Status of Health among Rural Households of Assam: A Study in Reference to Public Health Sector

A thesis submitted to Indian Institute of Technology Guwahati in partial fulfillment of the requirements for the degree of Doctor of Philosophy

Submitted by

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Declaration

I hereby declare that the thesis entitled "**Status of Health among Rural Households of Assam: A Study in Reference to Public Health Sector**" is the result of investigation carried out by me in the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, India, under the supervision of Dr. Rajshree Bedamatta, Associate Professor (Economics), Department of Humanities and Social Sciences, IIT Guwahati.

In keeping with the general practice of reporting observations, due acknowledgement has been made wherever the work described is based on the findings of other investigations.

Nirmala Devi

July 2016

Certificate

This is to certify that the thesis entitled "**Status of Health among Rural Households of Assam: A Study in Reference to Public Health Sector**" submitted by Nirmala Devi for the degree of Doctor of Philosophy in Economics in the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, embodies bonafide record of research work carried out under my supervision. The collection of materials from the secondary and primary sources has also been done by Ms. Nirmala Devi herself. All assistance received has been duly acknowledged.

The present thesis or any part thereof has not been submitted to any other University for any degree or diploma.

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(Dr. Rajshree Bedamatta)
Supervisor

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LIST OF ABBREVIATIONS USED IN THE THESIS

ANM	Auxiliary Nurse Midwives
ASHA	Accredited Social Health Activist
AYUSH	Ayurveda, Yoga & Neuropathy, Unani, Siddha and Homeopathy
BCG	Bacillus Calmette Guerin
BPL	Below Poverty Line
CAG	Comptroller and Auditor General
CBR	Crude Birth Rate
CHC	Community Health Centre
CPR	Contraceptive Prevalence Rate
DDG	Detailed Demand for Grants
DFID	Department for International Development
DLHS	District Level Health Survey
DPT	Diphtheria, Pertussis, and Tetanus
ERF	Economic Research Foundation
FRU	First Referral Unit
FW	Family Welfare
GDP	Gross Domestic Product
GOA	Government of Assam
GOI	Government of India
GSDP	Gross State Domestic Product
IFA	Iron and Folic Acid
IMR	Infant Mortality Rate

JSY	Janani Suraksha Yojana
M&PH	Medical and Public Health
MERT	Medical Education Research and Training
MMR	Maternal Mortality Rate
MOHFW	Ministry of Health and Family Welfare
MPO	Mean Positive Overshoot
MPR	Morbidity Prevalence Rate
NCAER	National Council of Applied Economic Research
NFHS	National Family Health Survey
NGR	Natural Growth Rate
NRHM	National Rural Health Mission
NSS	National Sample Survey
NSSO	National Sample Survey Organization
OBC	Other Backward Castes
OOP	Out of Pocket Expenses/Expenditure
PHC	Primary Health Centre
PPP	Public Private Partnership
RCH	Reproductive and Child Health
RHS	Rural Health Services
RSBY	Rashtriya Swasthya Bima Yojna
SC	Scheduled Caste
SDP	State Domestic Product
ST	Scheduled Tribe

T.B	Tuberculosis
TT	Tetanus toxoid
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WHO	World Health Organization

Abstract

Since the initiation of economic reforms in India, central and state governments have retreated from the social sector, by reducing their share of expenditure on basic healthcare, and providing fiscal space to private players including the insurance sector. Reports emerging at the national and international level show that India has one of the most privatized healthcare systems of the world. Out of pocket expenses of people in accessing basic health care services have reached catastrophic levels. In this context the thesis investigate the status of health among rural households of Assam, which has one of the most vulnerable health outcome indicators in India.

The country's highest child and maternal mortality ratios have been estimated for Assam. The draft National Health Policy 2015 categorizes Assam as a state with 'greater challenges' with respect to infant and maternal mortality rates. The National Sample Survey Organization estimate very high levels of morbidity prevalence for Assam for the period 1995-96 and 2004.

At a macro level this thesis examines the level, pattern and extent of public expenditure on health in Assam, over the period 1990-91 to 2011-12 spanning different phases of economic reforms in social sector expenditure. At a more disaggregated level, health status among the rural population is studied taking household as unit of study. Morbidity prevalence, utilization of healthcare services and out of pocket expenditure on health of rural households is examined in detail. Over the period 1990-91 to 2010-11, capital expenditure on healthcare has been stagnant in Assam. Bulk of the total expenditure is on revenue account.

For a large part of the 1990s and the early 2000s, share of expenditure on rural health services has been declining. Though declining, rural health services have received more government attention compared to urban health services. While budgetary expenditure on health has seen a rapid decline in the post reform period, some reversal of trend has been noticed since 2007 onwards. This can be attributed to the implementation of the National Rural Health Mission in 2005.

Study on health status of the population indicates presence of high morbidity among rural households. The incidence of untreated illnesses among rural households is quite high. Proportions of untreated illnesses are higher in cases of acute than chronic morbidity. While

presence of untreated acute morbidity points to the overall low health status of population, presence of untreated chronic morbidity reflects failure of the health system as well as distress conditions among households. A major share of the household's consumption expenditure is on health thus reflecting sacrifices made on food and education related expenditures.

Utilization of public health facilities have been examined in detail. There is a large demand and preference for public health services in the rural areas. Private health facilities became an option only when government health facilities could not provide treatment due to poor crowdedness and poor quality of treatment. A significant proportion of the population also depends on other sources (self medication, home remedial measures and traditional healers) which is specifically true for the lower economic strata.

The crucial problem areas identified are geographical accessibility, manpower shortages, lack of health specialists, shortages of medical equipment, shortages of essential medicines, lack of infrastructural facilities, low bed capacity, over crowdedness, high cost of diagnostic charges and lackadaisical attitude of health personnel. However, a significantly positive causal relationship is found between implementation of public health programmes and utilization of maternal and child healthcare services, specifically in cases of institutional delivery and post natal care.

Chapter 1

Introduction and Review of Literature

This thesis is an attempt to study the status of health of rural households of Assam, with particular reference to public health sector. The health sector in India has undergone a structural change over the period of last two and a half decades. Massive budgetary cuts in the health sector have resulted in lowered transfers from the centre to the states. Similarly, market reforms in healthcare have pushed ahead privatization in an unprecedented manner. Reports emerging at the national and international level show India as having one of the most privatized healthcare systems of the world. Out of pocket expenses on health are not just high but have catastrophic effects on households. Within the Indian states, Assam's health outcome indicators continue to be vulnerable even after two decades of reforms. Infant and maternal mortality rates continue to be the highest in the country (Government of India, 2016). The levels of morbidity among the general population are also very high (NSSO, 1998, 2004). It is in this context that this thesis investigates the status of health among rural households of Assam.

1.1. BACKGROUND OF THE STUDY

Among the several developing countries in Asia and the world, India spends the least on health. According to the World Bank Report on World Health Indicators, 2012, Indian government expenditure on health (henceforth referred to as public health expenditure) as a percentage of total health expenditure was 29 percent. The expenditure of other South Asian countries was Bhutan (87 percent), Nepal (33 percent), Bangladesh (34 percent) and Sri Lanka (45 percent). Global comparisons also show India's health expenditure to be very low. Public health expenditure as a percentage of the total health expenditure was 68 percent in Australia, 47 percent in Brazil, 85 percent in Denmark and 77 percent in France. Even in smaller countries like Angola, Bolivia and Cuba, it is as high as 83 percent, 63 percent and 92 percent respectively (World Bank, 2012).

The latest available estimate from the Indian National Health Accounts shows that India's healthcare system is largely privatized. In 2004–05, while public expenditure on health accounted for only 0.84 percent of India's Gross Domestic Product (GDP), the share of private expenditure was 3.32 percent. India's total health expenditure (public, private and external flows) accounted for only 4.25 percent of the GDP (National Health Accounts, 2009).

The literature on healthcare issues in India has over time emphasized on the inadequate official attention to matters of public health (Dreze and Sen 2002; Kethineni 1991; Ashtekar 2008). Basic diseases such as tetanus, measles, pneumonia, leprosy, malaria and hepatitis that have drastically lessened in many developing countries continue to be common in India even today. Dreze and Sen (2002), while identifying some of the reasons for the low status of health in India, have drawn attention to two drawbacks of the Indian health system. Firstly, India's blind imitation of the Western model of healthcare, which supports a market-based healthcare system, instead of indigenous approaches. Secondly, healthcare in India is dominated by the chronic inefficiencies of public services with an increasing reliance on the private sector.

The bulk of health expenditure in India is currently out-of-pocket, associated with presence of a large and unregulated private sector. Utilization of private health services for inpatient and outpatient care is ever increasing. More than 80 percent of the population are utilizing private sector for outpatient care in both urban and rural areas of the state. In case of inpatient care also dependence on private sector is on a rise (Baru, 2012, 2013; Phadke, 2016). The High Level Expert Group Committee on Universal Health coverage set up by the Planning Commission in 2011 emphasizes on improving the quality of care in public sector by increasing outlay on public health.

State level performances on basic health indicators vary widely in India. The Draft National Health Policy 2015 categorizes Assam as one of the states facing 'greater challenges'. In the backdrop of social sector expenditure cuts and changes in rates and levels of utilization of public health facilities in India, a study on status of health among rural households of Assam will provide a case of public health sector coverage and problem areas that need attention.

1.2 BASIC HEALTH IS A MERIT GOOD: THEORETICAL FRAMEWORKS

Kenneth Arrow's (1963) paper on "Uncertainty and the Welfare Economics of Medical Care" and Mark Pauly's (1968) paper on "Economics of Moral Hazard: A comment" are some of the earliest studies that initiated discussions on the markets for healthcare. Similarly Alan Williams' (1987) paper on "Health Economics: the cheerful face of a dismal science" provided some of the most comprehensive frameworks on health economics as a separate area of specialization within the discipline of economics. Conceptually, distinction between health and other goods have been made broadly on the following grounds: A. there is extensive government intervention in case of healthcare services; B. there is uncertainty in

case of health goods as the recovery from an illness is most uncertain for an individual while the consequences of treatment is better known to the physician than the patients; C. health goods create asymmetric information and externalities D. licensing barriers in healthcare markets.

Healthcare finds a prime of place in most approaches to development, such as the basic needs approach (Streeten et al., 1981; Streeten, 1999) or the capabilities approach (Sen, 1985; 1999). Economic growth models have also emphasized on the role of healthcare and its direct impact on human capital. In most approaches to economic development, it is maintained that provision of healthcare facilities should not be determined on the basis of people's income, and that basic healthcare services should be available universally. The Basic Needs Approach conceptualized by the International Labour Organization's World Employment Conference, 1976 considered health as an integral part of the absolute minimum resources necessary for physical well-being. Basic needs may be interpreted as the minimum specified quantities of things such as clothing, shelter, water, and sanitation that are necessary to prevent ill health and undernourishment (Streeten et al., 1981). Nutrition and health are also an element of this approach together with education, shelter, water and sanitation. According to this approach, nutrition and health are essential in raising labor productivity, enhancing people's adaptability and capacity to change and creating a political environment for stable development (Streeten et al., 1981).

(Streeten et al., 1981) also introduced the concept of 'health production function' which includes nutrition, education, housing, water supply and sanitation that improves the health of population. There is a 'linkage effect' between all the components of basic needs. Education and health are complementary in nature, for instance, knowledge of hygiene practices improves health which in turn raises productivity. Similarly improved earning power encourages family planning which can in turn improve nutrition and health (ibid, 1981). They also considered measures of health, such as life expectancy at birth, as a single good measure of basic needs. It was regarded as superior to other indicators such as composite index of social indicators, gross national product (GNP) or indices of income distribution.

Good health is one of the important factors in Sen's formulation of capabilities approach to human development (Sen, 1995; 1997; 1999). Health constitutes an important 'capability' that enables individuals to 'pursue things that they have reason to value' (Sen, 1985). Any

conception of social justice that accepts the need for a fair distribution and efficient formulation of human capabilities cannot ignore the role of health in human life. The major constituents of Sen's capability approach are *functionings* and *capabilities*. Functionings are the 'beings and doings' of a person, whereas a person's capability is the various combinations of functionings that a person can achieve. Capability thus reflects the freedom of a person to lead life as one desires. Functionings are more directly related to an individual's living conditions: being well-nourished and disease-free, having self-respect, to preserve human dignity, taking part in community life, etc. Thus functionings are constitutive of a person's well-being. However, a person is free to move between different sets of functionings (Sen, 1995). Sen outlines the importance of 'constitutive role' and 'instrumental role' of freedom in development which has a direct impact on health.

> The constitutive role of freedom relates to the importance of substantive freedom in enriching human life…The substantive freedoms include elementary capabilities like being able to avoid such deprivations as starvation, undernourishment, unnecessary morbidity and premature mortality, together with other freedoms…Thus the process of development when judged by the enhancement of human freedom has to include the removal of a person's deprivation. Instrumental freedoms include political freedoms, economic facilities, social opportunities, transparency guarantees and protective security. In the context of public health social opportunities plays a vital role. It refers to the arrangements that society makes for education, healthcare and so on, and which influence the individual's substantive freedom to live better… These facilities are important to conduct a better life such as living a healthy life and avoiding preventable morbidity and premature mortality (Sen, 1999, pp. 36-40).

It has been widely discussed among social scientists whether healthcare is different from other goods and services because of a greater likelihood of market failure (Curlyer, 1972; Kethineni, 1991; Ghosh 2008; Hammer et al., 2007). Some of the characteristics associated with market failure are presence of externalities and information asymmetry. When there are huge positive externalities, market forces result in a sub-optimal production of the relevant good or service. This requires direct provisioning of such good and services and makes government intervention essential. Therefore from both efficiency and equity grounds, there is no alternative to the public provision of health goods with huge positive externalities (Ghosh, 2008). In the economic categorization of goods and services, healthcare may be categorized either as private good or public good. However a basic healthcare service

meeting requirements of large sections of population is termed as merit good (Curlyer, 1971; Ghosh, 2008 and Hammer et al., 2007).

There is also a view on government failure of health delivery. In this view failure in health services delivery systems is related to 'accountability' (Hammer et al., 2007). There can be two routes of accountability: 'short route of accountability' and the 'long route of accountability'. The short route of accountability delivers healthcare directly through the market. The long route delivers health through state actors or policymakers. In the short route there is a risk of market failure and in the long route there is a risk of government failure. Government failure occurs mostly because policymakers are unable to reflect the choices of people Hammer and others draw on a model of public sector accountability of World Bank and argue that a 'weak voice' and 'low accountability' between the public sector employees and the citizens result in inefficient healthcare delivery systems. Some of the important reasons of inefficient healthcare delivery systems are high rates of absenteeism, low quality of clinical care, lower satisfaction levels of users with respect to the personal behavior and amenities provided by healthcare providers, and corruption. A second type of government failure occurs when the government is interested in transmitting the wishes of the people to the service provider or healthcare providers. Based upon the Accountability Framework of the World Bank it can be argued that given certain specific economic environment, both the market and the government failure are subjected to their respective failures and therefore there is a need to weigh the advantages of one over the other (World Development Report, 2004, cited in Hammer et al., 2007).

1.3 HEALTH PROGRAMMES AND POLICIES IN INDIA SINCE INDEPENDENCE

The 1950's

During the years immediately preceding the time of Indian independence, there was an attempt of the British India government to frame polices relating to the public health system in India. One of the first such committees was set up under the chairmanship of Joseph C. Bhore, popularly known as the Bhore Committee. The Bhore Committee laid down its final report called *Health Survey and Development Committee report* in 1946. Subsequently two more committees were set up: Chopra Committee (1946) and Sokhey Committee (1948). The committees' recommendations were based upon the principles of equal access, providing services especially to the rural areas, to provide comprehensive, preventive and curative services and create health professionals through proper medical training. The Chopra

Committee in 1946 recommended the mutual exchange of knowledge between allopathy and Indian system of medicine, and to bring about enriched integrated knowledge system. The Sokhey Committee of 1948 recommended development of services and manpower at the grassroots. Youth from each village were to be trained as health workers and trained further to become doctors.

In 1950 the planning commission was set up which started formulation and implementation of health programmes through the Indian five year plans. During the first two Five Year Plans the basic structural framework of public healthcare delivery system remained unchanged. Urban areas continued to get over three fourths of medical resources whereas rural areas received 'special attention' under the Community Development Programme. However the community development programme had started to weaken even before the second five year plan. To evaluate the progress made in the first two plans and to draw up recommendations for the future path of development of health services, the Mudaliar Committee was set up in 1959. The Mudaliar Committee report recorded that disease control programmes had been successful in controlling certain virulent epidemic diseases like malaria, cholera, and smallpox etc. However this committee also admitted that the primary healthcare programmes were not given their due importance. The decade of the 1950's saw a special focus on control of epidemics, and mass campaigns were started, for eradication of various diseases. The National Malaria Eradication programme was started in 1953 with the aid of Technical Cooperation Mission of the U.S.A. In 1952, the country also launched a national programme on family planning to stabilize the population at a more 'consistent level' (Geol, 2008).

The 1960's

By the 1960s, the focus on management of epidemics continued and several vertical programmes were introduced like National Malaria Eradication Programme (1958), National Small Pox Eradication Programme (1962), and the Cholera Control Programme (1963). The most successful of such programmes was the National Small Pox Eradication Programme (Deodhar, 1982). However, some of the drawbacks highlighted about these programmes are that they were initiated without proper knowledge of the diseases. In 1963 a special committee popularly known as the Chadha Committee was appointed by the Government of India under the Chairmanship of M.S. Chadha, the Director General of Health Services. The committee was appointed to observe the working of the National Malaria Eradication Programme. In 1965 another committee known as the Mukherjee Committee was

formulated and it recommended delinking of malaria maintenance activities from Family Planning. It was done so that the family planning activities could receive full attention. The other committees that were appointed during this period were Jain Committee (1967) and Modhak Committee (1972) (Duggal and Gangoli 2005; Duggal, 2005).

The 1970's

During the 1970's, the central government implemented the vision of Sokhey Committee: of having one community health worker for every 1000 persons in order to implement the call for 'people's health in People's hand'. During this period Kartar Singh Committee (1973) was also formed which recommended that each pair of health worker should serve a population of 10,000 to 12,000. Meanwhile certain important developments were taking place globally. The World Health Organisation (WHO) in its International Conference on Primary Healthcare at Alma-Ata, USSR, in 1978 came up with the Declaration of Alma Ata. This Declaration considered health as a fundamental right and prioritized the study of existing inequalities in the health status of people in developed and developing countries, community participation in health matters and community health reliance, and effective use of traditional medicine system to provide promotional, preventive, curative and rehabilitative services (Geol, 2008). The Declaration of Alma-Ata had a significant effect on health policies of developing countries around the world. Inspired by the Alma-Ata Declaration, the Indian government also committed itself to an agenda of 'health for all' by the year 2000 (Rao, 2010). Emphasis was also laid on use of essential drugs and formulation of national policies and strategies to launch and sustain primary healthcare. But the changes in the health sector because of Alma Ata declaration was also short lived and the main reason behind it was the beginning of the era of globalization and privatization (Geol, 2008).

Another important programme launched in 1977 was the Community Health Worker program. The community health workers were part times workers. This program showed that there are certain conditions necessary for better performance of the health sector which includes strong leadership, and training for the workers, a good quality of referral linkages and to appoint women as healthcare providers. This scheme was adopted based on the recommendations of the Shrivastava Committee, 1975. This committee was formed to look into medical education and increasing manpower in medical institutions. Integrated child Development Scheme was launched in 2nd October 1975 as a project. The main objective of the programme was overall development of the child and to improve nutritional status of

health of a child below six years. It gave emphasis on inter-sectoral coordination between different implementing departments at the centre, state, district, block and anganwadi levels.

The 1980s

The remarkable feature of the 1980's was the introduction of the first National Health Policy during the sixth plan period. It was implemented in 1983. Its main features were to set up a wide network of comprehensive primary healthcare services, to increase the number of health volunteers, to reduce the incidence of communicable diseases, qualitative improvement in health and family planning services and to improve medical research aiming at development of health of the common people. In 1987 the Bajaj Committee also submitted its report with the aim of integrating all health sciences. The Universal immunization programme was launched in 1985.

The 1990s and thereafter

During the 8th plan period a committee was set up to review the public health system set up. This committee made an appraisal of the public health programs and found that there is a need to improve disease surveillance in the country. Recommendations of this committee formed the basis for the Ninth plan to revitalize the public health system of the country and to look after the healthcare needs of the people (Duggal and Gangoli, 2005).

In 2002 the second National Health Policy was introduced, which aimed at achieving 'an acceptable standard of good health' amongst the general population of the country, increasing access to decentralized public health system, up gradation of infrastructural facilities in deficient areas and to increase the contribution of private sector in improving the public health sector. Market principles were also incorporated in the health sector during this period to increase the efficiency and quality of this sector. A large numbers of incentives were provided to the private health sector, for instance, loans from financial institutions at lower rates of interest, exempting custom duty for import of sophisticated medical technology and provision of land for establishment of private institutions at very low prices. Some of the major health programmes that were introduced during this period were Child survival and Safe Motherhood Programmes (1992), Reproductive and Child Health Programme (1997), and more recently the National Rural Health Mission (2005). The National Population Policy was introduced in 2000 to address the needs for contraception, healthcare infrastructure, and health personnel, and to provide integrated service delivery for basic reproductive and child healthcare (Duggal and Gangoli, 2005).

1.4 INDIAN HEALTH SECTOR IN THE POST REFORMS PERIOD

The need for reforms in India's health sector was emphasized since the Eight Five Year plan in 1992. Reform strategies generally include healthcare financing in the form of user fees and health insurance. It also includes healthcare financing through community health insurance and private sector investment. Another important institutional measure under economic reforms is the kind of autonomy provided to the hospitals in terms of contracting, monitoring and management by the local government agencies. Emphasis was also on collaboration with the private sector for providing healthcare facilities (Raman et. al., 1996).

Market reforms in health sector were advanced with the view that excessive burden on the government will not be able to reverse the deteriorating healthcare scenario of the country. In order to resolve the problem of inefficiencies in public healthcare system, reforms were carried out either by pushing for privatization or operating in public private partnership mode. Public private partnership (PPP) has been called upon to improve equity, efficiency, accountability, quality and accessibility of the entire health system (Bhatt, 2000; Sen et al., 2004). Opening up of the health sector to insurance is another form of privatization that has been openly embraced in the post reforms period (see Ahuja, 2004; Acharya and Ranson, 2005; Mudgal et al., 2005; Hasio, 2013; Selvaraj and Karan, 2012; Fan et al., 2012; Desai, 2009, Rao, 2004; Ellis et al., 2000). The need for a more broad based medical insurance coverage has been initiated with the aim of absorbing the financial shocks caused by lump-sum expenditure on medical treatment (Rao, 2004; Ahuja 2004).

However reforms seem to have had a severe impact on India's health scenario. While an average Indian's life expectancy has increased, infant and maternal mortality rates have declined but in comparison to other developing countries, growth is still unsatisfactory (Guhan, 1995). The process of structural adjustment introduced in 1991 has had a severe impact on India's health scenario. While budgetary expenditures increased on the energy, transport and irrigation sectors, social sector (like education and health) expenditure drastically declined. The growth oriented structural adjustment programme supported a perfectly competitive market set-up. But this model did not fit the medical care sector in India because the ordinary people in need of medical care need it immediately and have no time to gather information about these services through repeated transactions (Guhan, 1995).

Provisioning of healthcare services, medical technology, medical and paramedical education started getting increasingly commercialized and unregulated during the 1990's and that had adverse impacts on quality and cost of healthcare. These introduced a range of measures such as user fees, contracting out of clinical and ancillary services, decentralization and public-private partnerships. The policy of levying user fees had a negative impact on the poor and marginalized communities (Ghosh, 2008; Baru et. al., 2010). State support for private healthcare also grew with the initiation of various kinds of public- private partnerships (Rao, 2010). Incentives were offered to the private health industries which led to high technology diagnostic centers in urban areas. Qualified and trained health personnel moved massively from the public health system to the private sector due to higher remuneration.

1.4.1 Out-of-pocket expenses on healthcare in India

There is an increasing literature in India that shows that private spending or out of pocket expenses on basic healthcare are unusually high and on a rise. Out of pocket expenditure includes direct payments for medical consultation, diagnostic testing, transportation and other such private spending by households on medicines and services (Baru et al., 2010). Some estimates show that 83 percent of health expenses are being borne privately in India compared to 6 percent in United Kingdom and 56 percent in United States. A quarter of the population relies on loans or sells ornaments to pay for medical expenses (Phadke, 2003).

According to Selvaraj and Karan (2009), the dominance of the private sector in India is one of the most important reasons of increasing out of pocket (OOP) expenses, especially among the vulnerable classes. The cost of inpatient and outpatient care has also increased over the years in both government and private health institutions, the increase being higher in private health sector. The dependence on private sector for hospitalization cases has been increasing in the rural areas as well. In 1995-96, 55 percent of the rural population and 57 percent of the urban population went to private health sector for hospitalization cases while in 1986-87, 40 percent from both urban and rural areas went to private health sector (Sen et al., 2002). Cost of care on health also increased after the privatization of 1990's. In comparison to the mid 1980's, the average cost on both inpatient and outpatient care increased in India. Between 1986-87 and 1995-96, outpatient care per illness, increased by 142 percent in the private sector and 77 percent in the public sector. The costs of inpatient care increased to 43 percent in rural and 320 percent in the urban areas. By 1995-96, more than 80 percent of individuals preferred outpatient care in private sector than in the public

sector. There was also a fall in public sector utilization of healthcare facilities in poorer states such as Assam, Orissa and Madhya Pradesh.

Based upon the NSSO 42nd, 52nd and 60th round results, Mukherjee and Levesque (2010) show that in India access of the poor to government medical facilities are declining, with simultaneous increases in costs of inpatient care. For example, at the all-India level, between 1995-96 and 2004, access to medical health facilities has declined from 45 percent to 42 percent. While some states do still have a 'heavy dependence on government health facilities' (Jammu and Kashmir, 98 percent; Orissa 91 percent; Himachal Pradesh 88 percent; and West Bengal, 82 percent) there is an evidence of overall declining trend. States like Andhra Pradesh (23 percent) and Bihar (25 percent) have an overall low dependence on government medical facilities. States like Kerala and Tamil Nadu have a good network of private health facilities, however dependence of the general population on government health facilities, was not as low as in Andhra Pradesh and Bihar (ibid, 2010).

One of the striking findings of the Mukherjee and Levesque (2010) study was that the poor in almost all states are utilizing less and less government healthcare. However, that does not mean that there is an overall decline of dependence of people on government healthcare services. For example, states like Assam, Jammu and Kashmir, Kerala and Punjab show its rural poor depending more on public services (ibid, 2010). The NSSO results clearly show that the demand for public healthcare services is still very high. In respect of states in the north-eastern region, the NSSO 60th round reveals that large sections of rural households in Mizoram, Nagaland and Assam finance more than 80 percent of their health treatment expenditure from borrowings, contributions from friends and relatives and, by selling ornaments (Kumar and Prakash, 2011). The gap between the rich and poor in utilization of healthcare services is increasing in India. The rich benefit from having access to both better quality health services in the private sector, and to subsidized services from the government sector. The poorer sections are heavily taxed on account of low quality of public healthcare as well as non-affordability of private healthcare services (Kumar and Prakash, 2011).

According to Ghosh (2010) out of pocket expenses become catastrophic if it exceeds a particular threshold such that a household has to reduce its expenses on other basic goods over a certain period of time. A household incurring catastrophic payments has to sell assets, or incur debts in order to fulfill or meet healthcare needs of himself and his family members (ibid, 2010). Large numbers of households are also pushed below poverty line because of catastrophic OOP payments. Ghosh (2010) estimates show that in India OOP

payment has resulted in increase in the poverty headcount by 4 percent in 1993-94 to 4.4 percent in 2004-05. In absolute terms, in 1993-94, 35 million people were pushed into poverty while in 2004-05, 47 million people were pushed into poverty due to OOP health payments.

Across the major states highest increase in poverty is noticed in Uttar Pradesh followed by Bihar, Orissa and Madhya Pradesh (Garg and Karan, 2008). However, states such as Assam, Jammu and Kashmir and Himachal Pradesh showed a smaller impact in terms of poverty deepening. Although a smaller impact has been observed in terms of poverty deepening, breakdown of the population into rural-urban areas provides some interesting results. Poorer states such as Assam, Orissa, Uttar Pradesh, Bihar, and Jammu and Kashmir experienced the highest increase in poverty in the rural areas. The highest increase in poverty was noticed for the states of Assam, Bihar and Orissa. In these states, increase in poverty was as high as 90 percent. On the other hand in the richer states of Gujarat, Haryana, Maharashtra and Punjab the increase in poverty was only 67 percent in the rural areas.

1.4.2 Utilisation of health services: Access, equity and affordability issues

Poorer nations generally have much worse health indicators. For example, in 2004, Japan and Sweden had the highest life expectancy (73 years) while Angola had only 29 years. Women experience greater illnesses but they live longer than men do. Sex and race are also known to be an important component like wealth while considering health inequality (Coburn, 2010). It is found that people in lower socioeconomic positions receive fewer healthcare facilities (a survey published in the Journal of the American Medical Association, 2001, cited in Lee and Fogel, 2002). Evidences show that in Britain, poorer sections of population had lower rates of utilization of advanced technologies such as angiography and other surgery. In most of the developing countries the richer sections of population receive better health facilities. Many researchers blame rising inequality in access to healthcare as the cause for growing health inequality. Moreover, primary healthcare needs are underestimated in a society where there is greater inequality in income. The poorer section is deprived of better health facilities and they suffer from inadequate, inefficient and below standard healthcare services (Lee and 2002).

A historical review of life expectancies across the world shows an overall improvement, although there are differences across social and economic categories. Coburn (2010)

discusses that the 20th century has seen rapid improvements in global life expectancy. In 1910, the average world life expectancy was pegged at 33 years which by the year 2000 had risen to 53 years. The average world life expectancy in 1820 was around 26 years. These improvements in life expectancy were due to declines in infant and child mortality and "not due to a general lengthening of the lifespan". The world's under five-mortality rate has also declined from 198 per 1,000 live births in 1960 to 83 by the year 2000. However, during the same time, persistent inequalities in health have increased throughout the world. Coburn observes that, 'rich and more powerful live longer and healthier than do the poor. White men in the ten healthiest counties in the United States live over 15 years longer than black men in the least healthy counties' (2010, p. 39). Differences in health outcomes are also observed across economic categories of population. In 1930-32, the mortality rate of unskilled male workers in Britain was 1.2 times higher than professional men, which by 1991-93 was higher by 2.9 times. A report of the WHO Commission on the Social Determinants of Health shows that 'male life expectancy in socially deprived area of Glasgow (Calton) is 54, much less than the male life expectancy in India 62 and 28 years less than in an affluent area of Glasgow (Lenzie), only 13 kilometers away' (2010, p. 39).

In India inequalities in utilization of healthcare services are more visible in rural areas (Purohit and Siddiqui, 1994). Utilization of public hospitals is relatively more in rural than in the urban areas. Purohit and Siddique also show that the levels of utilization of healthcare services are higher in states, which have relatively higher per capita government expenditure on public healthcare, in comparison to states with lower per capita government expenditures. Thus the level of government expenditure has a direct influence on the availability as well as utilization of various healthcare facilities.

The National Family Health Survey (NFHS) 2005-06 shows that there are sharp regional and socio-economic divides in health outcomes, with the burden of mortality falling disproportionately on the lower caste population, as well as the poor and less developed states. High rates of infant mortality and under-five mortality are inversely related to income and also to caste and gender. This social gap seems to have increased dramatically in the 1990s for the more marginalized groups like the scheduled tribes (Indian Institute of Population sciences, 2007).

A study undertaken by the Economic Research Foundation, New Delhi based on NSSO Consumer Expenditure 50th, 55th, and 61st rounds shows that spending on health has been gradually increasing as a proportion of total household consumption expenditure (ERF,

2006). In the rural areas, on an average, 7 percent of total household consumption expenditure is spent on health which reflects that (a) greater valuation is placed on health by the poorer households, (b) deteriorating quality of health services leading to its reduced accessibility by the poor and (c) higher user charges among consumers in the public health system as government run hospitals and clinics are starved of public funds, and therefore are forcing to pay higher charges for medicines, diagnostic procedures and surgical aids.

Muraleedharan (1993) identifies five important measures determining equality of access to healthcare services. They are equality of public expenditure; equality of cost of healthcare; equality of physical accessibility; equality of use and equality of health outcome. Equality of public expenditure implies that resources should be allocated for healthcare to individuals on a per capita basis. Equality of cost of healthcare tells us that every individual should bear an equal amount of cost for receiving any kind of healthcare. Equality of physical accessibility refers to the distance of healthcare institutions from individual users. Travelling long distances result in loss of time, effort and money adding to costs. Equality of opportunity to use healthcare services is based upon the need of an individual. Thus equality of use measure requires the understanding of variation in use on account of both 'potential access factor' and 'change in use due to need or essentiality of a medical care'. The last measure, equality of health outcome deals with measuring of access to healthcare on the basis of health outcomes like, infant mortality ratio, life expectancy, age specific death rates, and mortality rates.

Similarly Baru et al. (2010) discussed five important factors which has adversely affected equity in healthcare in India. Firstly, the expenditure on public health is very low in comparison to countries with same level of income. This has resulted in expansion of the private health sector. There has been a shift of healthcare personnel from the public sector to the private sector because of greater opportunities in the form of tax concessions for import of medical technology and infrastructural facilities. Secondly, unregulated commercialization and rising cost has adversely impacted quality and cost of healthcare. This is because of variability in providers' qualifications, training and technological knowledge. The third factor is introduction of market reforms in the health sector during the 1990s. Reforms introduced user fees, provision of clinical and ancillary services to the private sector and public private partnership (Duggal, 2005, cited in Baru et al., 2010). Factors such as availability and affordability of healthcare, healthcare consciousness of the population, responsiveness of healthcare system, price of healthcare services and quality of

care determines utilization of available healthcare services (Peters et al., 2002, cited in Ghosh, 2009). As already discussed majority Indians now seek outpatient and inpatient care at private health centres, and this trend has been increasing over time (Ghosh, 2009).

Mukherjee and Karmakar (2008) while analyzing demand for healthcare in India, based on unit-level data from the NSSO 60th round, explored three important avenues through which health and human development may be related. These are demographic characteristics, education level of head of household, and expenditure groups. They suggest different strategies with respect to health seeking behaviour in rural and urban areas. The estimates show that rate of inpatient care utilization (number of hospitalization cases per 1,000 population) increased substantially between 1995-96 and 2004 (from 15 percent to 26 percent).

a) This increase was higher among the poor (from 6 to 16, a 167 percent increase) than the rich (from 44 to 52, an 18 percent increase).
b) At the state level, in 1995-96, rural Kerala and rural Bihar reported the highest (82) and lowest (6) rates of inpatient care utilization respectively.
c) Assam's inpatient care utilization rate increased from 9 to 11 during this period.

Based upon the NSSO 42nd, 52nd and 60th round results, Mukherjee and Levesque (2010) argue that while economic status related inequality in inpatient care utilization has declined in recent years that has not made situation better for the poor. They attribute this decline to an overall decline in dependence on the government healthcare system as well as an increase in costs of inpatient care services in the government hospitals. In other words, accessibility of government health facilities has also become difficult due to higher charges. Mukherjee and Levesque (2010) also argue that the average costs of inpatient care in government hospitals has increased across states in India, so much so that it has exceeded the prices of essential food items resulting in net welfare losses to the poor (ibid, 2010).

1.4.3 Prevalence of morbidity in India

NSSO in its 52nd round report *Morbidity and Treatment of Ailments* defines morbidity in terms of ailments, illnesses or any kind of injury. Ailments and illnesses are explained as 'any deviation from the state of physical or mental well-being'. In the report *Burden of Diseases in India* prepared by the National Commission of Macroeconomics and Health (2005), India is characterized by high levels of prevalence rate of communicable and non-communicable diseases. Communicable diseases such as tetanus, measles, pneumonia, leprosy, malaria and

hepatitis are still common in India. Similarly, non-communicable diseases such as asthma, chronic obstructive pulmonary diseases (COPD), hypertension, diabetes, injuries, arthritis etc. no longer afflict only the rich. Lack of nutritious food and infections during early stages, lead to high degree of chronic illnesses in later life (NCMH, 2005; Mukherjee et al., 2015; Prabhakaran et al., 2013; Bhojani et. al., 2013; Patel et al., 2011).

In India chronic disease are severely under-reported and hence under-treated as well. People depend heavily on pharmacies and traditional healers for minor illnesses, and there is no scope of it being recorded by government health institutions. Therefore special morbidity surveys are carried from time to time. Ghosh (2014) in his analysis of health sector reforms and prevalence of untreated morbidity, based on NSSO 52nd and 60th round survey, found that the proportion of respondents who cited access to healthcare facilities as the reason for not seeking care increased from 9 percent to 12 percent during the period respectively. Untreated morbidity is higher among rural population than in urban. User fees and high price of medicines affects the access of public health facilities by the poor. The opportunity cost of visiting a private health facility is also very high, resulting in low health seeking among the rural poor.

Sundararaman and Muraleedharan (2015) analyzed the 71st NSSO round on morbidity and utilization of healthcare and found that the gap between proportions of persons ailing has increased in rural and urban areas. The proportion of persons reporting ailment was 55 per thousand persons in 1986-87 which increased to 89 per thousand persons in 2014 in the rural areas. Similarly the proportion of person reporting illnesses in urban areas increased from 54 to 118 per thousand persons during the same period. This is probably because of perception, awareness, socio-economic condition and cultural factors which has an impact on morbidity of a region. For instance, states with better maternal and child health indicators have higher morbidity reporting than those with poor indicators. Thus the issues of accessibility and awareness among the common masses have an important role to play in morbidity reporting. Regarding the role of healthcare providers, it has been observed that dependence on traditional healers or self-medication has been declining. It was 18 percent in 2004 and declined to 4 percent in 2014[1].

[1]This is because of the fact that in the earlier rounds self-medication was considered as no treatment while in the 71st round those who seek care by self medication were considered under treated ailments.

The extent of morbidity is also determined by various socio-economic factors like age, education, caste, religion, per capita consumption expenditure and socio-economic status. Evidences show that there are gender differentials in morbidity prevalence rate; the risk of illness is more among females (Duraiswamy, 1998; Navaneetham, et al., 2009). Other than these factors, the prevalence rate of any kind of morbidity, whether acute or chronic, also depends on the extent of utilization and access to institutional healthcare facilities (Duraiswamy, 1998; Getler and Van der Garg, 1990). It depends on costs and benefits accruing to the ailing individual. Costs here imply financial expenditure in the form of doctor's fees, diagnostic tests, medicines and drugs and other costs including attendant charges, expenditure on medical appliances and transportation cost. Utilization not only depends on costs but also on physical accessibility to healthcare services, educational level of the respondents, socio cultural environment and economic status of the people.

1.5 HEALTH OUTCOME INDICATORS AND HUMAN DEVELOPMENT

Among the South Asian countries, India has the highest proportion of underweight children and children with nutritional deficiencies. The health outcome indicators like infant mortality rate and maternal mortality rate are also one of the highest in India in comparison to major countries of the world (World Bank, 2014). Maternal mortality ratio in developing countries is 50 times higher than in the developed world. Six lakh women die every year due to maternal health related reasons; and 99 percent of such deaths occur in the developing countries (Radhkar et al., 2007).

There are wide variations with respect to health outcome indicators across Indian states. Only a few states have been able to provide comprehensive healthcare services to its citizens. The public health system has been suffering from gross inadequacy of health personnel, insufficient funding and low quality of care. As a result there is diversion of the people towards the private healthcare sector instead of government health facilities (Kumar et. al., 2011). One of the major factors of low levels of health outcome in India is low levels of public health expenditure in the state. The richer states are generally the states with high per capita health spending and better health indicators in the form of full antenatal care, immunization, safe deliveries and better nutritional indicators. But there are exceptions too. Some of the richer states like Gujarat and Haryana have low per capita expenditure on health. On the other hand Rajasthan which is a state with low per capita income has higher per capita health expenditure (ERF, 2006). Erhijakpor (2007) found in his study on "Health Expenditure and Health Outcome in Africa", that health expenditure has a statistically

significant effect on health outcome indicators like infant mortality and under-five mortality rate of the country. Some of the studies which found that public health expenditure have a positive effect on health outcome indicators include (Bhalhotra, 2007; Farahani, et al., 2010).

Latest estimates show that there have been improvements in status of some of the maternal and child health indicators although slow in India (Sinha, 2015 based on Rapid survey on Children 2013-14). Rates of institutional delivery and births attended by health professionals have also increased. The proportion of institutional delivery has almost doubled but improvement in these health indicators are not reflected in the health outcome indicators of the state. For instance, the infant mortality and maternal mortality ratio of the state is still very high. Although the proportion of institutional deliveries and birth attended by health professionals are on a rise, indicators like post natal care and antenatal care does not seem to have improve significantly. Moreover, inequities in terms of wealth quintiles have also been observed. 93 percent of the women delivered their babies in the health institutions in the highest wealth quintiles while the same is 61 percent for the lowest wealth quintiles. In terms of child health indicators improvement are noticed in the proportion of underweight children, immunization and breastfeeding indicators. However as far as complementary feeding is concerned the achievements are not satisfactory.

The Report of the National Commission of Macroeconomics and Health (2005) discusses in length that the public health system of the country does not have proper norms for allocation of resources and monitoring of various health programmes. For instance, in case of Uttar Pradesh, health spending on primary care is high while a negligible amount is spent on tertiary sector. The tertiary sector comprises of medical education, research and training, which has a long term effect on the quality of health personnel trained and the negligence of the sector might result in shortages of skilled manpower. This will have an impact on the delivery of the healthcare services in primary healthcare sector in the form of skilled human resources in the long run. In addition, there is the problem of proper utilization of available resources in the health sector of the country. In most of the cases the resources available are not properly utilized. In countries like Bangladesh and Indonesia the per capita health expenditure or more or less same as that of India but the performance of health outcome indicators are better than India. The current level of funding is grossly inadequate as evidenced from most of the study on healthcare financing. As a consequence of the stagnant budgetary allocation in the health sector of the country, the quality of care has been

deteriorating over the years and the impact can also be seen in terms of decline in utilization of government healthcare services by the households (ibid, 2005).

Health outcome indicators of Assam

Assam's health outcome indicators are below the Indian average. Life expectancy at birth in Assam is 59 years compared to the national average of 64 years. Infant mortality rate (IMR) in Assam (61 deaths per 1000 live births) is higher than that in India as a whole (50 deaths per 1000 live births) (Government of India, 2010). Assam also has the highest number of neonatal mortality (45.5 deaths per 1000 live births) and infant mortality rates (66.1 deaths per 1000 live births) among the north eastern states. The post neonatal mortality (20.6 deaths per 1000 live births) and under-five mortality rates (85.0 deaths per 1000 live births) of Assam are also the highest amongst the north eastern states (IIPS, 2007). The Assam Development Report of 2003 highlights that higher child mortality rates in Assam are due to adverse health conditions of the mother, lack of birth facilities, and lack of care of newly born babies. A large percentage of the population is also deprived of access to basic health services such as vaccination like Bacillus Calmette Guerin (BCG); Measles, Diphtheria, Pertussis, and Tetanus (DPT); and Polio (Planning Commission, 2003). Like IMR, maternal mortality is also highest across the Indian States. MMR in Assam is 300 per lakh live births while the all India figure is 200 (Government of India, 2014).

The 3rd District Level Health Survey of India shows that the percentage of institutional delivery is third lowest in Assam, only above Bihar and Uttar Pradesh. Among the north-eastern states also the percentage of institutional delivery is the lowest (35 percent women in Assam delivered their babies in a health institution compared to 46 percent in India). Percentage of home delivery is 64 percent for the state while at all India level it is 52 percent. Similarly percentage of safe delivery is the third lowest in the state of Assam (40 percent). Percentage of women will full antenatal care 8.5 percent in the state which is not only below the Indian average but also one of the lowest among north-eastern and other states. Again, nearly about 78 percent of births take place at home and only 22 percent takes place in a health facility in Assam. The percentage of fully immunized children is 51 percent which is again lower than the Indian average (54 percent). Percentage of children receiving at least of one dose of Vitamin A supplementation is 50 percent for the state of Assam which is also one of the lowest across all the states of India.

A study in the state of Assam by Gogoi et al. (2014) showed that use of rigorous healthcare services can reduce maternal health complication. Moreover, it is necessary to improve the level of awareness among the women regarding use of more and more antenatal care services during the reproductive period (Dutta and Bawari, 2007). Deka (2014), mentions that, there is a need to improve the maternal health condition of the state with proper emphasis on impediments related to gender biases and neglect of women in the community. The common masses should also be made aware of various health programmes which have been implemented. Socio-cultural and factors related to service delivery should also be addressed carefully. Moreover, it seems that the major problem in the state of Assam is lack of skilled health personnel in the rural areas of the state (ibid, 2014). A study by Singh et al. (2012) revealed that, the utilization of maternal healthcare services is found to be lower among the women from the poor households than the richer ones. Moreover, there is considerable district level variation in terms of utilization of maternal healthcare services.

There are also evidences of rural urban disparity in provision of antenatal care. Eighty-seven percent of urban women received antenatal care from a health professional for their last birth, while it is only 64 percent for rural mothers. A very high level of disparity can be also being observed in terms of institutional delivery. The percentage of institutional delivery in the state is 54 percent for the rural mothers while it is 76 percent for the urban mothers. Similarly, the percentage of women receiving full antenatal care is 11 percent for rural mother and the same is 19 percent for the urban mothers. Again 46 percent of the mothers in the rural areas delivered those babies at home while the percentage of women delivering at home is 23 percent for urban mothers. Mothers receiving post natal care after 1 week of delivery are 57 percent for the rural population and 79 percent for the urban population. In terms of child health indicators, the percentages of children fully vaccinated is 58 percent for the rural population and 64 percent for the urban population. Again in rural areas the percentage of children whose birth weight has been taken is 49 percent while the same for urban areas is 75 percent. Thus there are presence of vast disparity in terms of various maternal and child health indicators across the rural and urban population of the state (Government of India, 2011).

1.6 JUSTIFICATION OF THE STUDY

The study focuses on the state of Assam because

A). Health outcome indicators reflects velnerability. The crucial health outcome indicators show that Assam's health status is vulnerable when compared to not just the other major states of India but also among the other north eastern states of this region.

B). There is a huge disparity in terms of performance of health indicators across rural and urban areas of the state. This emancipate the need to investigate the health scenerio specifically for the rural population of the state at the disaggregated level.

C). Research attention on the state of Assam has been relatively low. There are not many studies focussing on the health sector in the post reform period.

D). Studies shows that since the introduction of NHM in 2005, funds transfers to the north-east region have increased. In this context, the budgetary and non-budgetary expenditure made in Assam deserves attention.

E). Given the overall performance of the public health sector in Assam, a study on morbidity and private expenditure on health of the rural households will provide an assement of health status.

1.7 RESEARCH OBJECTIVES AND QUESTIONS

Research objective 1: To study the level, extent and pattern of government expenditure on public healthcare services in rural Assam after economic reforms in the social sector.

1. What is the state of expenditure on urban and rural health services?
2. How has the state performed in terms of creating rural health infrastructure?

Research objective 2: To assess the status of healthcare among rural households and to examine the factors explaining the differences across households.

1. What is the proportion of rural households suffering from chronic and acute morbidity in the study areas?
2. Do differences in household socio-economic characteristics affect morbidity?
3. What is the state of functioning and utilization of public health services in rural areas?
4. What is the impact of public health programmes on maternal and child health in the study areas?

Research objective 3: To study the impact of out of pocket expenditure on health on the economic wellbeing of rural households.

1. What is the share of health expenditure in total consumption expenditure of the rural households?
2. When does out-of pocket expenditure on health start having catastrophic effects on the households?
3. What are the determining factors of catastrophic health expenditure?

1.8 DATA SOURCES AND CHAPTER OUTLINE

Secondary sources, Government of Assam	
State and district statistical handbook	Directorate of Economics and Statistics
Economic Survey, various issues	Department of Finance
Demand for Grants, various issues	Department of Health and Family Welfare
Demand for Grants, various issues	Public Works Department
Secondary sources, Government of India	
Economic Survey, various issues	Ministry of Finance
Published reports on Public Finance, various issues	Centre for Monitoring Indian Economy
Demand for Grants, various issues	Ministry of Health and Family Welfare
Household Consumer Expenditure Survey in India, (Quinquennial round survey)	National Sample Survey Organization
a. 55th round report on Level and Pattern of Consumer Expenditure (Report No. 457)	National Sample Survey Organization
b. 61st round report on Level and Pattern of Consumer Expenditure (Report No.508)	National Sample Survey Organization
c. 66th round report on Levels and Pattern of Consumer Expenditure (Report No.538)	National Sample Survey Organization
Health rounds	National Sample Survey Organization
a. 52nd round report on Morbidity and treatment of ailments (Report No.441)	National Sample Survey Organization
b. 60th round report on Morbidity, Healthcare and the condition of the Aged (Report No. 507)	National Sample Survey Organization
c. 71st round report on Key Indicators of the Social Consumption in India: Health (NSS K1 (71/25.0)	National Sample Survey Organization
Secondary sources, Autonomous institutions	
National Family Health Surveys	International Institute of Population Sciences
District Level Household and Facility Surveys	International Institute of Population Sciences and Ministry of Health and Family Welfare
Primary data	
Detailed sample survey of rural households	Based on structured and close ended interview schedules

Chapter outline:

Chapter 1: **Introduction and review of literature**

Chapter 2: Public health expenditure in Assam: 1990-91 to 2011-12 studies the extent and pattern of public health expenditure in Assam from the period of 1990-91 to 2011-12. The budgetary expenditure on health is the focus of this chapter.

Chapter 3: District ranking and methodology of selection of study area ranks the districts of Assam based on some crucial health related domains and then based on a composite index ranking two districts are selected to collect cross-section data on health.

Chapter 4: Village and household profile describes the location of the study area and brings out the differences in socio-economic characteristics of both villages. This chapter also highlights the basic health entitlements and facilities available in the study area.

Chapter 5: Prevalence of morbidity among rural households examines the extent of morbidity (acute and chronic) in the study area. The factors causally affecting morbidity are also examined.

Chapter 6: Health related out of pocket expenditure among rural households studies the impoverishment effect of out of pocket expenditure on health among the households.

Chapter 7: **Public health facilities in the study villages** discuss the hierarchy of public health facilities in the context of rural areas in Assam. The state of public facilities in the study area is discussed in detail.

Chapter 8: **Summary and Conclusions**

Chapter 2

Public Health Expenditure in Assam: 1990-91 to 2011-12

This chapter discusses the levels and patterns of public health expenditure in Assam. The analysis is based on secondary data for the period 1990-91 to 2011-12. The focus is on health expenditure because health outcomes are a direct function of public health expenditure. Public health expenditure includes expenditure incurred by the state government, central government and the local bodies. Private health expenditure constitutes expenditure incurred by households, firms, insurance companies, non-government organization and expenditure through external flows. External flows are basically expenditure incurred by various bilateral and multilateral agencies such as USAID (United States Agency for International Development), UNDP (United Nations Development Programme), DFID (Department for International Development) etc. (National Health Accounts, 2004-05).

In India health is both a union and state subject, however the onus of making expenses on the health sector is largely on the state governments. The states generate resources to be spent on the health sector from the tax and non-tax revenues of the state. Central government expenditure on health is largely channeled through the Ministry of Health and Family Welfare. However other ministries, such as Ministry of Human Resources Development, Welfare, Labour, Defence, Food and Civil Supplies and Rural Development also have health expenditure heads. In this chapter we are only concerned with the budgetary expenditure made on health. Non- budgetary expenditure flows have not been considered. However it is worth noting that of the total health expenditure in a state, budgetary expenditure forms the largest share.

The data sources that we have relied on are Finance and Accounts (FA) compiled by the Comptroller and Auditor General of India (CAG) and detailed demand for grants (DDG) of Ministry of Health and Family Welfare (MOHFW). The DDGs are unaudited data which is discussed and voted in the parliament. On the other hand Finance and Accounts are audited by the CAG. The major heads considered under public health expenditure are Medical and Public Health and Family Welfare. While expenditure on Medical and Public Health is largely made by the state governments, Family Welfare expenditure is almost exclusively the Central government domain. Both capital and revenue accounts of the respective heads constitute the total health expenditure of the state. The respective heads are coded as 2210: Medical and Public Health, 2211: Family Welfare, 4210: Capital Expenditure on Medical and

Public Health and 4211: Capital Expenditure on Family Welfare. The data for public health expenditure has been collected for the period 1990-91 to 2011-12. The data is compiled for the specific period because there was a major policy shift towards privatized healthcare systems after the initiation of economic reforms in the 1990s. This had impact on health sector in the states as well.

Section 2.1 describes the institutional set up of medical and public health administration in the state of Assam. Section 2.2 discusses the pattern of public health expenditure with respect to GSDP of the state. Section 2.3 discusses the overall extent and pattern of public health expenditure in the state. This section briefly discusses about various components of health expenditure under the head of medical and public health and family welfare (for instance, rural health services, urban health services and public health) which together constitute the total health expenditure of the state. Section 2.4 discusses briefly about expenditure pattern of National Health Mission (NHM) in the state of Assam.

2.1 INSTITUTIONAL SET UP OF MEDICAL AND PUBLIC HEALTH ADMINISTRATION IN ASSAM

Medical and public health services and Family Welfare are considered as direct health services. Direct health services are both preventive and curative in nature while indirect health services are only curative in nature. Preventive health care implies measures for control of diseases while curative healthcare is related to treatment of diseases. Indirect health services include expenditure on water supply and sanitation. Thus direct healthcare services are broader in concept and they have implications for provisioning of various healthcare services and have a direct effect on the health outcome of the state (Hooda, 2013). The secondary data considered here relate only to direct health services. Indirect health services such as water and sanitation and electricity are however used as variables in the cross section study of households in Chapters 5 and 6.

Medical and public health expenditure in Assam is carried under the Department of Health and Family Welfare, Government of Assam. There are three branches under the Department of Health and Family welfare. They are Directorate of General Health Services (GHS), Directorate of Health Services, family welfare (FW), and Directorate of Medical Education Research and Training (MERT).Total budgetary expenditure comprise resources spent under revenue account and capital account. As far as total budgetary expenditure on health is concerned, there are three heads: (a) medical (b) public health and (c) family

welfare. In the budget accounts of Government of Assam, (a) and (b) are clubbed together under the head medical and public health expenditure (M&PH) which is administered under the supervision of Directorate of General Health Services (GHS) and MERT, while the second category family welfare (FW) which runs under the supervision of Directorate of Health Services, Family welfare.

More than 90 percent of total budgetary expenditure on health is made in the category M&PH. Medical and Public Health has two major components: urban health services and rural health services. The sub-heads included under urban health services are allopathic and other systems of medicine, direction and administration, training of employees, employees state insurance schemes, departmental drug manufacture, school health schemes and expenditure on hospitals and dispensaries. Likewise, rural health services include allopathic and other systems of medicine, primary health centres, community health centres, and hospitals and dispensaries. Some sub heads are expenditure on direction and administration, prevention and control of diseases, prevention of food adulteration, drug control, public health laboratories and public health education. Under the category rural health services, expenditure on primary health centre (PHC) and community health centre (CHC) take the largest share. The various components under medical and public health has been depicted in Table 2.1.

The core functions of Directorate of MERT (also a part of M&PH) include research in the field of medical sciences, establishment of fully-equipped hospitals, sustenance of medical education through proper training, provide quality health care facilities, improve the functioning of the various streams of medicine like allopathy, homeopathy, ayurveda and paramedical science and establish of quality educational institutions and to hold administrative control over all medical colleges and hospitals under it. Expenditure heads under MERT also comprise direction and administration, ayurveda, homeopathy, allopathy and hospitals and dispensaries.

The Department of Health and Family Welfare, also known as the Directorate of Health Services (family welfare) mostly coordinates the central government sponsored programmes. Family welfare being a fully central government funded programme, the state is only an implementing agency through a network of rural and urban family welfare centres[2].

[2] The Family Welfare programme was introduced in 1952. During the fourth five year plan, maternal and child health care services, which was mainly concerned with the health of mothers and children were also integrated into the family planning programme. The Programme was renamed as Family Welfare Programme in 1977-78.

Table 2.1 *Components of Medical and Public Health and Family Welfare*

Medical and Public health				*Family Planning*
A. Urban health services (Allopathy)	*B. Rural Health services- (Allopathy)*	*Medical education training and research*	*Public health*	*Family planning*
Direction and administration	Health sub centres	Direction and administration	Direction and administration	Maternity and child health
Training	Subsidiary health centres	Ayurveda	Prevention and control of diseases	Centrally sponsored schemes, direction and administration
Employees state insurance schemes	Primary health centres	Homeopathy	Prevention of food adulteration	Training
District medical stores	Community health centres	Allopathy	Drugs control	Rural family Welfare services
Departmental drug manufacture	Hospitals and dispensaries	Hospitals and dispensaries	Public health laboratories	Urban family welfare services
School health schemes	Other expenditure	Other expenditure	Public health education	Transport
Hospitals and dispensaries	*C. Rural health services- other system of medicine*			Compensation
Other health schemes	Ayurveda			Mass education
Other expenditure	Homeopathy			Other services and supplies
B. Urban health services, Other system of medicine				Other expenditure
Ayurveda				
Homeopathy				

Expenditure on family welfare comprise spending on direction and administration, training, rural family welfare services, urban family welfare services, maternity and child health, transport, communication, mass education and other services and supplies. Direction and administration comprise expenditure on state secretariat cell, state family welfare bureau and district family welfare bureau.

The training component includes expenditure on health and family welfare training centre, training of auxiliary nurse midwives, training of lady health visitors, orientation of private medical practitioners, homoeopathy and Indian system of medicine, training of employment of multipurpose workers scheme, training of traditional birth attendants and community health workers. Rural family welfare services comprise expenditure on rural family planning centre. Expenditure on maternity and child health includes among other things immunization of infants and children. Transport includes expenditure incurred on state health transport organization, funds for major repairs and procurement of vehicle for rural family welfare planning centre, state and district family welfare bureau. Under mass education expenditure is on orientation camps. Other services and supplies include expenditures on supply of surgical equipments of family welfare planning centre, sterilizations beds, post mortem centre etc. The Directorate of medical education, research and training was established in 1984 under the Department of Health and Family Welfare.

2.2 *EXTENT AND PATTERN OF PUBLIC HEALTH EXPENDITURE IN ASSAM*

One of the important indicators of the inadequacy of public health spending in India is reflected in the lower percentage of health spending with respect to Gross State Domestic Product. In most of the developed countries of the world public spending account for around 5 percent of GDP. In India public expenditure on health is less than 1 percent of GDP. Study of public health expenditure with respect to GDP is important because it is a major determinant of health expenditure. As the ratio of health expenditure to GDP increases, economic and industrial development of the country is also enhanced (Smith, 1963, 1967, Hitris and Posnett, 1992; Hansen and King, 1996; Gerdtham and Lothgren, 2000; Karataz, 2000).

In Assam on an average 1.08 percent is spent on health. Moreover, there has been a decline in health expenditure of the state since 1990-91 to 1999-2000. The proportion of health expenditure to GSDP declined from 1.21 in 1990-91 to 1.06 in 1999-2000. One of the probable reasons of declining public health expenditure as a proportion of GSDP is the

initiation of the structural adjustment programme at the centre in 1991[3]. There was a reduction in the central transfer of funds to almost all states so as to contain the fiscal deficit. This resulted in reduction in the resource pool of the state governments because of which the state governments were forced to cut down their budgetary allocation on different sectors specifically the health sector (Selvaraju and Annigeri, 2001, Tulasidhar, 1993, Ghuman et al. 2009, Choudhury and Nath, 2012). Sarma (2004) in a study related to health expenditure in Assam has noted that in times of fiscal hardship public expenditure has been squeezed more in the health sector than in any other sector.

Table 2.2 *Health expenditure as a proportion of Gross State Domestic Product (GSDP) of Assam, in percent, 1990-91to 2011-12*

Year	*Share of health expenditure in GSDP*	*Share of total health expenditure in total social sector expenditure*
1990-91	1.21	16
1991-92	1.32	16
1992-93	1.15	15
1993-94	1.23	15
1994-95	1.17	12
1995-96	1.17	15
1996-97	1.10	15
1997-98	1.12	14
1998-99	0.92	12
1999-2000	1.06	13
2000-01	0.97	12
2001-02	0.94	13
2002-03	0.76	12
2003-04	0.78	11
2004-05	0.80	10
2005-06	0.71	10
2006-07	0.89	12
2007-08	0.92	13
2008-09	1.15	14
2009-10	1.71	17
2010-11	1.42	14
2011-12	1.40	14
Average expenditure	*1.08*	*13*

Source: Finance Accounts, annual reports, Government of Assam

[3] A study of the macroeconomic conditions and health policy reforms on public expenditure on health among the Indian states reveals that during the period between 1987 to 1992 growth rates in public expenditure was negative for all the states including Assam. In the 2nd phase (1993-1998), the introduction of the structural adjustment programme has adverse impact on the health sector of most of the states. During this period the growth rate in per capita health expenditure was negative in some of the states like Assam and Uttar Pradesh which was mainly due to financial stress in these states, resulting in cut in expenditure on health (Hooda, 2013).

The entire period covering 2000-2001 to 2007-08, the health expenditure as a proportion of GSDP was less than one. Choudhury et al., (2011) noted that although there has been a decline in the expenditure in the central fund to the states due to initiation of economic reforms, the centre still is spending a major amount on family planning and disease control programme. However during the mid-nineties various donor agencies and autonomous bodies emerged through whom the central government directly invested in the state. This resulted in a decline in the central expenditure to the state through the budgetary channel which might explain the continuous decline in the public health expenditure since 2000-2001. It was only after 2007-08, that a slight increase has been noticed in the share of health expenditure to GSDP of the state. One reason for the increase in the share of health expenditure to GSDP might be the implementation of the National Rural Health Mission in the state, which included the state share of central expenditure. Health expenditure as a proportion of total social service expenditure also shows a declining pattern since 1990-91 to 2005-06. It declined from 16 percent in 1990-91 to 10 percent in 2005-06. However, a slight increase in health expenditure was noticed since 2006-07 (Table 2.2).

Revenue and capital expenditure on health account

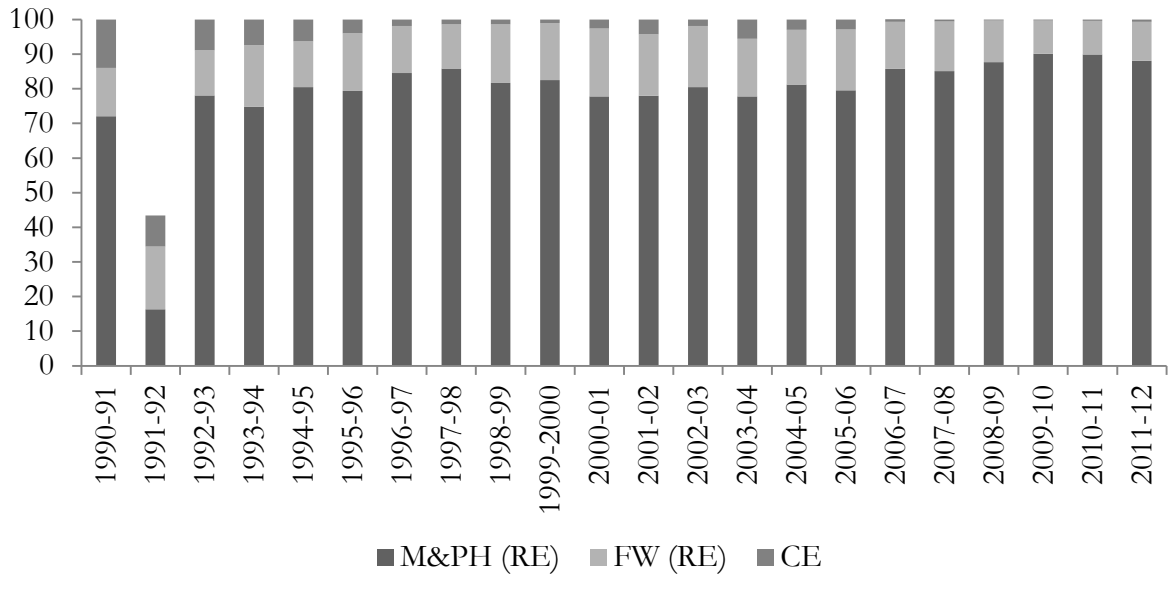
The pattern of revenue and capital expenditure on health reflects the nature of change undergoing in the health sector of the state. Capital expenditure includes spending on construction of hospital buildings, health centre and installation of equipments and machineries[4]. Revenue expenditure is of a recurring type necessary for daily operation and administration of government sponsored programmes. Thus it includes wages and salaries and expenditure on consumables. In Figure 2.1, revenue expenditure on medical and public health (M&PH) and family welfare (FW) is stacked separately. Capital expenditure incurred on the health sector is combined to show the total capital expenditure.

During the entire period under consideration, the level as well share of revenue expenditure was always higher than capital expenditure. It ranged from 80 percent to 100 percent of total health expenditure over the period under consideration. The revenue expenditure was 86 percent of total health expenditure in 1990-91, 96 percent in 2001-02 and 99 percent in 2011-12. The share of capital expenditure decreased from a high of 14 percent in 1990–1991 to only 1 percent in 2011–12. Capital expenditure on health saw a rise only during the early

[4] The 12th plan approach paper of the Planning Commission has also emphasized the role of the capital investment on health. According to the approach paper, one of the major factors behind poor quality of health care services is the lack of capital investment in the health sector of the country for a prolonged period of time.

period of 1990s which was followed by a continuous decline since 1999-2000. However a slight increase in capital expenditure was observed for the period 2000–2001 to 2005–2006, the highest points being in 2001–2002 (4 percent) and 2003–2004 (5 percent), respectively.

Figure 2.1 *Share of revenue and capital expenditure in total health expenditure, Assam, in percent,1990-91 to 2011-12*



There has been no systematic allocation of expenditure on strengthening of basic infrastructural facilities in the state of Assam which is one of the important areas of investment[5]. However, during the recent period the National Rural Health Mission has sought to strengthen the necessary infrastructure of the state in the form of construction of primary health centre, community health centre and sub-centre. This expenditure is not reflected in the budgetary heads as they are being incurred under NHM flexible pool of the states under state programme implementation plan. NHM flexible pool is one of the major components under NHM. The NHM flexible pool is one of the important components under NHM. The NHM flexible pools are incurred through Mission Flexible Pool and RCH flexible pool. NHM flexible pool implies expenditure on construction of health infrastructural facilities, up gradation of existing facilities, mobile medical units and

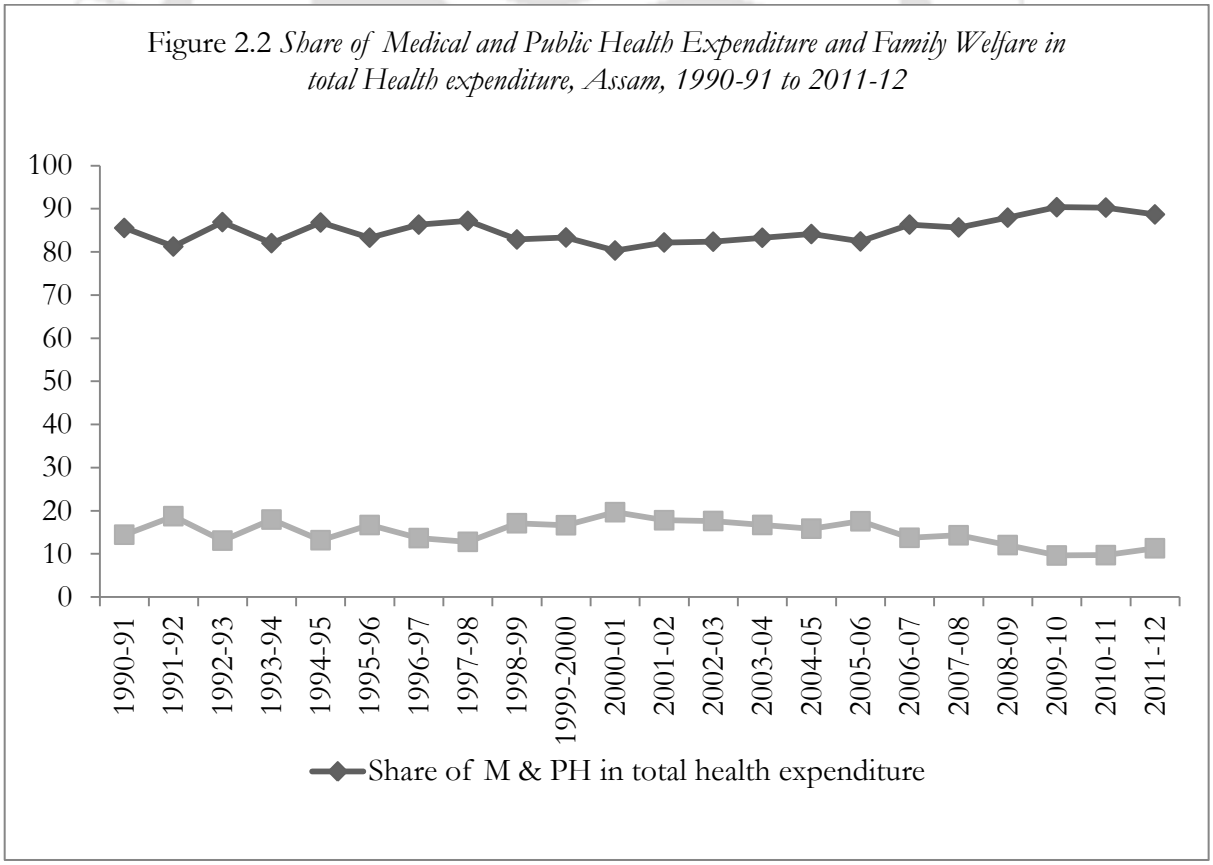
[5] In case of India as a whole also the share of revenue expenditure is higher than the capital expenditure. Moreover, there has been a decline in the capital expenditure by the Ministry of Health and Family Welfare over the years (Economic Research Foundation, 2006, NCMH, 2005). Duggal et al. (2005) in his book "Review of Healthcare in India" mentioned that capital expenditure on health has been declining over the period since 1975-76. Capital expenditure as a share of revenue expenditure declined from .11 percent in 1975-76 to 0.05 percent in 2002-03.

ambulance services. Expenditure on RCH flexible pool implies expenditure on reproductive and child health such as family planning, immunization and adolescent health.

2.3 PATTERNS OF EXPENDITURE ON MEDICAL AND PUBLIC HEALTH AND FAMILY WELFARE

There has been a continuous increase in the share of expenditure on M&PH in total health since 1990-91 to 2011-12. For the entire period it ranges between 80 percent in 2000-01 to 89 percent in 2011-12[6]. Although a major proportion of expenditure is spent on M&PH in the state, out of the total expenditure spent on M&PH, a major amount of the expenditure (both plan and non-plan) is spent on wages and salaries. This resulted in low levels of spending on non-salary components such as machinery, equipments, maintenance and materials and supplies. Previous studies show that although the government is allocating sufficient amount of money for maintenance, it has not been utilized properly (Dutta and Bawari, 2007)[7] (Figure 2.2).

Figure 2.2 *Share of Medical and Public Health Expenditure and Family Welfare in total Health expenditure, Assam, 1990-91 to 2011-12*



[6] Expenditure on medical and public health comprises of a major share in total health expenditure of all the states (ERF, 2006).

[7] Estimates show very high level of staffing expenses on wages and salaries in India leaving little fund for purchase of machinery equipments, drugs, materials and supplies. This has an adverse impact on the overall quality of health care delivery services in the country (Hooda, 2013, Duggal et al. 2005).

Arokiasamy et al., (2011) mentioned that emphasis has been given on family welfare as a separate department because these programmes are playing a role in satisfying some of the important goals which have policy implications. Two such important goals are: (a) reduction of fertility rates and (b) stabilization of population. However the International Conference on Population and Development in Cairo by United Nations which was held in 1994 broadened the concept of family welfare and now it is being considered as a programme aiming improvement of health of women and children and to protect the rights of the women (ibid, 2011).

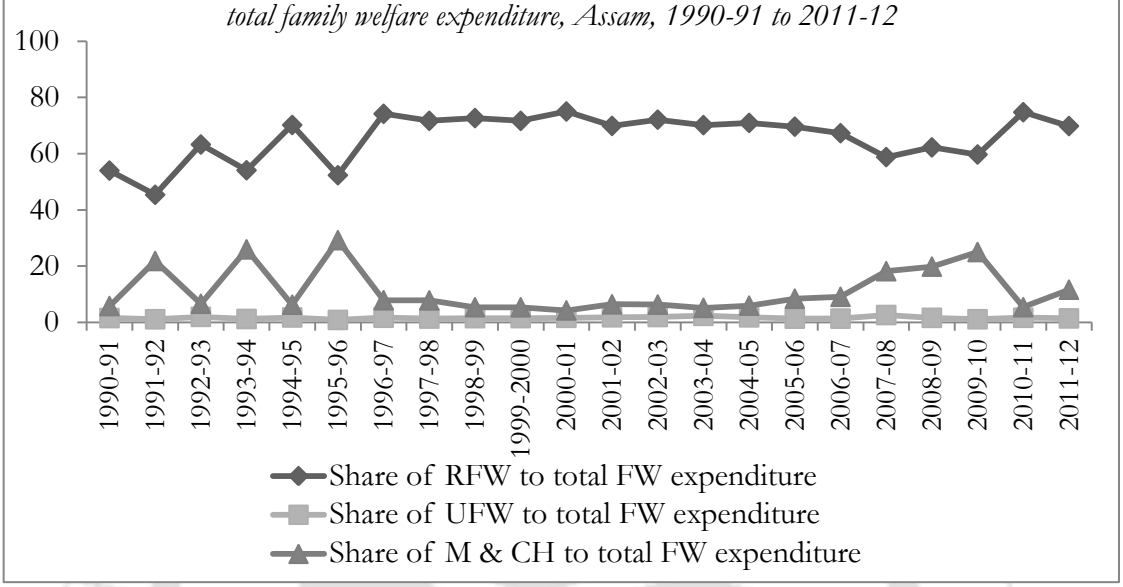
The share of expenditure on family welfare was observed to be very low during the early 1990s. However an increase in the share of family expenditure has been observed since 1997-98. It increased from 13 percent in 1997-1998 to 18 percent in 2005-06. This increase in the share of expenditure may be attributed to introduction of reproductive and child health schemes in 1997. During the period covering 1997-98 to 2005-06, the share of expenditure on family welfare was more or less constant. It varies from 16 percent to 19 percent of total health expenditure of total health expenditure of the state. However a decline in the share of family welfare programme has been noticed since 2005-06. This decline in the share of expenditure could be due to funds coming in through the National Health Mission. The mission implemented various schemes such as universal immunization scheme and reproductive and child health scheme. Under these schemes a large amount of funding was done and the budgetary expenditure on family welfare tends to decline during this period (see Figure 2.2).

Expenditure on various components of family welfare

The share of heads under family welfare shows remarkable variations. The share of rural family welfare services has been more or less constant during the period 1996-97 to 2005-06. However, there is a continuous decline in expenditure after 2006-07. It was only after 2009-10, that an increase in the share of rural family welfare services has been noticed. Expenditure on urban family welfare services shows a fixed pattern of expenditure over the period, varying from 1.54 percent in 1990-91 to 1.43 percent in 2011-12. In overall terms, expenditure on urban family welfare services has been very low with respect to the other components of family welfare. There seems to be a considerable variation in expenditure on maternity and child health care services in total family welfare expenditure. However, a sudden increase has been observed in the share of expenditure on maternity and child health

during the period 2004-05 to 2009-10 while a sudden decline in the expenditure was noticed during 2009-10 to 2010-11 (Figure 2.3).

Figure 2.3 *Share of rural, urban and maternal and child health components in total family welfare expenditure, Assam, 1990-91 to 2011-12*



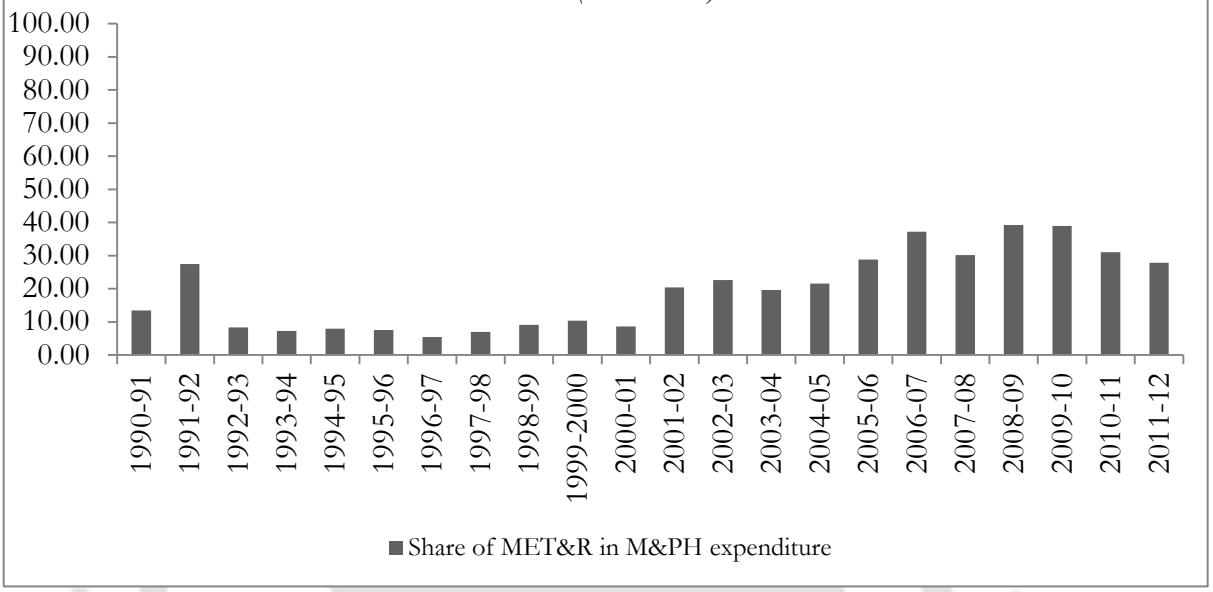
Medical Education, Research and Training

This is one of the areas which require much investment because the primary healthcare sector is dependent on this source for supply of trained health personnel or human resources in the long run. The primary care services will be adversely affected if there is insufficient investment in the field of medical education research and training (NCHM, 2005). ERF (2006) focused on greater investment on medical education, research and training. The research foundation focused on two reasons behind greater public investment in this area: Firstly, the multinational companies in the developed world are not focusing on the developing countries as the patented drugs are not related to the diseases which are mostly prevalent in India. Secondly, technological innovations among the Indian producers should be increased, which is generally inadequate in the state.

The pattern of expenditure on medical education research and training in the state of Assam seems to be grossly inadequate for the entire period from 1990-1991 to 2000-01. Some increase in the share has been observed only after 2000-01. It increased from 9 percent in 2001-02 to 39 percent in 2009-10. Although a slight decline was observed during the period of 2010-2011, the situation was much better than the early period of 1990s. During 1990s there has been tremendous development in the field of medical technology at the all India level, but due to lack of funds, Government of Assam could not provide these techniques

and equipments. As a result the medical institutions have to refer a good number of patients for treatment to other developed medical hospitals and institute outside Assam (Sarma, 2004) (Figure 2.4).

Figure 2.4 *Share of Medical Education Research and Training in Medical and Public Health (M and PH)*



Rural and Urban Health Services

The two most important components of M&PH in Assam are those pertaining to rural and urban health services. Under the category of rural health services, expenditure on primary health centres (PHCs) and community health centres (CHC) takes the largest share. They are also considered to be the backbone of the rural health sector. Rural health expenditure is divided into (a) allopathy and (b) other systems of medicine. Services under allopathy include primary health centres, hospitals and dispensaries, and other expenditure, and under (b) ayurveda and homeopathy. Similarly urban health services expenditure is also divided into (a) allopathy and (b) other systems of medicine. Services under (a) are direction and administration, training, employees' state insurance scheme, medical stores, depots, departmental drug manufacture, school health schemes, hospitals and dispensaries, other health schemes and other expenditure. Other systems of medicine in the urban areas also include ayurveda and homeopathy. The state's share in the centrally sponsored schemes appears under the 'other expenditure' category of rural health services.

Between 1990-91 and 2011-12, the per capita expenditure on overall health and M&PH increased gradually. Per capita overall health expenditure in Assam rose from Rs. 149 in

1990-91 to Rs. 347.28 in 2011-12. Similarly per capita medical and public health expenditure increased from Rs. 27 in 1990-91 to Rs. 308.03 in 2011-12. The rise in per capita rural health services was noticed from Rs. 48 in 1990-91 to Rs. 168.66 in 2011-12[8]. However if we look at the expenditure on RHS as a share of total M&PH expenditure, there is an overall declining trend. Per capita urban health services declined from Rs. 409.1 in 1990-91 to Rs. 348.17 in 2011-12.

There are two notable things here. One, while the share of rural population is high in Assam, the per capita expenditure on RHS is very low compared to that made on UHS. For example, in 2011-12 the state government spent only Rs. 169 per person in the rural areas on health. Second, although the level of per capita expenditure on urban health services is much higher compared to the rural, a consistently declining pattern emerges for the entire period under consideration. The share of per capita expenditure on RHS is however increasing (Table 2.3). Between 1990--91 and 2011-12, of the total public health expenditure in Assam, while the share of rural health services increased the share of urban health services declined. However, increase in per capita expenditure under all the heads are noticed only after implementation of the programme of NHM in 2005.[9] The NHA estimates available for 2004-05, at the all-India level shows that the per capita public health expenditure was the fourth lowest in Assam among all the major states considered. Expenditure in Assam was higher than Bihar (Rs. 93 per capita), Uttar Pradesh (Rs. 128 per capita) and Madhya Pradesh (Rs. 145 per capita only. The NHA 2004-05 also concluded that out-of-pocket expenses or private expenditures on healthcare are among the highest in Assam. In Assam in 2004-05, when per capita public expenditure on health was Rs. 162, per capita private expenditure was Rs. 612. Similarly, public expenditure on health as a share of total state expenditure was only 3.08 percent, and as a share of the GSDP was 0.86 percent.

[8] During the period covering 1993-94 to 2002-03, while urban per capita expenditure declined, an increase in the rural per capita expenditure was observed (Economic Research Foundation, 2006).

[9] Most of the Indian states experiences positive growth rate in per capita public health expenditure during the period from 2005-11, which was mainly because of the implementation of the programme of NHM in the states (Hooda, 2013).

Table 2.3 *Annual expenditure on healthcare services in Assam, 1990-91 to 2011-12, in Rs. per capita, at 2004-05 prices*

Year	*All health expenditure*	*Medical and public health (M and PH)*	*Rural health services (RHS)*	*Urban health services (UHS)*
1990-91	149.14	27.60	47.53	409.10
1991-92	166.30	124.94	40.34	538.10
1992-93	146.01	126.92	38.28	532.28
1994-95	160.56	131.72	31.95	586.77
1995-96	153.58	133.35	47.08	501.16
1996-97	148.62	128.31	46.24	519.48
1997-98	150.03	130.84	38.51	486.26
1998-99	118.94	98.59	39.11	292.69
1999-2000	139.68	116.44	89.37	308.38
2000-01	153.00	122.91	95.73	317.84
2001-02	150.60	123.80	59.71	202.67
2002-03	128.35	105.73	43.76	179.13
2003-04	137.97	114.93	48.37	211.42
2004-05	148.58	125.04	49.02	262.51
2005-06	132.08	108.88	39.61	197.44
2006-07	173.91	150.17	42.05	181.50
2007-08	187.58	160.72	62.92	211.83
2008-09	236.85	208.33	83.71	232.70
2009-10	359.27	324.67	104.22	526.13
2010-11	333.25	300.90	129.92	383.02
2011-12	347.28	308.03	168.66	348.17

Source: Finance Accounts, Volume 2 (Annual Reports), Government of Assam, various issues

Note: 1. Expenditure data has been adjusted for inflation using the NSDP deflator (base 2004-05) for Assam.

2. Rural, urban and total population figures for Assam have been projected for the inter-censal years using population growth rates for the period 1991-2001 and 2001-2011.
3. All health services include M&PH and Family Welfare
4. Per capita M&PH is with respect to total population of Assam, per capita RHS takes total rural population and per capita UHS is estimated with respect to total urban population.

There is considerable variation in the share of expenditure on RHS as a proportion of M&PH during the period from 1990-91 to 1998-99. The share of expenditure on rural health services have declined from 33 percent in 1990-91 to 21 percent in 1993-94. The highest increase in rural health services was noticed in 1999-2000 and 2001-02. The intervening period between 2002-03 and 2006-07 shows the maximum decline in public expenditure on rural health services (Figure 2.5). Some slight recovery in expenditure is noticed from 2007-08 onwards. The state share of centrally sponsored schemes appears under the other expenditure category of rural health services. Since the introduction and implementation of the National Rural Health Mission (NHM) in 2005-06, the state share of budgeted expenditure forms a major chunk of other expenditure on rural health services. This perhaps explains the reversal in the declining trend of rural health services in Assam

since 2007-08. Comparatively, the share of urban health services in total M&PH expenditure has continuously declined with no reversal in the declining trend.

Figure 2.5 *Share of rural health services (RHS) and urban health services (UHS) in M and PH, Assam, in per cent, 1990-91 to 2011-12*

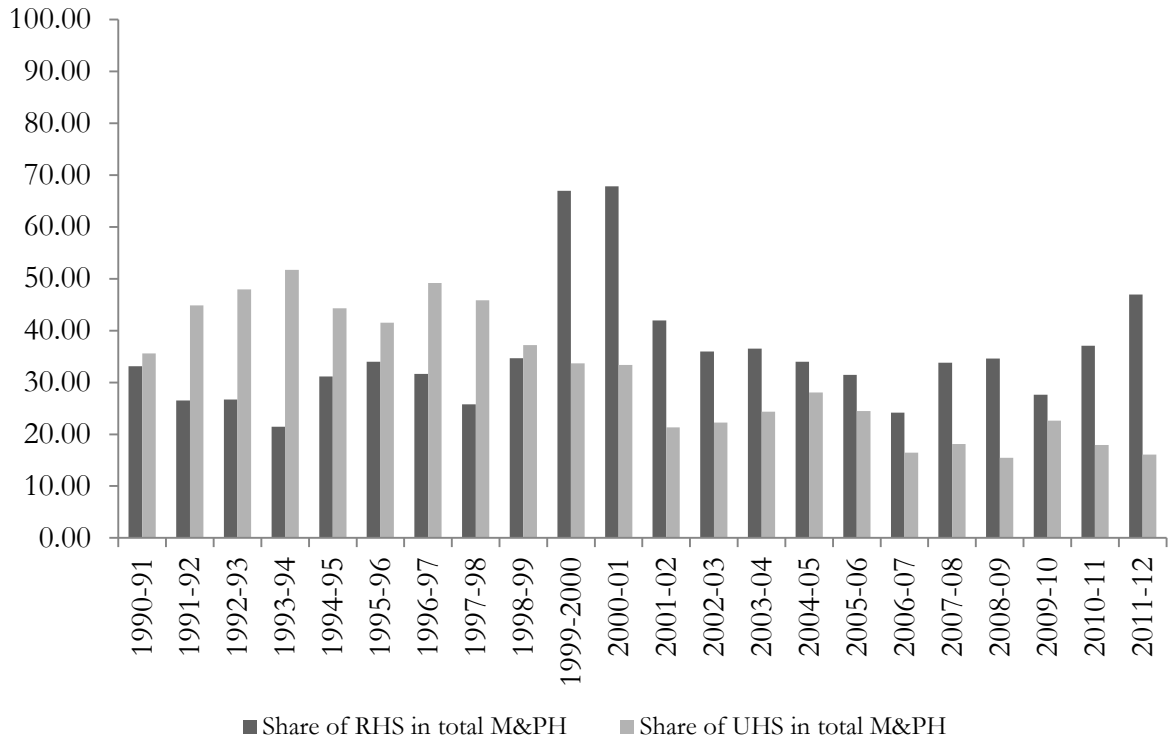
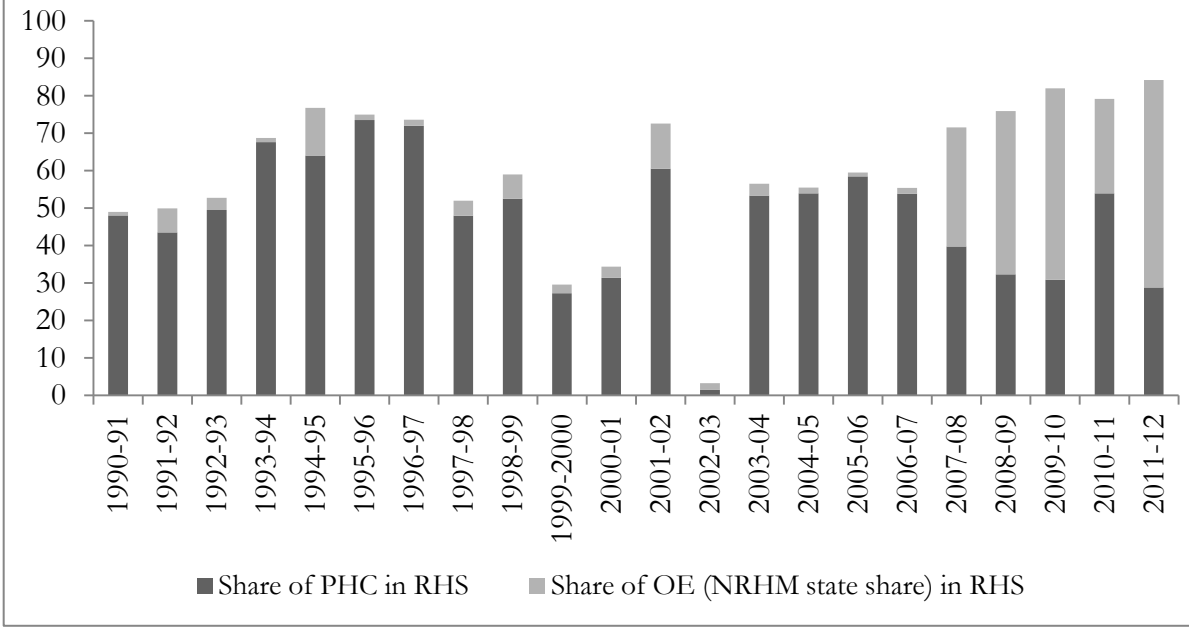


Figure 2.6 *Expenditure pertaining to primary health centre (PHC)and other expenditure (including state share of Centrally Sponsored Schemes) in total rural health services expenditure, Assam, in percent, 1990-91 to 2011-12*



The share of expenditure on primary health centre in total rural health services has reduced drastically between 1990-91 (48 percent) and 2011-12 (29 percent) (see Figure 2.5). Other expenditure increased from .89 percent in 1990-91 to 55 percent in 2011-12. However, there seems to be a consistently increased pattern of expenditure on PHC between 2001-02 and 2006-07. In terms of percentage share, the level of expenditure ranged between 54 percent and 63 percent for the entire duration. Since 2007-08, expenditure on PHC as a share of total rural health services shows a consistent decline but as shown in Figure 2.6 the state share of expenditure on NHM shows an increasing pattern which may explain the declining expenditure on PHCs.

Public health and prevention and control of diseases

Public health and prevention and control of diseases (PHPCD) are an important component under the head medical and public health in Assam. Public health expenditure includes expenditure on direction and administration, prevention and control of diseases, prevention of food adulteration, drug control, public health laboratories and public health education. Among the various components, the major component of public health is expenditure on prevention and control of diseases. Prevention and control of diseases includes eradication of malaria, filaria, leprosy, tuberculosis and control of general epidemic including cholera, dysentery, typhoid etc.

The share of expenditure on PHPCD to total medical and public health is not only unsatisfactory but rather it has been declining over the years. There has been stagnation in PHPCD since 1998-98 except for one year 2011-12. There is reduced budgetary expenditure on several communicable and non-communicable diseases during the entire period. The share of expenditure on control and prevention of diseases has also been declining with a slight increase during 1996-1997 to 1998-1999 (Figure 2.7)[10]. Although there has been a decline in the expenditure on prevention and control of diseases through budgetary heads during the recent years, expenditure through non-budgetary head has increased though National Heath Mission. The mission is spending on prevention and control of diseases under the head National Disease Control Programme (NDCPs).

[10] The share of expenditure on various disease programme shows a declining trend in most of the states. Highest decline has been observed for the states of Assam, Karnataka, Madhya Pradesh, Punjab, Rajasthan and Tamil Nadu. Estimate shows that states such as West Bengal, Rajasthan, Assam, Bihar, Karnataka, Madhya Pradesh and Orissa spent less than per capita Rs. 7 per year on disease control programme (Duggal et al., 1995).

Figure 2.7 *Share of public health in total Medical and Public health expenditure (M and PH), Assam, in per cent, 1990-91 to 2011-12*

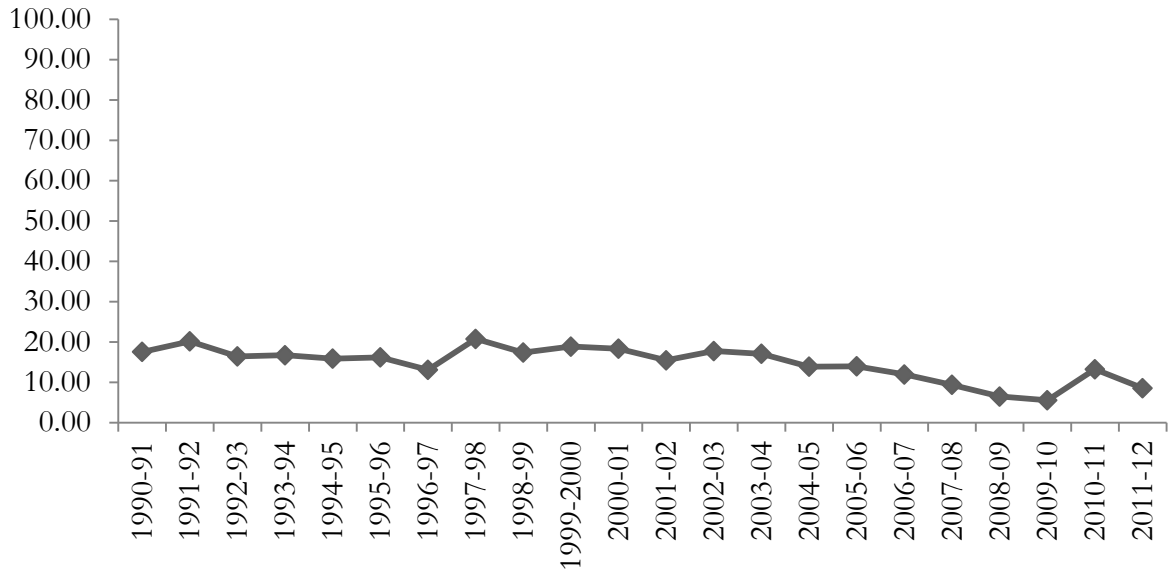
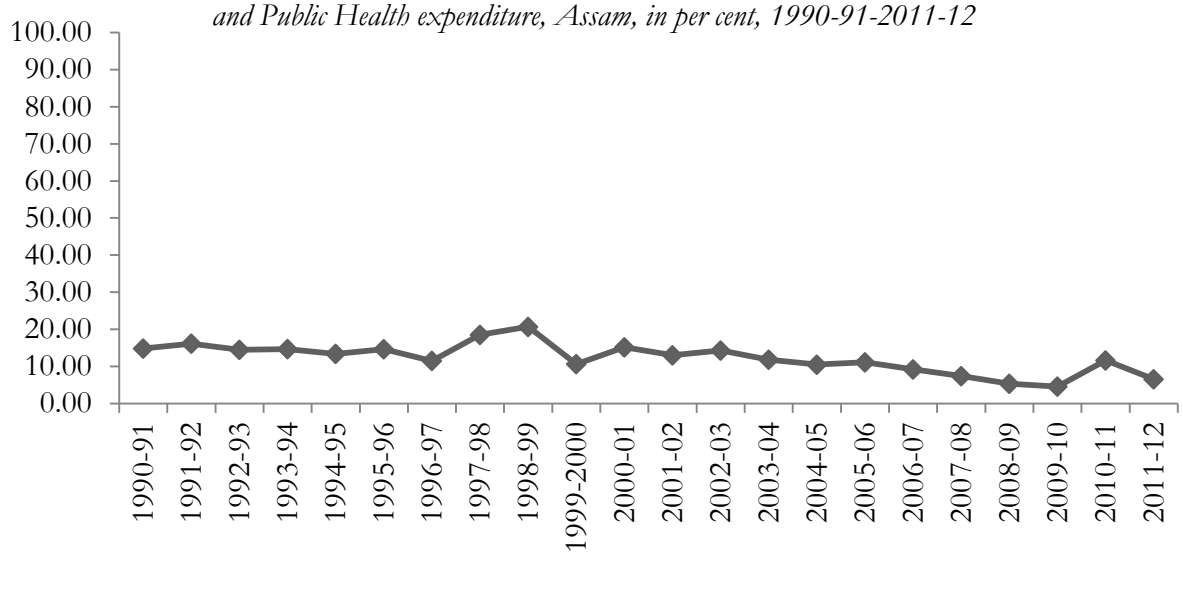


Figure 2.8 *Share of expenditure on prevention and control of diseases in total Medical and Public Health expenditure, Assam, in per cent, 1990-91-2011-12*



2.4 NATIONAL HEALTH MISSION IN ASSAM

The National Rural Health Mission is an initiative launched by government by India in 2005 to meet the health needs of the rural poor and underprivileged section of the country. The programme initially aimed at meeting the health needs of 18 states with weak health

outcome indicators[11]. The main objective of the programme is to reduce infant and maternal mortality rate, to provide universal access to public health services including women's health, child health, water, sanitation, and hygiene. It also emphasizes on universal access to immunization and nutrition for the general masses. The mission also aimed at prevention and control of communicable and non-communicable diseases, proper access to comprehensive primary health care, to stabilize population and gender and to maintain demographic balance, to revitalize local health tradition and mainstreaming AYUSH and to promote healthy lifestyle among the rural poor. Table 2.4 shows the various components of National Health Mission (previously National Rural Health Mission).

Table 2.4 *Components of National Health Mission*

Health systems strengthening	*Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A)*	*National Disease Control Programmes (NDCPs)*
1. Mobile Medical Units	1. Maternal health a. Janani Sishu Suraksha Karyakram b. Janani Suraksha Yojana	1. .National Iodine Deficiency Disorder
2. Patient transport Service	2. Child health and immunization a. Pulse Polio Programme b. Rashtriya Bal Swasthya Karyakram c. National Deworming Day	2. National Vector Borne Disease Control Programme
3. Infrastructure	3. Adolescent health a. Adolescent friendly health clinics b. Weekly iron and folic acid supplementation c. Menstrual hygiene scheme	3. Revised National TB Control
4. Human resources	4. Family planning	5. National Leprosy Eradication Programme
5. Drugs and logistics		6. Integrated Disease Surveillance Project
6. Telemedicine		7. National Mental Health Programme
		8. National Communicable Disease Control Programme
		9. Programme for Prevention and Management of Burn Injuries

Source: Government of Assam, National Health Mission, 2008.

[11]The eighteen states constitute of the Empowered Action Group (EAG) states together with the north-eastern states of the country. The EAG states include, Uttar Pradesh, Uttaranchal, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, Orissa, Rajasthan, Himachal Pradesh, and Jammu and Kashmir. On the other hand, the north-eastern states constitute of Assam, Arunachal Pradesh, Manipur, Meghalaya, Nagaland, Mizoram, Sikkim and Tripura.

The discussion on extent and pattern of public health expenditure in the previous section has shown that there has been an increase in the total health spending after 2005 which is mainly because of the implementation of the programme of NHM in the state[12]. Before the introduction of the NHM, health expenditure by the centre at the state level was mainly through state treasuries. However, after introduction of NHM many donor funded health programmes has come into being which are outside the state treasuries. During the recent time period health expenditure by the centre at the state level is incurred through non-treasury routes. These are in the form of expenditure on institutions located in the states, direct transfer to the implementing agencies under centrally sponsored schemes and expenditure under Central Government Health Schemes (CGHS). The increase in expenditure through these agencies in the state has resulted in an increase in health expenditure through the non-treasury routes[13] while the flow of expenditure through treasury routes has been declining over the years. The flow of expenditure through treasury routes is mainly through grants in aids to the state government and Union Territories.

Health expenditure pattern under NHM

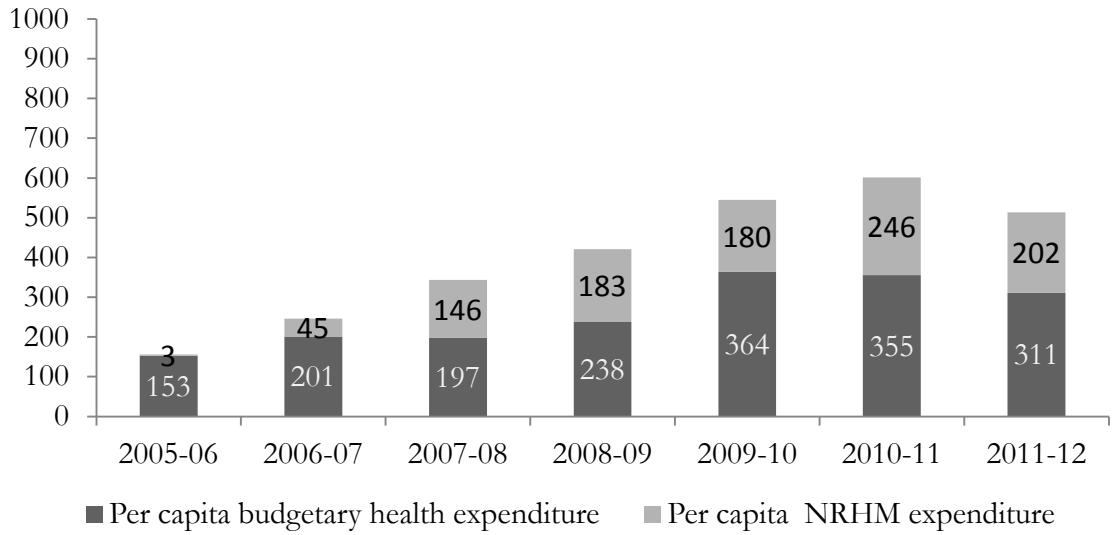
The NHM funds are generally routed through state health societies. Only a part of the funds are routed directly through state treasuries and get reflected in the state budget documents. Therefore, adding state share of NHM and central share will lead to overestimation of the total health expenditure of the state. The state share of health expenditure has to be deducted before calculating central spending of NHM for the state. NHM has been acting as an independent implementing agency in the state. It is a separate entity and funds are allocated separately for the programme. Only the state share of NHM is reflected in the finance accounts or the detailed demand for grants. The per capita expenditure on NHM has been calculated in Rs. per capita at 2004-05 prices to show the expenditure pattern under NHM. Figure 2.9 indicates the per capita government health expenditure and per capita NHM expenditure in from 2005-06 to 2011-12. To recall, the government/budgetary expenditure here include the expenditure statements available in Finance Accounts documents.

[12]There has been an increase in the total health spending of almost all the states after implementation of NHM at the central level (Berman and Ahuja, 2008).

[13]A major component of expenditure through non-treasury routes is through implementing agencies in the form of "Flexible Pool for the state Programme Implementation Plan (PIP)". Assam, Uttar Pradesh, Maharashtra, Andhra Pradesh and West Bengal are at the top five positions in terms of expenditure incurred on flexible pools (Choudhury et al., 2011).

It can be observed that the per capita budgetary expenditure increased from Rs. 153 in 2005-06 to Rs. 355 in 2010-11. Similarly, the per capita NHM expenditure has also been increasing from Rs. 3 to Rs. 246 in 2011-12. The proportion of increase in NHM expenditure is however higher. There is a slight decline in both per capita budgetary expenditure and per capita NHM expenditure during 2011-12. The per capita budgetary expenditure declined to Rs. 311 during the period of 2011-12 and per capita NHM expenditure declined to Rs. 202 during the same period.

Figure 2.9 *Per capita governement health expenditure and per capita NRHM expenditure in Assam at 2004-05 prices, 2005-06 to 2011-12 (in Rs. per capita)*



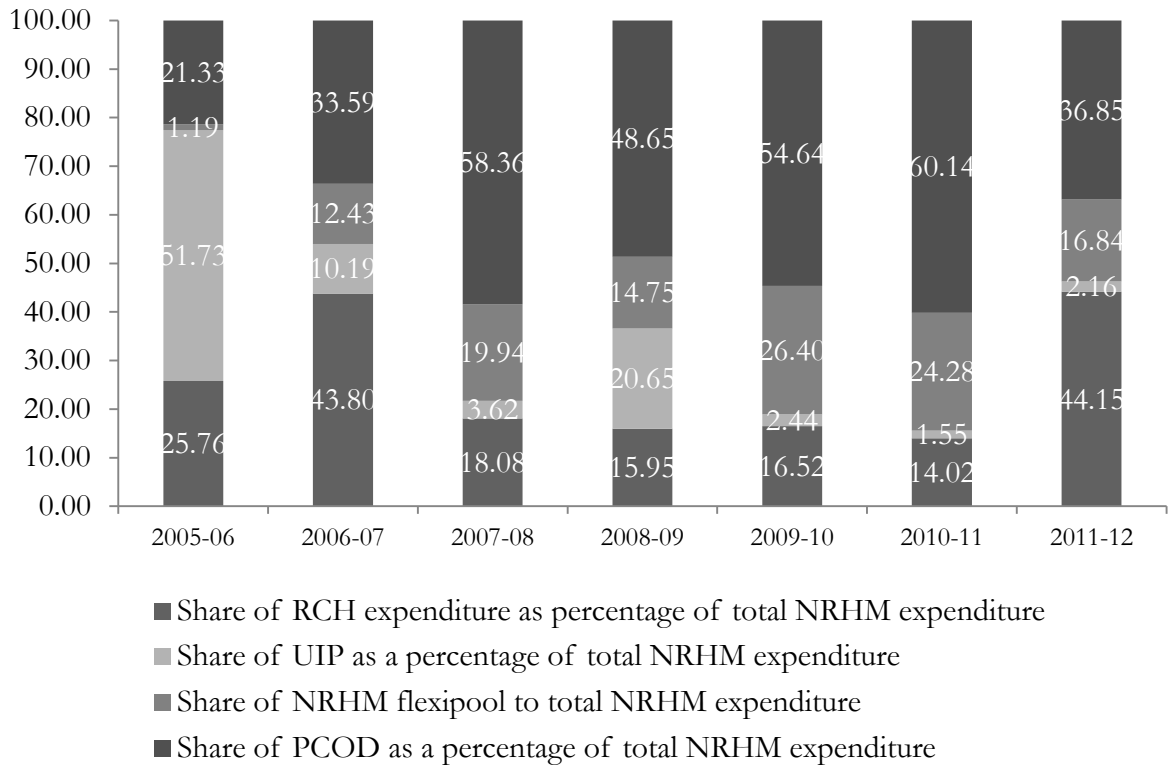
During the recent period the expenditure through independent implementing agencies like NHM has been increasing. The highest share through implementing agencies constitute of expenditure through the NHM flexible pool. The transfer of funds through non-treasury routes especially through the NHM flexible pool is higher for the north-eastern states. Uttar Pradesh, Assam, Maharashtra, Andhra Pradesh and West Bengal are the states receiving highest share of NHM flexible pool. These states account for 47 percent of expenditure incurred through NHM flexible pool. One of the reasons of high expenditure in these states is that they have a higher population share with respect to the other states of the country (Choudhury et al., 2011).

Components of National Health Mission (under National Health Mission)

Expenditure on universal immunization programme (UIP) was highest during the period of 2005-06 (26 percent). In 2006-07, the share of expenditure on reproductive and child health

scheme (RCH) (44 percent) is the highest. The share of UIP has been declining since the period of 2007-08 (4 percent). Since 2009-10, the share of UIP is constant at 2 percent till 2011-12. During the recent period a major amount is spent on RCH (44 percent) in 2011-12. Expenditure on prevention and control of diseases (PCOD) constituted of 37 percent in total NHM expenditure. The percentage share spent on NHM flexipool is 17 percent for 2011-12. The pattern of expenditure by NHM indicates that the main focus of the programme is on preventive care. This has an impact on the rural households because for curative care they have given preference to private health facilities or district or civil hospital. This is mainly because of the fact that the basic health facilities for curative care are not available in the government health facilities. Moreover, the quality of care is low in case of curative care in the nearby public health institutions (Table 2.10).

Figure 2.10 *Share of RCH, UIP, NRHM flexipool and NDCP in total NRHM expenditure, in per cent*



2.5 CONCLUSION

While health is both a Union and a State subject, large part of the responsibility is borne by the State governments. In Assam there has been a heavy reliance on central government funding for provision of health services. Health expenditure as a share of gross state domestic product has been stagnant over the years. Most of the expenditure is made on

revenue account while capital account expenditure is not just stagnant but also deteriorating. Of those made on revenue account, bulk of it pertains to the component Medical and Public Health. However even in M&PH, much of the expenditure relates to wages and salaries.

Expenditure on rural and urban health as a share of total medical and public health expenditure has been declining. A reversal in trend in rural health services was noticed in 2007-08. Even then the levels of per capita expenditure on rural health services are negligible. In 2011-12, the latest year for which health expenditure data has been estimated in this chapter barely Rs. 168 per person per annum was spent in the rural areas. The corresponding amount for the urban areas was Rs. 348 per person per annum.

The check in the declining trend of per capita rural health services in the state can be largely attributed to the National Rural Health Mission. The share of expenditure on urban health services, public health and prevention and control of diseases continue to decline without check. However, a major proportion is being spent on National Disease Control Programme (NDCP) under National Health Mission, which is the non-treasury route and therefore does not count as budgetary expenditure.

The scenario of present health programmes specifically in the form of National Health Mission shows a positive impact on the present health scenario of the state. Expenditure through non-treasury routes in the form of NHM flexipool has been increasing. While the expenditure through non-treasury routes has been increasing in the form of autonomous bodies and implementing agencies, expenditure through treasury routes has been declining specifically after implementation of the programme of National Rural Health Mission in 2005. Thus, expenditure through treasury routes in the form of grants-in-aids in the state has been declining since 2005. Assam has one of the highest expenditures made under NHM flexible pool, this being one of the major sources of funding through autonomous implementing agencies.

Chapter 3

District ranking and methodology of selection of study area

For carrying out a disaggregated study on morbidity prevalence and private expenditure on health, a district ranking was done based on select health indicators. The objective of ranking districts is twofold: First, to bring out the district level disparity in Assam and second, to select two districts for a comparative study on health status of rural households. The selection of districts is therefore based on analysis based on the district ranks. This chapter has three sections. Section 3.1 discusses the health indicators and methodology used for ranking of districts. Section 3.2 brings out the district level disparity and Section 3.3 outlines the methodology used for selection of study area.

3.1 HEALTH INDICATORS AND METHODOLOGY USED FOR DISTRICT RANKING

Various health indicators, following various definitions, have been developed by different national and international agencies. Such indicators are used for various purposes including academic, advocacy, resource allocation or monitoring progress. For carrying a district ranking based on health indicators, we have relied on the framework prepared by the World Health Organization. A Global Reference List of Core Health Indicators prepared by WHO (2014) categorized various indicators into one of four domains. They are Health status, risk factors, service coverage and health systems. They have been arranged into these domains based on a 'results chain framework' which identifies input, output, outcome and impact indicators which gives a more holistic approach to formulate policy prescriptions.

In the results chain framework health systems are categorized as input indicators. Demographic and socio-economic indicators are also categorized under input indicators as these provide health related information that describes the processes at work. Health service coverage is categorized as output indicators, risk factors as outcome indicators and health status as impact indicators. Keeping this framework in mind, we have used Indian health data sources that provide district level data to categorize indicators.[14] For the purpose of our analysis, the indicators considered are as follows.

[14]For a detailed discussion on the core list of indicators and the methodology followed for cross country comparisons, see WHO (2014) *Global Reference List of 100 Core Health Indicators*, Working Version 5, Geneva. The document can also be accessed at: http://www.who.int/healthinfo/country_monitoring_evaluation/GlobalRefListCoreIndicators_V5_17Nov2014_WithoutAnnexes.pdf.

Table 3.1 *List of indicators used for district ranking*

Demographic and socio-economic characteristics	*Health Coverage*	*Risk factors*	*Health status*
1. Crude birth rate (CBR)	1. Provision of full antenatal care to pregnant women	1.Low Birth Weight of new born infants	1. Infant mortality rate (IMR)
2. Natural growth rate (NGR)	2. Post natal care within 48 hours of delivery	2.Source of drinking water	2. Under 5 mortality rate
3. Female literacy rate	3. Contraceptive prevalence rate (CPR)	3.Household access to toilet facility	
4. Women with birth order 3 and above	4. Full immunization (12-23 months)	4. Household access to electricity facility	
	5. Financial assistance for institutional delivery		
	6. Delivery at government health institutions		

Source: Framework adapted from WHO (2016); methodology of ranking adapted from Ram and Shekhar (2006); district level data gathered from Annual health Survey (2011) and Census of India (2011).

District level data

The main sources of district level data are district level statistical handbooks, district level household survey (DLHS), Census of India and state specific Annual Health Surveys. The present study is based on Annual Health Survey of Assam (2011) and Census of India (2011). These specific data sources were used for the analysis because they were the most recent and updated database during the course of the study. As already mentioned the framework used in this chapter is adapted from WHO (2014).We have used the methodology of ranking of districts and list of individual indicators from Ram and Shekhar (2006). A few more indicators have been added to the list provided in Ram and Shekar (2006) based on availability of data. Since the present study focuses on rural households of Assam, the rural database has been used for ranking of districts.

District ranking methodology

The methodology used to rank the various districts of Assam is from Ram and Shekhar (2006). Altogether 16 health indicators following the results chain of input, output, outcome and impact of WHO (2014) have been used for ranking the districts. First the list of 16 indicators has been used to calculate an index value for each indicator using the range

equalization method. Secondly, a composite index has been calculated based on all the individual indices pertaining to the 16 indicators. The index values are normalized with respect to the direction of the individual indicators. For example, female literacy rate or availability of toilet facility are indicators that depict achievements (higher the estimate better the performance), whereas the rate of infant mortality or under 5 mortality show the deprivation (higher estimate worsens performance) of a district. Therefore these sets of indicators move in opposite directions while carrying out ranking of districts. For indicators showing deprivation, the index value is calculated as: Index value=$\frac{Max(X_{1d})-X_{1d}}{\{Max(X_{1d})-Min(X_{1d})\}}$. For indicators that show achievement of a district, the index value is calculated as: Index value=$\frac{X_{1d}-Min\,(X_{1d})}{\{Max(X_{1d})-Min(X_{1d})\}}$. The composite index is a simple average of all the 16 indices. Composite index $=1/16\sum_{i=1}^{16}X_{id}$.

3.2 DISTRICT LEVEL DISPARITY IN ASSAM

Ram and Shekhar (2006) had carried out a ranking of all the districts in India based on select socio-economic and demographic indicators. The main focus of their ranking was to assess the levels of development a district is in. Since population and health parameters are important for development planning, focus was on ranking and mapping the districts of the state on the basis of these indicators. The study considered 13 socio- economic and demographic indicators: Population age 0-6 years, births order 3 and above, births below 20 years, under five mortality, female literacy, households using safe drinking water, households having toilet facility, household with electricity, women receiving 3 or more antenatal checkup, women receiving at least 2 Tetanus Toxoid injections, full immunization, children with immunization drop outs and contraceptive prevalence rate.

Of these, nine indicators (birth order 3 and above, under-5 mortality, female literacy, household safe drinking water, toilet facility, electricity, women receive ante natal checkup, full immunization coverage, contraceptive prevalence rate) have been used for the present district ranking. To these nine, we have added five more indicators (crude birth rate, natural growth rate, infant mortality rate, financial assistance for institutional delivery, and post natal care to women within 48 hours of delivery).Since this study is centred on health status of rural households, we have used direct and indirect indicators of health fitting the framework of WHO (2014). Unlike Ram and Shekhar (2006), this study uses more recent data from Annual Health Survey (2011) and Census of India (2011).

Ram and Shekhar (2006) concluded the following for Assam districts. In terms of *birth order 3 and above*, 7 districts of Assam were above and 16 districts were below the median rank implying higher levels of fertility and lower levels of awareness about family planning programmes. For the indicator *safe drinking water* four districts were above the median rank while 19 districts were below implying vulnerability of the population to basic diseases. This also effectively implies that the chances of morbidity rate is high When taking all Indian districts into account, the performance of Assam was found to be extremely low in the indicators of access to electricity facility, safe drinking water and immunization dropout rates. Ram and Shekhar (2006) also divided the Indian districts into three categories: least developed districts, developing districts and more developed districts. Assam had 16 developing districts and 7 least developed districts among the districts of India.

Based upon the results chain framework of WHO (2014) district level disparity in Assam have been estimated. The input, output, outcome and impact indicators will indicate the performance of districts based on each of the categories. The position of the districts in each of the categories will also have policy relevance in terms of district level planning of health intervention programmes. We have four domains. (a) Demographic and socio-economic (DES) corresponding to the list of input or process indicators (b) Health coverage containing output indicators (c) Risk factors containing outcome indicators and (d) Health status containing impact indicators. While (a) contains four health indicators, (b) includes six, (c) contains four and (d) contains two indicators, there is no particular reason why the numbers of indicators in each of the category are not uniform. While one may assume that the category health coverage carries an implicit weight as the numbers of indicators are more, this in no way hampers the analysis.

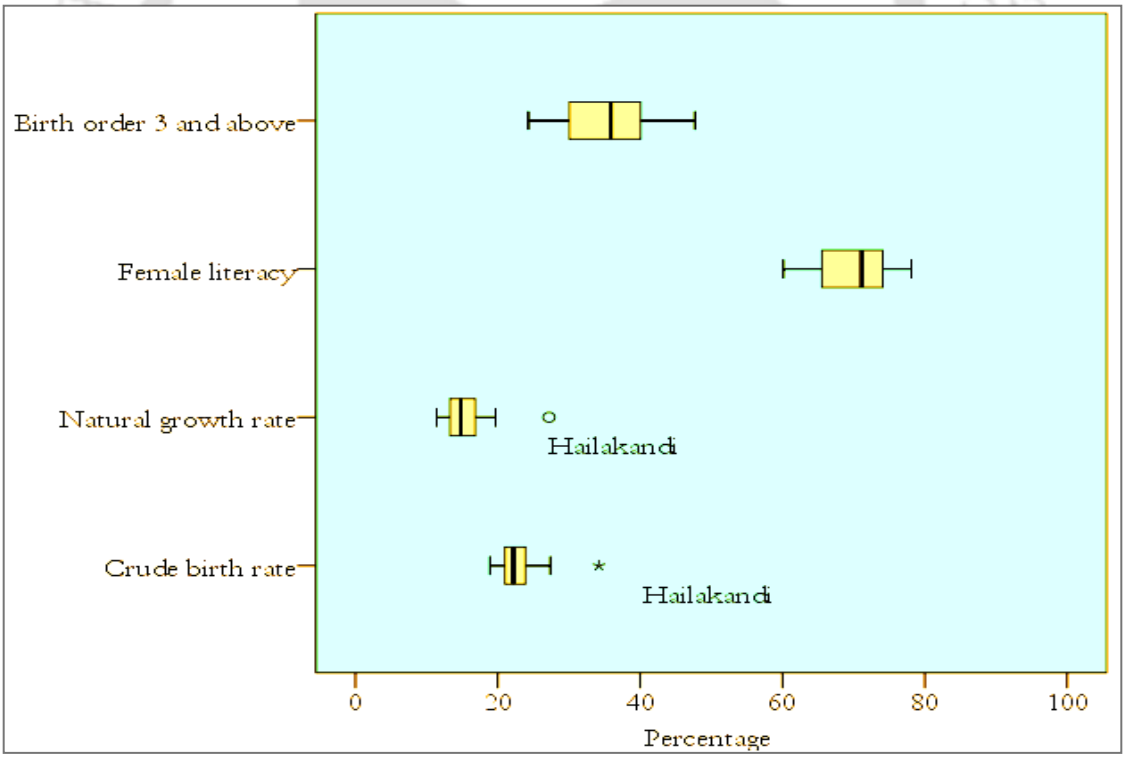
The biggest limitation of this exercise is availability of district level data on key health indicators. Therefore only those indicators have been used for the study that have been identified in the literature as being some of the crucial ones for assessing health status of a region. First individual indices in each of the categories have been estimated. Then a composite index and rank based on all the individual indices of indicators in the respective category has been estimated. The district selection for village study is however based upon a composite index ranking of all 16 indicators. Box-plots[15] have also been used to depict inter-district disparity.

[15] A box plot diagram falls under the category of Exploratory Data Analysis in Econometric techniques. It is otherwise also known as a box and whisker diagram which shows summary statistics of a statistical distribution

Demographic and Socio-economic indicators (DSE)

The indicators explaining DSE are: crude birth rate, natural growth rate, female literacy rate and birth order 3 and above (Table 3.2). The inter district variations based on DSE are not stark, specifically, in case of natural growth rate (NGR) and crude birth rate (CBR). It is indicated by the distance between upper whisker and lower whisker, which indicates the range of the distribution. The distance between the maximum and the minimum is not very large. Upper end of the whisker indicates the highest value while low end of the whisker indicates the lowest value of the distribution. Both the indicators are found to be positively skewed. Hailakandi is an outlier district based on these two indicators. It is below the median rank as it is situated to the right of the median (middle line in the box). It is one of the districts with highest crude birth rate (34) and natural growth rate (27) across the districts implying very high levels of fertility (Figure 3.1).

Figure 3.1 *Distribution of Demographic and socio-economic indicators, Box and Whisker diagram, all districts, Assam*



based on maximum, minimum, quartiles and outliers. If most of the observations are concentrated on the low end of the scale, the distribution is said to be positively skewed i.e. the mean of the observation is greater than the median. On the other hand if the distributions are concentrated at the upper end of the scale, it is said to be negatively skewed in case of which the mean is less than the median. A distribution is said to be symmetrical if mean values of the distribution is equal to the median values of the distribution.

The variation between districts is however quite large between the districts in case of female literacy rate and birth order 3 and above. They are also negatively skewed (arithmetic mean is less than median) as indicated by the box-plot diagram. The district with the lowest proportion of women with birth order 3 and above is Nalbari (24 percent) the district with highest proportion of women with birth order 3 and above is Karimganj (47 percent).Similarly, the indicator female literacy rate also indicates stark inter-district variation although comparatively less than birth order 3 and above. In both cases the values above the median rank are more scatted as shown by the larger space in the box above the median line. Female literacy rate is highest in Sibsagar (78 percent) and it is the lowest in Tinsukia (60 percent). Under DSE domain the district with highest rank is Sibsagar and the district with lowest rank is Hailakandi (Table 3.2 and Figure 3.1)[16].

Table 3.2 *Ranking of the districts on the basis of demographic and socio-economic (DSE) indicators*

District	*CBR index ranks*	*NGR index ranks*	*Female literacy rate index ranks*	*Birth order 3 and above index ranks*	*Composite DSE index ranks*
Sibsagar	3	2	1	2	1
Nalbari	1	1	5	1	2
Kamrup	5	6	3	3	3
Jorhat	16	3	6	5	4
Golaghat	10	9	11	9	5
Dibrugarh	8	7	15	6	6
Morigaon	17	14	2	17	7
Bongaigaon	5	10	19	7	8
Goalpara	13	16	7	15	9
Dhemaji	15	20	12	8	10
NC Hills	2	4	13	21	11
Lakhimpur	19	19	9	11	12
Dhubri	13	14	18	9	13
Sonitpur	4	8	20	12	14
Barpeta	9	12	17	13	15
Kokrajhar	17	17	21	4	16
Karbi-Anglong	11	13	14	19	17
Darrang	7	5	21	16	18
Nagaon	20	18	9	18	19
Tinsukia	12	11	23	13	20
Cachar	22	20	3	20	21
Karimganj	21	22	16	22	22
Hailakandi	23	23	8	22	23

Source: Annual Health Survey (2011) and Census of India (2011)

[16] See appendix A3, Table A 3.1 to A 3.16 for the individual indices of the 16 indicators.

Health coverage indicators

Indicators in the health coverage domain are: provision of full antenatal care to pregnant women, post natal care after 48 hours of delivery, contraceptive prevalence rate, full immunization (12-23 months), financial assistance for institutional delivery and delivery at government health institutions. The indicator financial assistance for institutional delivery is found to be negatively skewed (most of the observations are concentrated on the high end of the scale) and has less inter district variations, highest being Dhemaji (93 percent) and lowest Karimganj (72 percent). The outlier districts in terms of worse performances are Hailakandi and Karimganj (Figure 3.2). The proportion of women receiving financial assistance for institutional delivery is also lowest in these two districts. It is 74 percent for Hailakandi and 71 percent for Karimganj.

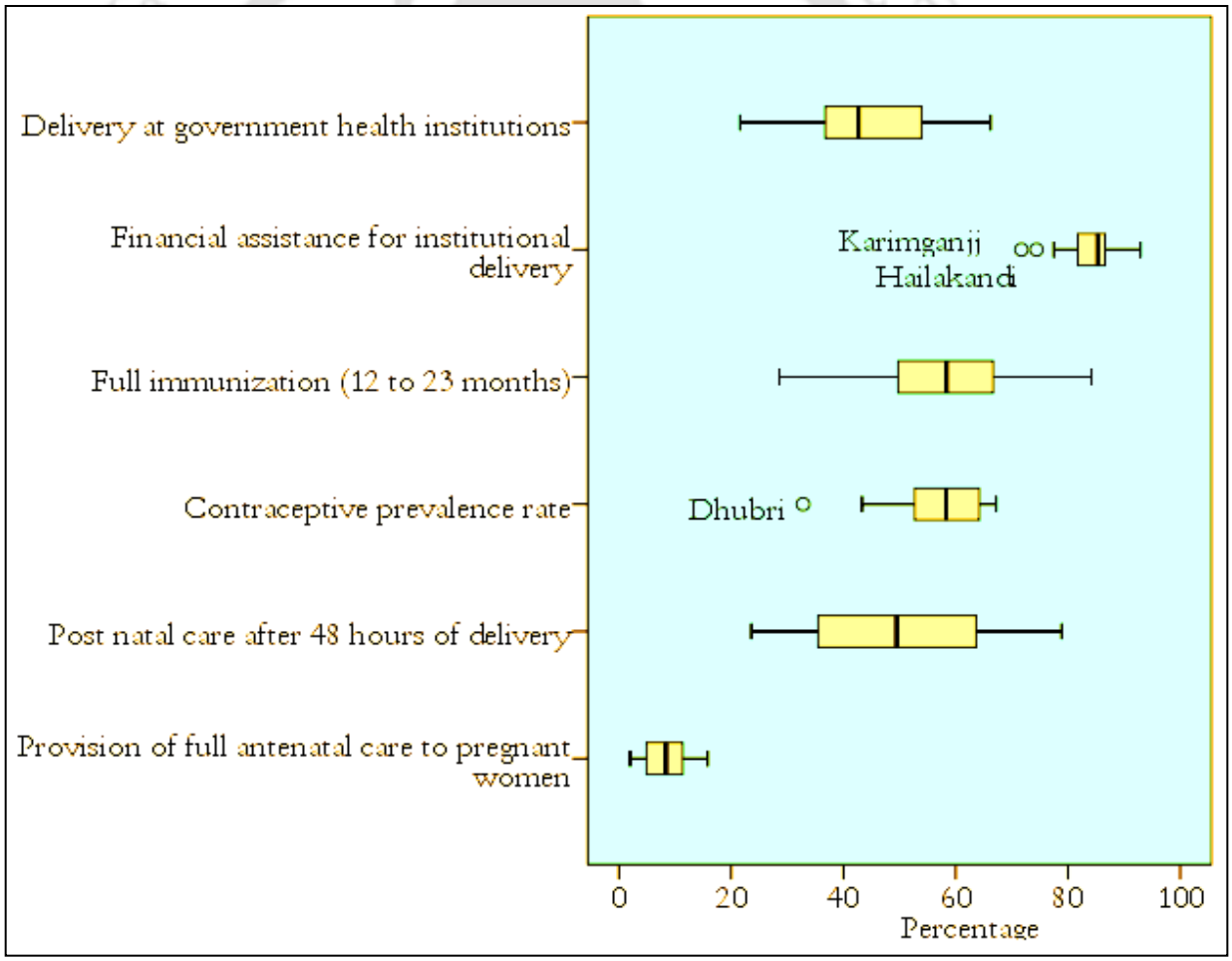
Table 3.3 *Ranking of districts on the basis of health coverage (HC) indicators*

District	*Full ANC index ranks*	*PNC within 48 hours of delivery index ranks*	*CPR index ranks*	*Full immunization index ranks*	*Financial assistance (JSY) index ranks*	*Institutional delivery index ranks*	*Composite HC index ranks*
Sibsagar	2	1	6	3	8	3	1
Nalbari	4	2	5	8	11	1	2
Lakhimpur	7	3	1	12	3	2	3
Jorhat	1	7	12	5	16	6	4
Dibrugarh	3	4	2	1	20	10	5
Golaghat	6	8	15	7	13	7	6
Kamrup	11	5	9	20	10	5	7
Tinsukia	13	6	4	4	15	13	8
Darrang	8	12	3	11	7	9	9
Morigaon	12	16	10	6	2	8	10
Dhemaji	20	11	11	14	1	4	11
Karbi-Anglong	15	14	7	2	12	20	12
Sonitpur	10	9	17	15	19	15	13
Nagaon	9	14	8	17	18	18	14
Cachar	5	10	22	16	21	13	15
NC Hills	14	18	13	13	17	21	16
Bongaigaon	19	19	16	18	8	19	17
Barpeta	21	17	13	19	14	17	18
Kokrajhar	22	13	20	22	4	11	19
Goalpara	15	20	19	21	5	16	20
Hailakandi	17	22	18	9	22	23	21
Karimganj	17	22	21	10	23	23	22
Dhubri	23	21	23	23	6	22	23

Source: Annual Health Survey (2011) and Census of India (2011)

Among all the indicators fully immunized children shows maximum variation. The highest proportion of fully immunized baby is 84 percent in Dibrugarh and lowest in Dhubri (29 percent).However, the distributions above the median and below the median are spread out equally shown by the equal distance of the box from the median line. Similarly, for contraceptive prevalence rate the inter-district variations are not as stark as observed by the size of the box plot diagram. The distribution is found to be negatively skewed (Figure 3.2).Dhubri, is an outlier district, showing very low percentage of contraceptive prevalence rates (33 percent). The district with highest proportion of women with contraceptive prevalence rate is Lakhimpur (67 percent).

Figure 3.2 *Distribution of Health coverage indicators, Box and Whisker diagram, all districts, Assam*



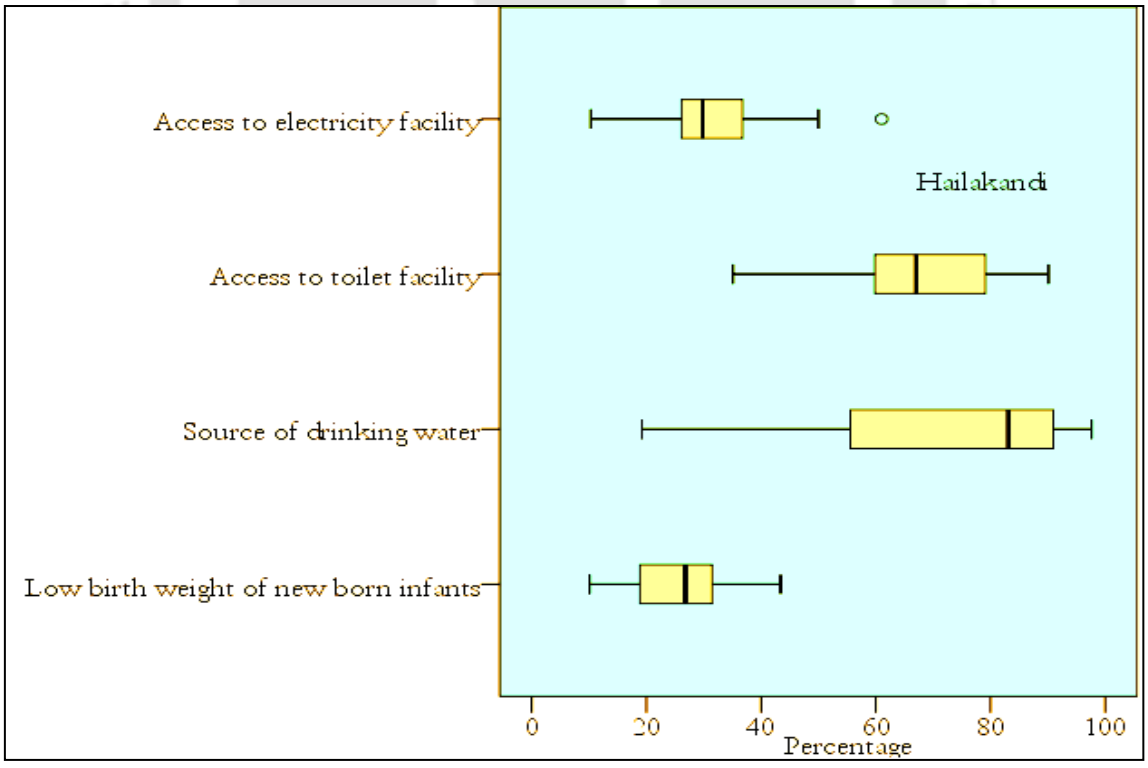
The indicator delivery at government health institution is positively skewed and indicates moderate inter-district variations. The observations below the median are found to be more spread (Figure 3.2). The district with highest proportion of women delivering their children at government health institution is Nalbari (66 percent) while the district showing lowest

proportions is Karimganj (22 percent). The indicator post natal care after 48 hours of delivery also has great variation across the districts. The indicator is however found to be negatively skewed. Sibsagar (79 percent) has the highest proportion of mothers receiving post natal care while it is lowest in Karimganj (24 percent). The indicator full antenatal care to pregnant women indicates least inter-district variations and the distribution is negatively skewed (Figure 3.2). The district with highest proportion of women receiving full antenatal care is Jorhat (16 percent) and the lowest is Dhubri (2 percent). The ranking of the districts on the basis of health coverage indicators shows that Sibsagar is top ranked and Dhubri is the lowest ranked (Table 3.3).

Risk factor indicators

The indicators explaining risks to health are: low birth weight of new born infants, source of drinking water, access to toilet facility and access to electricity facility. Access to electricity is positively skewed with a moderate variation across districts. The district with highest percentage of household access to electricity is Tinsukia (61 percent) and the worst performing district is Kokrajhar (10 percent). Hailakandi is an outlier in this indicator as well and is much below the median rank.

Figure 3.3 *Distribution of Risk factor indicators, Box and Whisker diagram, all districts, Assam*



Access to toilet facility also shows large variation and has positive skewness. The observations below the median rank are found to be more spread out relative to the observations above the median rank (Figure 3.3). District showing highest estimate of toilet facility is Cachar (90 percent) and the lowest is Kokrajhar (35 percent). Severe inter-district variations have been observed for the indicator access to safe drinking water. The indicator is found to be negatively skewed. One may note that access to safe drinking water and expenditure on it is one of the important components of the public health programmes. Access to safe drinking water is found to be highest in Dhubri (98 percent) and lowest in Hailakandi (19 percent).

Table 3.4 *Ranking of the districts on the basis of risk factors (RF) indicators*

District	*Low birth weight new born index ranks*	*Improved source of drinking water index ranks*	*Access to toilet facility index ranks*	*Access to electricity facility index ranks*	*Composite RF index ranks*
Sibsagar	17	10	6	2	1
Tinsukia	15	3	4	1	2
Dibrugarh	22	2	8	4	3
Nalbari	8	4	11	7	4
Golaghat	23	6	10	5	5
Jorhat	16	13	13	3	6
Kamrup	14	9	16	12	7
Nagaon	12	8	5	8	8
Barpeta	9	6	9	18	9
Goalpara	4	15	7	13	10
Dhubri	3	1	17	21	11
Morigaon	7	5	15	15	12
Darrang	11	11	14	17	13
Bongaigaon	4	14	18	19	14
Cachar	18	18	1	6	15
Dhemaji	2	12	22	22	16
Lakhimpur	1	16	19	20	17
Sonitpur	6	18	21	9	18
Karimganj	21	21	3	10	19
Kokrajhar	9	17	23	23	20
Hailakandi	20	23	2	14	21
NC Hills	13	22	12	11	22
Karbi-Anglong	18	20	20	16	23

Source: Annual Health Survey (2011) and Census of India (2011)

Among all the risk factor indicators, least inter-district variations is observed in low birth weight of new born infants (Figure 3.3). The district with lowest proportion of low birth weight of new born infants is Lakhimpur (10 percent) while the district with highest proportion of low birth weight of new born infants is Golaghat (43 percent). The composite

rank of the risk factor indicators shows that Sibsagar is top ranked and Karbi-Anglong is lowest ranked (Table 3.4).

Health status indicators

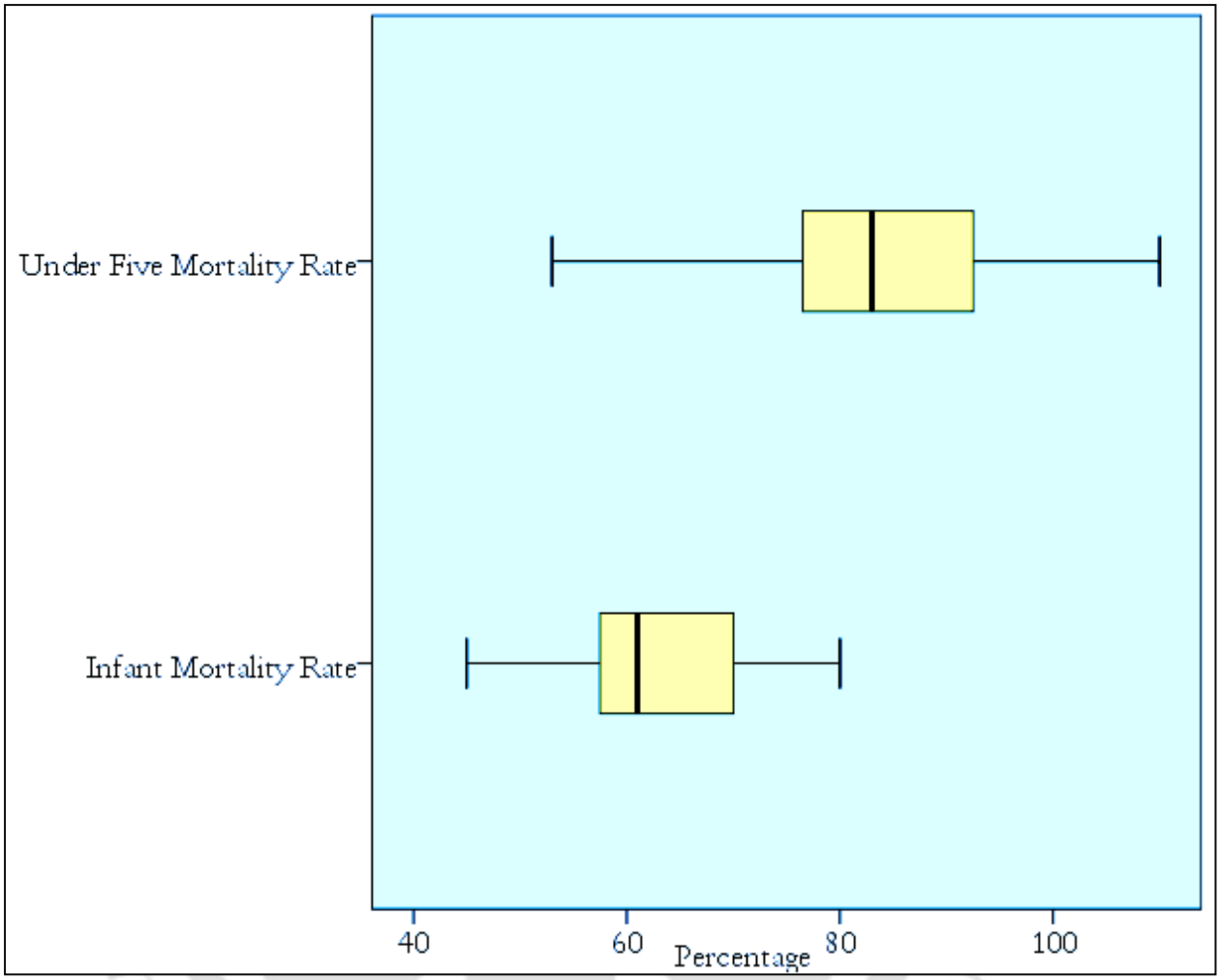
The health status indicators are infant mortality and under-5 mortality. Both the indicators are positively skewed with mean higher than the median. The box plot shows much variation in under-5 mortality rate (Figure 3.4).The lowest value for U-5MR is 53 for Dhemaji while the highest value is 110 for Kokrajhar. The observations below the median rank are more scattered compared to above the median rank. Similarly IMR also shows a lot of disparity. Values below the median are more scatted than those above the median (Figure 3.4). Dhemaji has the lowest number of infant deaths (45) while Kokrajhar (80) has the highest number of infant deaths. The composite index on the basis of health status indicators shows that Dhemaji is at the top rank and Kokrajhar is at the lowest rank (Table 3.5 and Figure 3.4).

Table 3.5 Ranking of the districts on the basis of health status (HS) indicators

District	*IMR index ranks*	*U5MR index ranks*	*Composite HS index ranks*
Dhemaji	1	1	1
Barpeta	2	2	2
Bongaigaon	3	4	3
Lakhimpur	7	3	4
Dibrugarh	3	5	5
Tinsukia	5	7	6
Goalpara	6	6	7
Jorhat	8	5	8
Sibsagar	8	9	9
Cachar	8	10	10
Karbi-Anglong	10	10	11
Kamrup	11	8	12
Hailakandi	3	19	13
Golaghat	12	14	14
Nalbari	13	15	15
Karimganj	17	12	16
Sonitpur	18	12	17
Nagaon	15	16	18
NC Hills	14	21	19
Darrang	16	17	20
Morigaon	19	18	21
Dhubri	20	20	22
Kokrajhar	21	22	23

Source: Annual Health Survey (2011) and Census of India (2011)

Figure 3.4 *Distribution of Health coverage indicators, Box and Whisker diagram, all districts, Assam*



3.3 METHODOLOGY OF SELECTION OF STUDY AREA

For the purpose of our study we decided to select two districts. To carry out a comparative study of status of health among rural households, one district above the median rank (a relatively better performing district) and another below the median rank (a relatively worse performing district) were selected at random. The districts selected were Nalbari and Nagaon. While Nalbari was ranked 2nd in terms of the composite index, Nagaon was at the bottom, ranked 22nd. Since the study is planned at the household level, the next step was to select a Community Development Block. For block selection, we relied on Barua (2012) that had carried out an extensive study on 'forward' and 'backward' blocks in Assam based upon a number of socio-economic indicators (see Table 3.6).[17]

[17]The backward block has been selected on the basis of the available literature on *Identification of Backward Blocks* by Barua (2012). He has identified the backward and developed blocks of Assam on the basis of following

Table 3.6 *Ranking of districts of Assam based on the composite index of 16 indicators*

Sl. no.	District	Rank
1	Sibsagar	1
2	Nalbari	2
3	Jorhat	3
4	Lakhimpur	4
5	Dibrugarh	5
6	Kamrup	6
7	Tinsukia	7
8	Dhemaji	8
9	Golaghat	9
10	Morigaon	10
11	Barpeta	11
12	Darrang	12
13	Goalpara	13
14	Bongaigaon	14
15	Karbi-Anglong	15
16	Sonitpur	16
17	Dhubri	17
18	Kokrajhar	18
19	Karimganj	19
20	NC Hills	20
21	Hailakandi	21
22	Nagaon	22
23	Cachar	23

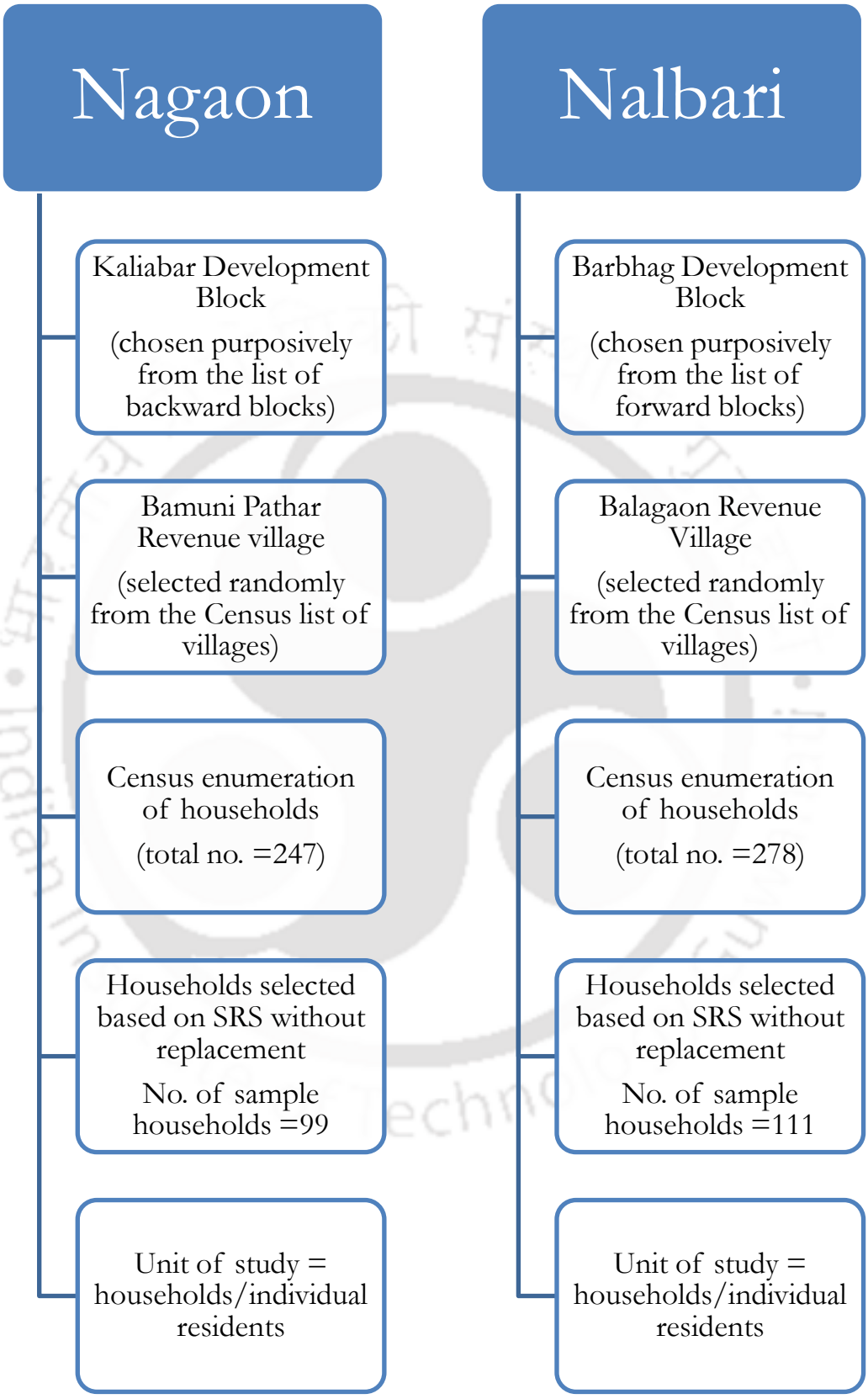
Source: Annual Health Survey, Government of India, 2010-11

Administratively Nagaon constitutes 20 Community Development Blocks and Nalbari has12. From the list of forward and backward blocks based on Barua (2012), the most easily accessible blocks were selected for the study. Barbhag Development block (forward block) has been selected from the district of Nalbari and Kaliabar Development block (backward block) has been selected from Nagaon district.

After finalization of the blocks from the respective districts the next step was selection of a revenue village from each of the blocks for administering household questionnaires. This was done after detailed consultations with the respective Block Development Officers (the administrative head of a Block). Profiles of revenue villages were compiled from the Census 2011 list of villages. Bamuni Pathar revenue village and Balagaon revenue village were selected randomly from the Census list of villages. Study area selection has been summarized in the form of a flow chart in figure 3.5

indicators: paved roads, area of land irrigated in agriculture, safe source of drinking water, provision of electricity, educational facility and literacy status, presence of health care facilities, employment and gender gap in literacy. However, the classifications of the blocks are on the basis of the data available from 2001 census. Since the full report of census 2011 were not available during that period the census 2001 data could not be used for block classification.

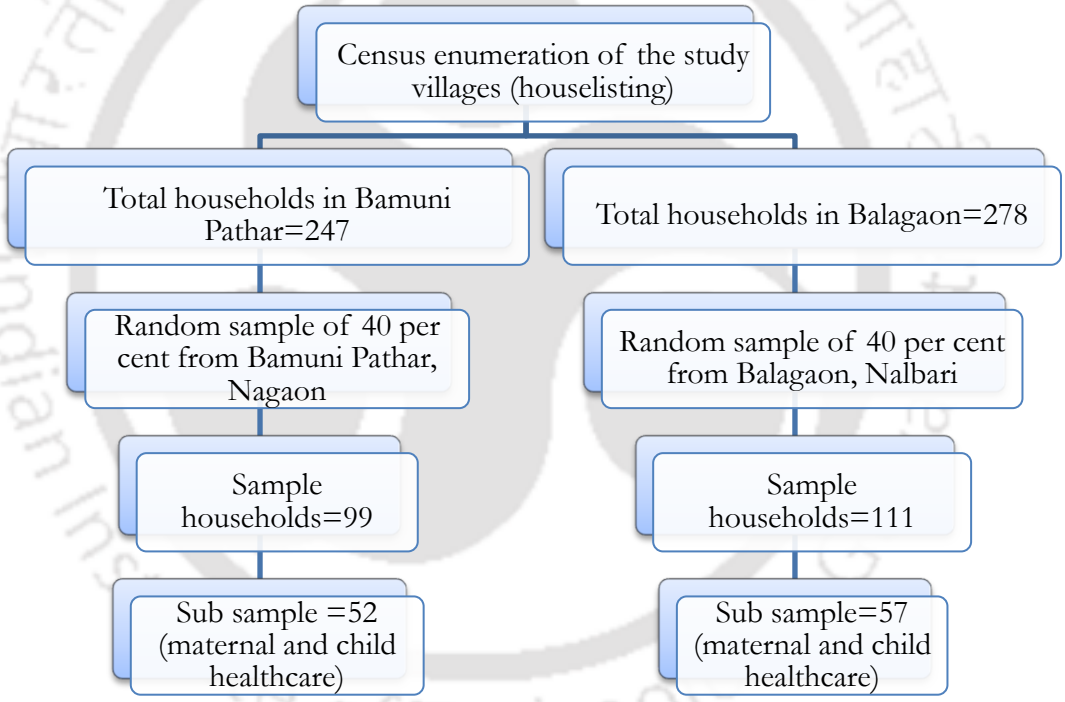
Figure 3.5 *A flowchart showing selection of study area*



Sample survey of households

A census type survey was carried out in Bamuni Pathar and Balagaon in 2014 based upon a houselisting schedule. The houselisting schedule contained queries regarding general socio-economic characteristics of the households, general characteristics of household members, operational holdings of land, and information regarding health entitlements and health facilities. Estimated numbers of households in Bamuni Pathar revenue village was 246 and in Balagaon revenue village 278. For the sample survey, 40 percent were selected from the list of households by the method of simple random sampling without replacement. Number of sample households was 99 from Bamuni Pathar and 111 households from Balagaon (Figure 3.6).

Figure 3.6 *The sample size and unit*



Sub-sample

To assess maternal and child health in the study villages a sub-sample was taken from the chosen sample. Households containing married women within 15-49 years of age and children aged 0-6 years were considered. The sub-sample was a purposive selection, containing 52 and 56 such households from Bamuni Pathar and Balagaon respectively.

Types of questionnaire used for the study

1. Houselisting schedule for the census type survey: include information such as name of the head of the household, place of birth, caste/tribe, religion, gender, age, marital status, occupation and educational level of the households. Data on land ownership and information on basic health entitlements like immunization card, antenatal care card, RSBY card, ASHA and 108 ambulance services were also collected during the houselisting survey.

2. Household schedule for the sample survey: include information on basic health amenities, details of household income, food and non-food household expenditure, acute and chronic morbidity, outpatient and inpatient care, out of pocket expenses, maternal and child health, utilization of public health delivery system and health insurance.

3. Healthcare delivery schedule included:

(a) **Auxiliary nurse midwives (ANM) and sub centre (SC):** include general information about the ANM, physical infrastructure of the sub-centre, fund flow and information about intervention programmes in the sub centre.

(b) **Primary Health Centre (PHC) and Community Health Centre (CHC):** includes information on availability of basic health infrastructure, funds, human resources and information on Rogi Kalyan Samittees.

(c) **Accredited Social Health Activists (ASHA):** includes general information on job training, general activities and the pattern of incentive to the ASHAs.

Chapter 4

Village and household profile

This chapter discusses the general socio-economic characteristics of the study villages and profile of the households based on key indicators. Cross section data was collected to study the levels of morbidity, rates of utilization of healthcare facilities, maternal and child health, and out of pocket expenditure on healthcare. The morbidity estimates have been carried out considering individual residents as the unit of study. For studying health expenditure, catastrophic health expenditure related headcount and public health delivery system in the villages, household has been considered as the unit. A small sub-sample of women respondents have also been considered to assess the state of maternal and child health in the study villages.

The village surveys in Bamuni Pathar revenue village (Nagaon district) and Balagaon revenue village (Nalbari district) was carried out in 2014. A census enumeration of all households based on a houselisting schedule was carried out in Bamuni Pathar in October 2014, followed by a sample survey during October-November 2014. Similarly census enumeration of households in Balagaon was administered through a houselisting schedule in July 2014 and followed by a sample survey in September 2014. For carrying out morbidity estimates for both the villages the reference period considered is last 30 days (for acute) and last 365 days (for chronic) from the date of survey. For estimating catastrophic expenditure the reference period is 365 days from the date of survey. For the purpose of this study, a household has been defined as all members of the family who take food from the same kitchen and are regular residents based upon responses of heads of household. Therefore if members shared the same house and agricultural land but had separate kitchens, they have been considered as two separate families.

4.1 PROFILE OF BAMUNI PATHAR REVENUE VILLAGE

Geographical location and general characteristics

Bamuni Pathar revenue village falls in the Kaliabar block of Nagaon district in Assam[18]. Nagaon is one of the largest districts of Assam, measuring 3,993 square kilometers in area. The district of Nagaon is situated at 92 ° 41' 39" East and 26 ° 20' 39" North. It has a population of 2,826,006. The district has a population density of 711 inhabitants per square

[18] Please see the district and village maps in page number 77 and 78.

kilometer (1840 sq mi). The population growth rate of the district over the decade 2001-11 is 22.09 percent. Rural population constitutes 87 percent and sex ratio is 962 females for every 1000 males. Overall literacy rate of the district is 72 percent; male and female literacy rates are 76 percent and 68 percent respectively. From the Census 2011 estimates we know that of the total population in workforce in Nagaon, 78 percent are males. Women participation is very less in the workforce. Overall work participation rate in the district is only 35 percent. Of the total worker population, 75 percent are main workers. Cultivators and agricultural laborers account for 35 percent and 20 percent of the total workforce respectively. Caste-wise classification indicates that eight percent of the population belongs to scheduled caste category while four percent of the population is from scheduled tribes. Kaliabar Development Block, in which the revenue village Bamuni Pathar is located, is one of the most backward blocks of Nagaon district[19]. Overall literacy rate of the block is 64 percent; male and female literacy rates are 55 percent and 45 percent respectively. Of the total worker population, 74 percent are main workers. Cultivators and agricultural laborers account for 19 percent and 16 percent of the total workforce respectively.

Table 4.1 *Profile of Bamuni Pathar revenue village*

Indicator	*2011*	*2014*
Total population	865	1169
Total Number of households	191	247
Female population (in percent)	51	50
Male Population (in percent)	49	51
Literate population (in percent)	53	66
Sex Ratio	1035	929
Juvenile Sex Ratio	1183	1018

Source: Census of India, 2011; Survey data, 2014

The census enumeration carried out in July 2014 estimated total number of households in the village as 247. This is an increase of 56 households if compared with the Census estimate of 2011. The Census recorded 191 households in Bamuni Pathar. Similarly the 2014 survey estimate showed a population size of 1169, however the Census of 2011 estimated 865 persons in the village. While the exact reasons for such an increase in number of households and population cannot be ascertained, around five households had moved into Bamuni Pathar very recently. Some families were divided and the members had started using separate kitchen. The overall literacy rate recorded during the 2014 survey was 66 percent. This is a rise of about nine percentage points from 2011. Although size of

[19] This is based on Barua (2012) *Identification of Backward Blocks*. The indicators considered to assess backwardness of the block are: paved roads, area of land irrigated, source of safe drinking water, electricity, educational facility and literacy status, presence of health care facilities, employment and gender gap in literacy.

population and number of households showed an increase in 2014, sex ratio of both adults and children in the age group 0 to 6 showed a decline (Table 4.1).

In Bamuni Pathar population is distributed across all officially notified social groups. While households belonging to the other backward castes (OBCs) (33 percent) outnumber those of the other categories, they are by no means predominant in number. The schedules castes (25 percent) are the second largest group followed by the OBCs. The general category has Muslim households in a majority (around 80 percent). In the OBC category 19 percent are Muslims (Table 4.2). The socio-economic composition of the village indicates social backwardness. Caste Hindu households that fall in the general category are 25 percent, while the majority belongs to the SC category.

Table 4.2 *Distribution of households by social group in Bamuni Pathar revenue village,* in number and percent

Social group	*Number*	*Percent*
General	50	20
Scheduled caste	62	25
Schedule tribe	55	22
Other backward castes	80	33
All castes	247	100

Source: Survey data, 2014
Note: 40 households from general category and 15 households from OBCs are Muslims. Four household from STs and 5 households from OBCs are Christians.

While literacy rate in Bamuni Pathar in 2014 showed an increase compared to Census 2011, the total number of persons aged 7 and above who are illiterate is high (34 precent). The proportion of literate population below primary level education (less than Class V) is 22 percent. The share of persons that have cleared primary level education but are below secondary level is 20 percent. Only two percent of all persons above age 7 have completed secondary education but are below the higher secondary level. The share of persons educated above higher secondary and graduated is significantly low, constitutes only one percent. Although literacy rate showed an increase in 2014, the average level of education in this village is very low, where about more than 60 percent of the population age 7 and more are only matriculates (Table 4.3).

Table 4.3 *Distribution of households by educational level in Bamuni Pathar,* in number and percent

Educational level	*Bamuni Pathar*	*Percent*
Below primary (below 5 standard)	229	22
Primary (up to class five)	212	21
Secondary passed but below higher secondary	211	20
Higher secondary but under graduate	19	2
Graduation but below post graduation	9	1
Illiterate	350	34
All persons (aged 7 and above)	1030	100

Source: Survey data, 2014

Note: The literacy rate estimate follows the Census of India definition of those who can read and write with understanding in any one Indian language, in the age group 7 and above.

The total worker population is 455, constituting 38 percent of the total population. Therefore the dependency ratio is very high in the village. Of the total worker population in the village, 15 percent are cultivators. Half the workers are engaged as casual labourers either in agriculture or non-agriculture. While 21 percent labour out in agriculture 27 percent are engaged in non-agricultural activities. Laboring out in agriculture mainly includes working in others field as daily wage earners in agricultural activities such as ploughing, sowing and harvesting. A sizeable number of workers are also wage earners in nearby tea gardens. Non-agricultural workers are engaged as construction workers, manual laborers, mechanics in small workshops, and as domestic help. Close to six percent are construction workers. The proportion of self-employed persons in the village is 21 percent. Self-employment includes engagement in small businesses such as grocery shops, carpentry, vegetable sellers, tailoring, driving, mechanic, and bicycle repairing shops. Around ten percent of the worker population are regular salaried in Bamuni Pathar (Table 4.4).

Table 4.4 *Distribution of households by occupation in Bamuni Pathar revenue village,* in number and percent

Type of occupation	*Number*	*Percent*
Cultivators	66	15
Laboring out in agriculture	96	21
Laboring out in non-agriculture	123	27
Construction workers	29	6
Self employed	96	21
Salaried	45	10
All workers	455	100

Source: Survey data, 2014

Almost half the households in Bamuni Pathar do not possess any agricultural land although from the occupational pattern of the village we know that large share depends upon land for survival. While the share of cultivators is only 15 percent (Table 4.4), those working on

agricultural land as daily wage earners are around 21 percent. Moreover, 4 percent of the households also depend on land as their secondary occupation. This shows the vulnerability of the village with respect to source of earning. Marginal and small holders are 34 percent and 13 percent respectively (Table 4.5).

Table 4.5 *Distribution of households by operational holding in Bamuni Pathar revenue village,* in number and percent

Land holdings (in hectares)	*Number*	*Percent*
4.01-10.00	4	2
2.01-4.00	3	13
0.002-2.00	83	34
<0.002	125	51
All households	247	100

Source: Survey data, 2014
Note: The size distribution of household operational holding is followed from NSSO large sample survey. The categories of household operational holding are: Landless holders=less than 0.002 hectare, Marginal land=0.002 hectares-1.00 hectare, Small holding=2.01 hectare-4.00 hectares, Semi medium=2.01 hectare-4.00 hectare, Medium=4.01 hectares-10.00 hectare

The distribution of households by family size in Bamuni Pathar revenue village indicates presence of 1 percent of single headed households. Majority of the households in the village have a maximum of 5 to 6 members (43 percent) and less than or equal to 4 members (40 percent). Larger households with more than or equal to 7 households members constitute 15 percent of the total households of the village (Table 4.6).

Table 4.6 *Distribution of households by family size in Bamuni Pathar revenue village,* in number and percent

Family Size	*Number*	*Percent*
Single headed	3	1
≤ 4	100	41
5-6	106	43
≥ 7	38	15
All households	247	100

Source: Survey data, 2014

Age-wise majority of the households are headed by members in the age-group of 41 to 60 years of age (47 percent). 36 percent of the households are headed by household members aged 21 to 40 years of age. Households headed by elderly members are however less in proportion. 17 percent of the households are headed by elderly member of more than 60 years of age (Table 4.7).

Share of households having access to electricity facility is 75 percent; however households report that it is functional only for 7 to 8 hours during the day. Only 60 percent of the households are using toilet facility while the rest go for open defecation. Use of safe drinking is limited to 63 percent of the households which indicates that proneness to disease is more among the households. Majority of the households are residing in kutcha houses. The percentage of households residing in kutcha houses and semi-pucca houses accounts for 57 percent and 33 percent respectively. Proportion of households residing in pucca houses is significantly low, constituting only nine percent. In terms of source of cooking fuel, dependence on firewood is the highest. Very large shares of households (87 percent) depend on firewood as the only source of cooking fuel. The dependence on biogas alone and both firewood and biogas is 8 percent and 4 percent respectively in the village (Table 4.8).

Table 4.7 *Distribution of households by age of head of the household in Bamuni Pathar revenue village,* in number and percent

Age of the household head	*Number*	*Percent*
21-40	90	36
41-60	116	47
61 and above	41	17
All households	247	100

Source: Survey data, 2014

Table 4.8 *Distribution of basic amenities of the households in Bamuni Pathar revenue village,* in number and percent

Household basic amenities	*Number*	*Percent*
Electricity facility	74	75
Toilet facility	59	60
Safe drinking water	62	63
Kutcha	57	58
Pucca	9	9
Semi Pucca	33	33
Biogas	8	8
Firewood	87	88
Both firewood and biogas	4	4

Source: Survey data, 2014

4.2 PROFILE OF BALAGAON REVENUE VILLAGE

Geographical location

Balagaon revenue village falls in the Barbhag block of Nalbari district in Assam. Nalbari district occupies an area of 2,257 square kilometers. It is situated at 26° 25' North and 91° 26' East. It has a population of 7,69,919. The district has a population density of 734 inhabitants per square kilometer. The population growth rate of the district over the decade 2001-11 is 11.74 percent. Rural population constitutes 89 percent and sex ratio is 945 females for every 1000 males. Overall literacy of the village is 79 percent; male and female literacy rates are 84 percent and 73 percent respectively.

Table 4.9 *Profile of Balagaon revenue village*

Indicators	*2011*	*2014*
Total population of the village	1297	1278
Total Number of households	256	278
Female population (in percent)	49	48
Male Population (in percent)	51	52
Literate population (in percent)	81	84
Sex Ratio	944	927
Juvenile Sex Ratio	1127	1390

Source: Census of India, 2011; Survey data, 2014

The Census 2011 estimates show that of the total population in workforce, 79 percent are males. The work participation rate for the district is 35 percent. Of the total worker population, 74 percent are main workers. Cultivators and agricultural laborers account for 22 percent and 25 percent of the total workforce respectively. Caste-wise classification indicates that eight percent of the population belongs to scheduled caste category while 3 percent of the population is from scheduled tribes. Barbhag Development Block has been identified as a 'forward block' based on Barua (2012). Overall literacy rate of the block is 69 percent; male and female literacy rates are 58 percent and 42 percent respectively. Of the total worker population, 75 percent are main workers. Cultivators and agricultural laborers account for 8 percent and 9 percent of the total workforce respectively.

The census enumeration carried out in July 2014 estimated total number of households in the village as 278. This is an increase of 22 households if compared with the Census estimate of 2011. The Census recorded 256 households in Balagaon. The 2014 survey estimate showed a population size of 1278, the Census of 2011 estimated 1297 persons in the village. Overall literacy rate recorded in the survey of 2014 was 84 percent. This is a rise

of about 3 percentage points from 2011. The juvenile sex ratio in the village stands in favour of girl children (Table 4.9).

In terms of the social group composition, in Balagaon, general caste category households (59 percent) outnumber other categories. The schedules castes (28 percent) are the second largest group followed by the OBCs (13 percent) (Table 4.10). Majority households of Balagaon village are caste Hindu households.

Table 4.10 *Distribution of households by social group in Balagaon revenue village,* in number and percent

Social group	*Number*	*percent*
General	165	59
Scheduled caste	78	28
Other backward castes	35	13
All castes	278	100

Source: Survey data, 2014
Note: Balagaon village does not constitute any Muslim population

The overall literacy rate of Balagaon village is 84 percent. The proportion of literate population below primary level education (less than Class V) is 23 percent. The share of people that have cleared secondary level education but are below higher secondary level is 39 percent. 11 percent of the population have completed higher secondary level but are under graduate. The share of population completing graduate level education but below post graduation is 6 percent in the village. The proportion of post graduated population is however significantly low and constitutes only 2 percent of total population. 16 percent of population in the village has no formal education (Table 4.11).

Table 4.11 *Distribution of households by educational level in Balagaon revenue village,* in number and percent

Educational level	*Number*	*percent*
Below primary (below 5 standard)	270	23
Primary (up to class five)	41	4
Secondary passed but below higher secondary	441	38
Higher secondary but under graduate	130	11
Graduation but below post graduation	78	6
Post graduation	18	2
Illiterate	181	16
All persons	1159	100

Source: Survey data, 2014

The total worker population of the village is 506, constituting 39 percent of the total population. Of the total worker population of the village, 8 percent are cultivators. While 8 percent labor out in agriculture, 16 percent are engaged in non-agricultural activities.

Laboring out in agriculture mainly includes working in others field as daily wage earners and other agricultural activities like sowing, harvesting and ploughing. Non-agricultural workers are mainly engaged in activities such as carpentry, mechanical works, cycling pushcarts and as workers in small factories. Around 15 percent are construction workers. The proportion of self employed population in the village is 27 percent. Self employment includes engagement in small businesses such as grocery shops, weavers, vegetable vendors, village priest, carpenters, fishing and other small businesses. Around 28 percent of the worker population is regular salaried (Table 4.12).

Table 4.12 *Distribution of households by occupation in Balagaon revenue village,* in number and percent

Types of occupation	*Number*	*Percent*
Cultivators	42	8
Laboring out in agriculture	140	8
Laboring out in non-agriculture	40	16
Construction workers	80	15
Self employed	130	27
Salaried	74	28
All workers	506	100

Source: Survey data, 2014

Almost 71 percent of the households do not possess any agricultural land in Balgaon. The share of households engaged in agricultural related activities is low in Balgaon. The percentage of households possessing marginal and small holding constitute 25 percent and 4 percent respectively. Proportion of households with semi-medium land holding is only 1 percent. Only 1 household in the village is a medium holder (Table 4.13).

Table 4.13 *Distribution of households by operational holding in Balagaon revenue village,* in number and percent

Land holding (in hectares)	*Number*	*Percent*
4.01-10.00	1	0.36
2.01-4.00	2	0.72
1.01-2.00	10	3.60
0.002-1.00	69	24.82
<0.002	196	70.50
All households	278	100

Source: Survey data, 2014

Note: The size distribution of household operational holding follows the definition used in NSSO large sample surveys. The categories are: Landless/near landless =< 0.002 ha, Marginal=0.002 -1.00 ha, Small =2.01-4.00 ha, Semi medium=2.01-4.00 ha, Medium=4.01-10.00 ha, and Large=>10 ha.

The distribution of households by family size in Balagaon revenue village indicates presence of 1 single headed household. Majority of the households in the village have less than or equal to 4 members (57 percent). Households with 5 to 6 members constitute 31 percent of the total household. Larger households with more than or equal to 7 households members constitute 12 percent of the total households in Balagaon (Table 4.14).

Table 4.14 *Distribution of households by family size in Balagaon revenue village,* in number and percent

	Number	*Percent*
Single headed	1	.36
≤ 4	158	56.83
5-6	86	30.94
≥ 7	33	11.87
All households	278	100

Source: Survey data, 2014

The distribution of the households by age of head of the household shows that majority of the households are headed by members in the age group 41 to 60 years of age (56 percent). 23 percent of the households are headed by household members aged 21 to 40 years of age. Households headed by elderly member of more than 60 years of age accounts for 21 percent of the households (Table 4.15).

Table 4.15 *Distribution of households by age of head of the household in Balagaon revenue village,* in number and percent

Age of the household head	*Number*	*Percent*
21-40	63	23
41-60	156	56
61 and above	59	21
All households	278	100

Source: Survey data, 2014

Share of households having access to electricity facility is 93 percent. In terms of use of toilet facility, the estimate shows that 84 percent of the households are using toilet facility. 73 percent of the households in the village are using safe drinking water. Similarly, housing condition of the village indicates that majority of the households are residing in kutcha houses. The percentage of households residing in kutcha houses and semi-pucca houses accounts for 48 percent and 35 percent respectively. Proportion of households residing in pucca houses is 16 percent. In terms of source of cooking fuel, dependence on biogas is highest in the village. 49 percent of the households depend on biogas as source of cooking fuel. The dependence on firewood alone and both firewood and biogas is 18 percent and 35 percent respectively in the village (table 4.16).

Table 4.16 *Distribution of basic amenities of the households in Balagaon revenue villages,* in number and percent

Household basic amenities	*Number*	*Percent*
Electricity facility	103	93
Toilet facility	93	84
Safe drinking water	81	73
Kutcha	53	48
Pucca	18	16
Semi Pucca	39	35
Biogas	54	49
Firewood	37	18
Both firewood and biogas	20	35

Source: Survey data, 2014

4.3 HEALTH ENTITLEMENTS AND HEALTH FACILITIES IN THE STUDY VILLAGES

Bamuni Pathar revenue village

Based upon the houselisting schedule canvassed in the study villages, some information regarding health entitlements and health facilities were collected. Health entitlements and awareness among households regarding what they are entitled to is the first step towards being able to secure the health benefits. The houselisting schedule collected information on possession of Rashtriya Swasthya Bima Yojana (RSBY) card in the sample villages. RSBY is a Central government sponsored health insurance scheme which is in operation since 2008. The main objective of the scheme is to provide financial security and to improve quality of care among below poverty line population. It provides Rs. 30,000 per annum for a family of five on a floater basis for hospitalization cases. The scheme also covers transportation charges of Rs. 1000 per year. Each beneficiary is provided with a biometric smart card and they can visit any empanelled hospital within India. Moreover, the beneficiaries are provided with pre hospitalization charges for one day before admission and post hospitalization charges for five days after being discharged from hospital.

The survey also collected information on awareness about Accredited Social Health Activist (ASHA) of the village. ASHA workers are social health activist who are being appointed on contractual basis through common consent of villagers and are finally appointed by the block authorities. It is essential to know whether the rural women are aware of the ASHA because they are the source of linkage between the rural women and the health facilities of the village. They provide information about existing health services, create awareness about

health, hygiene and nutrition and escort pregnant women in case of various child and maternal health related complications. The survey also collected information on awareness about 108 ambulance services. 108 is a free emergency service which provides medical services and fire emergency services. Information on possession of immunization card and antenatal care card were also collected during the survey. Possession of immunization card and antenatal card is an indicator of awareness about maternal and child healthcare among the rural women. Information on child birth below age 20 was collected as it has an adverse impact on survival risk of both mother and the child.

Information on availability of healthcare services was also collected during the course of the survey. The rural healthcare system is a three tier system comprising of sub-centre, primary health centre and community health centre. The most peripheral unit is the sub-centre which is said to be the first unit of contact between the healthcare providers and the community. Next to the sub centre is primary health centre, which may be classified as a block primary health centre or a mini primary health centre. The block primary health centre is entrusted with the function of providing preventive and promotive healthcare services to the rural population. The coverage area under block primary health centre is 20,000 populations for hill areas and 30,000 population for plain areas. It also acts as a referral unit for 6 sub-centres. It provides emergency services for 24 hours. It has the responsibility of referring cases to the community health centre and other higher level of public health institutions. According to the standard norm, a block primary health centre should possess 4 to 6 indoor bed. The mini primary health centre covers a maximum of 34 sub-centres within its purview. Each mini primary health centre covers an average population of 20000 populations. It covers a smaller population compared to block primary health centre with lesser healthcare facilities. Apart from these health facilities at the rural level, the higher levels of health institutions include state level, district level and sub-divisional hospitals.

The estimate on health entitlement of Bamuni Pathar village indicates that the proportion of households with Rashtriya Swasthya Bima Yojana Card (RSBY) is 36 percent in Bamuni Pathar. Although 36 percent of the households are possessing RSBY card, only 5 percent of the households have availed its benefits. The estimates regarding possession of immunization card and antenatal card has been collected from those households having married women aged 15 to 49 years of age with 0 to 6 years of children. The percentage of households possessing immunization card and antenatal cards is found to be 92 percent and

90 percent in the village. Similarly, majority of the households are aware of Accredited Social Health Activist (ASHA) and 108 emergency services of the village. 97 percent and 98 percent of the households in the village are aware of ASHA and 108 emergency ambulance services respectively. Moreover, 43 percent of the households are residing below the official poverty line in Bamuni Pathar village (Table 4.17).

Table 4.17 *Information on basic health entitlements in Bamuni Pathar revenue village,* in number and percent

Basic heath entitlements	*Number*	*Percent*
Households with RSBY cards	89	36
Households with immunization card	48	92
Households with ANC cards	47	90
Households aware about 108 ambulance services	240	97
Households aware about the village ASHA workers	241	98
Households with BPL cards	106	43

Source: Survey data, 2014
Note: The proportion of household's access to immunization card and antenatal card has been calculated from the total number of married women with 0 to 6 years of children. The total numbers of households with married women aged 15 to 49 years of age are 52 in Bamuni Pathar and 56 households in Balagaon.

Bamuni Pathar revenue village is mainly dependent on three sources of treatment for various illnesses. They are

a) **Public health facilities**: include a primary health centre (PHC) and sub-centre located within the village. The health facilities within the village provide only minimal care, mostly with respect to maternal and child health. The first referral unit (FRU) for the village is located at the nearest town Jakhalabandha, 13 kilometers away from the revenue village. A first referral unit is an upgraded Community Health Centre or Sub-District hospital which should possess at least three important facilities: surgical intervention facilities, new born care and blood storage facility on a 24 hour basis. Although the FRU is located 13 kilometers away from the revenue village, there are difficulties in physical accessibility due to road conditions as well as lack of transportation. The nearest civil hospital is located in Tezpur town which is 35 kilometers away from the revenue village.

b) **Private health facilities:** includes private clinics and nursing homes located in Jakhalabandha and Tezpur. For example in case of, tuberculosis, heart related diseases, appendicitis and gall bladder stone, residents of the village are observed to visit the private hospitals or health clinics.

c) **Other sources**: include treatment through self-medication, traditional healers (*Ojhas*) and home remedial measures. People prefer to go for self medication by

purchasing medicine directly from the pharmacy in case of minor illnesses like fever, headache, allergy problem and minor stomach problem. Dependence on home remedial measures is also observed in case of minor illnesses such as fever, cold and headache. In case of some of the diseases such as jaundice, small pox and asthma, dependence on Ojhas or traditional healers was noticed.

Balagaon revenue village

In Balagaon, proportion of households with Rashtriya Swasthya Bima Yojana Card (RSBY) is 3 percent. Majority of the households opined that they were unaware of any kind of health insurance scheme. However, the proportion of households possessing immunization card and antenatal cards was found to be more than 90 percent in the village. Similarly, 97 percent and 95 percent of the households are aware of Accredited Social Health Activist (ASHA) and 108 emergency services respectively (Table 4.18).

Table 4.18 *Information on basic health entitlements in Balagaon revenue villages,* in number and percent

Basic heath entitlements	*Number*	*Percent*
Households with RSBY cards	9	3
Households with immunization card	52	93
Households with ANC cards	51	91
Households aware about 108 ambulance services	265	95
Households aware about the village ASHA workers	270	97
Households with BPL cards	95	34

Source: Survey data, 2014
Note: The proportion of household's access to immunization card and antenatal card has been calculated from the total number of married women with 0 to 6 years of children. The total numbers of households with married women aged 15 to 49 years of age are 52 in Bamuni Pathar and 56 households in Balagaon.

Availability of health facilities in Balagaon revenue village

Like Bamuni Pathar revenue village, the residents of Balagaon village also depend on public health facilities, private health facilities and other sources.

a) **Public health facilities**: include mini primary health centre (MPHC) and a sub-centre. The MPHC is at a distance of about 3 kilometers in Maroa town. A community health centre (CHC) is situated 12 kilometers away from the village at Kamarkuchi. The civil hospital is situated in Nalbari town which is also at a distance of about 12 kilometers from the village. Thus more options are available for the rural households of Balagaon with respect to visit to a public health facility. Moreover, the communication system is good enough to visit a health facility

whether public or private at the earliest

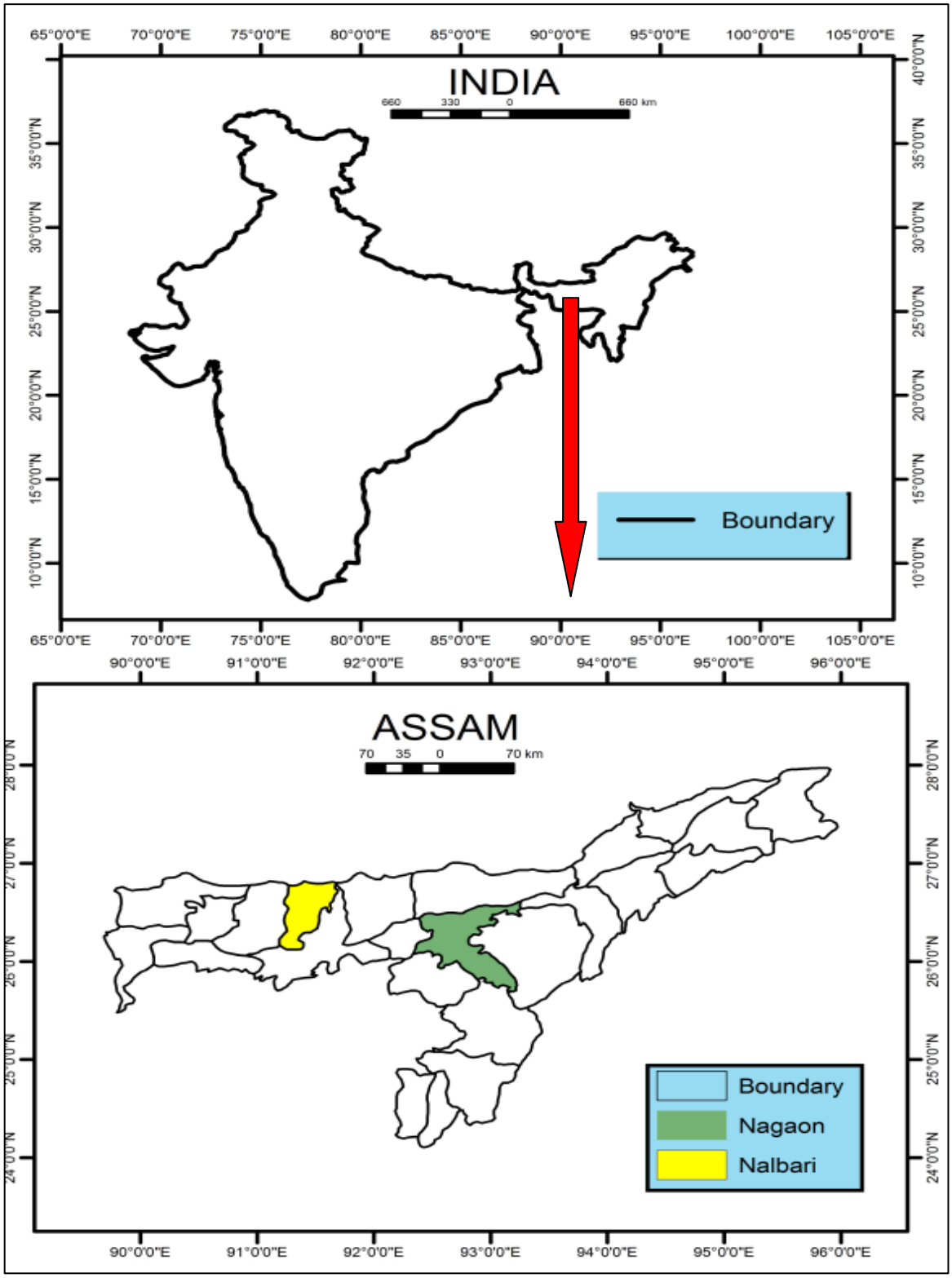
d) **Private health facilities**: include private health clinics and nursing homes which are in Nalbari town. For outpatient care most of the households prefer private health facilities (63 percent) while for inpatient care government health facility (80 percent) is preferred. The households of the village opined that although there is a demand for government health facilities in the village due to low quality of care in these institution people prefer to go to the private health facilities although unwillingly.

e) **Other sources**: include treatment through self-medication, traditional healers (*ojhas*) and home remedial measures. People prefer to go for self medication by purchasing medicine directly from the pharmacy in case of minor illnesses like fever, headache, allergy problem, diarrhea and minor stomach problem. Dependence on home remedial measures is also observed in case of minor illnesses such as fever, cold and headache. In case of some of the diseases such as jaundice, small pox and asthma and piles dependence on ojhas or traditional healers has been noticed.

4.4 CONCLUSION

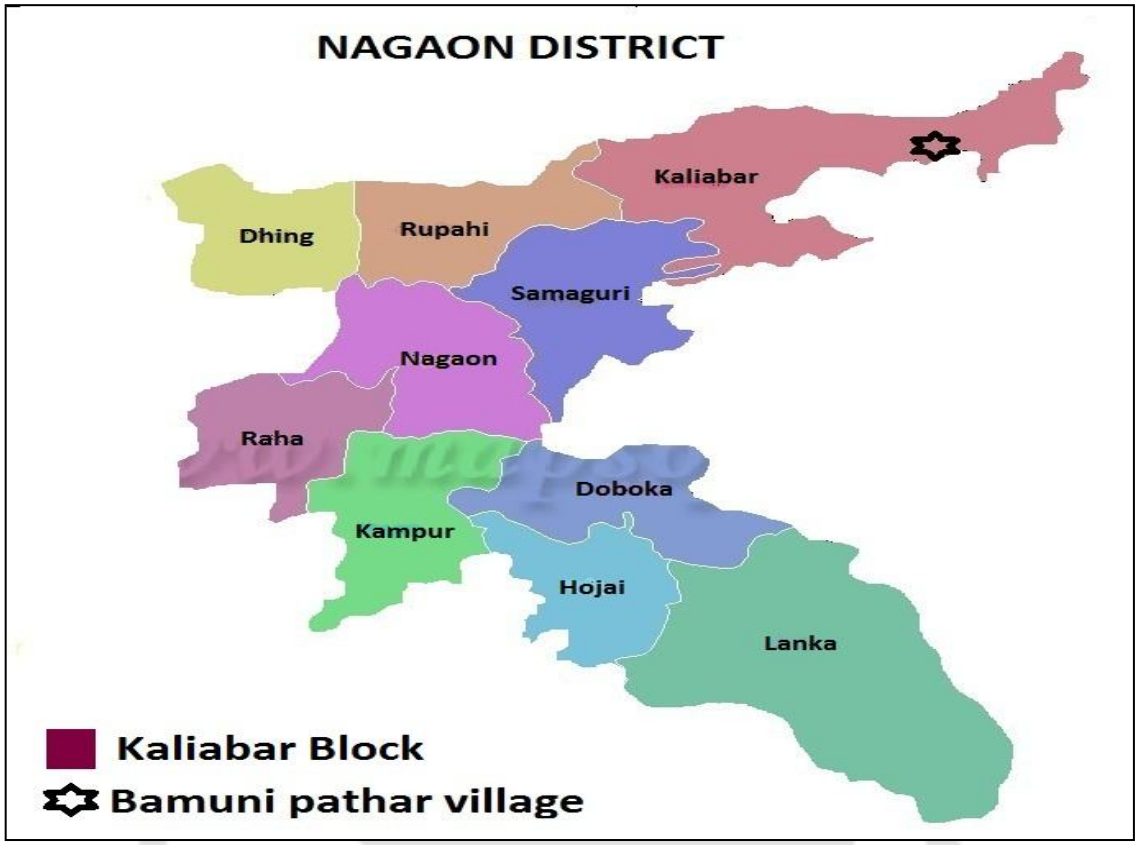
While a large proportion of households in Bamuni Pathar are dependent on agricultural activities for their livelihood, households from Balagaon are engaged in diversified activities. In terms of household accessibility to basic household amenities Balagaon is relatively better off than Bamuni Pathar. Awareness about maternal and child health entitlements is high in both villages. More than 90 percent of households in both the villages possess immunization and antenatal card. A majority of the households are aware of Accredited Social Health Activist (ASHA) and 108 emergency services in both the revenue villages. In terms of accessibility to healthcare facilities in both the villages, Balagaon has more options in terms of numbers of public and private healthcare facilities. However dependence on government healthcare facilities is higher in Bamuni Pathar relative to Balagaon.

Map 1: Maps of India and Assam



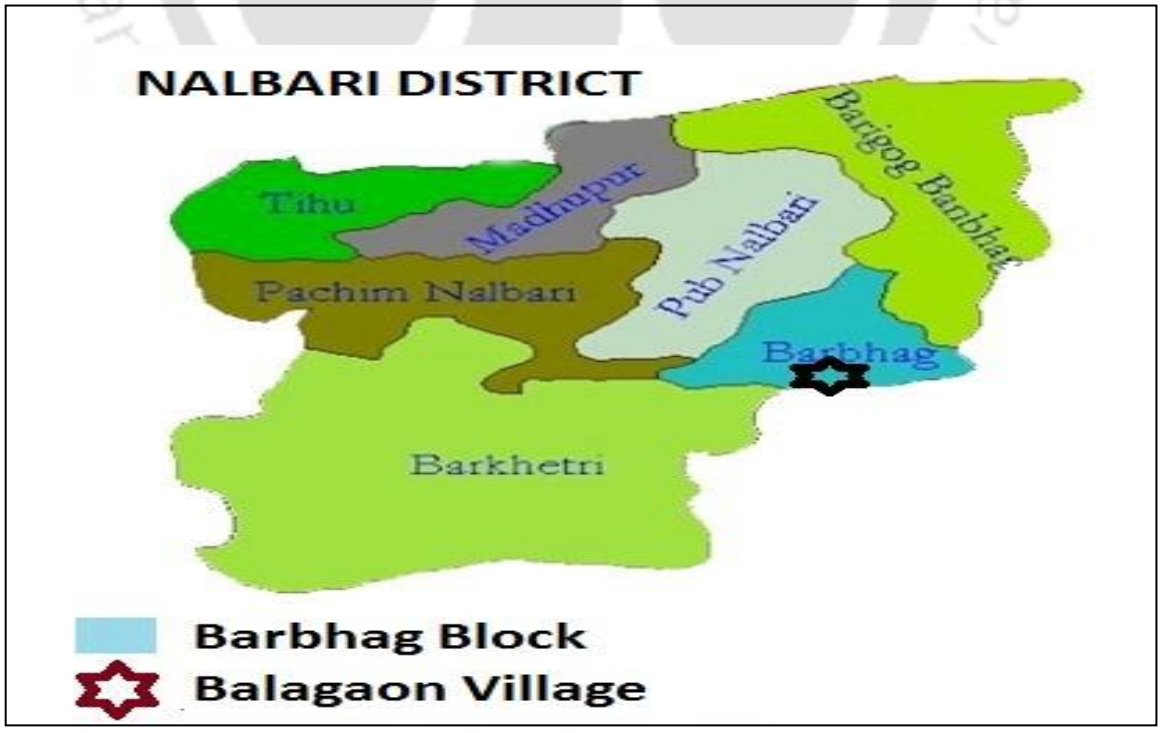
Source: Block Office, Nagaon and Nalbari

Map 2: Map of Nagaon district



Source: Block Office, Nagaon and Nalbari

Map 3: Map of Nalbari district



Source: Block Office, Nagaon and Nalbari

Chapter 5

Prevalence of Morbidity among Rural Households

This chapter estimates morbidity prevalence in the study villages. A study on morbidity is important because it shows the general levels of illnesses in a population. Chronic and untreated illnesses in the long run may lead to mortality. Moreover, a study on morbidity will also pave way for policy formulation; such as focusing on health intervention programmes for control of specific diseases. Absence of empirical data on specific diseases and morbidity prevalence may affect design of health programmes and its outcomes. Section 5.1 gives an overview of morbidity prevalence in India and Assam. Section 5.2 examines the levels and extent of morbidity in the study villages. Section 5.3 explains the pattern of utilization of healthcare services among the rural households. This section also discusses the factors determining choice of facility with the help of a logistic regression analysis. Section 5.4 examines factors affecting morbidity in both the villages.

5.1 MORBIDITY IN INDIA AND ASSAM: AN OVERVIEW

State level estimates on healthcare and morbidity are available from the National Sample Survey Organization and the National Council of Applied Economic Research. Since one of the main objectives of this thesis is to study the status of health in Assam in the post liberalization period, the morbidity prevalence rates are compared based on the NSSO and NCAER estimates emerging from the 1990s and 2000s. Apart from the NSSO and NCAER, morbidity data is also collected in national level surveys like National Family Health Survey. However NFHS collects disease specific data on common infectious and communicable diseases like tuberculosis (TB), diabetes and goitre.

The NSSO is the first national level organization which conducted morbidity study on a large scale for the first time. The NSSO has been publishing reports on morbidity and healthcare since its seventh round in 1953-54[20]. The successive rounds in 1961-62 (17th round[21]), 1973-1974 (28th round[22]), 1986-87(42nd round[23]), and 1995-96 (52nd round) also

[20] It was the first survey on morbidity by NSSO. The sample was very small (only 8253 rural households and 1720 urban households). The survey collected information on sex, age, marital status, occupational status, cause of illness and duration of illness.

[21] The 17th round report was entitled as 'Report on Pilot Survey on morbidity'. This was a pilot survey attempting to examine the alternative approaches to morbidity reporting.

[22] The 28th round survey entitled 'Note on Morbidity, NSS' was a full scale survey conducted on the basis of the earlier surveys on morbidity. There was a shift in the idea of morbidity to utilization pattern since the 28th

provided detailed morbidity and health related estimates. The main objective of the 52nd round survey was to study the pattern of utilization of public and private health care services together with creating a morbidity profile of the population. Another round of survey on morbidity was conducted from January to June, 2004 (60th round). The 60th round entitled *Morbidity and Condition of the Aged* collected information on general health care system, utilization of health care services provided by the public and private sector and expenditure incurred on medical treatment by the households. Information on conditions of health of the aged was also collected in this round. The 71st round report on health and education is one of the parts of the decennial series which started during the period of 1980s.[24] The 42nd, 52nd and the 60th round of the NSSO have also been a part of the decennial series on health. The 71st round (January-June 2014) released a report entitled *Key Indicators of the Social Consumption in India: Health* which focused on the trends and patterns in morbidity rates, the role of public sector in providing health services and the cost of health care in both public and private health care sector.

The major differences between NSSO 71st round and the 52nd and 60th round on morbidity are: *Firstly*, in the previous rounds persons with disabilities were considered as ailing persons. In the present round, pre-existing disabilities are considered as disabilities on the condition that they were under treatment for a month or more than a month during the reference period. If this condition is not met, it is not considered as an ailment. *Secondly*, in the earlier rounds only those individuals were considered to have sought treatment who received some kind of medical attention in hospitals, but in the 71st round, those who were self-medicated were also considered treated if the treatment was undertaken on medical advice. *Thirdly*, in the present round, additional information on ailments, as on the date of survey, was not collected for any age groups. In the earlier rounds, ailments reported on the date of survey and the nature of treatment of such kind of ailment during the reference period of last 15 days was also collected (Sundararaman and Muraleedharan, 2015).

In 1995-96, Assam's rate of morbidity was higher than the Indian average. Other states that had morbidity rates higher than the Indian average are Andhra Pradesh, Bihar, Gujarat, Haryana, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal and Kerala.

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round survey. NSSO has not taken any separate survey on morbidity since this round. Morbidity estimates are now collected as a part of the decennial survey on social consumption.

[23] The 42nd round report was entitled as 'Morbidity and Utilization of Medical Services'. It was the second survey on social consumption and for the first time the survey collected data on utilization of health services in India incorporating data on both inpatient and outpatient care.

[24] The 52nd and the 71st round were quinquennial round survey while 60th round was thin round.

In 2004 as well morbidity rate in Assam was higher than the Indian average. During this period the states with morbidity rates above Indian average were Andhra Pradesh, Haryana, Maharashtra, Punjab Tamil Nadu, Uttar Pradesh, West Bengal and Kerala. In 2014, the morbidity prevalence for the state of Assam (31 per one thousand populations) seems to decline with respect to the all India average of 87 per one thousand populations (Table 5.1).

However, Kerala may be considered to be an outlier in all the years, showing a morbidity prevalence rate much higher than the Indian average. For example, the morbidity estimate in 1995-96 is seen to be almost two times higher than the Indian average. Since Kerala is in the last stage of demographic transition it is expected to be experiencing lower levels of morbidity prevalence. One of the explanations of Kerala's high morbidity estimate is that reporting is very high. Secondly the nature of disease prevalence, unlike in the case of other states, is mostly related to lifestyle. In other states the incidence of communicable diseases are relatively high. The variations in the morbidity estimates across different rounds may be attributed to changes in some of the concepts and definitions with respect to the earlier rounds. Thus the estimates of the 71st round are not strictly comparable with the earlier rounds. Although incomparable, the estimates are still useful in terms of depicting the levels of morbidity in the Indian states.

Table 5.1 *Prevalence rate of morbidity (per thousand population) for the major states of India during the 52nd, 60th and 71st round of National Sample Survey Organization*

Major states	*52nd round (1995-96)*	*60th round (2004)*	*71st round (2014)*
Andhra Pradesh	64	90	155
Assam	80	82	31
Bihar	36	53	57
Gujarat	46	69	92
Haryana	61	95	56
Karnataka	45	64	93
Madhya Pradesh	41	61	53
Maharashtra	52	93	80
Orissa	62	77	103
Punjab	76	136	161
Rajasthan	28	57	54
Tamil Nadu	52	95	146
Uttar Pradesh	61	108	68
West Bengal	65	114	161
India	**55**	**85**	**94**
Kerala (Outlier)	**178**	**358**	**310**

Source: NSSO, 52nd and 60th round and 71st round, 1998, 2004, 2015
Note: The reference period for all the rounds is 15 days

National Council of Applied Economic Research (NCAER) has also been collecting data on morbidity. The NCAER first published morbidity estimates in 1992 in a report entitled *Household Survey of Medical Care*. This report provided data on nature of illnesses suffered, source of medical treatment and costs borne by the patient during the period of treatment. Another survey report titled *Household Survey of Health Care Utilization and Expenditure* was published in 1995. NCAER (1992) referred only to 'treated illnesses' while NCAER (1995) gathered information on 'both treated and untreated ailments'. Elaborate results were also published on prevalence rate of morbidity by gender, hospitalized and non-hospitalized cases, utilization of health care services by type of provider, use of various systems of medicine, and expenditure on hospitalized and non-hospitalized treatment. NCAER (1995) estimates show that the morbidity prevalence rate (based on treated and untreated) was higher than the Indian average in the states of Andhra Pradesh, Karnataka, Madhya Pradesh, Orissa, Punjab, Rajasthan, Uttar Pradesh and Kerala. In this report, Assam is seen to have relatively lower rate of morbidity. The NCAER morbidity surveys have not been updates since then.

5.2 MORBIDITY PREVALENCE IN THE STUYDY VILLAGES

The information on morbidity prevalence has been gathered from individual residents of all the sample households. In Bamuni Pathar village the number of sample households is 99, constituting 485 individuals. In Balagaon village sample households are 111 constituting 546 individuals. The estimates are based on self reported morbidity as opposed to clinical or medical examination. Although self reported morbidity estimates have the disadvantage of respondent bias, it is the only way of collecting information in socio-economic surveys.

The study collected information on both acute and chronic morbidity in the study villages. We have followed the NSSO definition of acute and chronic morbidity. The same definition of morbidity will also make comparison with NSSO estimates possible. Acute morbidities here refer to those illnesses which are of short duration i.e. for a period of less than 30 days. Chronic illnesses on the other hand are of long duration continuing for a period of more than one month (NSSO, 2015). Thus information on acute morbidity is collected for a period of last 30 days from the date of the survey while the information for chronic morbidity is collected for last 365 days. The study measures morbidity as a ratio of estimated number of persons reporting ailments during the reference period and the total number of persons exposed to the risk of some illness (NSSO, 2015). For the present study since the

sample size is small, the morbidity prevalence rate (MPR) is calculated in terms of per 100 populations.

$$MPR=\frac{Number\ of\ ailing\ persons}{Total\ number\ of\ persons\ exposed\ to\ the\ risk\ of\ anykind\ of\ illnesses}*100$$

5.2.1 Levels of overall morbidity

For estimating overall morbidity, we have considered all those residents who have suffered either chronic or acute morbidity or both over the period of last 365 days. In Bamuni Pathar the prevalence rate was 42 percent and in Balagaon 40 percent. In Bamuni Pathar among the total population reporting any kind of illness, acute or chronic, 86 percent were treated and 14 percent were untreated while in Balagaon 90 percent has been treated and 7 percent were untreated. Compared to the NSSO estimates, the village estimates show far too high morbidity levels.

Table 5.2 *Morbidity Prevalence rate for Bamuni Pathar village, Nagaon district,* in number and percent

Background Characteristics	*Morbidity prevalence (persons)*	*All persons*	*Morbidity prevalence (percent)*
Age			
0-5	22	67	33
6-14	27	85	32
15-59	131	297	44
60 and above	22	36	61
All persons	202	485	42
Sex			
Male	111	249	45
Female	91	236	39
All persons	202	485	42
Caste			
General caste	48	120	40
SC	51	129	40
ST	70	135	52
OBC	33	101	33
All persons	202	485	42

Source: Survey data, 2014

Categorizing morbidity prevalence based on various socio-economic characteristics show that the share increases as age category increases. It is 33 percent among infants and 32 percent among children aged 6-14 years. The share is 44 percent in the working age population 15-59 years and 61 percent among those 60 years and above. Male residents reporting morbidity was 45 percent and females 39 percent. Caste-wise categorization

indicates that among the general caste and scheduled caste population Share of scheduled tribes reporting morbidity was 52 percent which is the highest among all social groups (Table 5.2).

Similarly, for Balagaon village, the reporting of morbidity is 42 percent among infants, 41 percent among population aged 6-14 years, 36 in the age group 15-59 years and 70 percent among those 60 years and above. Share of females (45 percent) reporting morbidity in Balagaon is higher than males (40 percent). The share among general caste Hindu population was 44 percent, 41 percent among scheduled castes and 31 percent among OBCs (Table 5.3).

Table 5.3 *Morbidity prevalence rate for Balagaon village, Nalbari district,* in number and percent

Background Characteristics	*Morbidity prevalence (persons)*	*All persons*	*Morbidity prevalence (percent)*
Age			
0-5	19	45	42
6-14	28	69	41
15-59	140	385	36
60 and above	33	47	70
All persons	220	546	40
Sex			
Male	108	271	40
Female	123	275	45
All persons	220	546	40
Caste			
General caste	135	332	44
SC	71	169	41
OBC	14	45	31
All persons	220	546	40

Source: Survey data, 2014

5.2.2 Prevalence rate of morbidity by acute and chronic categories

It is important to look at acute and chronic morbidity because they have an impact on the overall living condition of the household. Information on acute and chronic morbidity has been collected separately because chronic morbidity has a greater impact on the household financial liability of the households. For treatment of chronic morbidity the households have to spend a larger share of their total consumption expenditure leading to higher impoverishment among the rural households[25].In Bamuni Pathar 23 percent of all residents

[25] There is a direct relationship between poverty and chronic diseases. For instance, treatment of chronic diseases is much expensive in comparison to acute diseases as for treatment of chronic diseases the rural population has to either go to the private sources as the sophisticated facilities are not available within their

reported acute morbidity. Age group wise, share of acute morbidity among infants was 22 percent, among children 6-14 years it was 25 percent. The share among the working age group and senior citizens above 60 was 22 percent and 19 percent respectively. Gender-wise there is not much variation in reporting of acute morbidity. Among males the share was 24 percent and females 22 percent. Acute morbidity reporting among ST households is higher than the other social groups (see Table 5.4).

Table 5.4 *Residents suffering from acute and chronic morbidity by background characteristics, Bamuni Pathar village, Nagaon district,* in number and percent

Background characteristics	*Acute morbidity*	*Chronic morbidity*	*All persons in the sample*	*Acutely morbid in total population (percent)*	*Chronic morbid in total population (percent)*
Age					
0-5	15	6	67	22	9
6-14	21	5	85	25	6
15-59	70	63	297	24	21
60 and above	7	15	36	19	42
All persons	113	89	485	23	18
Sex					
Male	60	53	249	24	21
Female	53	37	236	22	16
All persons	113	90	485	23	19
Caste					
General	25	21	120	21	18
SC	27	24	129	21	19
ST	46	27	135	34	20
OBC	15	18	101	15	18
All persons	113	90	485	23	19

Source: Survey data, Bamuni Pathar, 2014

Note: Those who reported acute morbidity in the reference period of last 30 days may have also faced chronic morbidity over the period of last 365 days and vice versa.

In terms of chronic morbidity higher reporting is observed for the elders (42 percent) and lowest among infants (9 percent)[26]. Gender-wise chronic morbidity is higher among males (21 percent) than among females (16 percent). Among social groups percentage reporting chronic morbidity is almost similar. It varies from 18 percent among the general caste category to 20 percent among the scheduled tribes (Table 5.4).

coverage and they have to travel to tertiary or secondary hospitals which are located far away from the village (Mukherjee et al., 2015)

[26]Evidences have also shown that the children are susceptible to more of acute illnesses and elders are susceptible to more of chronic illnesses. Moreover, the morbidity prevalence rate is high in the age group 0-4 years afterwards it starts declining up to age group of 24 years. An increasing in morbidity is observed after 24 years of age thus representing a U shaped relationship between morbidity and age (Krishnaswami et al., 2004; NSSO, 1998; Duraisumy, 1998). However the present study does not found any U shaped relationship between morbidity and age.

A similar pattern is observed in Balagaon village as well. While reported acute morbidity is highest among infants, the share among age group 60 and above is higher in Balagaon compared to Bamuni Pathar (36 percent among infants, 32 among 6-14 years, 19 percent among 15-59 years and 30 percent among 60 and above). Gender-wise variation in acute morbidity is also similar with Bamuni Pathar (22 percent males and 24 percent females). Reported morbidity among scheduled caste category is highest compared to other social groups in Balagaon (16 percent among general category, 38 percent among SCs and 16 percent among OBCs). See Table 5.5.

Table 5.5 *Residents suffering from acute and chronic morbidity by background characteristics, Balagaon village, Nalbari district,* in number and percent

Background characteristics	*Acute morbidity*	*Chronic morbidity*	*All persons in the sample*	*Acutely morbid in total population (percent)*	*Chronic morbid in total population (percent)*
Age					
0-5	16	3	45	36	7
6-14	22	6	69	32	9
15-59	73	67	385	19	17
60 and above	14	21	47	30	45
All persons	125	97	546	23	18
Sex					
Male	59	48	271	22	18
Female	66	49	275	24	18
All persons	125	97	546	23	18
Caste					
General	53	40	332	16	12
SC	65	50	169	38	30
OBC	7	7	45	16	16
All persons	125	97	546	23	18

Source: Survey data, Balagaon, 2014

Note: Those who reported acute morbidity in the reference period of last 30 days may have also faced chronic morbidity over the period of last 365 days and vice versa.

In terms of chronic illnesses the percentages of morbidity varies from 7 percent among infants to 45 percent among. The share of males and females reporting chronic morbidity is same (18 percent).Caste-wise categorization shows that share of population reporting chronic morbidity among the general caste population is 12 percent, 30 percent among the scheduled caste and 16 percent among the other classes. Thus in case of both the villages it is observed that acute morbidity is comparatively high among the infants and chronic morbidity is high among the elders (Table 5.5).

5.2.3 Treated and untreated acute morbidity by background characteristics

This section focuses on both treated and untreated acute and chronic morbidity so as to observe the vulnerability of a specific group with respect to treatment of illnesses. Treated morbidity here refers to those illnesses for which the respondent visited health personnel. In case of untreated morbidity respondents did relied on traditional healers, home remedial measures or direct purchase of medicines from the pharmacy.

Among those reporting acute morbidity in Bamuni Pathar, 23 percent did not visit a health personnel for treatment. Treated acute morbidity among infants is 93 percent (Table 5.6). Illnesses among infants are very promptly attended to in this village. This is very clear from the share of untreated morbidity among infants in the village. This is also supported by our findings from the houselisting survey, where large numbers of households showed good awareness about maternal and child health schemes. It is also an indication that the reproductive and child health programmes implemented in the rural areas are a success. The untreated cases for acute morbidity are however found to be higher among 6-14 years (24 percent) and 15-59 years of age group (27 percent). There is a tendency of ignoring minor illnesses among the working group population[27]. Many residents in this category, working as construction workers, daily wage earners or cultivators cited the opportunity cost of forgoing work as one of the major reasons for not going to a health facility. Only during times of unavoidable or emergency illnesses did they visit health personnel. This pattern of untreated illnesses among the reproductive age group implies long run health consequences in the form of chronic diseases during old age[28].

Gender-wise, percentages of treated cases are higher among males (91 percent) than females (62 percent)[29]. From observations based on personal interviews we conclude that the illnesses among female members are neglected by other members of the households. In many cases the male members are busy with their daily activities and do not find time to accompany their female counterparts to health institutions. Sometimes the females themselves also hesitate to go to health institutions because of engagement in daily household activities. Some women respondents shared that they find it intimidating to go to

[27] Similar results have been found in Mukherjee et, al., 2008

[28] Chronic diseases are no longer treated as diseases of the rich. They are equally prevalent among the rich. Lack of nutritious food and proper care in the early stages of life lead to higher prevalence of chronic diseases in the later stage specifically among the rural poor (Prabhakaran et al., 2013; Bygbjerg, 2012; Bhojani et al., 2013).

[29] Mukherjee et al., (2008) has found that the cases of untreated morbidity are greater for females. Ghosh, (2014) also found similar kind of result.

a health facility alone. Some of the health problems of women are also hidden by the women themselves and the information have been collected after probing again and again. The women members therefore resort to self-medication, home remedial measures or temporary treatment of illnesses by asking medicines to be purchased from the pharmacy without a prescription.

Untreated cases among the social group categories were higher among the scheduled castes (26 percent) and scheduled tribes (30 percent) in Bamuni Pathar[30]. It was observed that the ST households were located remotely within the village, far away from the other households and had less physical access to institutional health care. Therefore their preference towards self medication and other ways of treatment was higher. Probing further on this, the ST households reasoned that treatment other than institutional health care will save both money and time which can be utilized for other activities. They are prone to more illnesses because of residing in unhygienic conditions, with unsafe drinking water, non-availability of toilet facility, absence of proper drainage system and use of firewood for cooking purposes (Table 5.6).

In Balagaon treatment of acute morbidity was far higher. Of all residents reporting acute morbidity, the share of untreated cases was only 5 percent. Table 5.7 depicts the prevalence rate of morbidity in Balagaon by background characteristics. Age-wise categorization also shows only marginal variation in terms of treatment. In all the age groups more than 90 percent of the illnesses are treated. Across gender also marginal variation was not high. While among males, share reporting untreated was only 7 percent, among females it was 8 percent. Similarly, among the social groups, the proportion of untreated cases varied from 7 percent among the general category to 9 percent among the scheduled caste category. However, no untreated cases were observed among OBCs.

5.2.4 Treated and untreated chronic morbidity in the study areas

The incidence of untreated chronic morbidity in Bamuni Pathar is very low (only 2 percent). Among the infants, children between 6-14 years and those above 60 years, no untreated chronic morbidity cases were reported. However, among the working age group 15-59,

[30]Krishaswami (2004), Sundar and Sarma (2002), Dilip (2002) found out that the prevalence rate of morbidity is higher among the schedule caste and scheduled tribes category. In some of the studies, it has been found that the prevalence rate of morbidity is low among the scheduled caste and scheduled tribe population because they are the backward classes and generally are residing in remote areas, which results in neglect in treatment by these category (Ghosh and Arokiasamy, 2009).

untreated chronic morbidity was 7 percent. Gender-wise, 2 percent and 3 percent of untreated cases were males and females respectively (Table 5.6).

Similarly in Balagaon village the untreated cases are observed more among the working age group (6 percent). Untreated cases for gender show 4 percent of cases for both males and females. Caste-wise categorization of the respondents of the village indicates absence of untreated cases among the OBCs it was 4 percent among the general caste and 6 percent among the scheduled caste population (Table 5.7)

Cases of untreated morbidity are found to be higher for acute illnesses while the cases are lower for chronic illnesses. However, higher untreated illness among the population does not mean low demand for healthcare. There are other reasons like lack of awareness, low literacy levels and financial constraint which resulted in higher proportion of untreated illness especially among the rural population of Bamuni Pathar. However, in case of chronic morbidity the proportion of untreated cases is quite low both in Bamuni Pathar and Balagaon village because these are the cases which are mostly unavoidable and have serious implications resulting in immediate treatment of chronic diseases

.

Table 5.6 *Treated and untreated morbidity (acute and chronic) by background characteristics, Bamuni Pathar village, Nagaon district,* in number and percent

Background characteristics	*Acutely morbid (in numbers)*			*Chronically morbid (in numbers)*				*Percentage treated for acute morbidity*	*Percentage treated for chronic morbidity*
	Treated (1)	*Untreated* (2)	*All* 3=(1+2)	*Treated* (4)	*Untreated* (5)	*All* 6=(4+5)	*All persons* (7)	(8)	(9)
Age									
0-5	14	1	15	6	0	6	67	93	100
6-14	16	5	21	6	0	6	85	76	100
15-59	51	19	70	61	2	63	297	73	97
60 and above	6	1	7	15	0	15	36	86	100
All persons	87	26	113	88	2	90	485	77	98
Sex									
Male	53	5	58	52	1	53	249	91	98
Female	34	21	55	36	1	37	236	62	97
All persons	87	26	113	88	2	90	485	77	98
Caste									
General	22	3	25	23	0	23	120	88	100
SC	20	7	27	23	1	24	129	74	96
ST	30	13	46	25	0	25	135	70	100
OBC	12	3	15	17	1	18	101	80	94
All persons	87	26	113	88	2	90	485	77	98

Source: Survey data, 2014

Table 5.7 *Treated and untreated morbidity (acute and chronic) by background characteristics, Balagaon village, Nalbari district,* in number and percent

Background characteristics	*Acutely morbid (in numbers)*			*Chronically morbid (in numbers)*			*All persons*	*Acute morbidity treated (in percent)*	*Chronic morbidity treated (in percent)*
	Treated	*Untreated*	*All*	*Treated*	*Untreated*	*All*			
	(1)	*(2)*	*3=(1+2)*	*(4)*	*(5)*	*6=(4+5)*	*(7)*	*(8)*	*(9)*
Age									
0-5	15	1	16	3	0	3	45	94	100
6-14	21	1	22	6	0	6	69	95	100
15-59	67	6	73	63	4	67	385	92	94
60 and above	13	1	14	21	0	21	47	93	100
All persons	116	9	125	93	4	97	546	93	96
Sex									
Male	55	4	59	46	2	48	271	93	96
Female	61	5	66	47	2	49	275	92	96
All persons	116	9	125	93	4	97	546	93	96
Caste									
General	77	6	83	52	2	54	332	93	96
SC	32	3	35	34	2	36	169	91	94
Others	7	0	7	7	0	7	45	100	100
All persons	116	9	125	93	4	97	546	93	96

Source: Survey data, 2014

5.3 DISEASE SPECIFIC PREVALENCE RATE OF ACUTE MORBIDITY

To assess the overall morbidity condition of the study villages' information on disease specific morbidity among the respondents has been collected. It is important to look at the disease specific prevalence rate of acute and chronic morbidity because they have serious policy implications. Information on disease specific morbidity will be helpful to implement health policies with respect to most prevalent diseases in specific areas or community. It will also be helpful in drawing the attention of the administration for allocating resources in construction of hospitals and dispensaries, providing free medicines, improve health infrastructure and increasing the number of health specialist especially in the disease prone areas.

In Bamuni Pathar of those reporting acute morbidity, 26 percent suffered from water borne diseases, 41 percent suffered from fever of short duration, 13 percent suffered from respiratory problem, 4 percent suffered from communicable diseases and 17 percent suffered from other diseases such as skin diseases, allergy problems, ear pain, headache, accident and injury related, asthma, stomach pain and malaria (Table 5.8).

In Balagaon, the most prevalent diseases were fever of short duration (33 percent), water borne diseases (12 percent) and other diseases (33 percent) such as chest pain, stomach pain, liver problem, thigh pain, nerve problem, accidents and injuries, ear nose throat related (ENT) problems and underweight problems (Table 5.9)

The high prevalence of fever of short duration, water borne diseases, respiratory problem and other diseases like chest pain, stomach pain, liver pain, ear nose throat (ENT) related problems, headache and skin problem in both the villages indicates low levels of living standards among the households. The incidence of lifestyle diseases is also very low in the villages[31].

5.3.1 Disease specific treated and untreated acute morbidity

Estimates of disease specific treated and untreated morbidity shows that in Bamuni Pathar 50 percent of communicable diseases remain untreated. Untreated communicable diseases have huge negative externalities. This calls for public policy attention in terms of creating awareness among people about seeking treatment. Similarly 24 percent of waterborne diseases are untreated. Since a sizeable proportion of population is suffering from

[31] According to Peter et al., (2003) mentioned that Assam is in the early to mid health transition phase because of which there is high prevalence of morbidity and mortality.

waterborne diseases, it points to a more structural problem in the village. It brings back the focus on availability of basic amenities. Of the respiratory diseases 13 percent are untreated. Untreated morbidity is also found to be higher in case of minor illnesses like headache, allergy and skin problem as they are generally ignored and are not considered to have serious implications (Table 5.8).

In Balagaon the most untreated cases are observed for communicable diseases (25 percent), water borne diseases (13 percent) and fever of short duration (6 percent). The most treated diseases include respiratory related and accidents and injuries. In most of the cases, respondents seek treatment as they have already reached a stage where it cannot be avoided any further (Table 5.9).

5.3.2 Disease specific treated and untreated chronic morbidity

In terms of chronic morbidity, in Bamuni Pathar, the highest share of disease comprises joint pains (15 percent). Fever of unknown origin accounted for 15 percent of the total chronic illnesses. The other diseases prevalent in the area are malaria (13 percent), diabetes (9 percent), hypertension (8 percent) and other diseases (26 percent). Other chronic diseases includes kidney problem, liver problem, stomach trouble, dog biting, paralysis, heart problem, uric acid and accidents. Malaria was an epidemic in the region during last few years but the frequency has gradually declined. A significantly large proportion of respondents do not seek treatment at the initial stages as they presume it to be viral or a minor fever. Thus perception of the individual matters a lot in accessing healthcare facilities. Supply or economic constraint is not the only reason behind non-accessibility. However, it has been observed that the proportion of untreated morbidity is less in case of chronic morbidities (2 percent). Untreated cases are observed in case of fever of unknown origin (8 percent) and other diseases (4 percent) (Table 5.10).

In Balagaon village the most prevalent chronic diseases are joint pain (15 percent), fever of unknown origin (15 percent), gastroenteritis (14 percent) hypertension (10 percent) and other diseases (28 percent). Other chronic diseases include stomach pain, sinusitis, haemorrhoids, asthenia and chest pain. Untreated chronic morbidity in the village is 4 percent. Out of 4 cases of jaundice 3 were untreated. The general psychology of residents in both villages is biased against accessing institutional facilities for treatment (Table 5.11).

Table 5.8 *Disease specific acute morbidity among usual residents, Bamuni Pathar village, Nagaon*, in number and percent

Type of disease	*All persons (in number)*	*All persons (in percent)*	*Treated (in number)*	*Untreated (in number)*	*Percentage treated for acute morbidity*
Water Borne infections	29	26	22	7	76
Respiratory diseases	15	13	13	2	87
Fever of short duration	46	41	38	8	83
Communicable diseases	4	4	2	2	50
Others	19	17	12	7	63
Total	113	100	87	26	77

Source: Survey Data, 2014

Table 5.9 *Disease specific acute morbidity among usual residents, Balagaon village, Nalbari*, in number and percent

Type of disease	*All persons (in number)*	*All persons (in percent)*	*Treated (in number)*	*Untreated (in number)*	*Percentage treated for acute morbidity*
Water Borne infections	15	12	13	2	87
Respiratory diseases	6	5	6	0	100
Fever of short duration	52	42	50	2	96
Communicable diseases	4	3	3	1	75
Accidents and Injury	4	3	4	0	100
Others	41	33	39	2	95
Total	125	100	116	9	93

Source: Survey data, 2014

Table 5.10 *Disease specific chronic morbidity among usual residents, Bamuni Pathar village, Nagaon district,* in number and percent

Type of disease	*All persons (in number)*	*All persons (in percent)*	*Treated (in number)*	*Untreated (in number)*	*Percentage treated for chronic morbidity*
Diabetes	8	9	8	0	100
Hypertension	7	8	7	0	100
Joint pain	15	17	15	0	100
Asthma	5	6	5	0	100
Fever of unknown origin	13	15	12	1	91
Malaria	11	13	10	0	100
Tuberculosis	4	5	4	0	100
Typhoid	4	5	4	0	100
Others	23	26	21	1	91
All persons	88	100	86	2	98

Source: Survey data, 2014

Table 5.11 *Disease specific chronic morbidity among usual residents, Balagaon village, Nalbari district,* in number and percent

Type of disease	*All persons (in number)*	*All persons (in percent)*	*Treated (in number)*	*Untreated (in number)*	*Percentage treated for chronic morbidity*
Diabetes	8	8	8	0	100
Hypertension	10	10	10	0	100
Joint pain	15	15	15	0	100
Jaundice	4	4	1	3	25
Fever of unknown origin	15	15	15	0	100
Gastroenteritis	14	14	14	0	100
Others	27	28	30	1	96
All persons	97	100	93	4	96

Source: Survey data, 2014

5.4 DIFFERENTIALS IN UTILIZATION OF HEALTH CARE SERVICES BY PLACE OF TREATMENT

As described in Chapter 4, the options available for households in Bamuni Pathar for seeking treatment are: PHC and sub-centre located within the village, FRU located at the nearest town in Jakhalabandha (13 kilometers away from the revenue village), civil hospital in Tezpur town (35 kilometers away from the revenue village), and private clinics and nursing homes located in Jakhalabandha and Tezpur. Households also prefer self-medication by directly buying medicines from the pharmacy, traditional healers (*ojhas*) and home remedial measures.

In Balagaon revenue village, the government health services include mini primary health (MPHC) centre and a sub-centre located within the village, a PHC is situated almost 5 kilometers away at Maroa town. Patients from Bamuni Pathar also visit the CHC at Kamarkuchi for treatment. A CHC is situated 15 kilometers away from the village at Kamarkuchi town. The civil hospital is situated at Nalbari town which is almost 12 kilometers away from the village. Private health clinics and nursing homes are concentrated in Nalbari town.

In terms of individual behavior seeking treatment (whether chronic or acute) the use of government health facilities is 78 percent in Bamuni Pathar village, 8 percent go to private health facilities and 26 percent rely on other measures. For seeking treatment in case of those reporting acute morbidity, 72 percent prefer government health facilities, 5 percent depend on private health facility and 23 percent on other sources. For treating chronic morbidity conditions, 86 percent depend on government health facilities, 11 percent on private health facility, 2 percent on both government and private health facility and other sources for treatment. Thus the demand for government health facility is very high in case of both acute and chronic morbidity. Although the demand for government health facility is high in the village; due to lack of proper treatment, lack of equipments, medicines and health specialist most of the patient budge to the FRU at Jakhalabanha which is nearly 13 kilometres away from the village. However, the FRU is mostly overcrowded and due to shortage of beds in the FRU, people have to go to the nearby private clinics or hospitals. The civil hospital which is situated at Tezpur which has a high carrying capacity is far away from the village. Therefore the residents of the village had to depend on the private health

facilities although unwillingly[32] (Table 5.12).

Although the preference on government health facilities is high among the study population in Bamuni Pathar, due to deteriorating or low quality of care and other loopholes, people are compelled to visit private healthcare facilities. In cases of acute morbidity as already mentioned, 23 percent took recourse to home remedial measures or direct purchase of medicines without consulting health professionals. These are mainly cases of minor illnesses. However, people did not seem to take chances in cases of chronic morbidity and dependence on other sources in this case was found to be only two percent. Thus dependence on government health facilities is high in cases of both acute and chronic morbidity in the study village. Cases of untreated acute morbidity are higher than chronic morbidity. NCAER (1995) and NSSO (1995) had found higher dependence on private health facilities for acute morbidity and higher dependence on government health facilities for chronic morbidity.

Table 5.12 *Persons utilizing healthcare facilities for acute and chronic morbidity in Bamuni Pathar village, Nagaon district,* in number and percent

Source of treatment	*All persons (in number)*	*All persons (in percent)*	*Acute morbidity (in numbers)*	*Acute morbidity (in percent)*	*Chronic morbidity (in numbers)*	*Chronic morbidity (in percent)*
Government	157	78	81	72	74	84
Private	14	8	6	5	10	11
Both government and private	2	1	0	0	2	2
Others	28	14	26	23	2	2
Total	201	100	113	100	88	100

Source: Survey data, 2014

In Balagaon among all those suffering from morbidity (both acute and chronic), 59 percent went to government health facility and 33 percent went to private health facility for treatment. Around 3 percent availed both public and private facilities and 5 percent relied on other forms of treatment. In cases of acute illnesses, 50 percent went to government health facility, 42 percent private health facilities and 7 percent used other measures. However, in cases of chronic morbidity 68 percent went to government health facilities, 22 percent went to private health facilities, 6 percent to both public and private health

[32] Public health facilities in the rural areas are more acquainted with provision of treatment for acute morbidity and child and maternal healthcare facilities. Therefore the patients have to move to the nearby private hospitals for treatment of chronic or hospitalization cases resulting in higher out of pocket expenses (Mukherjee et al., 2008).

institutions and 4 percent preferred other measures. Those who went to both government and private health institutions are those cases, where the patients first went to government health institutions, were not fully cured, and therefore went to a private health facility later on (Table 5.13).

Table 5.13 *Persons utilizing healthcare facilities for acute and chronic morbidity in Balagaon village, Nalbari district,* in number and percent

Source of treatment	*All persons (in number)*	*All persons (in percent)*	*Acute morbidity (in numbers)*	*Acute morbidity (in percent)*	*Chronic morbidity (in numbers)*	*Chronic morbidity (in percent)*
Government	131	59	63	50	66	68
Private	74	33	53	42	21	22
Both government and private	6	3	0	0	6	6
Others	11	5	9	7	4	4
Total	222	100	125	100	97	100

Source: Survey data, 2014

In both villages preference and demand for government health facilities are very high. Private health facilities became an option only when government health facilities could not provide treatment due to crowding, or lack of quality care. This is true of both villages. Between both the villages however, Bamuni Pathar, the relatively more backward village, shows a heavy dependence on government health facilities. While low household incomes are one of the most important reasons for accessing public health facilities, there are more. Personal interviews explored preference for health facilities based on household characteristics. Bamuni Pathar has low levels of awareness regarding quality treatment, and people are accustomed to the low quality of care in government hospitals, apart from the fact that they are more accessible in terms of expenses. Balagaon village has higher levels of literacy and economic status of households is relatively better off. Dependence on private healthcare facilities is comparatively high in Balagaon. The respondents maintained that due to poor quality of treatment, rude behavior of the hospital staff, lack of proper care and negligence by the hospital authority and long duration of treatment in the government health facilities, they were reluctant to go to government health facilities. Some households preferred to go to private health facility even if they had to borrow money from friends and relatives.[33]

[33] The utilization of health care facilities for acute and chronic morbidity by background characteristics has also been calculated for both Bamuni Pathar and Balagaon villages. See Appendix A5, Table A 5.1, A5.2, A 5.3, A 5.4

Choice of healthcare facility (a pooled regression analysis)

In order to statistically test the choice of healthcare facility among residents in the study areas, a pooled logistic regression analysis was carried out.[34] The analysis is restricted to only those who have sought care in health facilities (either government of private) thus excluding treatment through home remedial measures, self-prescribed medicines or traditional healers. The dependent variable in this model is "whether the resident visited a government or private health facility" if yes the variable will take value 1, or 0 otherwise. For the model fit we have considered nine variables keeping in mind the composition of households and data gathered during the household survey. The explanatory variables used in the model are described in Table 5.14. The functional form of the logistic regression model is:

$$Z_i = \propto + \beta_1(AGE) + \beta_2(SEX) + \beta_3(CS) + \beta_4(EDU) + \beta_5(HSS) + \beta_6(OH) + \beta_7(LN\_MI) + \beta_8(BPL) + \beta_9(Village\ dummy) + \mu_i$$

Table 5.14 *Choice of healthcare facility, pooled regression analysis, explanatory variables*

Sl. No.	Variable	Description
1a.	AGE1	Age of the respondent (1=0 to 5 years, 0, otherwise)
1b.	AGE2	Age of the respondent (1=6 to 14 years, 0, otherwise)
1c.	AGE3	Age of the respondent (1=15 to 59 years, 0, otherwise)
1d.	AGE4®	Age of the respondent (1=60 years and above, 0, otherwise)
2	SEX	Sex of the respondent (1=Male, 0, otherwise)
3	CS	Caste of the respondent (1=SC; 0, otherwise)
4a	EDU1	Education of the respondent (1=above primary but below secondary 0, otherwise)
4b	EDU2	Education of the respondent (1=secondary and above, 0, otherwise)
4c	EDU 3 ®	Education of the respondents (1=illiterate, 0, otherwise)
5a	HSS 1	Household size (1=equal to or less than 4, 0, otherwise)
5b	HSS 2	Household size (1=5 to 6, 0, otherwise)
5c	HSS 3®	Household size (1=7 and above, 0, otherwise)
6	OH	Operational holding (1= landless, 0, otherwise)
7	LN_MI	Log of monthly income (in Rs.)
8	BPL	Availability of Below Poverty Line Card (1=Yes; 0, otherwise)
9	Village dummy	1=Bamuni Pathar village; 0, otherwise

Note: ® refers to reference category.

Results and Discussion

The logistic regression is statistically significant with a significant Likelihood Ratio Test (L-RCh2) of p value less than .001. The Variance Inflation Factor (VIF) values used to check

[34] Separate regression has not been carried out for both the villages because the dependence on private health facility is very low in Bamunipahtar village (8 percent). This will not represent the appropriate picture and the logistic regression will not be representative.

multi-collinearity problem shows absence of any kind of multi-collinearity problem among the explanatory variables. The descriptive statistics has also been calculated for the explanatory variables[35]. The count R2 is .78 and the Cragg and Uhler's R2 comes out to be .27[36]. The independent variables which are found to have a significant causal relationship with the choice of healthcare facility are age of the respondent, educational level of the respondent, household size and monthly income of the households[37]. The village dummy is also found to be positive and significant.

Table 5.15 *Logistic regression results for the pooled regression (Bamuni Pathar and Balagaon) for choice of healthcare providers*

Explanatory variables	*Maximum Likelihood estimates (MLE)*		*Marginal effects (MFX)*	
	Coefficient	*Standard error*	*dy/dx*	*Standard Error*
AGE 1	.4064	.6015	.0619	.0823
AGE 2	1.039**	.4648	.1404	.0491
AGE 3	1.041**	.3553	.1863	.0662
SEX	-.0066	.2565	-.0011	.0432
CS	-.1770	.2778	-.0299	.0472
EDU1	-.7662**	.4177	-.1311	.0716
EDU2	-.8873***	.4445	-.1643	.0879
HSS 1	-.9083***	.3887	-.1656	.0751
HSS 2	-.9129**	.3756	-.1583	.0661
OH	.1656	.2725	.0282	.0470
LN_MI	-.5735**	.2051	-.0966	.0345
BPL	-.2499	.2759	-.0419	.0460
Village dummy	1.2997***	.3586	.2125	.0547
Log likelihood: -193.40				
LR ch2 (13): 83.04				
Prob>chi2: .0000				
Pseudo R2: .17				
Count R2: .78				
Cragg and Uhler's R2: .27				
Number of observations: 402				

Note: *** Implies significant at 1percent level ** implies significance at 5 percent level; *implies significance at 10 percent level.

The analysis shows a significant effect of age on choice of healthcare facility. β_2 co-efficient (AGE) is found to have a positive and significant relationship with choice of healthcare

[35] For multi-collinearity diagnostic and descriptive statistics refer to appendix 5A, Table A 5.5 and A 5.6.

[36] In a binary regression model goodness of fit is of secondary importance. Iinterpretation of pseudo R2 is not as the interpretation of R^2 as in ordinary least square method. Therefore various pseudo R2 are being used to find the goodness of fit in binary model. However, in case of a binary model the expected sign of the co-efficient and its practical significance is more important (Gujarati, 1998, Gujarati and Sangeetha, 2007).

[37] Variables such as age, sex, caste, household size and montly income has found to have an impact on choice of health care facilities (Ghosh, 2014).

facility. The result shows that there is a positive and significant relationship between the respondents with 0 to14 years of age and 16 to 59 years of age. This implies that the probability of use of government healthcare facility is higher among these age groups compared to the elders above 60 years of age. In case of elders it is observed that most of the residents are suffering from chronic diseases and therefore had to visit private hospital as the required healthcare facilities are not available in the nearby government health facilities. The partial probability of the variables implies that if the age of the respondent is 0-14 years and 16-59 years the probability of visiting a government health facility increases by .14 and .18 points other things remaining the same. The β_4 co-efficient (EDU) indicates that there is a negative and significant relationship between educational level and choice of healthcare facility. This implies that higher the educational level of the respondent lower is the probability of visiting a government health facility for treatment. The education variable indicates that the choice for a government healthcare facility is lower for those who have educational level higher than primary level and above secondary in comparison to those who are illiterate. The partial probability of the variables indicate that if the resident has educational level higher than primary or secondary, the probability of using government health facility decreases by .13 and .16 points, other things remaining the same. The β_5 co-efficient (HSS) has a statistically significant and negative relationship with visit to a government health facility. It implies that those households having household members equal to 4 or 5-6 have higher probability of visiting a private health care facility compared to households with more than 7 members. The partial probability of the variables indicates that the probability of visiting a government health facility decreases by .16 points and .15 points if the household has 4 or 5 to 6 member. β_7 coefficient (LN_MI) has a significant and negative relationship with choice of healthcare facility. Higher the monthly income of the household, lower is the probability of visit to a government health facility. Respondents with higher income generally visit private healthcare facilities because they can afford treatment in the private healthcare facilities which is not true in case of the lower income strata. The partial probability of the variable implies that with increase in income the probability of the household visiting a government health facility decreases by .96 points. The β_9 co-efficient (village dummy) is found to have a statistically significant and positive relationship with choice of a healthcare facility. It implies that the residents of Bamuni Pathar village have a higher probability of visiting a government healthcare facility in comparison to the resident of Balagaon which has been already been discussed in the early part of this section.

5.5 *FACTORS INFLUENCING MORBIDITY IN THE STUDY VILLAGES: A POOLED REGRESSION ANALYSIS*

To identify the factors influencing morbidity in the study villages a pooled logistic regression model has been used. For the pooled regression model the data for both the villages has been combined to identify the causal relationship between morbidity conditions and factors affecting morbidity[38]. The dependent variable used in the model is "whether an individual is suffering from any kind of illness or not" if 'yes' the variable takes the value 1, or 0 otherwise. The theoretical justifications for the variables included in the model are discussed below:

Awareness about 108 ambulance services

The prevalence rate of any kind of morbidity whether acute or chronic also largely depends on the extent of utilization and access to institutional health care facilities. Utilization on the other hand also depends on the degree of awareness among the respondents (Getler and Van der Gag, 1990; Duraisamy, 1998). Therefore this variable has been taken into consideration in accordance to the relevance of the study villages. The variable is denoted by awareness 108.

Sex

Sex is one of the important factors affecting morbidity. It has been found in some of the literatures that the probability of the being ill is more among the males than among the females (Duraisamy, 1998,). However, in some of the studies it has also been found that the prevalence rate of morbidity is higher among the females than among the males (Duraisamy, 1998; Navaneetham, 2009). The variable sex is denoted as SEX in the model.

Religion

Religion is another factor affecting morbidity of a region. A few literatures on morbidity and religion indicate that the morbidity is higher among the Muslims in comparison to the

[38] The logistic regression estimation has been used because the dependent variable is dichotomous in nature. In a number of empirical studies related to morbidity this model has been used (Navaneetham et. al., 2009; Dilip, 2002; Mukherjee et.al, 2001). However some studies have also used probit regression model to identify the factors influencing morbidity (Ghosh and Arokiasamy., 2009, Duraisamy, 1998). In the present study, the logistic regression model has been used as there is little justification on whether to use either probit or logit model in case of dichotomous dependent variables. More or less both the models give almost the same results (Gujarati, 1998, Maddala, 2007).

Hindus and other religious groups (Krishanaswamy, 2004). The variable religion has been denoted as RL in the logistic regression model.

Caste

Social group is another factor affecting morbidity status of an individual. Earlier studies have also shown that the prevalence rate of morbidity is low among the scheduled castes and scheduled tribes. Within the villages, S and ST households are remotely located, which adversely affects treatment (Ghosh and Arokiasamy, 2009; Krishaswami 2004; Sundar and Sharma, 2002; Dilip, 2002). The variable caste is denoted as CS in the model.

Age

Age is another important factor influencing morbidity. It has been found that the prevalence rate of morbidity increases with increase in age of an individual. (Duraisamy, 1998; Ghosh and Arokiasamy, 2009; Sekhar 1997; Navaneetham et al., 2009). The variable age has been denoted as AGE in the regression model.

Educational level

With increase in educational level of an individual, the prevalence rate of morbidity also increases. There is a negative relationship between education of an individual and morbidity prevalence rate. The better educated people are more conscious about health and therefore they are susceptible to lesser morbidity prevalence rate than those who are illiterate (Duraisamy, 1998, Ghosh and Arokiasamy, 2009, Naveentham et al., 2009, Sundar and Sharma, 2002). The variable educational level has been denoted as EDU in the regression model.

Household size

Household size is also found to be an essential determinant of morbidity. Studies based on NSSO data shows that there is negative relationship between morbidity and household size i.e. higher the household size, higher is the morbidity. Most of the studies found that morbidity in larger households are generally underreported and therefore morbidity is found to be low among larger households (Donell et. al., 2005; Duraisumy, 1998; Sekhar, 1997; Navaneetham, 2009; Dilip, 2002).

Operational holding:

Operational holding of the respondent is another important factor that has been taken into consideration in the model. The variable operational holding has been taken because almost 40 percent of the respondents are engaged with agricultural activities. Thus the area of land holding or operational holding can be taken as a proxy for wealth of the households (Duraisamy, 1998). The variable operational holding has been denoted as OH in the model.

Monthly income of the households

In most of the literature per capita consumption expenditure has been taken as one of the variable affecting morbidity. For the present study, households monthly income figure has been taken as a proxy for economic status as it will provide an overall scenario of the economic status of the households. Proportion of illnesses decreases with the increase in per capita consumption expenditure because people have the capacity to have medical attention and in turn their perception about illness also increases (Ghosh, 2009; Duraisamy, 1998, Vaidyamathan, 1995). Similarly higher income will lead to lower morbidity. On the contrary, the NCAER (1995) on morbidity and utilization, a negative relationship has been observed. The variable monthly income has been indicated as LN_MI in the model.

Structure of the house

The structure of house of a household not only reflects the standard of living of the people but also have an impact on the health condition of the household. It can be observed from the NSSO sample surveys (2006) that in rural areas majority of the households (75 percent) lives in kutcha houses or semi pucca houses in Assam, Chattisgarh, Orissa, Jharkhand and West Bengal live in kutcha houses or semi pucca houses (NSSO, 2006). The variable structure of the house is denoted as SOH in the model.

Source of cooking fuel

Cooking methods also influence health risks. Long-term exposure to solid cooking fuels increases the chances of falling ill (Parikh et al., 2003). The variable source of cooking fuel has been indicated SCF in the model.

Safe drinking water:

Safe drinking water and sanitation are some of the basic facilities required for the hygienic and healthy living of the people. If the people are using water from unhealthy sources like ponds or lake and using it without purification, the disease burden will increase in the

community (NSSO, 2006, 2012, Ram and Sekhar, 2006). The variable safe drinking water has been indicated as SDW in the logistic regression model.

Availability of toilet facility:

Access to improved source of latrine is also an important indicator of overall healthiness of people as mentioned in the NSSO 69th round report and Millennium Development Goals. Thus emphasis on availability of toilet facility has been given priority. According to Ram and Shekhar (2006) access to toilet facility is also an important indicator to measure the quality of life of the people. The variable availability of the toilet facility has been indicated by ATF in the model.

Rastriya Swasthya Bima Yojana Card

The availability of Rastriya Swasthya Bima Yojana (RSBY) card among the rural population is another important variable used in the study. The RSBY is a health insurance scheme which is implemented to provide health insurance to the population living below the poverty line for hospitalization cases. This is an important indicator because it protects the people form financial risk of illnesses and thus reduces the cost of care (Sudararaman and Muraraleedharan, 2015, Hooda, 2015, Selvaraj and Karan, 2009). The variable Rastriya Swasthaya Bima Yojana Card has been denoted as RSBY in the model.

Below poverty line card

The poor people are generally prone to more illnesses in comparison to the rich (Ghosh, 2014; Berman et al., 2014; Gupta, 2009; Garg and Karan, 2009). Therefore, the population who possesses BPL card is also taken into consideration in the logistic regression model. The variable is denoted as BPL in the logistic regression model.
The functional form of the logistic regression model is

$$\begin{aligned} Z_{i=}\alpha + \beta_1(AWARENESS108) + \beta_2(SEX) + +\beta_3(CS) + \beta_4(LN\_AGE) + +\beta_5(EDU) \\ + \beta_6(HSS) + \beta_7(OH) \\ + \beta_8(\mathrm{LN}\_MI) + \beta_9(SOH) + \beta_{10}(SDW) + \beta_{11}(ATF) \\ + \beta_{12}(SCF) + \beta_{13}(RSBY) + \beta_{14}(BPL) + \beta_{15}(VILLDUMMY) + \mu_i \end{aligned}$$

The explanatory variables are defined in Table 5.16. The multi-collinearity diagnostic test shows absence of multi-collinearity among explanatory variable.

Table 5.16 *Factors influencing morbidity in the study villages, pooled regression analysis, explanatory variables*

Sl. No.	Variable	Description
1	Awareness108	Awareness about 108 ambulance services (1=yes; 0, otherwise)
2	SEX	Sex of the respondent (1=Male, 0, otherwise)
3	CS	Caste of the respondent (1=general; 0, otherwise)
4	LN_AGE	Log of age of the respondent (in years)[39]
5a	EDU1	Education of the respondent (1=above primary but below secondary 0, otherwise)
5b	EDU2	Education of the respondent (1=secondary and above, 0, otherwise)
5c	EDU 3 ®	Education of the respondents (1=illiterates, 0, otherwise)
7	HSS	Household size (in number)
8	OH	Operational holding (1= landless, 0, otherwise)
9	LN_MI	Log of monthly income (in Rs.)
10	SOH	Structure of the house (1=Kutcha, and Semi Pucca; 0 otherwise)
11	SDW	Safe drinking water (1=Yes; 0, otherwise)
12	ATF	Availability of toilet facility (1=Yes; 0, otherwise)
13	SCF	Source of cooking fuel (1= Biogas; 0, otherwise)
14	RSBY	Availability of Rashtriya Swasthya Bima Yojna Card (1=Yes; 0, otherwise)
15	BPL	Availability of Below Poverty Line Card (1=Yes; 0, otherwise)
16	Village dummy	1=Bamuni Pathar village; 0, otherwise

Note: ® refers to reference category.The educational level of the head of the household is considered in the analysis

For the model fit we have considered 16 explanatory variables keeping in mind the composition of households and the data collected from the household survey. Co-efficient $\beta_1$explains the information about the awareness of the 108 ambulance service of the government. If the respondents are aware about the service it will take value 1 or 0 otherwise. β_2 explain sex of the individual taking value 1 if male or 0 otherwise. Likewise the other β coefficients can also be explained. However, β_6 (EDU1, EDU2 and EDU3) contains three dummies respectively. Further in case of each of the dummies one is taken as the reference variable. For example, in the case of β_6 which is the caste variable, while there are three dummies (EDU1, EDU2 and EDU3), EDU 3 referring to illiterate is taken as the reference category. The other educational categories are explained with reference to EDU3.

Results and discussion

Table 5.17 depicts the result of the logistic regression model. It can be observed from the Table that the model is statistically significant with a significant Likelihood Ratio Test (L-R Ch2) of p value less than .01. The Variance Inflation Factor (VIF) values used to check

[39] Log transformation has been done for two variables age and monthly income as these variables are skewed and therefore to minimize the skewness and to make the variables better interpret log values have been taken in the model.

multi-collinearity problem have shown absence of any kind of multi-collinearity among the explanatory variables[40]. The descriptive statistics has also been calculated for the explanatory variables[41].The count R2 value is .62 and the Cragg and Uhler's R2 value comes to be 0.174 for the regression model. The independent variables that were found to have a significant causal relationship with morbidity conditions are age of the respondents, levels of education (head of the household), household size, availability of toilet facility and use of safe drinking water. The β_4 coefficient (Age) indicates that there is a positive and significant relationship between morbidity and age. It implies that as the age of an individual increases the probability of being ill also increase. The partial probability of the variable implies that as age increases morbidity increases by .06 points other things remaining the same. Similarly β_5 coefficient (education level) was found to have negative and significant relationship with the dependent variable. Respondents with educational level higher than secondary face low levels of morbidity than the illiterate[42]. The partial probability implies that when an individual has higher level of education other things remaining the same, one unit increase in the educational level will reduce the probability of being ill by -.15 points. β_6 co-efficient (Household size) indicates that with higher level of household size morbidity levels declines. However the probable reason behind such a result could not be found out. The partial probability of the variable can be explained in the similar manner. β_{11} co-efficient (availability of toilet facility) implies that higher the use of toilet facility among the respondents lower is the levels of morbidity. Thus there is a negative and significant relationship between use of toilet facility and levels of morbidity among the respondents. β_{10} (use of safe drinking water) indicates that there is a causal relationship between morbidity and safe drinking water. Higher the use of safe drinking water, lower is the probability of being ill. β_{16} coefficient which is the village dummy shows a negative coefficient although not significant, implying that the morbidity is high not only in Bamuni Pathar but also in Balagaon.

[40]See Appendix Table A 5.5
[41]See Appendix Table A 5.6
[42] Evidences have also shown that there is a inverse relationship between level of education and morbidity prevalence rate (Krishanswami, 2004; Duraiswamy, 1998; Naveentham et al. 2009, Ghosh, 2009, Sundar et. al. 2002.

Table 5.17 *Logistic regression results for the pooled regression (Bamuni Pathar and Balagaon) for factors affecting morbidity in the sample villages*

Explanatory variables	*Maximum Likelihood estimates (MLE)*		*Marginal effects (MFX)*	
	Coefficient	*Standard error*	*dy/dx*	*Standard Error*
Awareness108	-0.4506	0.2761	-0.111	.0688
SEX	0.0592	0.1302	.0144	.0317
CS	0.1452	0.1464	.0354	.0360
LN_AGE	0.2511***	0.0707	.0611	.0172
EDU1	-0.2541	0.1794	-0.0616	.0432
EDU2	-0.6609***	0.1993	-0.1567	.0456
HSS	-0.3504**	0.1562	-0.0853	.0381
OH	0.0140	0.1370	0.0034	.0334
LN_MI	-0.0195	0.1112	-0.004	.0274
SOH	-0.2019	0.2036	-0.0485	.0482
SDW	-0.3864**	0.1374	-0.0945	.0336
ATF	-0.3533**	0.1551	0-.0866	.0383
SCF	-0.1116	0.1758	-0.0270	.0424
BPL	0.2081	0.1397	0.0506	.0342
RSBY	0.0407	0.1869	.0094	.0460
Village dummy	-0.2754	0.1853	-0.668	.0457
Log likelihood:-673				
LR ch2 (19):58.64				
Prob>chi2: .0000				
Pseudo R2: 0.041				
Count R2: .62				
Cragg and Uhler's R2: 0.074				
Number of observations: 1031				

Note: *** Implies significant at 1percent level ** implies significance at 5 percent level; *implies significance at 10 percent level. For a dummy variable, dy/dx is the discrete change of dummy from 0 to 1.

Logistic regression analysis for the two sample villages

Bamuni Pathar

Since the two villages have diversified background characteristics, logistic regression model has been carried out for them separately to know specific factors affecting morbidity in both the villages. This will gives us an idea about the variation in the factors affecting morbidity in the two villages[43]. The logistic model is statistically significant at 1 percent level with a significant Likelihood Ratio Test (L-R Ch2).[44]. The value of count R2 is .64 and Cragg and Uhler's R2 value is 0.124. There is absence of multi-collinearity among the explanatory variables as depicted by the multi-collinearity diagnostic tests[45]. In Bamuni Pathar village, the

[43] The definition of explanatory variables are same for both the villages
[44]See Appendix Table A. 5.7
[45] See Appendix Table A. 5.8

independent variables which are found to be have a causal relationship with morbidity are awareness about 108 ambulance services, sex of the respondent, age of the respondent, educational level of the head of the household, household size, availability of toilet facility and use of safe drinking water.

β_1 co-efficient (awareness about 108 ambulance services) implies that higher the awareness about the 108 ambulance services, lower is the level of morbidity. The partial probability of the variable implies that the probability of being ill is declined by -.29 points if the respondents are aware about 108 ambulance services, other things remaining the same. β_2 coefficient (sex) has a significant and positive relationship between morbidity of an individual. This implies that the probability of illness is higher among the males than among the females. The higher probability of illnesses among males is probably because a major proportion of them (50 percent) are working as daily wage laborer. In many cases the workspaces are unhygienic. Moreover, the ST populations of the village which constitute 26 percent of all households are also found to be high consumers of intoxicants such as tobacco and alcohol. On the other hand the female members are mostly engaged in household activities, their exposure to workplace risks such as unhygienic conditions is less. The partial probability of the model implies that if the resident is male the probability of being ill increased by .08 points, other things remaining the same. The variable age (β_4) indicates that there is a positive and significant relationship between morbidity and age. Similarly the variable education level (β_5) is found to have negative and significant relationship with the dependent variable. The negative causal relationship with availability of toilet facility and safe drinking water can likewise be explained in the similar manner.

Balagaon

Similarly, the logistic regression has also been carried out for Balagaon village. The logistic model is statistically significant with a significant Likelihood Ratio Test (L-R Ch2) of p value significant at 1 percent. The count R2 value of the model is .62 and Cragg and Uhler's R2 value is 0.074[46]. There is absence of any kind of multi-collinearity among the variables. The independent variables that were found to have a significant causal relationship with morbidity conditions are age of the respondent, educational level, safe drinking water and household size. The results can be interpreted as in the previous model.

[46] See appendix Table A 5.9

5.6 CONCLUSION

From the study on morbidity prevalence based on cross section data analysis we see that the levels of morbidity are very high. The MPR is 42 percent in Bamuni Pathar and 40 percent in Balagaon. These show close to a quarter of the residents in the study area suffering from various kinds of basic illnesses. While morbidity prevalence is high, there is a sizeable share of population that remains untreated. Untreated morbidity is large because of various reasons. Many casual workers do not seek treatment due to high opportunity costs of missing workdays. Lack of availability of quality healthcare in public facilities is another reason for people not seeking treatment. Overcrowdedness in public facilities discourages people. Untreated morbidity is higher for acute illnesses than chronic illnesses. Since chronic illnesses are unavoidable in nature, untreated cases are found to be lower in both the villages. Although the cases of untreated illnesses are less in Balagaon, untreated cases for communicable diseases are found to be higher in both the villages which need policy intervention.

Demands for government health facilities are found to be high in both the villages. Utilization of government health facility is 78 percent in Bamuni Pathar and 59 percent in Balagaon. Bamuni Pathar has low levels of awareness regarding quality treatment, and people are accustomed to low quality of care in the government hospital apart from financial reasons for not seeking treatment. The cost of utilization is also high because of accessibility problem to the government health facility resulting in reliance on private health facility for treatment. Balagaon village has higher levels of literacy and economic status of households is relatively better off. Dependence on private healthcare facilities is comparatively high in Balagaon. Due to poor quality of treatment, rude behavior of the hospital staff, lack of proper care and negligence by the hospital authority and long duration of treatment in the government health facilities, they were reluctant to go to government health facilities.

Pooled regression analysis on choice of health care facility is found to be significant for Bamuni Pathar village showing higher utilization of government health facilities. Likelihood of utilizing government health facility is also influenced by age, educational level, household size and monthly income of households. On analyzing the factors affecting morbidity the pooled regression analysis shows that factors like age, educational level, household size, availability of toilet facility and use of safe drinking water has an impact on morbidity prevalence among the respondents of the villages.

Chapter 6

Health related out of pocket expenditure among rural households

This chapter examines the extent, nature and effects of out of pocket expenditure (OOP) on health among the households in the study area. A study on out of pocket expenses is worthwhile because it can provide policy makers an insight into financial burden households' bear due to OOP. In this context this chapter also focuses on catastrophic out of pocket expenses. Out of pocket expenses above the catastrophic level leads to impoverishment of the rural poor. It can push a large mass of population much below the poverty line and hamper general living standards. Therefore one of the major objectives of health policies is to systematically dismantle the insecurities arising out of catastrophic health expenses. A study of catastrophic health expenditure with household as a unit allows us to estimate the extent of impoverishment among rural households.

Section 6.1 gives a brief overview on the pattern of out of pocket expenditure in India compiled out of NSSO data. Section 6.2 examines OOP among the rural households based on village level data. Components of out of pocket expenses on healthcare and expenditure on hospitalization and non-hospitalization cases are discussed in detail in this section. Section 6.3 estimates catastrophic expenditure on health among rural households. This section also examines the intensity and incidence of catastrophic payment and its impact on the standard of living of households. Section 6.4 discusses about the impoverishing effect of catastrophic payment on rural households of the two villages. Section 6.5 identifies the factors affecting catastrophic expenditure with the help of a pooled logistic regression analysis. Section 6.6 lays out the sources of financing for outpatient and inpatient care which has an impact on the economic status of rural households.

The data on hospitalization (inpatient care) cases are collected for a reference period of last 365 days from the date of the survey. The data on non-hospitalization cases (outpatient care) are collected for a period of both last 30 days and 365 days reference period. The estimation for out of pocket expenses which combines expenditure on both inpatient care and outpatient care is estimated for the reference period of *last 365 days*.

6.1 OUT OF POCKET EXPENDITURE IN INDIA

The major source of data related to OOP expenditure on health are the NSSO large sample surveys. In this chapter three quinquennial round surveys (55th, 1999-2000; 61st, 2004-05 and 66th,

2009-10 rounds)[47] have been used for comparison of OOP expenses across the states.[48]. It is to be mentioned that in NSSO reports medical expenses are classified into institutional and non-institutional expenses[49]. The recall period in case of institutional (or inpatient) care is *last 365 days* and for non-institutional (outpatient) care it is *last 30 days*. Medical expenses includes expenditure on different type of medicines, payments to doctors, nurses, hospitals and nursing homes, expenditures incurred on clinical tests such as X-ray, Electrocardiography (ECG) and pathological tests. Expenditure incurred on all family planning appliances is also included under medical expenses.

From the NSSO data, we have estimated the proportions of OOP (including institutional and non-institutional) in total household consumption expenditure. There are wide state-wise variations. According to the latest consumer expenditure survey (2009-10) the states with out of pocket expenses higher than the state average are Andhra Pradesh, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal[50]. The states with lower OOP expenses than the Indian average are Assam, Bihar, Haryana, Gujarat, Karnataka, Orissa and Rajasthan. However OOP expenses as a proportion of total consumption expenditure is highest in the state of Kerala in all the rounds. One may recall here from Chapter 5 that Kerala was an outlier state in terms of morbidity reporting as well, which is why the levels of morbidity was much higher than all the other Indian states. A similar reasoning applies here. Kerala's population is exposed to better healthcare delivery system in the form of high technology equipment, and people from different strata are generally more aware of healthcare needs. Therefore health spending may be considered as being largely voluntary (see for example Peter et al., 2003).

A lower than average OOP in low income states may be largely attributed to the general low levels of income. There are earlier references to low income states being in early to mid-transition phase in health status, thus reflecting low reporting in morbidity as well as OOP (ibid, 2003). While generally people spend less on health care needs, preferring to go to hospitals only when the illnesses become unbearable or unavoidable, low quality of care in government health

[47] While writing this chapter, the NSSO 71st round report on *India – Social consumption – Health* Jan-June 2014 was just coming out. There was not much scope to include the data from 71st round in this analysis. Further although 71st round report focuses exclusively on health, it is not comparable with the above quinquennial rounds. Interpretation of 71st round data for Assam will be considered for future work.

[48] The number of household surveyed during the 55th round (2001) was 92296 (46148 rural and 46148 urban households. During the 61st (2007) NSSO round the number of households covered were 124644, out of which 79298 were rural and 45346 were urban households. During the 66th (2011) round the total numbers of households covered were 100855, of which 59119 were rural households and 41736 were urban households.

[49] Medical expenses are said to be institutional if they are incurred on medical treatment as an inpatient in the medical institutions. They are non-institutional if they are incurred on medical treatment as an outpatient in medical institutions.

[50] See appendix 6A, table A 6.1

facilities, poor literacy levels, lack of awareness, low incomes and low levels of public health expenditure are some of the other reasons reflecting on OOP of low income states.

In Assam proportion of OOP to total consumption expenditure has generally been below the Indian average. It was 3 percent in 1999-2000, 5 percent in 2004-05 and 2 percent in 2009-10. The Indian average in all the above rounds was 6 percent, 6 percent and 5 percent respectively. In general the so-called low OOP share on health in Assam is mainly because of low health seeking behavior and poor availability of healthcare facilities. However, even the *low OOP* is not a voluntary payment and it has an adverse impact on consumption pattern of households. This can be assessed by the fact that the proportion of population going below the poverty line, especially in the rural areas is highest in states such as Assam, Bihar and Orissa (see Garg and Karan, 2005; 2008). There is also availability of healthcare facilities in Assam with respect to large number of plantation workers using their own health facilities covering themselves and their families which might also has an effect on the share of OOP expenses with respect to total consumption expenditure of the households.

6.2 OUT OF POCKET EXPENSES ON HEALTH IN THE STUDY VILLAGES

To assess the share of out of pocket expenses on health of the households, we have categorized households into consumption expenditure quintiles. Based upon the monthly per capita consumption expenditure (MPCE) of the households, and the distribution of MPCE in both villages, quintile classifications have been worked upon. As expected Balagaon has relatively higher consumption expenditure quintile than Bamuni Pathar. The MPCE in Bamuni Pathar ranges from a minimum of Rs. 325 to a maximum of Rs. 31289 and in Balagaon the range is from Rs. 592 to Rs. 4028.

Food expenditure constitutes a major proportion of total household consumption expenditure in the study villages. It is 75 percent of total consumption expenditure in Bamuni Pathar and 66 percent in Balagaon. Non-food expenditure constitutes 25 percent of total consumption expenditure in Bamuni Pathar and 34 percent in Balagaon. Health expenditure is a component under non-food expenditure category. In Bamuni Pathar 10 percent of total consumption expenditure is spent on health and in Balagaon 8 percent. Bamuni Pathar, which is relatively backward, spends a larger proportion on health than Balagaon (Table 6.1). Higher expenditure on health implies cutting off expenditure on food and other non-food items such as expenditures on education and other household utilities. Thus on an average approximately 85 percent of expenses are made on health and food together in Bamuni Pathar and it is 75 percent

in Balagaon. Residents of Bamuni Pathar are therefore making greater sacrifices on other forms of non-food expenses, although the opportunities forgone in Balagaon are not that low either.

A similar picture emerges if we observe the differences across quintile groups in both villages. Lower quintile groups make larger sacrifices on basic utilities than the upper quintile. To make various ends meet, households go through an unending struggle of sacrificing one utility over the other; whether it is education, health, clothing or leisure activities. One of the reasons of low health seeking behaviour among rural households, as also pointed out elsewhere, can also be explained in a similar manner (refer Tables 6.2 and 6.3).

Table 6.1 *Share of expenditure on food, non-food and other components of non-food expenditure in total household consumption expenditure, Bamuni Pathar and Balagaon,* in percentage

Consumption expenditure	*Bamuni Pathar*	*Balagaon*
1. Food expenditure	**74.71**	**66.19**
2. Non-food expenditure	**25.29**	**33.81**
2a. Education	0.78	1.29
2b. Health	9.58	8.28
2c. Household utilities	5.84	7.31
2d. Repair/maintenance of house/building	1.57	1.80
2e. Social ceremonies	0.93	3.57
2f. Consumer durables	0.31	2.72
2h. Insurance/premiums	0.38	1.26
2i. Remittances	0.03	0.17
2j. Other non-food expenditure (including transport/telephone/mobile/cable TV etc.	5.87	7.41

Source: Survey data, 2014

From the distribution of income and expenditure in both villages we see that as income rises, consumption expenditure also rises. However the share of food expenditure in total consumption expenditure declines with every succeeding quintile group. Food expenditure is highest in the lowest consumption quintile and vice versa. This is so for both villages. In Bamuni Pathar share of food expenditure in total consumption expenditure is 78 percent in the lowest consumption quintile (Rs. 325 - Rs. 683) and 70 percent in the highest consumption quintile (Rs. 1596 – Rs. 3189). In Balagaon the lowest consumption quintile (Rs. 592 – Rs. 985) is spending 71 percent on food while the highest consumption quintile (Rs. 2147 – Rs. 4028) is spending 62 percent on food.

Table 6.2 *Average per capita income, average per capita consumption expenditure, average per capita OOP spending, average per capita food expenditure (in Rs.) and share of OOP health spending and food expenditure as a percentage of total consumption expenditure (in percent) Bamuni Pathar village, Nagaon*

MPCE quintiles	*Average per capita income**	*Average per capita consumption expenditure**	*Average per capita OOP spending on health**	*Average per capita food expenditure**	*OOP on health and food expenditure as percentage of total consumption expenditure*	
					Health expenditure	*Food expenditure*
325-683	510	591	59	461	9.9	78
690-804	766	737	63	551	8.5	75
814-969	834	887	94	633	10.5	71
970-1529	1318	1190	125	859	10.5	72
1596-3189	2724	2128	182	1490	8.5	70

Source: Survey data, 2014
Note: * All are monthly figures

Table 6.3 *Average per capita income, average per capita consumption expenditure, average per capita OOP spending and average per capita food expenditure(in Rs.) and share of OOP on health and food expenditure to total consumption expenditure (in percent) Balagaon village, Nalbari*

MPCE quintiles	*Average per capita income*	*Average per capita consumption expenditure*	*Average per capita OOP spending on health*	*Average per capita food expenditure*	*OOP on health and food expenditure as percentage of total consumption expenditure*	
					Health expenditure	*Food expenditure*
592-985	743	796	56	600	7.0	75
1028-1281	1308	1140	84	800	7.3	70
1288-1698	2356	1505	117	953	7.7	63
1708-2296	2661	1943	172	1218	8.8	63
2417-4028	4320	2937	292	1809	9.9	62

Source: Survey data, 2014
Note: All are monthly figures

6.2.1 Hospitalization (inpatient care) expenditure in Bamuni Pathar

Component wise distribution of out of pocket expenses among the rural households indicates that share of expenditure on doctor's fees as a proportion of total average OOP is 1 percent. Expenditure on diagnostic tests is 15 percent, medicines and drugs 65 percent[51]. A notably large proportion of residents are forced to purchase medicines from private pharmacies as most of the medicines are out of stock in government health facilities. Similarly, most of the diagnostic tests are outsourced to private health facilities due to their unavailability in government facilities. In absolute terms, average expenditure on purchase of medicines was Rs. 30,300 while the average OOP expenses were Rs 46,770 from government health facilities (Table 6.4). These estimates are for the reference period of last 365 days.

OOP expense from private sources for hospitalization cases shows 4 percent of average OOP expenditure is spent on doctor's fees, diagnostics tests 15 percent, and drugs and medicines 38 percent. A major share is also spent on medical appliances (17 percent), attendant charges (8 percent), bed charges (10 percent) and other expenses (9 percent) (Table 6.4). In Bamuni Pathar average OOP expenses by private sources is much higher than expenditure by government sources. The average OOP expenses in Balagaon amount to Rs. 156,800, which is almost three times higher than what it is in case of government health facilities.

Since many cases are referred to private facilities, OOP shoot up. In Bamuni Pathar, 56 percent of hospitalization cases are treated in private health facility. Although there is a high demand for government health facility in the village, low quality care, low seat capacity, over crowdedness, lack of specialists and lack of sophisticated health equipment compel residents to visit private health facilities for treatment. Amount is spent on attendant charges and transportation to reach private hospital or the FRU cannot be considered trivial.[52].

[51] Drugs and medicines comprises of a major part of OOP expenses of the households especially in rural areas (Ghosh, 2010; Alam and Tyagi; 2009, Garg and Karan, 2005; Garg and Karan, 2008)

[52] Hospitalization expenses are one of the major factor behind high out of pocket expenses resulting in catastrophic payment among the households (Peters et al., 2002; Roy and Hill 2007; Garg and Karan, 2008).

Table 6.4 *Components of out of pocket expenses in hospitalized cases, government and private*, Bamuni Pathar, in number and percentage

Components of out of pocket medical expenses	*Government sources*		*Private sources*	
	Average expenditure	*Share*	*Average expenditure*	*Share*
Doctor's fees	360	1	6100	4
Diagnostic tests*	6900	15	21500	14
Bed charges	260	1	16300	10
Attendant charges	2800	6	12100	8
Medicines and drugs*	30300	65	59800	38
Medical appliances	3200	7	27000	17
Other expenses	2950	6	14000	9
All expenses	46770	100	156800	100

Source: Survey data, 2014

Note: Data on hospitalized cases has been collected for a reference period of 365 days

* Diagnostic tests and medicines and drugs are largely purchased from private clinics and pharmacies. However the estimate for government sources shows diagnosis and medicines referred by government doctors but purchased from private sources. The estimate under private sources implies items referred by private doctors and bought from private sources as well.

6.2.2 Hospitalization (inpatient care) expenditure in Balagaon

Majority of the households visit public health facilities for hospitalization cases in Balagaon. The households prefer government health facilities because of low cost and easy accessibility. Hospitalization cases result in heavy expenses on account of bed charges, medicines and drugs and doctor's charges. If the duration of stay is long then the cost is even higher resulting in high OOP expenses. Among all the components of OOP, expenditure is highest on purchase of medicines and drugs. On an average 79 percent of the total OOP expenses are made on purchase of medicines and drugs, 12 percent on diagnostic charges and 6 percent as other expenses. In absolute terms, households in Balagaon spend an average amount of Rs. 36,885 in government health facilities and Rs. 3,110 in private health facilities for hospitalization cases (see Table 6.5).

The share of expenditure on doctor's fees is 8 percent of the total OOP expenses in Balagaon. Expenditure on diagnostic tests constitutes 16 percent of total average OOP expenses of the village. Expenditure on purchase of medicines and drugs constitute 48 percent of the average OOP expenses. In private health facilities a major proportion is also spent on other components. Other expenses constitute 5 percent of total average consumption expenditure of the village.

The difference in OOP due to private sources between both villages is worth discussing here. Although Bamuni Pathar is a relatively more backward village than Balagaon, OOP from private sources is much higher than what we see in Balagaon. The single reason for this difference is the presence/absence of public health facilities nearer village. The nearest health facility accessible by people in Bamuni Pathar is the FRU (which is an upgraded block PHC). The FRU is usually overcrowded, and has severe shortage of medical personnel and equipment. Therefore hospitalization cases are referred to private facilities in the nearest towns. Balagaon has more options of public facilities (a sub-centre, mini PHC, PHC, CHC as well as a civil hospital) closer to the village. Therefore people have a strong preference for public facilities.

Table 6.5 *Average expenditure on various components of medical expenses (in Rs.) and share of expenditure on various components to total average expenditure (in percent) in total hospitalized cases (both government and private) in Balagaon.*

Components of out of pocket expenses	*Government sources*		*Private sources*	
	Average expenditure	*Share*	*Average expenditure*	*Share*
Doctor's fees	0	0	250	8
Diagnostic tests	4500	12	500	16
Bed charges	635	2	500	16
Attendant charges	500	1	200	6
Medicines and drugs	29000	79	1500	48
Other expenses*	2250	6	160	5
All expenses	36885	100	3110	100

Source: Survey data, 2014
Note: Data on hospitalized cases has been collected for a reference period of 365 days.

6.2.3 Non-hospitalization (outpatient care) expenditure in Bamuni Pathar

Average expenditure on non-hospitalization cases show that the households incurred highest expenditure on purchase of drugs and medicines in case of outpatient care also. The share of expenditure on purchase of drugs and medicines is highest in total average OOP expenses. 73 percent of total average OOP expenditure is spent on purchase of drugs and medicines during last one year. Medicines are largely purchased from private pharmacies except for some common medicines available in the government hospitals free of cost. The share of expenditure on purchase of drugs and medicines is also highest during the reference period of last 30 days (71 percent). Doctor's fees constitute 1 percent, diagnostic tests 12 percent and other expenses 9 percent of total OOP expenses. Expenditure on diagnostic tests is higher for reference period of last 365 days. The

proportion of expenditure on attendants and medical appliances comprise 2 percent and 3 percent of total OOP (Table 6.6).

From private sources, 19 percent of OOP expenses are spent on doctor's fees during the reference period of last one year. Close to 16 percent is spent on diagnostic tests. However no expenditure on diagnostic tests was incurred during the last 30 days. Average OOP expenses on medicine constitute 48 percent in the last 30 days and 51 percent during the last 365 days. Other expenses together constitute 13 percent over the period of last one year. The average OOP expenses are low from private health facility because the dependence on private health facility for outpatient care is very low in Bamuni Pathar. Only 8 percent of the population is dependent on private health facilities in case of outpatient care.

While overall people seeking treatment in cases of inpatient care in Bamuni Pathar is very low, the little dependence on government health facility also lead to major costs because medicines and diagnostic tests are done from private sources. This is a cost addition to public health facilities. Contrary to the belief that public health facilities leads to free riding on resources, this completely upturns the case as shown by the huge costs borne by households due to outsourcing of services to the private sector.[53]

6.2.4 Non-hospitalization (outpatient care) expenditure in Balagaon

The table indicates that the share of expenditure on doctor's fees is 1 percent of the total average OOP expenditure. Similarly, expenditure on diagnostic tests for both the reference period together constitutes 15 percent of the total average OOP expenses. Moreover, the share of expenditure on diagnostic test is 4 percent during last 30 days and 19 percent during last 365 days. It is because of chronic nature of the disease that the share of diagnostic tests is higher for a longer reference period. Unlike Bamuni Pathar the highest expenses is incurred on purchase of drugs and medicines. 69 percent of the total OOP expenses are used for purchase of medicines. Together they constitute 15 percent of total OOP health expenses. Attendant charges and other expenses constitute a very small

[53] Selvaraj and Karan (2009) in their study based on NSSO 52nd and 60th round on morbidity and consumer expenditure round surveys, 50th, 55th and 60th round found that health expenditure cost has increased in both government and private sources. Moreover, it has been observed that with growing privatization the households seeking care in public health facilities are forced to purchase drugs and medicines and to receive diagnostic tests in the private health facilities. This has resulted in high cost of care for even those who are seeking care in the government health facilities.

proportion of total average OOP expenditure of the households. It comprises of 1 percent and 4 percent of the total average OOP expenditure.

Doctor's fees constitute 6 percent and 7 percent of total average expenditure for last 30 and 365 days. Average expenditure spent on medicines and drugs is highest both during last 30 days and 365 reference periods. 74 percent of total OOP expenses are spent on purchase of drugs and medicines for both 30 days and 365 days reference period. Share of expenditure on diagnostic test is 11 percent during last 30 days and 10 percent during last 365 days. Together it constitutes 11 percent of total expenditure. Other expenditure constituted of 5 percent of the total OOP for both 30 days and 365 days reference period.

In Balagaon also a major proportion is spent on purchase of medicines and drugs in both government and private hospitals. Moreover, the proportion spent on diagnostic tests in case of government referred and private referred sources are the same. This has already explained is because public facilities outsource diagnostic tests. Transportation costs are higher in Bamuni Pathar due to unavailability of many public facilities nearby.

Table 6.6 *Average expenditure (in Rs.) and share of expenditure (in percent) on components of out of pocket expenses from government sources for Bamuni Pathar village, Nagaon*

Components of out of pocket expenses	*Average expenditure (30 days)*	*Share (30 days)*	*Average expenditure (365 days)*	*Share (365 days)*	*Average expenditure (Both 30 day and 365 days)*	*Share (Both 30 days and 365 days)*
Doctor's fees	20	2	12	.3	32	1
Diagnostic tests	61	5	505	14	566	12
Attendant charges	31	2	94	3	125	3
Medicines and drugs	1034	80	2482	71	3516	73
Medical appliances	25	2	102	3	127	3
Other expenses	124	10	311	9	435	9
All expenses	1295	100	3506	100	4801	100

Source: Survey data, 2014
Note:: Expenditure for 30 days and 365 days are independent of each other
.

Table 6.7 *Average expenditure (in Rs.) and share of expenditure (in percent) on components of out of pocket expenses from private sources for Bamuni Pathar village, Nagaon*

Components of out of pocket expenses	*Average expenditure (30 days)*	*Share (30 days)*	*Average expenditure (365 days)*	*Share (365 days)*	*Average expenditure (Both 30 and 365 days)*	*Share (Both 30 days and 365 days)*
Doctor's fees	12	39	155	18	167	19
Diagnostic tests	0	0	141	16	141	16
Attendant charges	0	0	23	3	23	3
Medical appliances	0	0	17	2	17	2
Medicines and drugs	15	48	443	51	458	51
Other expenses	4	13	87	10	91	10
All expenses	31	100	866	100	897	100

Source: Survey data, 2014
Note: Expenditure for 30 days and 365 days are independent of each other

Table 6.8 *Average expenditure (in Rs.) and share of expenditure (in percent) on components of out of pocket expenses from government sources for Balagaon village, Nalbari*

Components of out of pocket expenses	*Average expenditure (30 days)*	*Share (30 days)*	*Average expenditure (365 days)*	*Share (365 days)*	*Average expenditure (Both 30 and 365 days*	*Share*
Doctor's fees	27	2	49	1	76	1
Diagnostic tests	66	4	685	19	751	15
Attendant charges	11	1	60	2	71	1
Medicines and drugs	1297	88	2221	61	3518	69
Medical appliances	0	0	495	14	495	10
Other expenses	80	5	135	4	215	4
All expenses	1481	100	3645	100	5126	100

Source: Survey data, 2014

Table 6.9 *Average expenditure (in Rs.) and share of expenditure (in percent) on components of out of pocket expenses from private sources for Balagaon village, Nalbari*

Components of out of pocket expenses	*Average expenditure (30 days)*	*Share of expenditure (30 days)*	*Average expenditure (365 days)*	*Share of expenditure (365 days)*	*Average expenditure (Both 30 days and 365 days)*	*Share of expenditure on components*
Doctor's fees	73	6	112	7	185	7
Diagnostic tests	124	11	158	10	282	11
Attendant charges	18	2	9	1	27	1
Medical appliances	53	5	6	0	59	2
Medicines and drugs	807	72	1176	76	1983	74
Other expenses	52	5	78	5	130	5
All expenses	1127	100	1539	100	2666	100

Source: Survey data, 2014

6.3 CATASTROPHIC HEALTH EXPENSES AMONG RURAL HOUSEHOLDS

The concept of catastrophic expenditure emerged in the 1980's. According to Berki (1986) *expenditure for medical care becomes financially catastrophic when it endangers the family's ability to maintain its customary standard of living*'. Out of pocket expenses become catastrophic when it exceeds a certain threshold level. For instance, health payment is considered as catastrophic if it exceeds a certain proportion with respect either total income or total consumption expenditure of the household (Wagstaff and Van Doorslaer, 2003; Berki, 1986 and Xu (2003).

However, O'Donnel et al., (2008)[54] defined catastrophic health payment as exceeding a certain proportion of households total consumption expenditure only. O'Donnel and others argue that health payments with respect to household income do not reflect the actual way of financing health care. This is so because households may spend on health out of past savings or current incomes. Those spending out of past savings may not have very high payments to income ratio. However those households cutting back on current expenditure (and no savings) for making health payments will have larger health payments to income ratio. Since the opportunity cost of current consumption is greater, the catastrophic impact is greater on households without savings than those who finance out of savings (including insurance).

The most general threshold level that has been used in literature is 10 percent of total consumption expenditure (also see Ranson, 2002 and O'Donnel et al., 2008). It is the approximate level at which households cut down their daily expenses on other necessary items resulting in deterioration of living standard. Instead of total consumption expenditure some studies have used only non-food expenditure for estimating catastrophic levels of health expenditure. The threshold in this case in the study of (Xu et al., 2003) for example is 40 percent. For the purpose of our study we have used the methodology proposed by O'Donnel et al., 2008.

6.3.1 Incidence and intensity of catastrophic health expenses

To measure the extent of catastrophic payment among the households, the concept of incidence and intensity has been used. The incidence of catastrophic payments can be measured by catastrophic headcount (H) which is nothing but the number of households that are making health related OOP beyond a particular threshold (Q) that endangers their current consumption of other goods and commodities. The intensity of catastrophic payment is measured by catastrophic overshoot (O) which explains the average degree by which the OOP exceeds a

[54] *Analyzing Health Equity Using Household Survey Data – A Guide to Techniques and Their Implementation*, World Bank Institute, The World Bank.

given threshold (Q). Both incidence and intensity therefore provides a measure of impoverishment among rural households due to health related payments.

Catastrophic headcount (H) is estimated as a fraction of sample households whose expenditure on health as a proportion of total consumption expenditure exceeds the threshold Q, which in most cases is considered as 10 percent of the total household consumption expenditure. In our analysis, to understand the scenario at different acceptable levels, we have considered four thresholds at 5 percent, 10 percent, 15 percent and 25 percent. H can be expressed as:

$$H=1/N\sum_{i=1}^{N} E_i$$

Where, *N is the sample size and E is defined as 1 if* $t_i / X_i > Q$ *and 0 otherwise. Here* t_i *is the amount of out of pocket expenses and* X_i *is the total household consumption expenditure.*

Catastrophic overshoot (O) estimates the intensity as an average degree by which payments exceed the threshold (Q). An individual household catastrophic payment overshoot is given by:

$$O_i=E_i\,(t_i/X_i)-Q$$

and then the overshoot is an average given by:

$$O=1/N\sum_{i=1}^{N} O_i$$

Catastrophic headcount by household characteristics

Catastrophic headcount and overshoot have been estimated by household characteristics and at the village level at the threshold levels of 5, 10, 15 and 25 percent of total consumption expenditure. While the literature on catastrophic headcount and overshoot generally uses 10 percent as the threshold, keeping in mind the overall socio-economic characteristics of both villages, we decided on considering four thresholds. The general levels of household income and consumption expenditure was found to be very low in both the study villages. Therefore a headcount and overshoot at 5 percent was considered as the first threshold. Households that cross the 5 percent threshold find it extremely difficult to meet ends meet. The 10 percent threshold will provide a comparable estimate with that of the other studies. However the objective of this village study is not to compare but provide an overall assessment of incidence of poverty due to health related private expenses. An overshoot beyond 15 and 25 percent, in

our analysis, can be considered as the most vulnerable households; health expenses for these households are debilitating in nature. The opportunity costs of healthcare expenses are too much to bear with other forms of expenditure.

From the quintile classification of households in Bamuni Pathar we know that the general levels of consumption expenditure and income are very low. Therefore even a 5 percent overshoot would mean that livelihoods are endangered. At the 5 percent threshold level, an overwhelming 70 percent of the households are found subjected to catastrophic payments. At the 10 percent level, their share comes down to 33 percent, at 15 percent level 17 percent of the households and at 25 percent level 6 percent. As shown in section 6.3 the average household spending on health in Bamuni Pathar is 10 percent, and as we have seen this combined with very high levels of food share in total consumption expenditure, leads to sacrifices on other goods and commodities.

Table 6.10 *Catastrophic expenditure at various threshold level for Bamuni Pathar and Balagaon village by various background characteristics (in percent)*

Background characteristics	*Q=5%*	*Q=10%*	*Q=15%*	*Q=25%*
Bamuni Pathar	**70**	**33**	**17**	**6**
General	57	43	22	13
SC	50	34	11	8
ST	68	32	28	16
OBC	60	40	24	8
Hindu	64	30	16	8
Muslim	86	43	19	5
Balagaon	**68**	**33**	**9**	**3**
General	65	32	6	2
SC	73	35	11	5
OBC	67	22	11	0

Source: Survey data, 2014

Social group composition wise the ST households are worse off than all the others at all levels of threshold. From the morbidity study we have seen that the ST households are more prone to diseases such as T.B., typhoid, malaria, asthma and arthritis. Moreover, among these groups, the level of illiteracy is also very high. Living in kutcha houses, use of unsafe drinking water, non-utilization of toilet facilities are some of the other factors responsible for higher prevalence rate of morbidity and therefore, higher out of pocket expenses. The compulsion to visit private hospitals due to unavailability of required care in government facilities add to their woes. Religion-wise catastrophic headcount is higher among Muslim households.

Similarly for Balagaon, the catastrophic headcount varies from 68 percent at 5 percent level to 3 percent at 25 percent threshold level. Caste-wise categorization in Balagaon village shows that

catastrophic headcount is higher among the SCs at all the threshold levels. The catastrophic headcount is 73 percent, 35 percent, 11 percent and 5 percent of total household consumption expenditure at 5 percent, 10 percent, 15 percent and 25 percent threshold level respectively. However, at higher threshold level (15 percent) both the SCs and OBCs are found to be a higher risk because they are spending 11 percent of total household consumption expenditure on health (Table 6.10).

Intensity of catastrophic payments by household characteristics

As in the measure of catastrophic headcount, intensity of catastrophic payments has also been measured at 5 percent, 10 percent, 15 percent and 25 percent of total consumption expenditure of the household. As already discussed the catastrophic overshoot measure has been used for this. In village Bamuni Pathar the overshoot at all the levels are 5.47 percent, 2.76 percent, 1.49 percent and 0.57 percent respectively (Table 6.11). As expected the intensity is lesser in Balagaon.

The catastrophic overshoot values can be read as follows. In Bamuni Pathar at the 5 percent threshold, there is an overshoot of 5.4 percent, which means that 70 percent of the households are spending 5.4 percent more than 5 percent threshold. In other words, on an average they are spending close to 10 percent on healthcare. This is also supported by the earlier analysis of quintile wise classification that average OOP health as a share of total consumption expenditure in Bamuni Pathar was close to 10 percent. Similarly at the 10 percent threshold, 33 percent of the households are spending 2.7 percent more than the required 10 percent which is likely to have an impoverishing effect on the households concerned. The overshoot decreases as the threshold levels increase, which indicates very high levels of OOP expense on health in the first place. The overshoot declines with successive threshold levels.

Caste-wise classification shows that the catastrophic overshoot is higher for OBCs at the 5 percent threshold level. On an average the health expenditure is 7.6 percent higher than the 5 percent threshold level. The catastrophic overshoot is however found to higher among the SCs, STs and SCs at all the threshold levels. However, the catastrophic overshoot is comparatively lower for the general category households. The higher catastrophic overshoot among the households indicates greater impoverishment among the households of these groups. However, minimal variations in the catastrophic overshoot are observed across the religious group at all the threshold level respectively.

Compared to Bamuni Pathar, in Balagaon the overshoot is slightly lower. At 5 percent of threshold level, average health expenditure is 3.4 percent higher than the 5 percent threshold

level. Similarly at 10 percent threshold level, the catastrophic overshoot is 1.5 percent which means that average health expenditure is 1.5 percent higher than the 10 percent threshold level. At 15 percent threshold level the catastrophic overshoot is .6 which means that average health expenditure is .6 percent higher than the 15 percent threshold level. Similarly the catastrophic overshoot at 25 percent threshold level can be explained. Caste-wise categorization in the village indicates that the catastrophic overshoot is slightly higher for the SCs at all the threshold levels.

Table 6.11 *Intensity of catastrophic health expenditure among the sample households at multiple threshold levels in Bamuni Pathar and Balagaon (in percent)*

Background characteristics	*Catastrophic overshoot at 5 percent*	*Catastrophic overshoot at 10 percent*	*Catastrophic overshoot at 15 percent*	*Catastrophic overshoot at 25 percent*
Bamuni Pathar	**5.47**	**2.76**	**1.49**	**0.57**
Caste				
General	4.1	1.5	0.4	0
SC	5.2	2.9	1.4	0. 5
ST	4.9	2.6	1.7	0.9
OBC	7.6	3.9	2.3	0.7
Religion				
Hindu	5.8	3.0	1.7	0.7
Muslims	5.6	2.5	0.9	0
Balagaon	**3.7**	**1.5**	**0.6**	**0.3**
Caste				
General	3.4	1.24	0.39	0.14
SC	4.2	2.04	1.12	0.58
OBC	3.3	0.89	0.33	0

Source: Survey data, 2014

6.4 IMPOVERISHMENT DUE TO CATASTROPHIC HEALTH EXPENSES

As already mentioned the methodology used for estimation of catastrophic expenditure has been adapted from World Bank's guide on household survey data. The method of measuring impoverishment is justified under the following ground. To quote

> Spending on health care is a response to a basic need that is not adequately reflected in the poverty line. The stochastic nature of health care needs means that they cannot be captured by a constant poverty line. Admittedly, not all spending on health care is for essential treatment. To the extent that it is not, the subtraction of all health spending from household resources before assessing poverty will result in an overestimate of poverty. But ignoring all health spending will result in an underestimate. Some households are classified as non poor simply because high expenses of vital health care

raises total spending above the poverty line, while spending on food, clothing, and shelter is below the subsistence level (O'Donnel et al., 2008, pp. 213-219).

According to O'Donnel et al., (2008) the estimation of impoverishment due to OOP expenses is possible under two conditions: OOP expenditure is non-discretionary in nature and b. household's total resources remain constant. Under these two conditions an approximate measure of impoverishing effect of poverty is possible. Although this kind of study is based on certain conditions which may not be practically applicable but still in absence of any perfect measurement this can be used as an indicator representing impoverishing effect of OOP expenses on poverty.[55]

The study uses two measures of poverty: a. poverty headcount and b. poverty gap to estimate the impoverishing effect of catastrophic health expenditure among the households of the sample villages. Poverty headcount is used to measure the proportion of households living below the poverty line. However, the concept of poverty line does not consider the depth of poverty and therefore to measure the depth of poverty, the concept of poverty gap has been used. Poverty gap measures the magnitude of poverty that is the amount by which a particular household falls short of poverty line. In order to measure the impoverishing effect of OOP health expenses in the study villages the poverty line estimates of Planning Commission (2010-11) has been used. Firstly, the poverty imapact of catastrophic health expenditure is estimated at nominal prices using the poverty line estimate of Planning Commission (Rs. 828 for rural areas). Secondly, the poverty impact of catastrophic OOP expenses is estimated at normalized prices. Since, there is a problem of comparability, the poverty line has been normalized using consumer price index for rural labour at 1986-87 prices equal to 100 for the year 2010-11. Similarly, the monthly per capita consumption expenditure of the households is also normalized using the consumer price index for rural labour at 1986-87 prices equal to 100 for the year 2013-14. The impact of out of pocket expenses on poverty has been measured in terms of gross of OOP health expenses of the households and net OOP health expenses with respect to the total consumption expenditure of the sample villages.

[55] O'Donnel et al., (2008) justified the argument with respect to measurement of net of OOP health expenses on the ground that poverty line includes only those resources which are required to cover only food subsistence level and does not take into account the resources required to cover health care needs of the individuals, therefore the question of adjusting the poverty line downwards does not arise.

1. **Poverty head count ratio** based on *gross consumption expenditure of households* is given by

$$H^{gross}=\sum_{i=1}^{N} s_i p_i^{gross} / \sum_{i=1}^{N} s_i$$

Where, s_i *is the size of the household;* p_i^{gross} *=1 if* X_i*<Poverty Line (in Rs.) and 0 otherwise;* X_i *= total consumption expenditure of the households and N is the total number of sample households*

2. **Poverty head count ratio** based on *net consumption expenditure of households (excluding expenditure made on health)* is given by

$$H^{net}=\sum_{i=1}^{N} s_i p_i^{net} / \sum_{i=1}^{N} s_i$$

Where, s_i *is household size;* P_i^{net}*=1 if* (X_i-t_i)*<Poverty Line (in Rs.) and 0 otherwise,* X_i *= total consumption expenditure of the households;* t_i *= out of pocket expenditure on health of the households and N is the total number of sample households.*

This measure has been used to study the impact of OOP expenditure on health on the standard of living of the household, the can be estimated. This also means that the share of out of pocket expenses on health in total consumption expenditure of a household is basically in the form of negative income.

3. Two measures of **poverty gap** have been estimated.

(a) Poverty gap calculated based on gross household consumption expenditure. It is given by:

$$G^{gross}=\sum_{i=1}^{N} s_i g_i^{gross} / \sum_{i=1}^{N} s_i$$

Where, $g_i^{gross}=p_i^{gross}(PL-X_i)$

(b) Poverty gap estimated based on *net consumption expenditure of households (excluding expenditure made on health)*. It is given by:

$$G^{net}=\sum_{i=1}^{N} s_i g_i^{net} / \sum_{i=1}^{N} s_i$$

Where, $g_i^{net}=p_i^{net}(PL-(X_i-t_i))$

At nominal prices 49 percent of the households were in extreme poverty in Bamuni Pathar village. Netting out OOP health expenses resulted in increase in the poverty headcount to 60 percent. The absolute increase in proportion of below poverty line households is 11 percent.

Similarly, poverty gap increased from Rs. 83 to Rs. 124 after netting out OOP health expenses. The absolute increase in poverty gap before and after netting out OOP health expenditure is Rs. 37.

On the other hand the poverty headcount of Balagaon, gross of health payment is 17 percent while it increases to 21 percent after netting out health expenditure. The absolute increase in poverty headcount is therefore, 5 percent in the Balagaon. The relative increase in poverty headcount is 27 percent. Similarly, the poverty gap in Balagaon increased from Rs. 19 to Rs. 21. The absolute poverty gap is 14 percent. Thus there has been an increase in the poverty gap and poverty headcount in both the villages, although the increase is more in Bamuni Pathar which is comparatively backward than Balagaon.

Table 6.12 *Impact of OOP expenses on poverty (poverty headcount and poverty gap) in Bamuni Pathar and Balagaon revenue villages, 2014*

Poverty measures	*Gross of health payments (at nominal value)*	*Gross of health payments (at normalized value)*	*Net of health payments (at nominal value)*	*Net of health payment (at normalized value)*	*Absolute gap (at nominal value)*	*Absolute gap (at normalized value)*
			Bamuni Pathar			
Poverty Headcount (in percent)	49	71	60	80	11	9
Poverty Gap (in Rs.)	87	31	124	38	37	7
			Balagaon			
Poverty Headcount (in percent)	17	36	21	41	5	5
Poverty Gap (in Rs.)	19	15	21	20	3	5

Source: Survey data, 2014

At normalized prices 71 percent of the households were in extreme poverty in Bamuni Pathar village. Netting out OOP health expenses resulted in increase in the poverty headcount to 80 percent. The absolute increase in proportion of below poverty line households is 9 percent. Similarly, poverty gap increased from Rs. 31 to Rs. 37 after netting out OOP health expenses. The absolute increase in poverty gap before and after netting out OOP health expenditure is Rs. 6. Similarly for Balagaon gross of health payment is 36 percent while it increases to 41 percent after netting out health expenditure. The absolute increase in poverty headcount is therefore, 5 percent in the Balagaon. The relative increase in poverty headcount is 27 percent. Similarly, the

poverty gap in Balagaon increased from Rs. 15 to Rs. 20. The absolute poverty gap is Rs. 5. Thus impoverishment due to OOP expenses is found to be higher among the household of Bamuni Pathar who are socio-economically backward than the households of Balagaon.

6.5 DETERMINANTS OF CATASTROPHIC HEALTH EXPENDITURE IN THE STUDY VILLAGES: A POOLED REGRESSION ANALYSIS

Logistic regression analysis is carried out to identify the factors influencing catastrophic health expenditure in both the villages. The dependent variable used in the model is "whether an individual is incurring a catastrophic expenditure exceeding than 10 percent of total consumption expenditure of the households or not" if 'yes' the variable takes the value 1, or 0 otherwise[56]. The available literature identifies a number of factors influencing catastrophic health expenditure. However, the present study identifies some of the factors on the basis of availability of data and relevance to the context of the present study[57]. Evidences have already proved that higher duration and chronic morbidity increases catastrophic expenditure of the households (Tyagi, 2009; Lara 2012, Garg and Karan, 2008, Pal, 2010).The explanatory variables used in the model are explained in Table 6.13.

The functional form of the model is:

$$Z_i = \alpha + \beta_1(Awareness\ 108) + \beta_2(OH) + \beta_3(DI) + \beta_4(CM) + \beta_5(HS) + \beta_6(SDW) + \beta_7(TF) + \beta_8(SCF) + \beta_9(SOH) + \beta_{10}(MI) + \beta_{11}(CS) + \beta_{12}(EDU) + \beta_{13}(RSBY) + \beta_{14}(BPL) + \beta_{15}(Village\ dummy) + \mu_i$$

[56] The 10 percent threshold level is considered here as the acceptable catastrophic level in relevance to the availability of village data.

[57] Since higher morbidity is related to higher out of pocket expenses, the justification of variables are also relevant in case of catastrophic expenditure

Table 6.13 *Explanation of the explanatory variables affecting catastrophic expenditure for Bamuni Pathar and Balagaon (combined), Nagaon and Nalbari*

Sl. No.	Variables	Description
1	Awareness108	Awareness about 108 ambulance services (1=yes; 0, otherwise)
2	OH	Operational holdings (in acres)
3	DI	Duration of illness (in number of days)
4	CM	Whether any member suffering from any kind of chronic illnesses (1=yes, 0, otherwise)
5	HS	Household size (in numbers)
6	SDW	Use of safe drinking water (1=Yes, 0, otherwise)
7	TF	Availability of toilet facility (1=Yes, 0, otherwise)
8	SCF	Source of cooking fuel (1=Biogas, 0, otherwise)
9	SOH	Structure of house (1=Pucca, 0, otherwise)
10	LN_MI	Monthly income (in Rs.)
11	CS	Caste (1=General, 0, Otherwise)
12 a.	EDU1	Education of the respondent (1=above primary but below secondary 0, otherwise)
12 b.	EDU2	Education of the respondent (1=secondary and above, 0, otherwise)
12 c.	EDU3 ®	Education of the respondents (1=illiterates, 0, otherwise)
13	RSBY	Availability of RSBY card (1=Yes, 0, Otherwise)
14	BPL	Availability of Below Poverty Line Card (1=Yes; 0, otherwise)
15	Village dummy	1=Bamuni Pathar village; 0, otherwise

Note: The educational level of the head of the household is considered in the analysis, ® refers to reference category.

Results and Discussion:

The logistic model is statistically significant with a significant Likelihood Ratio Test (L-R Ch2) of p value less than .01. The model has a count R2 value of .790 and adjusted count R2 value of .39. The multi-collinearity diagnostic test has shown absence of any kind of multi-collinearity among the explanatory variables[58].The descriptive statistics are also calculated for the explanatory variables[59]. The independent variables that were found to have a significant causal relationship with catastrophic expenditure at 10 percent threshold level are duration of illness, households with chronic morbidity and monthly income of the household. The β_3 coefficient (DI) is found to have positive and significant correlation with the dependent variable. Higher the duration of illness, higher will be the amount of expenditure on treatment of the specific disease and therefore higher is the catastrophic payment. The partial probability of the variable indicates that, as duration of illness increases, the probability of incurring catastrophic payment increases by .004 percent. The β_4 coefficient (CM) indicates that there is a positive and significant

[58]See Appendix Table A 6.2
[59]See Appendix Table A 6.3

relationship between catastrophic expenditure and prevalence rate of chronic morbidity among the households. It has been observed in the study village that 18 percent of the households are suffering from chronic diseases. In many cases it has been observed that, due of negligence of diseases at the initial stage, as time continues, it becomes chronic, and a heavy amount is to be paid for treatment of chronic illnesses. The β_{10} coefficient monthly income (LN_MI) has a negative and significant relationship with catastrophic expenditure. As income of the household increases, catastrophic expenditure of the household declines. The partial probability implies that, the probability of catastrophic expenditure declines by -.20 points as income of the household's increases by one unit.

Table 6.14 *Results of logistic regression model for factors determining catastrophic health expenditure in Bamuni Pathar and Balagaon villages*

Explanatory variables	*Co-efficient*	*Standard Error*	*dy/dx*	*Standard Error*
Awareness108	.2927	.74471	.05688	.13572
OH	-.1106	.26503	-.02280	.05472
DI	.0023***	.00069	.00048	.00016
CM	2.7310**	.55005	.47347	.06331
HS	-.26125	.16759	-.05382	.03444
SDW	-.07566	.41693	-.015678	.08684
TF	.71471	.49764	0.622	0.283
SCF	-.12309	.46906	-.02508	.09454
SOH	.39088	.55138	.08486	.12528
LN_MI	-.99860**	.31811	-.20572	.06682
CS	.28675	.41255	.05959	.08646
EDU1	-.62063	.49425	-.12643	.09904
EDU2	-.75692	.59048	-.14389	.10238
RSBY	-.17700	.54155	-.03686	.11382
BPL	-.07007	.39374	-.01444	.08109
Village dummy	1.5386	1.0809	.31452	.21285
Observations:210				
LRch2: 90.14				
Prob>chi2: .0000				
Pseudo R2:.3322				
Count R2:.79				
Adjusted count R2: .39				
Crag and Uhler's R2: .48				
Efron R2: .70				

Note: *** Implies significant at 1percent level ** implies significance at 5 percent level; * implies significance at 10 percent level. For a dummy variable, dy/dx is the discrete change of dummy from 0 to 1.

Bamuni Pathar

The logistic regression analysis has been carried out for Bamuni Pathar and Balagaon separately so as to identify the village specific factors influencing catastrophic payment. The logistic model

is statistically significant with a significant Likelihood Ratio Test (L-R Ch2) of p value less than .01 for Bamuni Pathar village[60]. The count R2 is found to be .85 while the adjusted count R2 is found to be .61. The independent variables which are found to have a significant and causal relationship with the dependent variables are household size, duration of illness, households with chronic morbidity, safe drinking water, monthly income of the households and availability of toilet facility in the households. The co-efficient β_4 (household size) is found to have a positive and significant relationship with catastrophic expenditure at 10 percent threshold level. Higher the household size higher is the probability of catastrophic payment. The partial probability of the variable indicates that as the household size increases the probability of catastrophic payment increases by .08 points. The coefficient β_3 (DI) is found to have a positive and significant relationship with the dependent variable indicating that higher the duration of illness, higher is the catastrophic expenditure at 10 percent threshold level. The partial probability of the variable indicates that as the duration of illness increases by one unit, the probability of catastrophic payment at 10 percent level increases by .0009 percent. Similarly, β_4 (CM) is found to have a positive and significant relationship with the dependent variable. The partial probability of the variable can be explained in the similar manner. The coefficient β_6 (SDW) shows a negative and significant relationship with the dependent variable. Higher the use of safe drinking water lower will be the catastrophic expenditure at 10 percent catastrophic threshold level. β_7 (TF) has a positive and significant relationship with catastrophic expenditure. The relationship is positive probably because at the higher catastrophic expenditure (say 15 percent or 25 percent), impact of non-use of toilet facility might be higher. The $\boldsymbol{\beta_{10}}$ coefficient monthly income (LN_MI) has a negative and significant relationship with catastrophic expenditure.

Balagaon

The logistic model is statistically significant with a significant Likelihood Ratio Test (L-R Ch2) of p value less than .01 for Balagaon. The value of count R2 is .77 while the adjusted count R2 is .324[61]. The explanatory variables are similar for both the villages. There is absence of any kind of multi-collinearity among the independent variables. The variables which are found to have a causal and significant relationship with catastrophic expenditure at 10 percent threshold level are duration of illness, households with member with chronic morbidity, monthly income and educational level of the head of the households. The explanation is similar to that of Bamuni Pathar for the similar variables. The coefficient β_{12} (EDU) has a negative and significant

[60] See Appendix Table A 6.4
[61] See Appendix Table A 6.5

relationship with the dependent variable. This implies that the catastrophic expenditure is lower for those households with higher education in comparison to the illiterate households. The partial probability can be explained in the similar manner as explained earlier.

6.6 SOURCE OF FINANCING HEALTH EXPENDITURE AMONG HOUSEHOLDS

Out of pocket expenses also have an impact on the economic condition of the households. The village data explored that a major proportion of the households have to rely on borrowings and contributions from friends and relatives to meet cost of healthcare. The important modes of payment for illnesses in the sample villages includes households own savings, borrowings and contributions from friends and relatives. In case of outpatient care the major source of financing is household savings in both the villages. 63 percent of the households of Bamuni Pathar and 79 percent of the households of Balagaon are financing healthcare expenses through household savings. The dependence on borrowing for financing of healthcare cost is 16 percent in Bamuni Pathar and 19 percent in Balagaon. The dependence on contributions from friends and relatives (21 percent) is found to be higher in Bamuni Pathar village. In Balagaon, dependence on friends and relatives is only 2 percent.

In Bamuni Pathar total inpatient care cases are 11 while in Balgaon the numbers of inpatient care cases are 9. In case of inpatient care the dependence on household savings is 27 percent in Bamuni Pathar which shows the economic burden on the households. Dependence on borrowings is another major source of financing healthcare in Bamuni Pathar. In total hospitalization cases, 45 percent went for borrowing in Bamuni Pathar. They either borrow from the NGOs' or the village societies. Financing through friends and relatives constitute of 18 percent of health financing. While dependence on other sources like sale of assets constitute 9 percent in Bamuni Pathar.

Table 6.15 *Source of financing for outpatient care in Bamuni Pathar and Balagaon,* in number and percent

Source of financing	*Bamuni Pathar*		*Balagaon*	
	Number	*Percent*	*Number*	*Percent*
Household savings	62	63	88	79
Borrowings	16	16	21	19
Contributions from friends and relatives	21	21	2	2
All persons	99	100	111	100

Source: Survey data, 2014

Table 6.16 *Source of financing for inpatient care in Bamuni Pathar and Balagaon,* in number and percent

Source of financing	*Bamuni Pathar*		*Balagaon*	
	Number	*Percent*	*Number*	*Percent*
Household savings	3	27	4	44
Borrowings	5	45	3	33
Contributions from friends and relatives	2	18	1	11
Others	1	9	1	11
All persons	11	100	9	100

Source: Survey data, 2014

In Balagaon, 44 percent of the hospitalization cases are financed through borrowing. Dependence on borrowings is higher and financing healthcare cost through contribution of friends and relatives and friends is miniature. Financing through borrowings is 33 percent and contribution from friends and relatives is 11 percent. Since the literate population of the village is high they go for borrowings rather than other sources or contributions from friends and relatives. Other sources here include financing through sale of land, ornaments or other household assets. 11 percent of the households has to bear the health cost through sale of household's assets in Balagaon. The households are afflicted with a larger burden of healthcare cost mainly in case of inpatient care, the cost being higher in Bamuni Pathar village[62].

6.7 CONCLUSION

Present analysis primarily focused on the impact of OOP expenses on economic well being of the households in the study areas. A considerable proportion of total consumption expenditure is spent as out of pocket expenses on health in both the villages. While the average OOP expenses is found to be increasing with increase in consumption expenditure quintile group, the share of expenditure on health as a proportion of total consumption expenditure shows negligible variations in both the villages. A low average income with a higher proportion being spent on health as OOP expenses implies greater burden on the lower consumption quintiles in both the villages. The estimates of expenditure in various components of OOP expenses reflect a considerably high proportion of expenditure on purchase of medicines and drugs in both the villages. This is because a considerable amount of money is spent on purchase of medicines and drugs from the private pharmacies due to lack of supply of medicines in the government health facilities. Therefore people seeking treatment even in government health facilities has to incur

[62] Based on a study on 55th NSSO round Peter et al. (2002) found that a large number of households have to sell their households assets and incur debts in case of hospitalization. Kudu (2009) estimation based on NSSO 55th round survey also found that 40 percent of health care expenses in case of hospitalization cases is met by borrowing.

heavy OOP expenses. Diagnostic tests are largely outsourced from the government health facilities to private health facilities adding to the households' burden of expenses.

The study reveals that a major proportion of OOP expenses are hospitalization related, specifically in Bamuni Pathar village. Households rely on private health facilities because of lack of quality care in the nearby government health facilities. The civil and district hospital is far away from the village. In Balagaon however the physical availability of public facilities is relatively better off. Hospitalization is largely sought in the nearby civil hospital and is easily accessible.

Catastrophic headcount and overshoot is high in Bamuni Pathar village at every threshold level indicating greater impoverishment among the housholds. A large proportion of households are pushed below poverty line because of OOP payments on health in both the villages, the proportion being higher in Bamuni Pathar. Those households with greater duration of illnesses, higher proportion of chronically ill member and lower monthly income bear higher impact of catastrophic expenditure.

Chapter 7

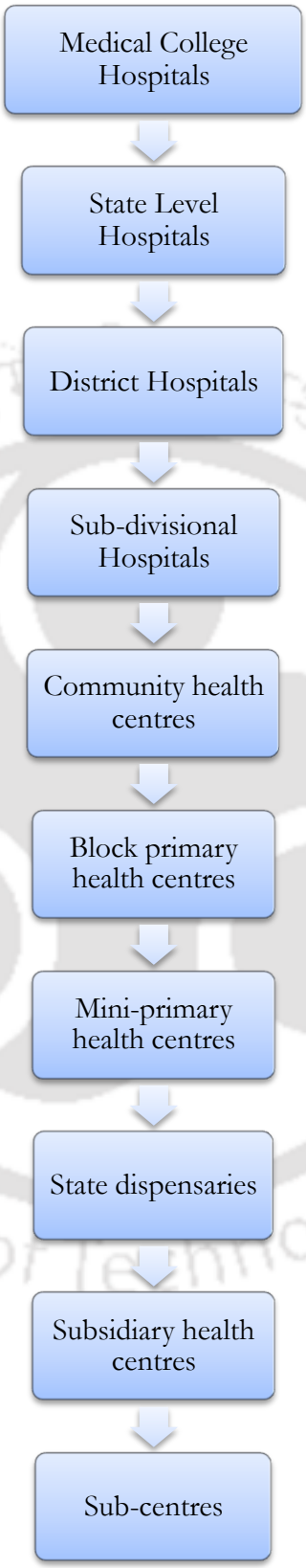
Public Health facility in the study villages

Public health care delivery system is at the core of standard of health among rural households. An assessment of public health facilities is important because there is a direct cause and effect relationship with levels of morbidity and mortality. A better healthcare delivery system is essential to have an impact in the form of decreased morbidity or mortality for rural population. Section 7.1 of this chapter gives an overall organizational structure of the healthcare delivery systems for the rural areas of Assam. Section 7.2 provides information about infrastructural facilities in the sample villages in terms of Indian Public Health Standards (IPHS). Section 7.3 discusses the fund flow pattern with respect to healthcare facilities in the study area. Section 7.4 describes the pattern of utilization of maternal and child healthcare services in the sample villages. Section 7.5 will identify some of the delivery factors which have a significant impact on maternal and child healthcare.

7.1 ORGANIZATIONAL STRUCTURE OF HEALTHCARE DELIVERY SYSTEM IN RURAL AREAS OF ASSAM

Medical Collage hospitals are at the top in the hierarchical structure of public health delivery system. Next to the Medical College hospitals are the State level hospitals which are maintained by the respective state governments. They are followed by the district level hospitals. District hospitals are generally referred to as secondary referral unit (SRU). These are responsible for a defined geographical area containing a defined population. These hospitals serve the purpose of specific districts and are controlled by the state government. The main functions of district hospitals are consultation and specialization in the field of medicine, surgical activities, pediatrics services, gynecology services, ophthalmology and ENT. They also handle emergency cases and outpatient door services. Below the district hospitals are the sub-divisional hospitals. These hospitals are above community health centres (CHCs) at the block level. They act as the first referral unit (FRU) in providing some of the emergency obstetric care and neonatal care. One of the main targets of these hospitals is to bring down the proportion of maternal and infant mortality rates in the respective sub-divisions. These hospitals serve as a source of linkage between the sub-centre, primary health centre and the community health centre on the one hand and the district hospital on the other hand.

Figure 7.1 *Organizational structure of public health delivery system in Assam*



The community health centres act as a referral unit for four primary health centres and they also function at the block level. It covers a population range of 80,000 to 120,000. The primary functions of CHCs are to provide care especially in the field of medicines, surgery, pediatrics and gynecology. At the block level, the most important unit of healthcare delivery is a primary health centre (PHC), which is also known as the backbone of the rural healthcare system. The primary health centre is entrusted with the function of providing preventive and promotive healthcare services to the rural population of the state. It also acts as a referral unit for six sub-centres. One of the primary responsibilities of PHCs is to refer cases to CHCs and other higher levels of public health facilities in the hierarchy.

Below the block PHCs, there are mini PHCs (MPHCs) and sub-centres. There are generally 34 sub-centres within the purview of MPHCs. Each of the MPHC covers an average of 20,000 populations. There are some subsidiary health centres functioning parallel with MPHCs, with sub-centres under them. The population coverage under subsidiary health centres are 24,000. At the next level of hierarchy are the state dispensaries. The state dispensaries cover on an average population of 20,000. The state dispensaries have 5 to 15 sub-centres under their coverage.

The lowest unit in the hierarchy is sub-centres. They work at the grass root level and provide all kinds of primary healthcare services to the rural population. The sub-centres are mainly engaged in activities like immunization, antenatal care, natal care, post natal care, control and prevention of childhood diseases, providing family planning services and counseling. They are also responsible for providing minimum levels of drugs and medicines to the common masses for common diseases such as diarrhea, fever, gastroenteritis etc. As per norms a sub-centre should be established for every 5,000 population in plain areas while it should be established for every 3,000 population in the hilly areas. They also have referral linkage to primary health centre

7.2 HEALTH INFRASTRUCTURE IN THE STUDY VILLAGES IN REFERENCE TO INDIAN PUBLIC HEALTH STANDARDS (IPHS)

The village level health facilities struggle to meet the minimal levels of standard laid down by the Indian Public Health Standard.[63] For instance, according to IPHS standards, a PHC should have inpatient care services with *four* beds. But in practice there is *only one* emergency bed in the Bamuni Pathar PHC. They are not equipped with the much required childbirth

[63] Indian Public Health Standards are the standard norms for all public health institutions. These are set under the NHM to improve the quality of public health institutions of the state.

delivery services, both normal and caesarean. As there is no provision of child delivery in the PHC, facilities for new born care is also not available. Moreover, pregnancy termination facilities are also not available in both the villages which is a high risk for maternal health. Of course the PHCs of both villages provide the minimum required care to pregnant women, particularly in terms of ANC, natal care and PNC. They are also largely responsible for the increasing rates of full immunization and control of communicable diseases. The health centre has one ambulance but it is not in a working condition because of lack of funds for maintenance. There is an acute shortage of personnel in the health centre. The centre has electricity facility functional for only 16-18 hours a day and a single toilet used both by male and female patients. Water supply is available for 24 hours through a tube-well. It has one medical store which has stock of only some of the common medicines.

In Balagaon the block PHC centre is equipped with 2 beds. For child birth, only normal delivery cases are carried out in the hospital, C-section patients are referred to the civil hospital. No caesarean cases are taken up in the PHC because of lack of manpower and required equipments in the health centre. Further there are no anesthetics in the centre to handle caesarean cases. There are two medical officer (AYUSH) in the centre, 1 medical officer (contractual), 2 staff nurses, 1 pharmacist, 1 male health assistant, 2 laboratory technicians (contractual), 2 female health workers (contractual), 2 class IV employees and 2 cleaners. The normal delivery cases are dealt with by the Medical Officer. The health assistant informed me that there is crisis of medicines in the health centre. Supply of medicines from the state headquarter are irregular. Shortage of medicines is common to PHCs in both villages. However, unlike Bamuni Pathar, the centre is equipped with proper electricity facility, drinking water and toilet facility. The centre provided healthcare services for 24 hours. The medical officer from the PHC visits the sub-centre for supervision and record keeping every month. Thus the health facilities in both the villages do not possesses even some of the minimum requirements for satisfying the norms established by Indian Public Health Standard.

The role of primary health care providers in the rural set up

At the village level there are two important health care providers. These include the accredited social health activist (ASHA) and auxiliary nurse midwives (ANM).

Selection of the accredited social health activist (ASHA): The ASHA is selected on the basis of a focus group discussion (FGD). ASHA workers are women. The FGD is initiated by the

Gaonburah[64] of the village. On the basis of the discussion the ASHA is selected by consensus. She is then appointed by the block authorities on the recommendation of the Gaonburah. The ASHA is entrusted with the following

1. Providing information about existing health services,
2. Creating awareness in the community on health, hygiene and nutrition.
3. Encouraging women to access antenatal care, post natal care and immunization of the children.
4. Escort pregnant women and sick children to the nearby health facility of the village.
4. Counseling on safe delivery and taking precautions during the time of delivery.
5. Providing information on new born care, breast feeding and supplementary food, use of contraceptives and family planning measures.
6. Providing statistical records on births and deaths in the villages to the sub-centre, PHC or the CHC.

Incentives to ASHA: The ASHA workers of both villages opined that the amount they are provided as incentive is not enough with respect to their work load. On an average they get Rs. 1500 per month. They are paid on the basis of the work load they have to carry on. For providing antenatal care they receive an amount of Rs. 150 under the condition that the pregnant lady have completed full antenatal checkup otherwise no incentive is paid. For a normal health checkup they are paid an amount of Rs. 100. Similarly, for post natal an amount of Rs. 250 is paid to the ASHA workers. In case of family planning measures they are paid an amount of Rs. 500 for the first two children, while an amount of Rs. 150 is paid for 3rd and 4th child. The ASHA workers opined that they are being provided with very low incentives which are not sufficient. In other words the ASHAs get a disincentive for birth orders above two.

Auxiliary Nurse Midwives (ANM): Auxiliary Nurse Midwife is the female health worker in the village working in the sub-centres, the first unit of contact between healthcare providers and the community. They are the grass root workers in the village. In both villages there is one ANM in the sub-centre. Although the National Health Mission specifies a norm of two ANM (one permanent and one contractual) for each sub-centre, in both the villages there were only one ANM each. ANMs are expected to work as multi-purpose health workers. They are entrusted with maternal and child health activities, family planning, educational

[64] Gaonburah is the head of the village.

awareness on health and nutrition, sanitation, child immunization, control of communicable diseases, treatment of minor illnesses and providing first hand aids during emergency. ANMs are expected to motivate ASHA workers for bringing beneficiaries to the sub-centre. They also act as resource person for training of ASHA workers. Since there was only one ANM each in both the sub centres, they have heavy work load. They opined that it is difficult for them to maintain all the official work in the sub-centre. They suggested providing additional workers to ease out the load.

7.3 FUND FLOW PATTERN AT VILLAGE LEVEL HEALTH FACILITIES

In order to investigate the loopholes of the public health facility at the village level it is important to know about the fund flow mechanism, and to identify the problems in the process. Funds are generally released by the Central Government to the States through two separate channels, i.e. through State Finance Departments and directly to the different health societies. Funds are provided to the state health mission on the basis of the approval of the State Programme Implementation Plan (PIPs) of the central government. Under the State PIP there are various programmes. These include: **A**. Reproductive and Child Health Scheme (RCH) **B**. Universal Immunization Programme (UIP) and **C**. Disease control Programme which will include control of Vector Borne Diseases, Tuberculosis Control Programme, and other National Diseases Control Programme.

During 2005-06 and 2006-07, all grants were provided to the states by the centre. However, since the 11th Plan Period (2007-12) states contribute 15 percent of the funds required while 75 percent of the funding is done by the central government. At the state and district levels, Financial Management Groups (FMGs) was formulated under respective Programme Management Support Unit (PMSU). They are responsible for centralized processing of fund releases. They are also responsible for collection, compilation and submission of Statements of Expenditure (SOEs), Financial Management Reports (FMRs) and audit reports from District Health Societies to State Health Mission. They have another responsibility of fund mobilization from the State Health Societies to Government of India. The NHM fund flow mechanism can be shown as given below:

The healthcare delivery questionnaire also collected information on fund flow pattern in the villages. There are two kinds of funds: the NHM fund and the Rogi Kalyan Samitee (RKS) fund, although RKS is a programme envisaged under the NHM. Rogi Kalyan Samities are

formed in the mini PHCs of both villages where people can lodge complaints and suggestions regarding the health centre. The Secretary, President and the Medical Officer are in charge of the fund. The RKS meeting is held 2-3 times during a year. Auditing of the fund is done by the block authority every year.

Centre

(*At the Central level the fund is mobilized by the National Health Mission which was earlier named as National Rural Health Mission*)

State

(*The fund flows from the National Health Mission to the State which is accounted for by the State Health Mission of the respective states)*

District

(*From the state, the funds are allocated to the districts in accordance to their requirement. The district level is managed by the District Health Societies*)

Block

(*From the district the funds flows to the block level.*)

Village

(*From the block level, the fund flows to the village level where it is allocated for various purposes in the form of Rogi Kalyan Samitee Fund. The fund is provided to various health facilities*

Fund flow pattern in health facilities within the village

The major head on which the funds are spent includes infrastructure, ambulance, repairing, and salary to the casual workers. NHM fund is used to pay for Janani Suraksha Yojana, Mamomi, Majoni, and to provide incentives to ASHA workers. However, the two schemes Mamoni and Majoni are under the Assam Bikash Yojana implemented by the State Health and Family Welfare Department. The JSY programme was launched in 2005, which is a modification of the erstwhile National Maternity Benefit Scheme (NMBS). The NMBS scheme was initially as a component of National Social Assistance Programme (NSAP), however in 2000-01; it was transferred from the Ministry of Rural Development to the

Department of Health and Family Welfare. The NMBS programme used to provide financial assistance of Rs. 500 per birth up-to two live births, to pregnant women who have attained 19 years of age and belonging to a BPL household. The NMBS provided financial assistance uniformly throughout the country, while the financial assistance under JSY varies on the basis of low and high performing states. The low performing states are provided a package of Rs. 1400 to mothers while in the high performing states the mother's package is Rs. 1000.

Mamoni is another scheme launched by the state of Assam for pregnant women. Under this scheme a pregnant women is provided Rs. 500 each for 1st and 3rd ANC visits respectively. Pregnant women are also given books on nutritional food and safe motherhood. However the usefulness of such benefits is questionable given the very low standards of education as well as numbers of illiterate women in the study villages. Majoni scheme is for those who have first two girl children in a family. They are provided Rs. 5000 in case of girl children and the amount is deposited in the form of a fixed account. It must be pointed out that although these schemes provide some form of financial assistance for health related issues, the forms of cash transfers are highly troublesome for the beneficiaries themselves. For example, the Rs. 5000 offered as fixed deposit for mothers of girl children does not ensure if the woman concerned is in a position to actually utilize the amount by having access to the banking system in the first place.

The flow of funds to health facility is made on an annual basis. The RKS fund constitutes an amount of Rs. 170,000. This amount is mainly spent for maintenance of minor repairing, hiring contractual staff, emergency medicines and payment to vehicle drivers and cleaners. However, the amount of money is hardly ever enough for functioning in an efficient manner, as informed by the Medical Officer of the concerned PHC. According to the Medical Officer, a minimum of Rs. 2 00,000 should be provided by the government. Because of lack of funds, sometimes normal functioning of the PHC is in danger. For instance, the ambulance in Bamuni Pathar village was not functional, thus requiring investments in maintenance and repairing. The PHC is also provided with a JSY fund of an amount of Rs. 8,000 towards JSY beneficiaries, laboratory activities and to technicians for collection of blood samples and other such activities. The sub-centre receives an amount of Rs. 20,000. According to the ANM the amount is not enough to meet the basic needs of the health centre. More amounts are required for maintaining the infrastructure of the centre.

7.4 PROBLEMS ASSOCIATED WITH HEALTH CARE DELIVERY SYSTEM IN THE STUDY VILLAGES

On the basis of personal interviews with residents and the views of health personnel in government health facilities in the villages, the following problems were observed.

a. *Accessibility:*

Accessibility to the public health care facilities is one of the major constraints in the rural setting. In the context of the present study, people in Bamuni Pathar spent 9 percent of the total OOP expenses on transportation. Since health facilities in the village provide only minimal health care, people regularly move out for health reasons. People are largely dependent on private transport due to a complete lack of public transport system in place. The civil hospital is 25 kilometers away from the village. The FRU is overcrowded with patients, there is lack of seats in the hospital, compelling patients to seek treatment in nearby private hospital or private health care clinics. Especially in cases of hospitalization and long term illnesses, the households have to bear a bulk of expenses in terms of transportation cost (10 percent) and attendant charges (16 percent), which result in heavy economic burden mainly for the poorer households. However, the problem of accessibility is comparatively lower among the households of Balagaon.

b. *Shortages of skilled health personnel:*

Shortages of skilled health personnel in health facilities in both villages have already been stressed in the previous section. The general opinion that came up was doctors are reluctant to work in the rural set up. In many cases it was observed that the doctors in the government health institutions practice privately in the villages and collect a fee. The ANM at the PHC in Bamuni Pathar expressed heavy workload due to lack of adequate manpower in the health centre. In the mini primary health centre of both the villages, there were AYUSH doctors only. In the FRU of Bamuni Pathar gynecologists and anesthetists are not available due to which patients are referred to private health facilities. Same is the case with the PHC and CHC of Balagaon.

c. *Shortages of medical equipment*:

Lacks of proper medical equipments such as ultrasound facilities are not available either in the PHC or the CHC in both the study villages. Thus for ultrasound, patients have to go to the nearest FRU, resulting in loss of time and money. Thus, in

many cases, residents ignore going to health facilities in the early stages resulting in critical condition at a later stage. Diagnostic test facilities are completely absent in nearby public health facilities. The health personnel in the study villages expressed their unhappiness regarding the lack of government attention to health units at the village level.

d. *Shortages of medicines in government hospitals*:

Another serious problem encountered was shortages of medicines in the health centres of both villages. Supply of medicines was irregular, and only some of the common medicines were available. Households purchased bulk of medicines from private pharmacies, which also contributed to high out of pocket expenses. Some of the commonly available medicines were Iron and Folic Acid tablets, calcium tablets, and medicines for minor illnesses like fever or diarrhea. We have seen in Chapter 6 that a major share of total out of pocket expenses were on drugs and medicines.

e. *Lack of infrastructural facilities*:

Lack of basic infrastructure such as separate toilet for males and females, poor housing, non-functional ambulance services, and lack of beds in government health facilities are a major limitation. The higher income groups prefer private health institutions while the lower income groups suffer the inefficiencies of public health institutions.

f. *Low seat capacity and over crowdedness*

Another problem in the government health institutions is the problem of low seat capacity and over crowdedness. Bamuni Pathar residents always complained of over crowdedness and low seat capacity, propelling them to go to private hospitals.

7.5 PATTERN OF UTILIZATION OF MATERNAL AND CHILD HEALTH CARE SERVICES IN THE SAMPLE VILLAGES

The share of women receiving full ANC is 23 percent in Bamuni Pathar and 59 percent in Balagaon. The main reason behind low percentage of full ANC in the sample villages is that in the rural setting pregnancy is treated as a natural phenomenon and due to ignorance and lack of awareness; the importance of ANC is not realized. Moreover, due to high level of illiteracy, especially in Bamuni Pathar village, married women hesitate to go for ANC during their initial period of pregnancy. In terms of institutional delivery, 88 percent of the women

in Bamuni Pathar village and 98 percent in Balagaon village delivered in government health facility.

Table 7.1 *Maternal health indicators in Bamuni Pathar and Balagaon villages,* in number and percent

Maternal health care indicators	*Bamuni Pathar*		*Balagaon*	
	Number	*Percent*	*Number*	*Percent*
Antenatal care				
Full ANC	12	23	23	59
Any ANC	40	77	33	41
Place of delivery				
Institution	52	88	54	98
Home	6	12	2	2
Consumption of IFA Tablets				
Yes	48	92	51	91
No	4	8	5	9
Whether have post natal care				
Yes	31	60	44	79
No	21	40	12	21
Whether used tetanus toxoid injection				
Yes	50	98	55	98
No	2	2	1	2
Age at marriage				
Below 18 years	23	44	11	20
Above 18 to 49 years	29	56	45	80
Whether JSY beneficiary				
Yes	47	90	30	54
No	5	10	26	46
Beneficiaries of Mamoni scheme				
Yes	24	54	30	54
No	28	46	26	46

Source: Survey data, 2014

The percentage of women consuming IFA Tablets is almost similar across the two villages. While 92 percent of the women consumed IFA Tablets in Bamuni Pathar it was 91 percent in Balagaon. Similarly, percentage of women receiving PNC was 60 percent in Bamuni Pathar and 79 percent in Balagaon. A look at the age of marriage indicates that the percentage of women married below the age of 20 years is very high in Bamuni Pathar; 44 percent were married before age 20 in Bamuni Pathar while it is 20 percent in Balagaon. The proportion of JSY beneficiaries in Bamuni Pathar was 90 percent, in Balagaon 46 percent. The lower percentage of JSY beneficiaries in Balagaon is mainly due to delivery of children

at private health facility, where they do not receive such benefits. A little more than 50 percent of married women were benefitted by Mamoni scheme in both the villages.

Child health indicators of the sample villages

The survey data on utilization of child health care services shows that 92 percent of children in Bamuni Pathar village have been weighted after birth while in Balagaon it is 98 percent. Similarly, the percentage of underweight children was 42 and 22 percent respectively. Low birth weight in Bamuni Pathar is mainly due to lack of nutritious food among the pregnant mothers. Married women in Bamuni Pathar were less aware of the Mamoni scheme. In terms of vaccination, out of all children aged 0-6 years, 92 percent were vaccinated in Bamuni Pathar and 97 percent in Balagaon. Supplementation of vitamin A to children was 65 percent and 70 percent respectively.

Table 7.2 *Child health indicators for Bamuni Pathar and Balagaon villages, in number and percent*

Child health indicators	*Bamuni Pathar*		*Balagaon*	
	Number	*Percent*	*Number*	*Percent*
Whether weighted				
Yes	47	90	54	98
No	5	10	2	2
Underweight				
Yes	22	42	2	4
No	30	58	54	96
Fully Immunized				
Yes	47	90	54	96
No	5	10	2	4
Received Vitamin A Supplement				
Yes	34	65	52	93
No	18	35	4	7

Source: Survey data, 2014

7.6 DELIVERY FACTORS INFLUENCING MATERNAL AND CHILD HEALTH CARE

To see the influence of healthcare delivery factors on maternal and child health utilization pattern of the sample villages Fisher-Freeman tests have been conducted. Generally we use chi-square test to see the association between categorical or ordinal variables. However, if the chi-square test fails to fulfill the criterion of expected frequencies being greater than 5, the use of chi-square test is not as valid as such. Under such circumstance we use the Fisher's exact test. However, there is limitation of this test as it is considered to be conservative. Therefore modified version has been used which is an extension of the

Fisher's exact test. It is known as the Freeman–Halton exact test of measures of association. Since this is an exact test the assumption of minimum expected frequencies are given away.

Table 7.3 *Health delivery factors affecting access to maternal health services, Freeman –Halton exact test results*

Explanatory variables	*Full antenatal care*	*Institutional delivery*	*Post natal care*	*Low birth weight*	*Vitamin A supplementation*
			p values		
JSY beneficiaries					
Yes	.252	.010	.407	.723	.000*
No					
Momoni Beneficiaries					
Yes	.099	.000*	.641	.001*	.326
No					
Mode of transportation to reach health facility					
Ambulance	.833	.000*	.210	.000*	.000*
Hired vehicle					
Advice of ASHA (gynecological problem)					
Yes	.267	.000*	.904	.210*	.000*
No					

Note: * Implies that the variables are significant

The data for both the villages have been pooled for the analysis. The total number of observations for this analysis is 108, which is a sub-sample containing married women having children of 0-6 years. Test results show that there is significant association between institutional delivery and all the explanatory variables (see Table 7.3). This implies that the healthcare delivery schemes in the form of JSY, Mamoni, utilization of ambulance services and role of ASHA workers are playing a major role at increasing institutional delivery. However, there is no significant causal relationship of ANC and PNC with the explanatory variables. Similarly, it can be observed that among the child health indicators, the percentage of low birth weight baby is lesser among those who are JSY and Mamoni beneficiaries. There is also a significant relationship between children receiving Vitamin A supplementation and JSY beneficiaries, Mamoni beneficiaries, mode of transportation and role of ASHA in providing advice on gynecological issues (Table 7.3).

7.7 CONCLUSION

In terms of health facilities, both the villages are functioning below the Indian Pulbic Health standard norm which shows poor performance of the health care facilities in the study

villages. Government flow of fund is also inadequate to maintain the normal functioning of the health care facilities. The health care facilities suffer from gross inadequacy of healthcare personnel and medical equipment resulting in movement of patients to private facilities. The health care providers of the villages like the ASHA worker or the village ANM are overloaded with work. The system of incentive based payment to the ASHA workers hampers work ethics as it is not sufficient with respect to their work load.

The study on public healthcare facilities in the sample villages indicates that there are various loopholes in terms of performance of healthcare delivery system. There are problems of accessibility, infrastructure, rude behavior of the health personnel, shortages of medical equipments, shortages of medicines, low bed capacity and shortages of manpower in the sample villages. Although a majority of the population depends on the government health facilities for treatment the quality of treatment is not at all satisfactory.

However, the results of the study indicates that the performance are somehow better in terms of some of the indicators like institutional delivery, receiving IFA Tablets, receiving tetanus toxoid injections and receiving JSY benefits. The Freeman –Halton exact test on delivery factors influencing maternal and child healthcare utilization shows that there is a significant relationship between institutional delivery and JSY, Mamoni scheme, mode of transportation and advice of the ASHA for gynecological tests for both the villages. A significant association is also found between children receiving Vitamin A supplementation and JSY beneficiaries, Mamoni beneficiaries, mode of transportation and role of ASHA in providing advice on gynecological problems.

Chapter 8

Summary and Conclusions

8.1 HEALTH IN ASSAM

Assam is identified as one of the states with 'weak health outcome indicator' in the flagship programme of National Health Mission introduced in 2005. Moreover, the recently introduced National Health Policy of 2015 also mentioned Assam as one of the states with 'greatest health challenges' in terms of infant mortality rate and maternal mortality ratio. Assam is characterized with highest maternal mortality (328 per live births) ratio across all the states of the country as reported in the Sample Registration Survey of 2014 by Government of India. Nevertheless the performance of Assam is also poor in terms of other health outcome indicators (for instance, fully immunized children, antenatal care, post natal care and institutional delivery).

A huge disparity in terms of performance of health outcome indicators across rural and urban areas of the state has also been observed. In urban areas the performance is better than the rural areas of the state. Due to having critical health indicators, the state has been provided with more of financial assistance than other states. In spite of this, crucial health outcome indicators are not satisfactory. Review of literature also indicates that research attention on the state of Assam has been relatively low over the period. Studies focusing on health are very limited in the state. Moreover, a study on morbidity and private healthcare expenditure among the rural households will provide an appraisal of health status of rural households in the state. This emancipated the need to investigate the health scenerio specifically for the rural population of the state at a more disaggregated level. Moreover, the study focused specially on the role of public health sector in providing healthcare services as 86 percent of the population are from rural background in the state and the common masses depend mostly on public healthcare services for treatment.

8.2 PUBLIC HEALTH EXPENDITURE IN ASSAM: 1990-91 TO 2011-12

As already mentioned in chapter 1 of the thesis, public provisioning is very important in case of health sector as it is a merit good. Therefore the second chapter (chapter 2) examines the pattern of public health expenditure in the state of Assam. The performance of public health system mainly depends on public health expenditure of the state. Increasing the public health expenditure has been one of the focus areas of the most of the health programmes and policies during the recent decades. Public health expenditure of the state

comprises of expenditure on medical and public health and family welfare. The analysis based on secondary level data shows that the average expenditure on health is 1 percent of Gross State Domestic Product (GSDP) of the state for the period 1990-91 to 2011-12. A look at the share of public health expenditure as a proportion of total government expenditure also implies a more or less constant pattern of expenditure over the years[65]. The study also estimated the per capita health expenditure of the state at 2004-05 prices as base[66]. Per capita overall health expenditure in Assam rose from Rs. 149 in 1990-91 to Rs. 347.28 in 2011-12. It was lowest during 2002-03 (Rs. 128) while it is highest during 2000-01 (Rs. 153). An increasing trend however in total per capita expenditure has been noticed since the implementation of National Health Mission in 2005. It increased from Rs. 132 in 2005-06 to Rs. 347 in 2011-12.

8.2.1 Expenditure on medical and public health and family welfare

Public expenditure in the state constitute of expenditure on medical and public health and family welfare. However, the bulk of expenditure comprises of expenditure on medical and public health. During 2010-11 expenditure on medical and public health constituted of 89 percent of the total health expenditure of the state. On the other hand expenditure on family welfare comprises of 11 percent of total health expenditure of the state during the same period. It has been noticed that the expenditure on medical health has been increasing since 2006-07 continuously which is basically the period of implementation of the NHM. In contrary the share of expenditure on family welfare as a proportion of total health expenditure of the state has been declining. Although the expenditure on family welfare seems to be declining in the budgetary expenditure, expenditure on this head is incurred under the National Health Mission (under NHM flexipool) which comes under central share of NHM. Thus NHM has been acting as an autonomous financing agency for the state and is contributing in increasing public health expenditure.

8.2.2 Expenditure on rural and urban healthcare services

Under medical and public health expenditure two important components are rural health services and urban health services (already explained in detail in section 2.3 in chapter 2).

[65] The finance account data shows that public expenditure on health is 14 percent during 2011-12 while the expenditure on education is 58 percent of the total social service expenditure during the same period. Thus the priority on health sector by the government in the state seems to be low.

[66] It has been already mentioned in chapter 2 that the expenditure data has been deflated using the NSDP deflator (base 2004-05) for the state of Assam.

The analysis on rural and urban healthcare services shows that while the share of rural population is high in Assam, the per capita expenditure on RHS is very low compared to that made on UHS. For instance, the per capita expenditure on rural health services is Rs. 168 in 2011-12 while the per capita health expenditure on urban health services is Rs 348 during the same period. However, the level of per capita expenditure on urban health services is much higher compared to the rural, a consistently declining pattern emerges for the entire period under consideration but the share of per capita expenditure on RHS is increasing over the period. A reversal in the trend has been noticed only after 2006-07 which was probably because of the funds coming from National Health Mission.

8.2.3 Expenditure on public health and medical education research and training

Another important component under medical and public health expenditure is expenditure on public health. The pattern of expenditure on public health shows a declining trend since the period from 2002-03. A rise in the expenditure on public health has been noticed only after 2009-10. This indicates that expenditure on public health has been very low in terms of budgetary provision of the government. The main reason behind the low public health expenditure under public health can be attributed to the low levels of expenditure on prevention and disease control programmes which is one of the major components of expenditure under public health. The share of expenditure on public health declined from 15 percent in 2002-03 to 6 percent in 2009-10. Although there has been a decline in the expenditure on prevention and control of diseases through budgetary heads during the recent years, expenditure through non-budgetary head has increased through National Heath Mission. The mission is spending on prevention and control of diseases under the head National Disease Control Programme (NDCPs).

Expenditure on medical education and research and training are another important area of investment in the state. Share of expenditure on medical education research and training shows that the share of expenditure on this component has been very low during the period of 1990-91 to 2000-01. However, the share stated to increase slowly since 2001-02. Highest increase in the expenditure has been observed for the period 2005-06 to 2009-10. It increased from 29 percent in 2005-06 to 39 percent in 2009-10. However, a slight decline has been observed during 2009-10 to 2011-12.

8.2.4 Revenue and capital expenditure and expenditure on rural and urban health services

The total health expenditure of the state constitutes of revenue expenditure and capital expenditure (discussed section 2.2 of chapter 2). The pattern of revenue and capital expenditure shows that revenue expenditure has always been higher than the capital expenditure of the state. The capital expenditure of the state has been more or less stagnant over the years as a proportion total health expenditure of the state. The pattern thus reveals that there was no systematic allocation of expenditure on strengthening of basic infrastructural facilities in the state.

8.2.5 Health expenditure and National Health Mission (NHM)

Under the purview of overall health expenditure of the state the contribution of NHM cannot be ignored. Therefore an attempt has been made to examine the pattern of expenditure under National Health Mission of the state (explained in section 2.4 of chapter 2). National Health Mission has been working as an autonomous implementing agency in the state. A study on per capita expenditure on NHM at 2004-05 prices shows that the per capita expenditure on NHM was Rs. 39 during 2006-07 which increased to Rs. 174 in 2011-12.

Before the introduction of the NHM, health expenditure by the centre at the state level was mainly through state treasuries. The flow of expenditure through treasury routes is mainly through grants in aids to the state government and Union Territories However, after introduction of NHM many donor funded health programmes has come into being which are outside the state treasuries. During the recent time period health expenditure by the centre at the state level is incurred through non-treasury routes. These are in the form of expenditure on institutions located in the states, direct transfer to the implementing agencies under centrally sponsored schemes and expenditure under Central Government Health Schemes (CGHS). The increase in expenditure through these agencies in the state has resulted in an increase in health expenditure through the non-treasury routes[67] while the flow of expenditure through treasury routes has been declining over the years. The mission has also been giving special focus on improving reproductive and child healthcare services. The allocation on RCH was highest for the year 2011-12 (44 percent). In terms of centre-

[67] A major component of expenditure through non-treasury routes is through implementing agencies in the form of "Flexible Pool for the state Programme Implementation Plan (PIP)". Assam, Uttar Pradesh, Maharashtra, Andhra Pradesh and West Bengal are at the top five position in terms of expenditure incurred on flexible pools (Choudhury et al., 2011)..

state transfer of funds, we found that fund flow through treasury route has been declining over the years.

Thus the discussion in the above section 8.2 fulfils the first objective of the thesis i.e. to study the level, extent and pattern of government expenditure on public healthcare services in rural Assam after Indian economic reforms in the social sector.

8.3 DISTRICT LEVEL ANALYSIS OF HEALTH INDICATORS

A district level analysis was undertaken for ranking and mapping of the districts of the state in order to show the district level disparity and to .select two districts for a comparative study on health status among the rural households. District ranking is based on the framework prepared by the World Health Organization. A Global Reference List of Core Health Indicators prepared by WHO (2014). Indicators are classified into four domains. They are health status, risk factors, services coverage and health systems. In the results chain framework health systems are categorized as input indicators. Demographic and socio-economic indicators are also categorized under input indicators as these provide health related information that describes the processes at work. Health service coverage is categorized as output indicators, risk factors as outcome indicators and health status as impact indicators. The study used 16 crucial health and socio-demographic indicators on the basis of available data and related literature which are relevant to the present study.

On the basis of ranking and mapping of the districts one district below the median and one district above the median rank has been selected randomly selected for the study. Nalbari district (2nd rank) of the state has been selected as the district above the median rank and Nagaon (22nd rank) has been selected as the district below the median rank. The forward and backward blocks are selected on the basis of available literature. Balagaon village has been selected from Nalbari district and Bamuni Pathar village has been selected from Nagaon district. Bamuni Pathar village is located in Kaliabar Development Block (backward block) while Balagaon is located in Barbhag Development Block (forward block). Moreover, the box plot analysis shows the presence of inter-district disparity among the districts in terms of various health and socio-economic indicators. Moreover, the village level data shows socio-economic variations across the two villages, Bamuni Pathar village being more backward than Balagaon village.

8.4 MORBIDITY AND HEALTH STATUS OF THE RURAL HOUSEHOLDS

On the basis of the household survey, the study examines the status of health among the rural households of Assam. To understand the health status of the population the study focuses on extent of morbidity, utilization of maternal and child healthcare services and the role of public healthcare services in improving the health status of the population. The results of the study show that morbidity in the two villages is much higher than the overall morbidity in the state as estimated by National Sample Survey Organization. 40 percent of the respondents are suffering from either acute or chronic morbidity in Balagaon and 42 percent in Bamuni Pathar is suffering from any kind of illnesses. The study shows that percentage of morbidity varies with individual and socio-economic characteristics of the respondents. Age-wise categorization indicates that morbidity has been increasing with increase in age in both the villages. Gender-wise classification shows that the proportion of morbidity is higher among the males in Bamuni Pathar while the contradictory result appears in Balagaon with higher levels of morbidity among the females. Across caste-groups, morbidity reporting is higher among the scheduled tribes in Bamuni Pathar and reporting is found to be higher among the scheduled caste in Balagaon.

Treated and untreated morbidity in Bamuni Pathar and Balagaon village

A discussion on treated and untreated morbidity in the study villages shows that among the total population suffering from any kind of morbidity (acute or chronic illnesses) 86 percent has been treated and 14 percent were untreated in Bamuni Pathar village. While in Balagaon the percentage of treated illnesses is 95 percent and untreated cases comprise 5 percent. Our study shows that untreated cases among the households can be explained from economic, personal perspective, failure of the healthcare delivery system in terms of quality of care and accessibility. Untreated cases mainly emerges either because of low quality of care and accessibility to healthcare facilities in the nearby government health institutions and lack of financial insecurity among the households. Perception about the diseases also plays an important role in treatment of the illnesses across the rural households.

It has been observed that the cases of untreated morbidity is however higher for acute illnesses relative to chronic illnesses. 23 percent of the acute morbidity cases are found to be untreated in Bamuni Pathar. Balagaon reported 7 percent of cases to be untreated. Age-wise categorization of the respondents indicates that untreated cases are higher among the 6-14

years (24 percent) and 15-59 years of age group (27 percent). It is because at this stage most of the minor illnesses are either ignored or nor reported. Similarly cases of untreated morbidity are higher among the females relative to the males. It has been observed that there is neglect of the female members and there is a tendency among the females to hide gynecological problems specifically in Bamuni Pathar village. However, the variation of untreated morbidity among male and female is minimal in Balagaon village.

Caste-wise classification in both the villages indicates a higher percentage of untreated morbidity cases among the scheduled tribes in Bamuni Pathar and scheduled caste respondents in Balagaon. However, the overall untreated cases for chronic morbidity are 2 percent in Bamuni Pathar village and 4 percent in Balagaon village. Untreated cases of chronic morbidity especially communicable diseases in both the villages are also a matter of concern which requires policy intervention by the government.

Disease specific morbidity in the study villages

The disease specific pattern of morbidity in both the villages indicates a higher proportion of respondents suffering from water borne diseases in both the villages. Cases of untreated morbidity are also higher for water borne diseases and communicable diseases in both the villages. Diseases like chicken pox and jaundice are generally ignored by the rural households and dependence on other sources like home remedial measures and visit to the village 'ojahas' are preferred in case of such diseases in both the villages. Among acute diseases proportion of respondent suffering from fever of short duration are found to be higher in both the villages. Similarly, among the chronic diseases, fever of unknown origin is the most common disease. The disease pattern in both the villages indicates the low levels of living in both the villages.

Utilization of healthcare services in the study areas and factors affecting morbidity

It has been found that the extent of morbidity also depends on costs, extent and access to institutional healthcare facilities. Variations are also observed in terms of utilization of healthcare facilities for acute and chronic morbidity in government and private health facilities. The dependence on government health facility is found to be higher in the Bamuni Pathar village (78 percent) relative to Balagaon village (62 percent). However dependence on private health facility is found to be higher for chronic morbidities in both the villages.

The study found there is still higher demand for public health services in both the villages however due to quality care problem of accessibility and other loopholes, the residents of the villages are forced to go for treatment in the private health facilities. The study also identifies some of the factors which have an effect on morbidity in the study villages. The result of the pooled regression model indicates that there is a significant association between age, educational level, household size and safe drinking water.

The above section (8.4) fulfills a part of the second research objective which is to assess the status of health care among rural households and to examine the factors explaining the differences across households.

8.5 CATASTROPHIC HEALTH EXPENSES IN THE SAMPLE VILLAGES

The present study found a high level of catastrophic expenditure in both the villages (10 percent in Bamuni Pathar and 8 percent in Balagaon) as a proportion of total health expenditure of the sample households. The data shows that a major proportion of non-food expenditure is spent on health in both the villages. Higher expenditure on health among all non-food items indicates that the households are cutting of expenditure on food and non-food items which has been inimical to maintain the overall standard of living in both the villages, the impact being higher in Bamuni Pathar as the households from this village are more backward with low average income and poor living conditions.

Consumption quintile-wise classification of the households implies that there is not much variation in terms of out of pocket expenses on health among the consumption quintiles. The lowest consumption quintile spent 10 percent of their consumption expenditure on health while the highest consumption quintile class spent 9 percent of their consumption expenditure on health in Bamuni Pathar village. While in Balagaon out of pocket a health expense varies between 7 percent among the lowest consumption quintile group it is 10 percent in the highest consumption quintile group. However, in terms Rs average OOP expenses increases with consumption quintile. Generally it has been observed that out of pocket expenses are less among the lowest consumption quintiles because they cannot afford quality care because of lack of money income. On the other hand the richer consumption quintile can afford better health facilities both from nearby health facilities and also from health facilities situated away from the village.

Hospitalization expenses by source of treatment

Hospitalization expense by source of treatment indicates that the average out of pocket expenditure is very high in private hospitals especially in Bamuni Pathar village. The average expenditure on medicines and drugs is Rs. 30300 in government health facilities and Rs. 44800 in private health facilities. On an average the total expenses on government health facility is Rs. 46770 in government health facilities and Rs. 156800 in private health facilities. The share of expenditure on diagnostic tests is however almost similar from both government and private sources. 15 percent of the total out of pocket expenses is spent on diagnostic tests in government health facility while 14 percent is spent in private health facility. However, the share of expenditure is highest for medicines among all the other components of out of pocket expenses.

In, Balagaon it has been observed that the average expenditure on hospitalization is higher in the government health facilities in comparison to the private health facilities because people prefer to go the government health facility which are easily accessible. In Balagaon also the expenditure on purchase of drugs and medicines is highest among all other components of OOP expenses. Since the cost of inpatient care is very high in the private hospital the households prefers to visit the nearby civil hospital where the charges are low.

Intensity and incidence of catastrophic expenditure in the sample households

The measurement of incidence and intensity in the study villages indicates that the catastrophic headcount is higher in Bamuni Pathar village at every threshold level relative to Balagaon village. The study measures catastrophic headcount at 5 percent, 10 percent, 15 percent and 25 percent threshold levels. Higher catastrophic headcount at every threshold level of income is due to dependence on private health facility and travel to the urban areas due to lack of healthcare facility in the nearby places. On the other hand, lower catastrophic headcount in Balagaon is mainly due to accessibility of the households to better healthcare facility, higher utilization and awareness among the households with respect to various diseases. However, it has been observed that catastrophic headcount is higher among the scheduled tribes household at 15 percent and 25 percent threshold levels. This indicates that they are prone to more of chronic diseases and a huge amount is spent on such cases as malaria, tuberculosis and asthma in Bamuni Pathar village. However the data shows that in Balagaon village the catastrophic headcount is higher among the scheduled cast households at 15 percent and 25 percent thresholds level.

The data on catastrophic overshoot indicates that the catastrophic overshoot is also higher in the study village of Bamini Pathar as compared to Balagaon. Thus it has been observed that the poor households have a higher catastrophic overshoot comparatively to the better ones.

Poverty and catastrophic health expenditure

Out of pocket expenses beyond a threshold are seen to have an impoverishing effect on the households. In the study villages large proportions of households were found to be falling below the official poverty line after accounting for health expenses that reached catastrophic thresholds. However, the proportion of households falling below the poverty line is higher for the households of Bamuni Pathar which is relatively backward. For households already below poverty line, catastrophic health payments added to distress. The low quality of health care at village level institutions resulted in movement of people from government health institutions to private clinics and dispensaries. This is observed specifically in case of hospitalization. The study identifies some of the crucial factors which have a significant impact on catastrophic expenditure of the households. These factors include duration of illness, prevalence rate of chronic morbidity, educational level, monthly income of the household and availability of toilet facility among the households.

Section 8.5 fulfills the 3rd objective of the thesis which to study the impact of out of pocket expenditure on health on the economic wellbeing of rural households.This section also answers all the research question of the thesis.

8.6 HEALTH CARE DELIVERY IN BAMUNI PATHAR AND BALAGAON VILLAGES

The study also discussed about the healthcare delivery system of the village in a nutshell. The findings shows that in both the villages the health centres (primary health centre, sub-centre and the community health centre) could not meet the norms of Indian Public Health Standard. Moreover, the fund flow among the health centres shows insufficient flow of funds in the health facilities within the village. This resulted in poor infrastructure and health equipments in the villages. Moreover, from the personnel interview of the respondents and health personnel of the respective health facilities of the village, it has been found that the health care delivery system of the village is associated with the problems of (a) Physical accessibility (b) shortages of health manpower (c) lack of health specialist (d)

shortages of medical equipment (e) shortages of essential medicines (f) lack of infrastructural facilities (g) low bed capacity and over crowdedness in the public health institutions (h) high cost of diagnostics and (i) rude behavior of health personnel.

Moreover, the study found a positive scenario in terms of maternal health and child health indicators like full immunization, institutional delivery, consumption of IFA tablets and receiving tetanus toxoid injection among the women of both the villages. However, the proportion of full antenatal care has been found to be very low in both the study villages. The women receiving post natal care is also found to be low Bamuni Pathar village while the percentage is comparatively better in Balagaon village of Nalbari district. The study also found a positive relationship between the healthcare delivery system and maternal and child heath indicators of the sample villages. The study also found a significant association between institutional delivery and JSY, Mamoni scheme, ASHA and mode of transportation in one of the villages. Significant association has also been found between ASHA and post natal care in the forward village.

TO CONCLUDE

Assam's reliance on central funding for health expenditure is considerable. This is clear from the pattern of budgetary expenditure on health that we analysed in Chapter 2. With the cutbacks on central government funding to the health sector due to the economic reforms package initiated in the 1990s, Assam's health expenditure to SDP also consequently declined. The pattern of expenditure under various heads of medical and public health and family welfare indicates decline in the share of expenditure by state treasuries. The flow of funds is mostly through non-treasury routes incurred by autonomous implementing agencies like NHM flexible pool of the state. Revenue expenditure takes the bulk of the share of total budgeted expenditure. Rural and urban health services form the bulk of expenditure under Medial and Public Health. While the expenditure share on rural health services has been increasing throughout the period considered in the analysis, the levels of per capita expenditure under this head is very low. Per capita urban health services though relatively higher than rural services, shows a declining trend.

This thesis reiterates the findings of NSSO that there is a large demand for quality public health services in the rural areas. This is particularly true of village Bamuni Pathar in Nagaon district where there is a heavy dependence of people on government health facility.

Balagaon village in Nalbari district, which has access to private health facilities, also has a very high rate of utilization of government health facility. Levels of morbidity in both study villages were found to be considerably high. Disease specific pattern of morbidity indicates low levels of living in both the villages. It supports the existing literature that some of the common diseases such as malaria, tuberculosis, typhoid and fever of unknown origin are still common among the rural households. Under such circumstances, well equipped government health facilities and a substantial increase in capital expenditure can contribute to better health status of the rural households.

This thesis supports the claim in the literature that out of pocket expenditure on health is exceedingly high. Around 8 to 10 percent of total household consumption expenditure is attributed to health. The catastrophic health expenditure analysis is based upon four different threshold scenarios. It may be noted that the 10 percent threshold level is largely considered in the literature, as being a crucial one, as expenditures higher than this level are bound to lead to cutbacks in current consumption of households. Given that the levels of consumption expenditure in the study villages are very low, a 10 percent threshold is on the higher side. At a 5 percent threshold level, we observed that more than half the population of the study area is subject to catastrophic health payments. Therefore, the estimates at 10, 15 and 25 percent threshold levels, point to extremely vulnerable conditions among the households.

Government programmes such as Janani Suraksha Yojana and Mamoni schemes show a positive and significant causal relationship with institutional delivery. One of the successes of the government health programmes is felt on reproductive and child health indicators. Maternal and child health issues are much better attended to in the public health facilities than other forms of diseases.

8.7 POLICY SUGGESTIONS

At the policy level, there ought to be more parity between curative and preventive care at the community level. We found that at the village level preventive care is given more emphasis. A large number of households in the survey opined that only maternal and child healthcare related services are easily accessible within the nearby health centres of the villages. For treatment of chronic diseases and curative care there is a heavy dependence on private health centres or district and civil hospitals, which are far away from the village. This is found to be especially true in Bamuni Pathar. This has led to a virtual breakdown of the

public health care delivery system. Apart from direct health intervention programmes, emphasis should continue on female literacy, use of safe drinking water, use of toilet facility, and proper drainage system, availability of proper source of cooking fuel. Community level campaigning may be encouraged to create awareness among people about various health programmes.

The village study clearly shows that untreated morbidity largely pertains to basic illnesses. Since basic health problems, such as communicable diseases have long term effect on the community, this must be attended to by the government. Needless to say government expenditure on infrastructure and quality services must improve, keeping in mind the affordability of such services by the common people. Non-affordability of basic services will only lead to long term morbidity and mortality.

8.8 LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

In the present study a detailed analysis of the flow of centre and state funds has not been possible. It is important to analyse flow of funds through treasury and non-treasury routes which will provide a more holistic picture of state and centre's contribution in the health sector The study is based upon cross section data and therefore collects information only for a point in time. The present study could not carry out in-depth research to measure efficiency of heath programmes implemented by NHM. A more detailed study based on programmes and policies could have given better insights into the performance of NHM and its effect on health indicators.

Appendix A3

Table A 3.1 *Ranking of the districts of Assam by Crude Birth Rate (CBR)*

District	*CBR (Rural)*	*Index value*	*Rank of the district*
Nalbari	18.90	1.0000	1
NC Hills	19.50	0.9607	2
Sibsagar	19.90	0.9346	3
Sonitpur	20.20	0.9150	4
Bongaigaon	21.00	0.8627	5
Kamrup	21.00	0.8627	5
Darrang	21.20	0.8496	6
Dibrugarh	21.40	0.8366	7
Barpeta	21.50	0.8300	8
Golaghat	21.90	0.8039	9
Assam	21.90	0.8039	9
Karbi-Anglong	22.20	0.7843	10
Tinsukia	22.50	0.7647	11
Dhubri	22.90	0.7385	12
Goalpara	22.90	0.7385	12
Dhemaji	23.10	0.7254	13
Jorhat	20.80	0.7089	14
Kokrajhar	23.90	0.6732	15
Marigaon	23.90	0.6732	15
Lakhimpur	25.00	0.6013	16
Nagaon	26.00	0.5359	17
Karimganj	26.40	0.5098	18
Cachar	27.40	0.4444	19
Hailakandi	34.20	0.0000	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.2 *Ranking of districts of Assam by Natural Growth Rate (NGR)*

District	*Natural Growth Rate*	*Index value*	*Rank of the district*
Nabari	11.40	1.0000	1
Sibsagar	11.60	0.9873	2
Jorhat	12.40	0.9367	3
NC Hills	12.60	0.9240	4
Darrang	12.70	0.9177	5
Kamrup	13.20	0.8860	6
Dibrugarh	13.40	0.8734	7
Sonitpur	13.50	0.8670	8
Golaghat	13.60	0.8607	9
Bongaigaon	14.50	0.8037	10
Tinsukia	14.70	0.7911	11
Barpeta	14.80	0.7848	12
Karbi-Anglong	15.20	0.7594	13
Dhubri	15.50	0.7405	14
Marigaon	15.50	0.7405	14
Goalpara	16.00	0.7088	16
Kokrajhar	16.20	0.6962	17
Nagaon	17.50	0.6139	18
Lakhimpur	17.80	0.5949	19
Dhemaji	18.60	0.5443	20
Cachar	19.70	0.4746	20
Karimganj	19.70	0.4746	22
Hailakandi	27.20	0.0000	23

Source: Annual Health Survey of Assam, Government of India, 2011

Table A 3.3 *Ranking of districts of Assam by percentages of delivery at government institution*

District	*Delivery at government institution*	*Index value*	*Rank of the district*
Nalbari	66.20	1.0000	1
Lakhimpur	63.70	0.9439	2
Sibsagar	63.00	0.9282	3
Dhemaji	62.10	0.9080	4
Kamrup	61.30	0.8901	5
Jorhat	56.10	0.7735	6
Golaghat	51.70	0.6748	7
Marigaon	49.40	0.6233	8
Darrang	47.00	0.5695	9
Dibrugarh	45.60	0.5381	10
Kokrajhar	44.90	0.5224	11
Cachar	42.70	0.4730	13
Tinsukia	42.70	0.4730	13
Sonitpur	39.00	0.3901	15
Goalpara	38.70	0.3834	16
Barpeta	37.60	0.3587	17
Nagaon	37.00	0.3452	18
Bongaigaon	36.60	0.3363	19
Karbi-Anglong	36.50	0.3340	20
NC Hills	31.60	0.2242	21
Dhubri	26.40	0.1076	22
Hailakandi	21.60	0.0000	23
Karimganj	21.60	0.0000	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.4 *Ranking of districts of Assam by Infant Mortality Rate*

District	*Infant mortality rate*	*Index value*	*Rank of the district*
Dhemaji	45	1.0000	1
Barpeta	51	0.8285	2
Bongaigaon	56	0.6857	3
Dibrugarh	56	0.6857	3
Hailakandi	56	0.6857	3
Tinsukia	57	0.6571	5
Goalpara	58	0.6285	6
Lakhimpur	59	0.6000	7
Cachar	60	0.5714	8
Jorhat	60	0.5714	8
Sibsagar	60	0.5714	8
Karbi-Anglong	61	0.5428	10
Kamrup	63	0.4857	11
Golaghat	64	0.4571	12
Nabari	65	0.4285	13
NC Hills	66	0.4000	14
Nagaon	69	0.3142	15
Darrang	71	0.2571	16
Karimganj	71	0.2571	17
Sonitpur	72	0.2285	18
Marigaon	74	0.1714	19
Dhubri	76	0.1142	20
Kokrajhar	80	0.0000	21

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.5 *Ranking of districts of Assam by under five mortality (U5M)*

District	*Under Five Mortality*	*Index value*	*Rank of the district*
Dhemaji	53	1.0000	1
Barpeta	70	0.7017	2
Lakhimpur	71	0.6842	3
Bongaigaon	73	0.6491	4
Dibrugarh	76	0.5964	5
Jorhat	76	0.5964	5
Goalpara	77	0.5789	6
Tinsukia	78	0.5614	7
Kamrup	80	0.5263	8
Sibsagar	82	0.4912	9
Cachar	83	0.4736	10
Karbi-Anglong	83	0.4736	10
Karimganj	85	0.4385	12
Sonitpur	85	0.4385	12
Golaghat	86	0.4210	14
Nabari	90	0.3508	15
Nagaon	92	0.3157	16
Darrang	93	0.2982	17
Marigaon	95	0.2631	18
Hailakandi	96	0.2456	19
Dhubri	97	0.2280	20
NC Hills	99	0.1929	21
Kokrajhar	110	0.0000	22

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.6 *Ranking of districts of Assam by the percentages of low birth weight of new born infants under nutritious baby*

District	*Low birth weight of new born infants (%)*	*Index value*	*Rank of the district*
Lakhimpur	10.1	1.000	1
Dhemaji	14.7	0.861	2
Dhubri	16.1	0.819	3
Bongaigaon	17.5	0.777	4
Goalpara	17.5	0.777	4
Sonitpur	18.5	0.747	6
Marigaon	19.2	0.726	7
Nabari	23.1	0.609	8
Barpeta	24.3	0.573	9
Kokrajhar	24.3	0.573	9
Darrang	26.0	0.522	11
Nagaon	26.8	0.498	12
NC Hills	2.00	0.492	13
Kamrup	27.2	0.486	14
Tinsukia	28.5	0.447	15
Jorhat	30.2	0.396	16
Sibsagar	30.7	0.381	17
Karbi-Anglong	32.2	0.336	18
Cachar	33.5	0.297	18
Hailakandi	36.4	0.210	20
Karimganj	36.4	0.210	21
Dibrugarh	37.2	0.186	22
Golaghat	43.4	0	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.7 *Ranking of districts of Assam by the percentages of children aged 12-23 months fully immunized*

District	*Children age 12-23 months fully immunized (%)*	*Index value*	*Rank of the district*
Dibrugarh	84.20	1.000	1
Karbi-Anglong	81.80	0.956	2
Sibsagar	80.20	0.928	3
Tinsukia	73.40	0.805	4
Jorhat	69.90	0.742	5
Marigaon	66.80	0.687	6
Golaghat	66.60	0.683	7
Nalbari	65.50	0.663	8
Hailakandi	61.90	0.598	9
Karimganj	61.90	0.598	10
Darrang	59.90	0.562	11
Lakhimpur	58.40	0.560	12
NC Hills	58.20	0.532	13
Dhemaji	57.70	0.523	14
Sonitpur	55.80	0.489	15
Cachar	52.40	0.428	16
Nagaon	49.80	0.381	17
Bongaigaon	49.70	0.379	18
Barpeta	49.00	0.366	19
Kamrup	46.60	0.323	20
Goalpara	40.60	0.215	21
Kokrajhar	33.30	0.084	22
Dhubri	28.60	0	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.8 *Ranking of districts of Assam by the percentages of mothers with full antenatal check up*

Districts	*Mothers with full antenatal check up (%)*	*Index value*	*Rank of the district*
Jorhat	15.80	1.000	1
Sibsagar	15.60	0.985	2
Dibrugarh	14.30	0.891	3
Nalbari	14.00	0.869	4
Cachar	13.70	0.847	5
Golaghat	11.90	0.717	6
Lakhimpur	10.80	0.637	7
Darrang	9.90	0.572	8
Nagaon	9.80	0.565	9
Sonitpur	9.40	0.536	10
Kamrup	9.10	0.514	11
Marigaon	8.40	0.463	12
Tinsukia	7.70	0.413	13
NC Hills	5.10	0.224	14
Goalpara	5.00	0.217	15
Karbi-Anglong	5.00	0.217	15
Hailakandi	4.90	0.210	17
Karimganj	4.90	0.210	17
Bongaigaon	4.00	0.144	19
Dhemaji	3.10	0.0797	20
Barpeta	2.80	0.057	21
Kokrajhar	2.60	0.043	22
Dhubri	2.00	0	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.9 *Ranking of districts of Assam by the percentages of women reporting birth order 3 and above*

District	*Women reporting birth order 3 and above*	*Index value*	*Rank of the district*
Nalbari	24.30	1.000	1
Sibsagar	25.50	0.948	2
Kamrup	26.10	0.923	3
Kokrajhar	26.70	0.897	4
Jorhat	28.10	0.837	5
Dibrugarh	29.90	0.760	6
Bongaigaon	30.20	0.747	7
Dhemaji	30.60	0.730	8
Dhubri	31.30	0.700	9
Golaghat	31.30	0.700	9
Lakhimpur	33.40	0.611	11
Sonitpur	35.90	0.504	12
Barpeta	36.40	0.482	13
Tinsukia	36.40	0.482	13
Goalpara	37.90	0.418	15
Darrang	39.00	0.371	16
Marigaon	39.50	0.350	17
Nagaon	40.60	0.303	18
Karbi-Anglong	43.00	0.200	19
Cachar	43.80	0.166	20
NC Hills	45.20	0.106	21
Hailakandi	47.70	0	22
Karimganj	47.70	0.	22

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.10 *Ranking of districts of Assam by the percentage of female literacy rate*

District	*Female literacy rate*	*Index value*	*Rank of the district*
Sibsagar	78.10	1.000	1
Marigaon	77.90	0.988	2
Cachar	74.90	0.822	3
Kamrup	74.90	0.822	3
Nalbari	74.70	0.811	5
Jorhat	74.50	0.800	6
Goalpara	73.70	0.755	7
Hailakandi	73.10	0.722	8
Lakhimpur	72.90	0.711	9
Nagaon	72.90	0.711	9
Golaghat	72.50	0.688	11
Dhemaji	71.10	0.611	12
NC Hills	70.30	0.566	13
Karbi-Anglong	69.80	0.538	14
Dibrugarh	68.90	0.488	15
Karimganj	67.40	0.405	16
Barpeta	65.80	0.316	17
Dhubri	65.30	0.288	18
Bongaigaon	64.50	0.244	19
Sonitpur	62.90	0.155	20
Darrang	61.40	0.072	21
Kokrajhar	60.90	0.044	21
Tinsukia	60.10	0	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.11 *Ranking of districts of Assam by the percentage of currently married women adopting family planning practice*

District	*Family planning practice (any method)*	*Index value*	*Rank of the district*
Lakhimpur	67.20	1.000	1
Dibrugarh	65.90	0.962	2
Darrang	65.80	0.959	3
Tinsukia	65.40	0.947	4
Nalbari	64.70	0.927	5
Sibsagar	64.50	0.921	6
Karbi-Anglong	63.90	0.904	7
Nagaon	63.50	0.892	8
Kamrup	63.20	0.883	9
Morigaon	59.90	0.787	10
Dhemaji	59.10	0.764	11
Jorhat	58.30	0.741	12
Barpeta	57.40	0.715	13
NC Hills	57.40	0.715	13
Golaghat	57.30	0.712	15
Bongaigaon	55.40	0.656	16
Sonitpur	53.90	0.613	17
Hailakandi	51.50	0.543	18
Goalpara	50.40	0.511	19
Kokrajhar	49.20	0.476	20
Karimganj	44.00	0.325	21
Cachar	43.30	0.305	22
Dhubri	32.80	0	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.12 *Ranking of districts of Assam by the percentages of mothers who received post natal check up within 48 hours of delivery*

District	*Mothers who received post natal check up within 48 hours of delivery (%)*	*Index value*	*Rank of the district*
Sibsagar	78.90	1.000	1
Nalbari	76.90	0.963	2
Lakhimpur	68.50	0.811	3
Dibrugarh	65.70	0.761	4
Kamrup	64.80	0.745	5
Tinsukia	63.70	0.725	6
Jorhat	63.60	0.723	7
Golaghat	59.30	0.645	8
Sonitpur	51.70	0.508	9
Cachar	51.50	0.504	10
Dhemaji	50.60	0.488	11
Darrang	49.50	0.468	12
Kokrajhar	43.00	0.350	13
Karbi-Anglong	41.60	0.325	14
Nagaon	41.60	0.325	14
Marigaon	38.30	0.265	16
Barpeta	37.10	0.244	17
NC Hills	33.90	0.186	18
Bongaigaon	33.00	0.169	19
Goalpara	31.20	0.137	20
Dhubri	28.90	0.095	21
Hailakandi	23.60	0.000	22
Karimganj	23.60	0.000	22

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.13 *Ranking of districts of Assam by the percentages of mother who availed assistance for institutional delivery under Janani Suraksha Yojana (JSY)*

District	*Mothers who availed financial assistance for institutional delivery under JSY (%)*	*Index value*	*Rank of the district*
Dhemaji	92.90	1.00	1
Morigaon	92.70	0.990	2
Lakhimpur	92.60	0.985	3
Kokrajhar	88.70	0.801	4
Goalpara	87.70	0.754	5
Dhubri	86.70	0.707	6
Darrang	86.50	0.698	7
Bongaigaon	86.10	0.679	8
Sibsagar	86.10	0.679	8
Kamrup	86.00	0.674	10
Nalbari	85.60	0.655	11
Karbi-Anglong	85.30	0.641	12
Golaghat	84.90	0.622	13
Barpeta	84.70	0.613	14
Tinsukia	84.40	0.599	15
Jorhat	83.80	0.570	16
NC Hills	82.40	0.504	17
Nagaon	81.10	0.443	18
Sonitpur	80.70	0.424	19
Dibrugarh	79.20	0.353	20
Cachar	77.50	0.273	21
Hailakandi	74.40	0.127	22
Karimganj	71.70	0.000	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.14 *Ranking of districts of Assam by the percentages of household having improved source of drinking water*

District	*Household having improved source of drinking water (%)*	*Index value*	*Rank of the district*
Dhubri	97.6	1.000	1
Dibrugarh	95.3	0.970	2
Tinsukia	93.8	0.951	3
Nalbari	93.5	0.947	4
Morigaon	92.7	0.937	5
Golaghat	91.3	0.919	6
Barpeta	90.6	0.910	7
Nagaon	89.8	0.890	8
Kamrup	87.6	0.872	9
Sibsagar	85.7	0.848	10
Darrang	85.4	0.844	11
Dhemaji	83.1	0.815	12
Jorhat	72.8	0.683	13
Bongaigaon	70.7	0.656	14
Goalpara	70.2	0.650	15
Lakhimpur	60.6	0.528	16
Kokrajhar	58.9	0.506	17
Sonitpur	52.2	0.4209	18
Cachar	42.6	0.298	18
Karbi-Anglong	34.3	0.192	20
Karimganj	31.4	0.1556	21
NC Hills	21.8	0.0331	22
Hailakandi	19.2	0.000	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.15 *Ranking of districts of Assam by the percentages of household having access to toilet facility*

District	*Household having access to toilet facility*	*Index value*	*Rank of the district*
Cachar	90.10	1.000	1
Hailakandi	89.00	0.980	2
Karimganj	87.00	0.943	3
Tinsukia	82.90	0.869	4
Nagaon	80.70	0.829	5
Sibsagar	79.40	0.805	6
Goalpara	78.80	0.794	7
Dibrugarh	78.40	0.787	8
Barpeta	73.40	0.696	9
Golaghat	72.60	0.681	10
Nalbari	67.80	0.594	11
NC Hills	67.00	0.580	12
Jorhat	66.70	0.574	13
Darrang	65.80	0.558	14
Morigaon	65.10	0.545	15
Kamrup	63.80	0.521	16
Dhubri	60.20	0.456	17
Bongaigaon	59.50	0.443	18
Lakhimpur	55.20	0.365	19
Karbi-Anglong	52.40	0.314	20
Sonitpur	51.70	0.301	21
Dhemaji	45.40	0.187	22
Kokrajhar	35.10	0.000	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Table A 3.16 *Ranking of districts of Assam by the percentage of household having access to electricity*

District	*Percentage of household having access to electricity*	*Index value*	*Rank of the district*
Tinsukia	61.0	1.000	1
Sibsagar	50.0	0.783	2
Jorhat	48.2	0.747	3
Dibrugarh	45.9	0.702	4
Golaghat	39.7	0.579	5
Cachar	37.5	0.536	6
Nabari	36.0	0.506	7
Nagaon	34.8	0.483	8
Sonitpur	32.5	0.437	9
Karimganj	31.9	0.426	10
NC Hills	31.2	0.412	11
Kamrup	29.8	0.384	12
Goalpara	29.7	0.382	13
Hailakandi	28.0	0.349	14
Morigaon	27.6	0.341	15
Karbi-Anglong	27.3	0.335	16
Darrang	27.1	0.331	17
Barpeta	25.2	0.293	18
Bongaigaon	23.2	0.254	19
Lakhimpur	22.9	0.248	20
Dhemaji	13.5	0.063	22
Dhubri	11.5	0.023	21
Kokrajhar	10.3	0.000	23

Source: Annual Health Survey of Assam, Government of India, 2010-11

Appendix A5

Table A 5.1 *Pattern of utilization of healthcare services for acute morbidity by background characteristics, Bamuni Pathar village, Nagaon*

Background characteristics	*Government (in numbers)*	*Government (in per cent)*	*Private (in numbers)*	*Private (in per cent)*	*Others (in numbers)*	*Others (in per cent)*
Age						
0-5	12.0	15.2	2.0	25.0	1.0	3.8
6-14	13.0	16.5	1.0	12.5	5.0	19.2
15-59	47.0	59.5	4.0	50.0	18.0	69.2
59 and above	7.0	8.9	1.0	12.5	2.0	7.7
All persons	79.0	100.0	8.0	100.0	26.0	100.0
Sex						
Male	50.0	63.3	3.0	37.5	6.0	23.1
Female	29.0	36.7	5.0	62.5	20.0	76.9
All persons	79.0	100.0	8.0	100.0	26.0	100.0
Caste						
Upper caste	15.0	19.0	1.0	12.5	3.0	11.5
SC	19.0	24.1	3.0	37.5	7.0	26.9
ST	34.0	43.0	4.0	50.0	13.0	50.0
Others	11.0	13.9	0.0	0.0	3.0	11.5
All persons	79.0	100.0	8.0	100.0	26.0	100.0
Religion						
Hindu	55.0	69.6	6.0	75.0	23.0	88.5
Muslim	24.0	30.4	2.0	25.0	3.0	11.5
All persons	79.0	100.0	8.0	100.0	26.0	100.0

Source: Survey data, 2014

Table A 5.2 *Pattern of utilization of healthcare services for chronic morbidity by background characteristics, Bamuni Pathar village, Nagaon*

Background characteristics	*Government (in numbers)*	*Government (in per cent)*	*Private (in numbers)*	*Private (in per cent)*	*Both government and private (in numbers)*	*Both government and private (in per cent)*	*Others (in numbers)*	*Others (in per cent)*
Age								
0-5	5	7	1	12	0	0	0	0
6-14	5	7	1	12	0	0	0	0
15-59	53	70	6	75	1	50	0	0
59 and above	13	16	0	0	1	50	2	100
All persons	76	100	8	100	2	100	2	100
Sex								
Male	45	56	1	12	1	50	0	0
Female	31	44	7	87	1	50	2	100
All persons	76	100	8	100	2	100	2	100
Caste								
General caste	18	24	5	46	1	50	0	0
SC	23	30	0	0	1	50	0	0
ST	20	27	4	36	0	0	2	100
Others	15	20	2	18	0	0	0	0
All persons	76	100	11	100	2	100	2	100
Religion								
Hindu	55	73	5	56	1	50	2	100
Muslim	21	28	3	44	1	50	0	0
All persons	76	100	8	100	2	100	2	100

Source: Survey data, 2014

Table A 5.3 *Pattern of utilization of healthcare services for acute morbidity by background characteristics, Balagaon village, Nalbari*

Household characteristics	*Government (in numbers)*	*Government (in per cent)*	*Private (in numbers)*	*Private in per cent)*	*Others (in numbers)*	*Others (in per cent)*
Age						
0-5	16.00	25.40	6.00	11.32	1.00	11.11
6-14	14.00	22.22	9.00	16.98	1.00	11.11
15-59	28.00	44.44	35.00	66.04	7.00	77.78
59 and above	5.00	7.94	3.00	5.66	0.00	0.00
Total	63.00	100.00	53.00	100.00	9.00	100.00
Sex						
Male	29.00	46.03	27.00	50.94	4.00	44.44
Female	34.00	53.97	26.00	49.06	5.00	55.56
Total	63.00	100.00	53.00	100.00	9.00	100.00
Caste						
General caste	33.00	52.38	34.00	64.15	6.00	66.67
SC	26.00	41.27	16.00	30.19	3.00	33.33
Others	4.00	6.35	3.00	5.66	0.00	0.00
Total	63.00	100.00	53.00	100.00	9.00	100.00

Source: Survey data, 2014

Table A 5.4 *Pattern of utilization of healthcare services for chronic morbidity by background characteristics, Balagaon village, Nalbari*

Household characteristics	*Government (in numbers)*	*Government (in per cent)*	*Private (in number)*	*Private (in per cent)*	*Both government and private (in numbers)*	*Both government and private (in per cent)*	*Others (in numbers)*	*Other sources (in per cent)*
Age								
0-5	15	23	0	0	0	0	0	0
6-14	3	5	4	19	1	17	1	20
15-59	32	48	16	74	4	67	3	80
59 and above	16	24	1	5	1	17	0	0
Total	66	100	21	100	6	100	4	100
Sex								
Male	30	45	15	71	2	33	1	33
Female	36	55	6	29	4	67	3	67
Total	66	100	21	100	6	100	4	100
Caste								
General caste	22	33	14	67	4	67	2	50
SC	34	52	5	24	2	33	2	50
Others	10	15	2	10	0	0	0	0
Total	66	100	21	100	6	100	4	100

Source: Survey data, 2014

Table A 5.5 *Multi-collinearity diagnostic test for the explanatory variables affecting morbidity in Bamuni Pathar and Balagaon (pooled)*

Explanatory variables	*VIF*	*1/VIF*
Awareness108	1.06	0.945233
SEX	1.01	0.990170
CS	1.27	0.786465
LN_AGE	1.15	0.867706
EDI1	1.90	0.527184
EDU2	2.13	0.469949
LN_HS	1.10	0.912823
OH	1.06	0.932011
LN_MI	1.47	0.678128
SOH	1.14	0.874081
SDW	1.07	0.932011
ATF	1.24	0.806761
SCF	1.47	0.678446
BPL CARD	1.18	0.847971
RSBY	1.27	0.790065
Mean VIF	1.35	

Table A 5.6 *Descriptive statistics for the explanatory variables affecting morbidity in Bamuni Pathar and Balagaon villages (pooled data)*

Variables	*Observation*	*Mean*	*Standard Deviation*	*Min*	*Max*
Awareness108	1031	0.94	0.24	0.00	1.00
SEX	1031	0.50	0.50	0.00	1.00
CS	1031	0.44	0.50	0.00	1.00
LN_AGE	1031	3.03	1.02	2.30	5.00
EDI1	1031	0.43	0.50	0.00	1.00
EDU2	1031	0.35	0.48	0.00	1.00
LN_HS	1031	1.65	0.43	0.00	2.30
OH	1031	0.62	0.49	0.00	1.00
LN_MI	1031	8.74	0.70	7.00	10.06
SOH	1031	0.14	0.35	0.00	1.00
SDW	1031	0.63	0.48	0.00	1.00
ATF	1031	0.70	0.46	0.00	1.00
SCF	1031	0.28	0.45	0.00	1.00
BPL CARD	1031	0.50	0.50	0.00	1.00
RSBY	1031	0.18	0.39	0.00	1.00
Village dummy	1031	0.47	0.50	0.00	1.00

Table A 5.7 *Logistic regression results for factors affecting morbidity in Bamuni Pathar village, Nagaon*

	Maximum Likelihood estimates (MLE)		*Marginal effects (MFX)*	
Explanatory variables	*Coefficient*	*Standard error*	*dy/dx*	*Standard Error*
Awareness108	-1.2193**	.43797	-.29389	.09513
SEX	.36283*	.19742	.08740	.04726
CS	-.08966	.25402	-.02157	.06084
LN_AGE	.18166*	.10058	.04391	.0243
EDU1	-.43925**	.22443	-.10524	.0531
EDU2	-.585141**	.27856	-.13539	.06088
LN_HSS	-.66303**	.29951	-.16026	.07238
OH	.07108	.20412	.017167	.04925
LN_MI	-.01876	.17863	-.004536	.04318
SOH	.13154	.36243	.03207	.08904
SDW	-.41353**	.20035	-.10014	.04841
ATF	-.51387**	.21632	-.12370	.05156
SCF	-.59069	.55449	-.13296	.11326
BPL	.21753	.21970	.05272	.05334
RSBY	-.13033	.21344	-.031502	.05159
Village dummy				
Log likelihood:-305				
LR ch2 (19):46.93				
Prob>chi2: .0000				
Pseudo R2: 0.07				
Count R2: .64				
Cragg and Uhler's R2: 0.124				
Number of observations: 485				

Note: *** Implies significant at 1 percent level ** implies significance at 5 percent level; * implies significance at 10 percent level. For a dummy variable, dy/dx is the discrete change of dummy from 0 to 1.

Table A 5.8 *Multi-collinearity diagnostic for the independent variables influencing morbidity in Bamuni Pathar*

Variable	*VIF*	*1/VIF*
SEX	1.13	0.89
RL	1.46	0.69
CS1	1.29	0.77
CS2	1.43	0.70
LN _AGE	1.21	0.82
MOCC	1.24	0.81
EDU1	1.32	0.76
EDU2	1.35	0.74
HSS1	1.13	0.88
HSS2	1.28	0.78
LN _MI	1.25	0.80
OH	1.13	0.88
SOH2	1.29	0.78
SDW	1.18	0.85
ATF	1.22	0.82
RSBY	1.20	0.84
Mean VIF	1.26	

Table A 5.9 *Logistic regression results for factors affecting morbidity in Balagaon village, Nalbari*

Explanatory variables	*Maximum Likelihood estimates (MLE)*		*Marginal effects (MFX)*	
	Co-efficient	*Standard Error*	*dy/dx*	*Standard Error*
Awareness108	.27842	.40325	.06614	.09296
SEX	-.21290	.18186	-.05179	.04416
CS	.22033	.19022	.05339	.04581
LN_AGE	.31575**	.10979	.07689	.0267
EDU1	-.21681	.34447	-.05260	.08321
EDU2	-.76598**	.35113	-.18379	.08206
LN_HSS	-.29045	.20132	-.07073	.04902
OH	.10306	.19948	.02501	.04825
LN_MI	-.05715	.15628	-.01391	.03806
SOH	-.27250	.25708	-.06524	.06029
SDW	-.35298*	.20286	-.08654	.04989
ATF	-.36502	.25735	-.09008	.06394
SCF	-.03723	.19796	-.00906	.0482
BPL	.16997	.20990	.04126	.05075
RSBY	.32664	.46929	.08085	.11718
Log likelihood:-354				
LR ch2 (19):36.23				
Prob>chi2: .0000				
Pseudo R2: 0.048				
Count R2: .62				
Cragg and Uhler's R2: 0.074				
Number of observations: 546				

Note: *** Implies significant at 1 percent level ** implies significance at 5 percent level; * implies significance at 10 percent level. For a dummy variable, dy/dx is the discrete change of dummy from 0 to 1.

Appendix A6

Table A 6.1 *Out of pocket expenses as a proportion of total consumption expenditure across Indian states (in per cent) for various NSSO rounds*

Major states	*55th round*			*61st round*			*66th round*		
	Total	*Institutional*	*Non-institutional*	*Total*	*Institutional*	*Non-institutional*	*Total*	*Institutional*	*Non-institutional*
Andhra Pradesh	6	1	5	7	1	5	6	2	4
Assam	3	1	2	5	4	2	2	0	2
Bihar	4	0	4	3	0	3	4	1	3
Gujarat	5	1	3	4	0	4	4	2	2
Haryana	8	3	5	8	4	4	4	1	3
Karnataka	5	2	4	4	1	3	4	1	3
Kerala	**8**	**3**	**5**	**8**	**2**	**6**	**9**	**4**	**5**
MP	6	1	5	7	2	6	5	2	4
Maharashtra	7	2	5	7	2	5	7	3	4
Orissa	6	1	5	5	1	4	4	1	3
Punjab	7	2	5	6	1	5	7	2	5
Rajasthan	5	1	4	5	1	4	4	1	3
Tamil Nadu	6	1	4	5	1	4	6	2	4
Uttar Pradesh	8	1	7	5	1	3	7	1	5
West Bengal	8	1	7	6	1	5	6	2	4
India average	6	1	5	6	1	5	5	2	4

Source: NSSO, 55th, 61st and 66th round, 2001, 2007 and 2011

Table A 6.2 *Multi-collinearity diagnostic tests for the explanatory variables influencing catastrophic expenditure for Bamuni Pathar and Balagaon*

Variable	*VIF*	*1/VIF*
Awareness108	1.04	0.960688
OH	1.07	0.935210
DI	1.15	0.871263
CM	1.13	0.888413
HS	5.14	0.194502
SDW	1.14	0.880984
TF	1.37	0.731472
SCF	1.37	0.728852
SOH	1.08	0.922222
LN_MI	1.48	0.67437
CS	1.26	0.793336
EDU1	1.77	0.565611
EDU2	1.90	0.526893
RSBY	2.01	0.496760
BPL	1.19	0.837541
Village dummy	7.85	0.127352

Table A 6.3 *Descriptive statistics for the explanatory variables influencing catastrophic expenditure*

Variable	*Observations*	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
Awareness108	210	.9428	.2326	0	1
OH	210	.3082	..6601	0	6.01
DI	210	329	835	1	12
CM	210	.604	.4900	3	8000
HS	210	2.319	1.8731	0	1
SDW	210	.68571	.4653	0	1
TF	210	.7285	.4457	0	1
SCF	210	.2952	4572	0	1
SOH	210	.1428	.3507	0	1
LN_MI	210	8.711	.7809	7	12
CS	210	.4190	.4945	0	1
EDU1	210	.4714	.5003	0	1
EDU2	210	.2761	.4481	0	1
RSBY	210	.6523	.4773	0	1
BPL	210	.5142	.5009	0	1
Village dummy	210	.4714	.5003	0	1

Table A 6.4 *Results of logistic regression model for factors determining catastrophic health expenditure in Bamuni Pathar village*

Explanatory variables	*Maximum Likelihood estimates (MLE)*		*Marginal effects (MFX)*	
	Co-efficient	*Standard Error*	*dy/dx*	*Standard Error*
Awareness108	-.24805	.74471	-.03715	.1229
OH	-.0665	.26503	-.0101	.0700
DI	.0064**	.00271	.00098	..0005
CM	5.010***	.1.2117	.7067	.0888
HS	.5298**	.2525	.0807	.0405
SDW	-.5298*	.1.0067	-.3205	.1782
TF	1.640*	.9830	.2296	.1354
SCF	-2.2408	1.3687	-.1882	.0763
SOH	1.0353	1.2039	.1982	.2665
LN_MI	-1.3028**	.6511	-.1986	.1030
CS	-.5605	1.1105	-.0777	.1454
EDU1	-.0275	.93238	-.0041	.1419
EDU2	.97211	1.157	.1789	.243
RSBY	-.7290	.8424	-.1021	.10773
BPL	1.5681	1.315	.1505	.0867
Observations:99				
LRch2: 71.42				
Prob>chi2: .0000				
Pseudo R2:.55				
Count R2:.85				
Adjusted count R2: .61				
Crag and Uhler's R2: .70				

Note: **** Implies significant at 1percent level ** implies significance at 5 percent level; * implies significance at 10 percent level. For a dummy variable, dy/dx is the discrete change of dummy from 0 to 1*

Table A 6.5 *Results of logistic regression model for factors determining catastrophic health expenditure in Balagaon village*

Explanatory variables	*Maximum Likelihood estimates (MLE)*		*Marginal effects (MFX)*	
	Co-efficient	*Standard Error*	*dy/dx*	*Standard Error*
Awareness108	.0030	1.011	.0006	.2287
OH	-1.178	.8203	-.2666	.1851
DI	.0029***	.0009	.0006	.0002
CM	1.306**	.7115	.2662	.1184
HS	.1831	.1396	.0414	.0316
SDW	.2364	.5996	.0525	.1309
TF	.7513	.8320	.1537	.1502
SCF	.0231	.5681	.0052	.1285
SOH	.2830	.71672	.0656	.1697
LN_MI	-1.230*	.4559	-.2785	.1042
CS	.5517	.5554	.1224	.1212
EDU1	-1.358*	.7907	-.2954	.1627
EDU2	-1.6543**	.8347	-.3400	.1529
RSBY	.8987	1.465	.1720	..2265
BPL	-.2306	.5581	-.0526	.1282
Observations:111				
LRch2: 42.97				
Prob>chi2: .0000				
Pseudo R2:.30				
Count R2:.77				
Adjusted count R2: .32				
Crag and Uhler's R2: .44				

Note: *** Implies significant at 1percent level ** implies significance at 5 percent level; * implies significance at 10 percent level. For a dummy variable, dy/dx is the discrete change of dummy from 0 to 1

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