026	0.090	0.186
	Higher Edn	-	0.188	0.225	0.000	0.118	0.140

Source: Author's Estimation from NSS 52nd, 60th and 71st Round data

The estimated results of logistic regression for occurrence of impoverishment in the KBK region and Odisha are presented in Table 6.10 and 6.11 respectively. It is observed that the number of children and number old persons in the households are found to be statistically significant determinants of probability of impoverishment occurrence in the KBK region for all the periods. The health need of individual at an early and later stage of life is more compared to younger age group. Hence, the health expenditure may increase for those households having more number of children and old persons, although the indirect cost of illness for these age groups is supposed to be zero or negligible due to non-participation in the work force. The positive sign of the severity of illness and opportunity cost of time are on

the expected lines implying that more the number of sickness days and hospitalisation days, the more will be severity of illness raising high probability of occurrence of impoverishment. Similarly, the positive relationship between the opportunity cost of time and occurrence of impoverishment of the household indicating that earning loss due to illness affects the occurrence of impoverishment. This could be possible when the working members in the household themselves become sick or attend any other sick individual of the family. It could be noticed that the per capita consumption expenditure quintile which is supposed to be an indicators of economic status of the households turned out to be a statistically significant explanatory factor in determining the chances of impoverishment occurrence in KBK region for 1995-96, 2004 and 2014. Compared to the poorest per capita consumption quintile, the probability of the occurrence of impoverishment due to illness for rich and the richest quintile turned out to be low across all the years. Like per capita consumption quintile, the residence status of the households determines the probability of occurrence of impoverishment. The negative sign of urban category indicates that compared to rural households, urban households are less likely to suffer impoverishment due to illness. This may be because of high access cost of health care for rural people such as high transportation cost, waiting time and earning loss of the household member especially when they attend a patient in an urban area during an illness event. In general, better living conditions in terms of latrine facilities, drainage facilities, drinking water and hygienic cooking practices by the households lead to reduction of the probability of impoverishment. However, there is a mixed result across different years for these variables and the coefficients of all are not statistically significant as well.

The probability of illness induced impoverishment is less for SC, OBC and Other social group compared to ST households. However, the coefficients of caste variable are not statistically significant except for the year 2014. As far as the education of the head is concerned, there is a mixed result across different years. For instance, households with educated head were less prone to being impoverished in the year 1995, whereas the opposite result was obtained during 2004 and 2014. However, the coefficients of education of the head are statistically insignificant. Insurance status turned out to be statistically insignificant determinant of the impoverishment occurrence in the KBK region.

It is observed from Table 6.11 that the explanatory factors such as number children, opportunity cost of time, residence status, caste (SC, ST), MPCE quintile, insurance status and better living conditions such as latrine facilities, drainage facilities and hygienic cooking practices are found to be statistically significant determinant of probability illness induced

impoverishment. The sign of the variables are found to be similar to that of the KBK region. Unlike KBK region, in Odisha the likelihood of impoverishment was more for urban households compared to rural ones particularly in the year 2014 but not in the year 1995-96 and 2004. This may be due to the fact that the utilisation of private health care services (both inpatient and outpatient care) in urban areas recorded twice that of the rural areas (See Table 4.10) and such a difference was not observed in the previous two rounds. If it is assumed that the direct price of health care in private sector is more than government sector then those who receive treatment from private sector spend more on health care. Similarly, insurance status turned out to be a significant factor in explaining the probability of impoverishment in the year 2014. Households having health insurance are less likely to be impoverished compared to households without health insurance as the odd ratio is 0.73.

Predicted Probabilities

The mean predicted probabilities for occurrence of impoverishment are given in Table 6.12. It is observed from the table that over the period of 1995-96 to 2014 the probabilities of impoverishment have increased in KBK region as well as Odisha. For instance, if MPCE quintile is considered then for each MPCE quintile the mean predicted probabilities for impoverishment have increased over time. It is important to note that the probabilities of occurrence of impoverishment for poorest and poor consumption quintile are zero. This is mainly because these two consumption quintiles are so poor that they are already below poverty line before an illness event, hence the situation remain same for them before and after an illness event. As already discussed impoverishment of a household occurs if a non-poor household slip below the poverty line after an illness event.

6.12 Summary

This chapter 6 of the present research work examined the illness induced poverty in the KBK region of Odisha based on NSSO health surveys data for the year 1995-96, 2004 and 2014. In order to examine the same, attempt has been made to modify the methodologies developed by Flores et al (2008) and Berman et al (2010) by incorporating indirect cost of illness while measuring the illness induced poverty. This is mainly because out of pocket health payment alone is not the only factor responsible for pushing the household below poverty line. The indirect cost of illness or burden of income forgone during the period of illness significantly impacted the livelihood of the households. It has been observed that the poverty impact of illness/illness induced impoverishment after adjustment of “indirect cost or earning loss” has

been found to be greater than the poverty impact of health payments, (i.e., unadjusted methodology) in the KBK region and Odisha across different years. The poverty impact of illness has increased from 1.4 percent in 1995-96 to 14.2 percent in 2014 in the KBK region. The estimated logistic regression result shows that MPCE, Severity of illness, opportunity cost of time, number of children and number old persons in the households are statistically significant determinants of probability of impoverishment occurrence in the KBK region for all the periods. It is important to note that the probabilities of occurrence of impoverishment for poorest and poor consumption quintile are zero. This is mainly because these two consumption quintiles are so poor that they are already below poverty line before an illness event, hence the situation remained same for them before and after an illness event.

Chapter 7

Summary and Conclusion

7.1 Summary

Investments in human capital in the form of education, health and on-job-training are considered to be important for the individual well-being and economic development (Becker, 1964). Following Gary Becker (1964, 1965), human capital theory and Kevin Lancaster (1966) characteristics approach to demand, Michael Grossman (1972a) developed his model of demand for health. According to Grossman, the individual makes investment or demands health because health is both consumption good as well as investment good. As consumption good, it enters into the utility function of the individual and augments the utility level of the individual as good health itself creates happiness. However, health as a commodity or good is not directly available in the market from where the individual can purchase it, the individual purchases health care or medical care on the presupposition that it restores or augments the stock of health. Similarly, as an investment good, it gives a flow of services and helps in enhancing the productivity or earning and welfare of the people. Hence, economists take a different approach to define health. According to them health is a capital stock or durable capital good that provides services and the flow of services derived from capital stock health consumes over the life times (Grossman, 1972a and 1972b). Each individual is assumed to be endowed with a given stock of health at the beginning of his life. But over time, the stock of health depreciates with age and it may be augmented by investments in medical and health services. Death generally occurs when an individual's stock of health falls below a critical minimum level. The stock of health and the rate of depreciation differ from one individual to another individual and it depends on many factors and some are uncontrollable. Therefore, people demand health care or utilise health care and other health related inputs in order to reduce illness or augment their health and to improve their well-beings. The investment in health capital is considered to be crucial for the individual and nation because it improves the returns to investment in other sector of the economy as well. Even the return to education is dependent on the investment in health. For instance, performance of the children in school is dependent on the health condition of the children which in turn is determined by investment in health. Above all, the investment in health starts even before the birth of a baby.

However, the demand model developed by Grossman (1972a) comprised one individual who planned investments in health over the lifecycle in a world without uncertainty (Muurinen 1982, Dardanoni and Wagstaff, 1990). In many cases, people encounter with an unexpected period of illness during their life spans. Sometimes, illness is not serious enough to induce the individual to receive treatment or stay away from work. In some cases, it restricts the individual from work and in the event of illness; the rate of depreciation is even faster thus illness calls for a measure (curative health care) to restore the level of health. Sometimes, the rate of depreciation is so high that it exceeds the rate of return of health investment, in such a case the individual/household has left with no option other than death. The curative health care is taken with the purpose of restoring the stock of health. Therefore, curative health care is different from other measures such as preventive and promotive health care. For instance, preventive and promotive measures such as check-up visits to a physician, physical exercise etc. are taken in order to maintain health or reducing the risk of becoming ill. Hence, demand for health care increases following increased uncertainty over the incidence of ill health (Dardanoni and Wagstaff, 1990). Moreover, when the amount curative health care is needed, it must take a point of departure that curative health care is not welfare enhancing per se, but rather it is used as a tool for achieving or restoring a certain level of health. Good health is crucial for the well being of the individuals as well as for the nation.

According to World Development Report (1993), improved health contributes to economic growth in four ways - (i) it reduces productivity losses caused by worker's illness, (ii) it permits the use of natural resources that had been totally or nearly inaccessible because of disease, (iii) it increases the enrollment of children in schools and makes them better able to learn, and (iv) it frees for alternative uses of resources that would otherwise have to be spent on treating illness. Illness on the other hand is a factor of social and economic stagnation and considered to be a key determinant of poverty. In a developing country like India, health expenditure accounts for only 5 percent of GDP, out of which public health expenditure constitutes about 1 percent of GDP. Hence, health expenditure is dominated by private spending with households' out of pocket (OOP) health payments constituting the single largest component of total health expenditure. The absence of proper health protection mechanisms like health insurance and high health payments leads to catastrophe and a major cause of debt and poverty in India (Peters et al. 2002; Van Doorslaer, 2006 and Garg and Karan 2009).

Many of earlier research works on health expenditure or health payments ignored indirect cost of illness while measuring impoverishment impact. However, if impoverishment impact is measured by considering the health payment alone, then those households that cannot afford to meet health care payments are ignored. It means the untreated cases of ailments or morbidity are not captured in the earlier methodology. Once the indirect cost of illness is incorporated, those households/individuals that cannot afford to meet their health care payments can be partially included. Therefore, the present study included the double cost burdens, i.e., both direct and indirect cost while measuring illness induced impoverishment. Moreover, for the estimations of detailed impact of illness burden both outpatient and inpatient health expenditure as well as indirect cost of inpatients and outpatients have been considered. The present study attempted to fill this gap by taking into consideration of total illness cost on household poverty by using NSSO data for the periods 1995-96, 2004 and 2014.

Keeping the above mentioned points in mind, the present study proceeded to examine the following specific objectives:

- (a) to analyse the pattern of morbidity and utilisation of available health care services across selected socioeconomic characteristics by the people in the KBK region of Odisha,
- (b) to examine the factors that determine the demand for curative health care services,
- (c) to measure the catastrophic impact of health care payments at the households level in both rural and urban areas of study region, and
- (d) to examine the impoverishment effects of illness for both rural and urban households in the region and to look into its impact across various social groups, religion, occupational classes and consumption quintiles of the households.

All the study objectives were examined by using National Sample Survey Office (NSSO)'s health and morbidity data of 52nd, 60th and 71st rounds for KBK region in Odisha. However, other secondary data and reports such as RBI Handbook on State Finance, Economic Survey of Odisha, Census data, CSO, Various reports of Department of Economics and Statistics (DES) Odisha etc. were also used in order to supplement the analysis.

7.2 Chapter-wise Main Findings

This section provides a summary of main findings of chapter 3 to 6.

Chapter 3 depicts the demographic, socioeconomic and health profile of KBK region and Odisha. The findings in this chapter are given below:

More than 60 percent of the population in the KBK region was found to be in the age group of 15-59 years during the period, 1995-96 to 2014. This implies that a larger proportion of people are capable of working and earning income. The sex ratio in the KBK region has decreased from 1028 in 1995-96 to 905 in 2014. Interestingly the sex ratio in the rural areas is more compared to that of the urban areas in the region (except for the year 2014). As far as the literacy level is concerned, still more than 40 percent people are illiterate; this percentage of illiterate is significantly higher in KBK region compared to the state average. More than 70 percent of the households belong to the category labour and agricultural occupational class in the KBK region of Odisha. The KBK region happen to be a drought prone area and the agriculture production of this region is highly erratic in nature, casual labour has become a major source of livelihood particularly in the rural areas. The Monthly Per Capita Expenditure (MPCE) is a proxy measure of the standard of living of the households. The MPCE found to be lower in the KBK region compared to the state average in all the three rounds during 1995-2014. Moreover, it has been found that the gap in the MPCE in between KBK region and Odisha is increasing during the each round of the surveys. This implies that the KBK region historically lagging behind the state average. As expected, the MPCE in urban areas is significantly higher than that of rural areas. It is important to note that there exists a high inequality in the monthly per capita consumption expenditure in the KBK region.

In KBK region more than one third of the rural households are living in kutcha houses. Though the housing conditions are improving marginally KBK region (the percentage of pucca houses increases over the period of 1995 to 2012) still it is very poor compared to the state average both in rural as well as in urban areas. The use of traditional cooking fuel firewood is quite popular in Odisha, particularly in rural KBK region. More than 90 percent of the households do not use clean sources of energy fuel for cooking in KBK region and compared poorly with that of the state average. Almost 84 percent of the households using open spaces for defecation. The percentage of households without any toilet facilities is much higher in the rural

areas compared to that of urban areas. This combinely shows the backwardness of the KBK region.

The state of health and health care in the KBK region is also not impressive compared to the the other districts of the state. Most of the districts in the KBK region stand towards the tail end in terms of HDI in the state. Similarly, the performance of KBK districts in terms of GDI and IDI are very poor compared to other Non-KBK districts of the state. Health Infrastructure in the KBK region, dismally low, there are only 2 medical colleges, 24 medical hospitals, 89 CHCs, 294 PHCs, 1690 Sub-centre and 2671 hospitals beds in the eight KBK districts. Although the per capita health expenditure in absolute amount has increased, during 1991-2014, however, as a percent of per capita state gross domestic product it has declined over the same period.

In Chapter 4, attempt was made to examine the morbidity patterns, health seeking behaviour and choice of health care providers by using NSSO data. The following are the main findings of this chapter.

Morbidity prevalence rates are found to be higher among SCs and STs Caste group. Prevalence of morbidities are higher for the population engaged in agriculture and labour occupational classes and infection and other diseases are more prevalent among those in the labour and agricultural activities. Among different diseases Infectious disease and disabilities has significantly increased within a period of two decades,(i.e., 1995-96 to 2014) of which infectious disease increased by more than four times and disabilities increased by more than 7 times. The relationship between age distribution and morbidity prevalence rate was found to be U-shaped in nature. It means morbidity rate was high among child age group (0-5 years) and old age (60 and above) population. This is mainly because these two groups are highly vulnerable to diseases. Educational attainment and morbidity rate was found to be negatively related in all the three periods. Disabilities and Infectious diseases have decreased with the increase in the level of education. Conversely cardiovascular diseases were higher among the population with higher level of education. Hospitalisation rate has been increased almost six folds in the KBK region during 1995-96 to 2014. Hospitalisation has occurred mostly because of non communicable, disabilities and other diseases have increased in KBK region. Moreover, hospitalisation rate has increased with the increase in the standard of living as measured by monthly per capita consumption quintiles.

The percentage of people seeking medical treatment has increased from 68 percent in 1995-96 to 86 percent in 2014 in the KBK region. This may be possible due to increase in the awareness among people and an increase in the medical institutions especially in rural areas after the introduction of NRHM in the State. Furthermore, educational status and standard of living as measured by monthly per capita consumption expenditure are positively related to medical seeking treatment of the people. Education is one of the important factors in the creation of health awareness and the choice between medical care against no care during the period of illness. It has been observed that with the increase in the level of education the medical seeking treatment increased in the KBK region and Odisha during the period of 1995- 2014. Compared to outpatient care, less people are utilising inpatient care from private institutions, because of significantly higher price in the private institution in case of inpatient care. The data reveals that the percentage of people utilising non government sources for inpatient care in urban areas is more than the rural areas. This is because the private health facilities mostly concentrate on urban areas. Because of non availability of private inpatient facilities the percentage of people receiving inpatient care from non government sources in the KBK region is less compared to the state average during the period from 1995-96 to 2014. Rural, socially and economically backward people pointed out that financial problems and the lack of medical facility is the major reasons for not taking care. It has been observed that people's dissatisfaction toward government treatment has been increased from 14 percent in 1995-96 to 52 percent in 2014 and has become the major reasons for not availing government health care services in the KBK region as well as in the State. It indicates that more than half of the ailing persons have not availed government health care services because of unsatisfactory treatment and poor quality services. Out of the total ailing persons who have not received medical treatment, 22 percent opt no care because of financial reasons in the KBK region as against 9 percent for Odisha. More interestingly the data shows that the financial reasons for not seeking treatment has increased from 10 percent to 22 percent for KBK region during the period 1995-96 to 2014.

The estimated binomial logistic model shows that the probability of the choice of public health care providers over private health care providers in case of inpatient care are significantly influenced by factors such as MPCE, household size, disease patterns, severity of illness, doctor fee and opportunity cost of time. The negative coefficients of MPCE in different periods indicate

that the likelihood of the choice of public health care decreases with the increase in MPCE. Higher the MPCE, greater the affordability of private health care providers and therefore lower the probability of choice of public health care providers in case of inpatient care. Similarly the coefficients of severity of illness are turned out to be negative in all the three periods; it implies that the likelihood of the choice of private health care over public health care increases with the increase in severity of illness.

The estimated multinomial logistic model for the choice of outpatient providers shows that the negative coefficients of the variable ST and SC for private health care providers implies that the odds favouring choice of no health care over the choice of private health care, holding all other regressors constant. Similarly the coefficient of the variables caste (ST), age group (0-14) and education of the head (illiterate) are negative indicating that the odds favouring choice of no health care over the choice of public health care providers, holding all other regressors constant.

As MPCE increases the choice of both public and private health care providers' increases, but the relative risk ratio (RRR) for private health care providers is greater than the public health care providers in each period. As MPCE increases, there is a greater preference for private care, because MPCE increases the affordability of health care services, hence people prefer private care on quality ground. The mean predicted probability for choice of private health providers in case of inpatient care is quite low when we compared it with the outpatient case in KBK region and Odisha. Thus, the tendency of shifting from public health care to private health care is low for inpatient care compared to outpatient care. This is mainly due to the fact that there is a huge price gap between public and private sector especially for inpatient care.

Chapter 5 examined the Out of Pocket health payment and its catastrophic impact on the households by using 52nd, 60th and 71st rounds NSSO data. Main observations and findings in this chapter are given below:

The amount of per capita health expenditure is less for SC, ST labour and poor households compared to any other households in the KBK region. The average monthly per capita expenditure on outpatient care is found to be more than that of inpatient care in the KBK region. This is due to fact that majority of the people are receiving inpatient care than outpatient care from government hospital/medical institutions. There is wide variation in the out of pocket payment across the sources of treatment. Out of pocket payment in private sector is significantly higher than that of public sector for inpatient as well as outpatient care in KBK region and

Odisha during 1995-96 to 2014. Higher the proportion of rural households, SC, ST and labour class households depend on distress financing sources (borrowing, selling household assets) for health care compared to their urban counterparts and other social group of households.

Inter temporal analysis that higher proportion of rural households in both KBK region as well as Odisha encountering catastrophic health payments during 1995-96 to 2014. The percentage of households experiencing catastrophic head count in KBK region was 12.9 percent in 1995-96 which augmented by 33 percent in 2014. Moreover, a negative of value of concentration index indicates a greater tendency for the poor households to cross the threshold level and the problem of catastrophic health payments is more common among the poor households in the KBK region. In rural KBK region, a negative value of concentration index indicates that the catastrophic health payment is more prevalent among the poor consumption quintiles. The catastrophic head count was highest among OBCs followed by Schedule Caste (SC) and Schedule Tribe (STs) household in the KBK region. However it has found the STs and SCs household in urban areas and SCs and OBCs household in rural areas experiencing highest catastrophic head count (CHC) in the KBK region. It has been found that catastrophic head count is considerably higher for self employed (43.4 percent) and other category (60.4 percent) of the households in the KBK region. However, labour class and self employed type household had higher burden of catastrophic health payment in the urban areas. Almost one third of labour and agricultural households are burdened with catastrophic health payment. The catastrophic head count is found to be highest for infectious and other disease category and lowest for cardiovascular disease case. This may be due to the fact that cardiovascular diseases are found to be more among those who belong to rich and richer class household, hence less chance of suffering from catastrophic payment.

Apart from direct health expenditure, the earning loss or indirect cost due to illness constitutes a significant percentage of household's consumption expenditure and it has increased from 6.9 percent in 1995-96 to 19.1 percent in 2014. The indirect cost burden is highest among self employed households followed by labour and agricultural households. The SC, ST household found to be more vulnerable to indirect cost burden of illness in KBK region as well as in Odisha. This is mainly because majority of them depend on casual labour work for their survival and hence even a short duration of illness become catastrophic for them.

The estimated Two-Part Model shows that the likelihood of incurring out of pocket health expenditure of the household is influenced by a number of factors such as number of children, number of old persons, severity of illness, per capita consumption expenditure, caste and insurance status of head in the KBK region of Odisha. The probability of incurring positive and on an average the level of out of pocket health expenditure is found to be higher among household having more number of children and old persons. The probability of incurring a positive and on an average amount of health expenditure increases with the increase in MPCE. The probability of incurring a positive out of pocket health expenditure is higher for insured households compared to uninsured households, however the level of out of pocket health expenditure is higher for uninsured households. This implies that health insurance has established as an enabling factor for the households which help them to purchase health care at the same time reduce the magnitude of out of pocket expenditure.

Chapter 6 measured the illness induced impoverishment at the household level. Here we have attempted to measure the impoverishment due to health shocks by incorporating financial coping mechanisms and indirect cost of illness. The main findings from this chapter are given below:

The poverty impact of health payment, i.e., the difference between post health payment head count and pre health payment head count has been increasing over the period from 1.4 percent in 1995-96 to 12.1 percent in 2014. It has been observed that the poverty impact of illness/illness induced impoverishment after adjustment of “indirect cost or earning loss” has been found to be greater than the poverty impact of health payments, (i.e., unadjusted methodology) in the KBK region and Odisha across different years. The poverty impact of illness has increased from 1.4 percent in 1995-96 to 14.2 percent in 2014 in the KBK region. There found to be a net increase of 2.1 percentage point in the poverty head count after adjustment for financial coping mechanisms and indirect cost for the year 2014. This implies that the indirect cost burden of the illness is found out to be significant while measuring the impoverishment. The Scheduled Caste households are the most vulnerable to medical poverty trap as the poverty impact of illness, (i.e., the difference in the head count between after and before illness situations) payment head count is much higher for this category of households, particularly the urban Schedule Caste households are more vulnerable to health shocks as poverty impact of illness (38.3 percentage point) is more than twice that of the rural households

(17.7 percentage point) in the KBK region. This is due to the fact that these social group mostly land less people and they depend on casual labour work for their livelihood. While the incidence of illness induced poverty is more among self employed and labour class households in the KBK region, diametrically the opposite result was found, i.e., agricultural and self employed households more vulnerable to the impact of illness in the state of Odisha. It has been observed that in non-hospitalised case (outpatient care) the impoverishment is highest for those who have suffered from infectious and other diseases in the total impoverished individuals/households. Hence, it is noticed that even the most common and reasonably inexpensive diseases such as diarrhoea/dysentery, malaria, fever of short duration and other diagnosed and non-diagnosed ailments impose a financial burden and push the individuals/households below poverty line in the KBK region. While in hospitalised case (inpatient care) impoverishment is found to be higher among those who have suffered from non-communicable diseases, other diseases and disabilities in the KBK region and Odisha. The normalized poverty gap (standardized with the head count) was much higher in the rural areas (46.9 percent) than in the urban areas (16.8 percent) thus it indicates that the relative burden of health payments is much greater in the rural areas. The same conclusion can be derived for the state and it has been found increasing over time for both KBK region and Odisha.

The estimated logistic regression result shows that MPCE, Severity of illness, opportunity cost of time, number of children and number old persons in the households are statistically significant determinants of probability of impoverishment occurrence in the KBK region for all the periods. It is found that the number of children and number old persons in the households are found to be statistically significant determinants of probability of impoverishment occurrence in the KBK region for all the periods. The health need of individual at an early and later stage of life is more compared to younger age group. Hence, the health expenditure may increase for those households having more number of children and old persons, although the indirect cost of illness for these age groups is supposed to be zero or negligible due to non-participation in the work force. The positive sign of the severity of illness and opportunity cost of time are on the expected lines implying that more the number of sickness days and hospitalisation days, the more will be severity of illness raising high probability of occurrence of impoverishment. It is important to note that the probabilities of occurrence of impoverishment for poorest and poor consumption quintile are zero. This is mainly because these two

consumption quintiles are so poor that they are already below poverty line before an illness event, hence the situation remained same for them before and after an illness event.

7.3 Policy Implications and Suggestions

Main findings of the present study have important policy implications to government and private agencies including non-governmental organizations, not only for the KBK region but also for other regions. Based on the above findings, the present study makes some policy suggestions. The study found that socioeconomically disadvantaged groups (like SC, ST, labour and agricultural households and lower consumption quintiles classes) are more vulnerable to morbidity, health shocks and experience heavier healthcare catastrophic burden because of high health payments and earning loss due to inability to work. Health being a state responsibility, it is the prime responsibility of the government of Odisha to provide basic health care services. Hence, government should increase health expenditure to reduce the burden of out of pocket payments. Moreover, social health protection scheme is an alternative mechanism to reduce the intensity of catastrophic health payments. Therefore, government should provide health insurance at lower and affordable price to its citizen.

The study has also found that infectious and other diseases are higher among illiterate, lower consumption quintiles and rural people and those who lack the basic hygienic and sanitation facilities. Moreover, impoverishment due to infectious and other diseases are more compared to other diseases in the KBK region. The diseases such as malaria, diarrhoea and dysentery, fever of short duration, other diagnosed and non diagnosed ailments continue to be vexing issues in the region. Hence, the basic facilities like safe drinking water, proper drainage and latrine facilities must be provided to the people of KBK region. There is a need for health awareness programme or camp especially in the rural areas to improve the awareness and hygienic practices of the people.

It has been observed that the morbidity prevalence rate is higher among those who lack the basic hygienic and sanitation facilities. It was observed that people who are opting private treatment are generally spending more and suffered from catastrophic health burden in the KBK region. Mostly people choose private care on better quality ground. Therefore, the government must take initiatives to provide a better quality of services so that the preference of the people can be improved and catastrophic impact of health payment can be reduced. One of the

interesting findings is that the occurrence of impoverishment after adjustment of earning loss or indirect cost of illness is found to be more compared to that of the unadjusted methodology, hence, policy makers should not ignore the impact of earning loss while making policies related to household health financing.

7.4 Limitations and Directions for Future Research

Like any other studies, the present study suffers from some limitations. The methodology adopted in gathering information regarding morbidity and utilization of health care services in all the three rounds of National Sample Surveys used here was self reported in nature. Criticizing this, Murray and Chen (1992) said that self reported morbidity is conceptually complex and it is difficult to apply with high validity and reliability. Moreover it is highly sensitive to many factors, viz., education, person's knowledge and perception about the diseases, willingness to report and others socioeconomic variables. Therefore, it possesses all the limitations of what a self reported morbidity possesses.

Secondly, the three NSSO rounds collected information on the self-reported morbidity and untreated morbidities are carried out at different seasons of a year, i.e., 52nd round (July 1995-June 1996), 60th round (Jan- June, 2004) and 71st round (Jan-June, 2014). The survey duration of 52nd round was a full agricultural year whereas 60th round and 71st round surveys were half of the calendar year. Therefore it may not be strictly comparable, because seasonality factors may bring variation in prevalence and incidence rate in different rounds.

In all the three rounds of NSSO Morbidity and Health care surveys (52nd, 60th and 71st rounds), the reference period for outpatient and inpatient care are 15 days and 12 months recall periods respectively. Therefore, we have converted the above figures into monthly figure for our analysis purposes. The underlying assumption here is that the health needs and health care expenditure remain constant in every month. However, the health needs and expenditure on health care may not remain constant in all every month of a year.

Such limitations may be overcome in future research activities. One can conduct extensive primary surveys at the household level to solve data and seasonality problems.

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