

HEALTH SEEKING BEHAVIOUR AND EFFICIENCY STATUS OF PROVIDERS IN THE DOOARS OF JALPAIGURI DISTRICT

THESIS SUBMITTED TO THE
UNIVERSITY OF NORTH BENGAL
FOR THE AWARD OF
DOCTOR OF PHILOSOPHY IN ECONOMICS

BY

SUBHASIS BHATTACHARYA

ASSISTANT PROFESSOR IN ECONOMICS
COOCH BEHAR COLLEGE
COOCH BEHAR, WEST BENGAL

GUIDE

PROFESSOR ANIL BHUIMALI

DEPARTMENT OF ECONOMICS
UNIVERSITY OF NORTH BENGAL
RAJA RAMMOHUNPUR
DARJEELING-734013
WEST BENGAL, INDIA

NOVEMBER, 2014

DECLARARION

I declare that this thesis entitled "Health seeking behaviour and efficiency status of the providers in the Dooars of Jalpaiguri district" has been prepared under the guidance of Anil Bhuimali, Professor, Department of Economics, University of North Bengal. No part of this thesis has formed the basis for the award of any degree or fellowship previously.

Subhasis Bhattacharya

SUBHASIS BHATTACHARYA

Department of Economics
North Bengal University

P.O.: Raja Rammohanpur, Siliguri,
Dist-Darjeeling,
PIN-734013, West Bengal
India

DATE: *20.11.2014*

CERTIFICATE

I certify that Subhasis Bhattacharya has prepared the thesis entitled "Health Seeking Behaviour and Efficiency Status of Providers in the Dooars of Jalpaiguri District", for the award of Ph.D degree of the university (N.B.U) under my guidance.

He has carried out the work at the department of economics (N.B.U).

Anil Bhuiimali

Dr Anil Bhuiimali

Professor,

Department of Economics,

University of North Bengal

Raja Rammohanpur

P.O & Dist- Darjeeling

Date: 20.11.2014

ABSTRACT

Introduction:

The literature on healthcare is not only confined to the qualities of healthcare use, but also extends to the quality of service provided by them. Performance of the health sector is a very important indicator of human development index of a society. Productivity factor of a society is severely affected by the poor health condition. For development a healthy population with productive workforce is the minimum precondition. World Health Organisation (WHO) emphasised in the year 2000 that each country will provide better health care with some fair financial distribution. The publicly provided health facilities have some common features like higher-tier hospitals or health units overloaded with patients, whereas the basic levels are underutilized. Hence it is an important and significant task for the stakeholders to consider the efficient side as well as the inefficient side of the health support function of the publicly provided institution. Arrow (1963) first identified some features of health seeking behaviour in terms of demand for healthcare. The features are demand for medical care is unsteady, irregular and unpredictable in nature. Illness is not only risky but also costly as it leads to death. It is such a commodity where the product and the activity of production are identical. The significance of this research is what is the features of health seeking behaviour and how efficiently available resources are utilized and eventually these will not only identify the cause of poor performance in the health but also strengthening the coordination between economic and social sector policies. The focus of this study on healthcare seeking behaviour and system efficiency analysis of a region like Western Dooars, which is backward itself in terms of education and health.

Objectives:

The approach of the study covers both the demand and supply sides because health seeking behaviour is a part of demand side and efficiency estimation is a part of supply side. The study encompasses following objectives:

1. To comprehend the health seeking behaviour of the dwellers and detect the health hurdle. The study looks for to understand the disease profile including minor illness, hospitalization, situation of maternal and child health, non-communicable diseases and mental health of this region.
2. To discern the contribution of Primary Health Centres (PHCs) and unqualified rural medical practitioners (RMPs) in health output. The role of Primary Health centres (PHCs) and

unqualified rural medical practitioners (RMPs) in the entire system of healthcare delivery and utilization is another significant objective of this study.

3. To fathom the efficiency of the existing health providers. This also provides information to the policy makers about the strength and weakness of the existing health care system.

Research Questions:

The study is based on three primary research questions.

1. What are the natures of health seeking behaviour of Western Dooars?
2. What level of efficiency the existing health providers (both public & private) have in Western Dooars area?
3. Is there any gap between the above mentioned questions i.e. to measure the extent of unmet need for people's health security?

As like other research, this study will also be followed by some secondary research questions or some sub-branches of primary research questions.

1. What kind of similarities or dissimilarities exist in health indicators of Western Dooars compared to the whole of West Bengal?
2. How is the health of this area linked with social, environmental and economic securities which posit health security on a broader spectrum of issues related to the protection of the Western Dooars?
3. How much health inequity performs between rural-urban areas, among various social groups, standard of livings as well as religious groups and caste groups?
4. How even (or uneven) is the healthcare distribution of accessibility problem across all blocks of the area?
5. What levels the obstructions are strong to achieve a reliable source of health care?
6. What kind of efficiency variations performs between different (primary) public health providers in this area?

Hypothesis:

Based on the objectives of our study and the research questions just mentioned we would like to test the following hypotheses for our purpose.

1. General morbidity rate is higher than the state average.
2. The dual burden of communicable and non-communicable diseases is quite evident.
3. Half of the children (below 5 years) are chronically malnourished.
4. Women share disproportionately higher burden of ailments than man do.
5. Utilisation of inpatient care is higher than the state level.
6. Dominance of RMPs in outpatient care market.
7. Utilisation of maternal healthcare at institutions is low.
8. Low bed occupancy rate at local facilities.
9. Utilisation of outpatient care at public facilities is also at sub-optimal level.
10. Not infrastructure but frontline workers shortages are more important for inefficient functioning of the health system.
11. Efficiency of the primary providers are functioning at some sub-optimal level.
12. Most of the primary producers are remain unable to utilise its resources like beds, equipments, man-power, medicines at some full capacity.

Methodology and Data:

The study can be divided into three parts. First one is health seeking behaviour analysis, which is basically observed on the basis of primary observation collected from this geographical arena. Second one is estimation of the efficiency of the existing providers and for this, the present study will depend upon the data supplied by the district level authority. In the third part of this study, both the demand side and supply side efficiencies of health units will be compiled. For the last part, comparison between study findings and the survey results like DLHS-III, NFHS-3 will be analysed.

The primary data sources are (i) Households of a chosen village in the blocks (ii) Sampled patients from the Primary Health centres (PHCs), (iii) Sampled RMPs from different blocks. The secondary panel data will be collected from Primary Health Centres (PHCs) of different blocks and an in-depth interview with Block Medical Officers in Health (BMOHs) and Chief Medical Officer in Health (CMOH) of Jalpaiguri district. For comparison of the results with national and state level, the study also uses District Level Health Survey, National Family Health Survey (DLHS-III, NFHS-3) data set.

The selection of the households involves a two-stage random sampling procedure. As per the perspective of this study, the blocks are arranged in terms of high, medium and low population

density and three blocks are chosen, one from each category. Now, from every block three PSU / Villages are chosen in terms of their location (distance) from block headquarter through purposive sampling. The selection of PSU is based on their distance from the block headquarters. One PSU be selected from very remote area of block (more than 10 Km), the second one from relatively less remote area (5-10 Km) and the third one from the nearest (located within 0-5 Km) to the block headquarter. Here, we assume that the highest health facilities are mainly located near block head quarter. The selected blocks for this study of Jalpaiguri districts are Alipurduar-II, Falakata and Madarihat and from these three blocks total nine villages /PSUs were selected on the basis of distance from the block head quarters. Among these nine villages three are located close to the respective head quarters, i.e. within 0-5 Km distance, three are within the 5-10 Km distance from the block head quarters, and the last three are located more than 10 Km distance from the respective head quarters. In the second stage 50 percent of the total households has been selected from each of the selected PSU / villages. A 10 percent over-sampling (i.e. additional 10 percent of total households in each PSU) of the households have been considered in order to adjust for non-responses. The study have conducted the survey using structured questionnaires which primarily focus on health status, health seeking behaviour, utilisation of healthcare facilities, out of pocket payments, maternal health, child health, antenatal care etc. The comparison corresponds to following health indicators has been made by useful statistical techniques. More specifically, the investigations focuses on four sources of information: (i) those who were hospitalised (for inpatient care) in last 365 days; (ii) those who sought outpatient care in last 30 days, but not hospitalised; (iii) selected household members above 40 years of age to enquire whether they have been suffering from any of the selected major chronic health problems or have associated risk factors; (iv) selected women who delivered births during last five years.

For the purpose of the efficiency estimation of PHCs of the study, detailed visits were made in all the 38 Primary Health Centres (PHCs) under structured questionnaire. The infrastructural, manpower, medicines, inpatients admission and outpatients visits was observed very carefully for each PHC under structured questionnaire. For some yearly results in case of patient's admissions and outpatients visits were collected from the district Chief Medical Officer in Health (CMOH) office at Jalpaiguri. During the visits of PHCs another parallel survey has been conduct on the inpatients and outpatients visited at that time of that concerned PHCs. In case of outpatient department (OPD) every second patient in the specialty queue was approached and

briefed about the study by the investigator. If he or she agreed, they were asked about their socio economic conditions at that time. As they finished their visits in the PHCs completing all types of services like doctor's advice, medicines allocation, diagnostic tests etc., they again approached at the gateway of PHCs regarding the experiences they gathered from such facilities.

For RMPs same techniques have been used like PSUs selection and 30 RMPs from each block have been selected of which 15 RMPs from the block headquarter and another 15 from remote villages of block are selected. In total, 90 RMPs have been interviewed under structured questionnaire through this process. The focus of this interview is on their back ground, background of their patients, knowledge about various diseases and treatment procedures and referral behaviour.

The economic efficiency of the health providers is an important aspect for the achievement of health output. The measurement of such efficiency has been done by two techniques, namely Stochastic Frontier Analysis (SFA) and other is Data envelopment Analysis (DEA). SFA is a parametric technique for estimating the efficiency and also identifies the frontier of production. SFA uses regression analysis for estimation of production frontier and the residual term of this estimated regression measures the technical efficiency (inefficiency) of a unit. Except stochastic error, an additional error term is also included in the system known as systematic inefficiency (White Noise). It is also assumed that both the error terms follow independent identical distribution (IID). The other way to measure the economic efficiency has been by Data envelopment Analysis (DEA). It is a methodology based upon an interesting application of linear programming. Initially it has been used mainly by performance management. Now it is effectively employed for assessing relative performance of a set of firms that use a variety of identical inputs to produce a variety of identical outputs. Now a number of practical applications for measuring performance of similar units such as hospitals, health centres, diagnostic centres, a set of schools and banks are found. DEA is an indicator of efficiency, defined as the ratio of a weighted sum of the output of a productive unit to a weighted sum of its inputs. It is a non-parametric approach. In this study we use the non-parametric DEA approach to find the technical efficiency score and scale efficiency score of each PHC. Under DEA a production possibility frontier has been created which will depicts a locus of potentially technically efficient output combination that a health system is capable of producing at a point of time. An output

combination below this frontier shows technically inefficient output. Here, under DEA each PHCs units are treated as the decision making units (DMUs). There are some normal national standard of PHCs guided by Indian Public Health Standard (IPHS). Here, we ranked the PHCs in terms of efficiency scores and indentify the peer group and also the sub-optimal output producing units in that respect.

Major Findings:

Majority of the sample households at the aggregate and disaggregate levels in the region of three to six members for each household. The average family size in the study area is around 4-5. The family size in the sample households is larger than the national average. The working age group population in the sample population is higher than the national average.

More than 97 percent of the total sample households are male headed and 3 percent of the total households are female headed. In case of female headed families, predominance of diseases leading to death are the root cause for such situation in this region. Moreover only 1.59 percent of the households are headed by persons with higher education. It is found that more than 36.5 percent of the total sample population are illiterate. Progeny are also there like illiteracy of the heads of the households. More than 37 percent of the female population are illiterate. With regard to total sample population only 37.84 percent have primary education. The households having availability of safe drinking water is 29 percent for the total sample households. So to reduce the prevalence of diseases in these areas providing safe drinking is the first measures to be adopted.

Cultivation is primary occupation practiced by 18 percent of heads of the sample households and the non-agricultural labour occupied the first position. In the total sample population 26.43 percent of the married women got married before they attain fifteen years of age. The mean age at marriage for the sample population is not encouraging. It is very less, and may be the cause for high mortality rate among the scheduled tribes. As the mean age at marriage is low, the age at first conception for the eligible sample women is also very low. The sample households with kuccha houses in the total sample are of 58.53 percent. We have noticed overall prevalence of BPL poor and APL poor in this region. During rainy season, people of this region are suffer from bad condition of road and some villages located near the river bank have lost their ancestral property by the erosion of soil in the river embankment. Thus natural calamity has some

significant role to play in determining the economic status and quality of life of people of this region.

The health status of the study area helps us understand the disease profile as well as the disease prevalence rate. The mortality behaviour identifies that half of those who died have received some sort of medical attention before death and nearly one fourth of them are hospitalised before death which means that the cause of death has remained largely unknown. Almost all types of communicable diseases are primarily related to respiratory and gastro-intestinal systems - are highly prevalent in the Western Dooars in varying degrees. The study concluded that children (below 5 years) were three times more vulnerable to respiratory ailments than the rest. The situation like snake bite and poisoning were very common among the rural inhabitants of Western Dooars. The non communicable ailments like Arthritic Pain, Cardio-vascular Problems, Asthma, Diabetes, Skin related Problems, and Vision Problems among the people of more than 40 years' old are very much frequent. The study also shows that both tobacco and alcohol use is very common among the poorer of Western Dooars. The weight and height for age of boys and girls (below 5 years) showing values for all children to be below the median reference at all ages and causes stunting with severe malnutrition. In case of children Acute Respiratory Infection (ARI) and Diarrhoea are very much frequent specially during monsoons. The disease prevalence rate is high among the women in both aggregate and individual level. Nearly half of the sampled mothers, who delivered at least one birth in the last five years, are found low Body Mass Index (BMI) (i.e., BMI < 18.5). This kind of scenario in Western Dooars demanded much more government intervention regarding health and family welfare programme for better future outcome.

The health scenario of Western Dooars offers little to celebrate. A typical resident of the Western Dooars carries an extra load of ill-health and health risk compared to others living within the same district. Poverty coupled with sharp geo-climatic challenges, make him / her especially vulnerable to health shocks caused by environmental and the life style related agents. People's response to these challenges is often perplexing primarily due to complex interface of the social, economic, and geographical barriers to access health care and perceived severity of the problem. Utilisation of inpatient care in public institutions is remarkably high implying that the perceived severity and benefits of getting a seriously ill person admitted to a hospital is higher than the

perceived costs and barriers of doing so. On the contrary, the family of a pregnant woman feels constrained to take her to a hospital for delivering a birth probably because the equation between benefits and costs is reversed. The village unqualified doctors dominate the outpatient market because people think it would be too costly, or unnecessary, or hazardous to seek treatment for a minor ailment from a qualified provider. In other words, physical accessibility to a government health facility apparently becomes a prohibitive issue when people seek ambulatory or birth delivery care (due to low perceived severity and benefits) but becomes non-prohibitive when they need admission to a hospital (due to high perceived severity and benefit). The clear implication of this complete response behaviour is that adding more health facilities to the less accessible areas may not improve 'access' unless the social barriers are simultaneously addressed to influence the perception about severity of health needs and increased benefits of accessing these facilities.

The public health care network in the Western Dooars symbolises a system with serious constraints, yet deemed to deal with extraordinary challenges of meeting the health care need of the Western Dooars. The constraints manifests lower level facilities the PHCs and sub-centres-operating far below the potential, and the block level facilities able to meet only a small part of the need. Hence, the necessary steps will be taken to strengthening the block level facilities. Strengthening the block level facilities is extremely crucial since they not only act as the first point of inpatient care, but also operate as a hub for all public health programmes carried out by their lower level counterparts including those located in hard-to-reach locations. RMPs are an integral and vital part of the Western Dooars' health care structure. They have a strong grip over the health care market, much stronger than the public health care system. From the policy perspective, there is an inherent dilemma is acknowledging this fact and taking a clear stand on this issue. On one hand, RMPs dominance is too obvious to ignore, while on the other, the legal and technical barriers are too strong to formally acknowledge RMPs and redirect their market power in a controlled and guided manner.

The study about the patient behaviour in the PHCs of Western Dooars reveals that maximum number of patients visited PHCs for IPD or OPD services are from low economic status with lower monthly per-capita expenditure. The study also found that among that poorer section a large amount of people don't have any BPL identification and that may be the major weakness of the government identification system. The study also added that the social background of the

IPD and OPD patients are not so well. Specially in case of IPD the study found that maximum patients are from bad background. Regarding education status the study found that one fourth of the IPD patients have some educational background, and at least half of the OPD patients have no education or less than primary educational status. Regarding access to health services in PHCs the study found that access by schedule caste and schedule tribes are lower in compare to general caste, thus the low social status people cannot access the service rendered by PHCs properly. In case of access to beds of PHCs the study found that poorer category access is maximum, which is a good sign but the other side of the story shows that a significant contribution for such access are generated by some kind of connection with local personal. The IPD patients are found not to travel a great distance to get the services from PHCs. The study found that majority of IPD patient from better income category chooses the PHCs services due to their proximities and from poor income categories responses shows that they come due to its cheapness. But, both the categories respond that they prefer private nursing home or the service rendered by the rural unqualified medical practitioner during their emergencies. Among OPD patients the study found both income category people agreed to move to private doctors or the rural unqualified medical practitioner during their pre-natal problems. The study also found a large section of IPD and OPD patients remain untouched from the access of free medicines. Regarding perceptions the study found that the patients of IPD and OPD both have some good perceptions about the service quality provided by the PHCs of Western Dooars.

The findings of this study reveal that more than half of the PHCs are operating at less than optimal levels of pure technical and scale efficiency. The performance of some of the PHCs in the sample is actually observed to be very low, and raises much concern for planners and policymakers. With the existing levels of inefficiency, the achievement of the health policy objectives and health related global and regional targets such as the Millennium Development Goals (MDGs) target will be compromised. Hence, greater focus should be placed on efficient use of the existing resources. Using technical efficiency scores of different PHCs it is possible to find out the extent to which outputs of out-patient department and in-patient department can be expanded. By the same way, scale efficiency scores combinations and the information on the technology, i.e., whether the hospitals are operating at increasing or decreasing returns to scale, one can arrive at the decision that at which extent change in scale proportion is needed. The block wise picture paints that Kumargram, one of the extreme east side block of the Western

Dooars, has performed as the best performer in the area followed by Alipurduar-II, Madarihat and Mal blocks of Jalpaiguri district. In terms of average technical efficiency score the block Kumargram again is the peer and situated on the extreme boundary of the health production possibility frontier. The study observes that service delivery spaces for the existing PHCs are limited by various factors. The physical accessibility of the blocks is derived on the basis of the infrastructure available within the blocks. The secondary level data were collected from the district administration to construct such index in terms of approach bus road distance from the existing villages, approach rail road distance from the same villages, numbers of river bodies on these approach roads, percentage of villages where more than 10 percent areas are covered by forest areas, and the distance factor from the farthest Sub-centre to performing BPHC of that particular block. The service delivery spaces are defined in terms of technical efficiencies and scale efficiencies derived in chapter 8 for all 38 PHCs of the Jalpaiguri district. By considering both the physical accessibility and service delivery spaces for all the blocks in macro terms, the study can identify the strongest and weakest blocks performing in terms of both service delivery spaces and physical accessibility index. Next, considering the technical and scale efficiency scores of each PHCs the study tries to identify the PHCs at micro or individual level which offers health support at primary level. Here, the study tries to identify the best practicing PHCs and the PHCs need special attention. Regarding the best practicing PHCs the study tries to identify the PHCs with full capacities of inputs like 10 beds and then from that level of selection the study tries to identify the PHCs with doctors involvement index (DII) and Perception index (PI) above the average and from that then the study filters the PHCs with all values of output above the average level. Then for the PHCs needed special attention shows that selected PHCs among the peer group performing with low inputs, and from those select those PHCs whose quality indexes are above average level.

PREFACE

I express my deep sense of gratitude for the almighty for enabling me to pursue research and fulfill this work.

At the outset, I express my sincere gratitude and thanks to my supervisor Dr Anil Bhuimali, Professor, Department of Economics, University of North Bengal, for his scholarly supervision to undertake the present study. I am very much obliged to him for his considerable care, encouragement, expert advice and substantial time extended to me.

I am equally grateful to the Head of the Department and all of our esteemed teachers of the Department of Economics, NBU, who have been a source of inspiration for the present work.

I am gratefully indebted to Professor Barun Kanjilal, Indian Institute of Health Research Management, Jaipur for his valuable suggestions regarding the availing the basic materials to complete the thesis. I am equally grateful to Dr. Debjani Barman, Indian Institute of Health Research Management, Kolkata for her generous help and valued suggestions.

I am thankful to the Chief Medical Officer of Health, and all Block Medical officers of Health, Jalpaiguri District for their full cooperation during data collection. I am also thankful to all Doctors, Nurses, Health assistants staffs of different Primary health Centres of Jalpaiguri district to conduct the administrative survey and patient survey part of this study.

I am grateful to all village Panchyats and the inhabitants of the surveyed villages of Alipurduar-II, Madarihat and Falakata block of Jalpaiguri district, by sharing their health information and perception about the health.

I also appreciate the active support from the Rural Medical Practitioners of Alipurduar-II, Madarihat and Falakata block of Jalpaiguri district by providing information regarding their treatment behaviour.

I acknowledge my enormous debt to my college Principal Dr Pankaj Kumar Debnath, for extending his support for the completion of such research. I am also grateful to all of my college colleagues for their endless support.

I am indebted to my friends and brothers Mr. Jony Murmu, Mr Sujit Majumder, and Mr Chinmoy Sarkar Research scholar, NBU for their valuable support and cooperation at every stage of this work.

Finally, I take this opportunity to thank my friends and well wishers who helped me with their ceaseless co-operation.

Last but not least, I am grateful to my mother Bandana Bhattacharya, my wife Sanghamitra and my affectionate daughter Srijita for their encouragement and sacrifice. My special hats-off to my wife for her careful handling of all family hazards and giving me professional as well as personal space, for such study.

Subhasis Bhattacharya

CONTENTS

Abstract	Page i-x
Preface	Page xi-xii
Contents	Page xiii-xix
List of tables	Page xx-xxiii
List of Figures	Page xxiv-xxvi
Glossary	Page xxvii-xxix
Chapter1: Introduction	Page1-16
1.1 Introduction	Page 2-2
1.2 Statement of the Problem	Page 2-6
1.3 Objectives of study	Page 6-7
1.4 Research Questions	Page 7-8
1.4 Research Hypotheses	Page 8-9
1.5 Methodology and Data	Page 9-13
1.6 Research Gap	Page 13-14
1.8 Break-up of Chapters	Page 14-16
Chapter 2: Review of Earlier Studies	Page 17-54
2.1 Introduction	Page 18-18
2.2 Section-I: Earlier Studies on Healthcare Seeking Behaviour	Page 19-30
2.3 Section-II: Earlier Studies on Provisions of healthcare facilities and their respective efficiency character	Page 31-39
2.4 Section-III: Earlier Studies on Performance of healthcare	Page 40-56
Chapter 3: Health Development and Indian Five Year Plan	Page 57-73
3.1 Introduction	Page 58-59
3.2 Healthcare Structure	Page 59-62
3.3 Different Committees for Better Health Functioning during Plan Period	Page 62-67
3.4 Ailments wise Health Programmes during Plan Period	Page 67-69
3.5 National Rural Health Mission (NRHM)	Page 69-72
3.5.1 Accredited Social Health activist (ASHA)	Page-70-71
3.5.2 Janani Suraksha Yojana (JSY)	Page 71-71
3.5.3 To make more powerful health Institutions	Page 71-71
3.5.4 Evaluation of NRHM	Page 72-72
3.6 Conclusion	Page 72-73
Chapter 4: Profile of the Study Area	Page 74-87
4.1 Introduction	Page 75-75

4.2 Natural Face (Physical Features)	Page 75-78
4.3 Human face (Demographic Character)	Page 78-80
4.4 Literacy	Page 80-80
4.5 Climate	Page 80-80
4.6 Rainfall	Page 81-81
4.7 Soil	Page 81-81
4.8 Land Use	Page 82-82
4.9 Flora and Fauna	Page 82-82
4.10 Economic Features	Page 82-83
4.11 Animal Husbandry	Page 83-83
4.12 Tea Garden	Page 83-84
4.13 Minerals	Page 84-84
4.14 Industries and power	Page 84-85
4.15 Transport and Communications	Page 85-85
4.16 Conclusion	Page 85-87

Chapter 5:	Health Seeking Behaviour of Sample Households	Page 88-145
5.1 Introduction		Page 89-89
Section-I: Demographic and Socio-economic Environment of Sample Households		Page 91-107
5.1.1 Introduction		Page-91-91
5.1.2 Family Size		Page 91-92
5.1.3 Gender Classification		Page 92-92
5.1.4 Age Specific and Gender Specific Classification		Page 92-93
5.1.5 Gender distribution of Head of the Household		Page 93-94
5.1.6 Educational qualification of the head of the Household		Page 94-94
5.1.7 Educational qualification of more than 5 years		Page 94-96
5.1.8 Schooling of children of age 6-11 years		Page 96-96
5.1.9 Uses of drinking water		Page 97-97
5.1.10 Occupational Structure		Page 97-98
5.1.11 Electrification of their houses		Page 99-99
5.1.12 Sanitation Condition		Page 99-99
5.1.13 Mean age at marriage for married women		Page 100-100
5.1.14 Age at first Conception for the women		Page 100-101
5.1.15 Caste Distribution		Page 101-102
5.1.16 Dwelling condition		Page 102-103
5.1.17 Income distribution		Page 103-104
5.1.18 Natural calamity affected in last 5 years		Page 104-105
5.1.19 Conclusion		Page 105-107
Section-II: Health Status of the Sampled Households		Page 108-127
5.2 Introduction		Page 109-109
5.2.1 Mortality rate with and without Medical attention		Page 109-110
5.2.2 Gender wise distribution of ailments in last 30 days		Page 110-111
5.2.3 Children Ailments in last 30 days		Page 111-112

5.2.4 Gender wise distribution of accidents, animal attacks in last year	Page 113-114
5.2.5 Gender and age wise distribution of chronic and non-communicable ailments in last five year	Page 114-115
5.2.6 Economic condition and age wise distribution of chronic and non-communicable ailments in last five year	Page 115-116
5.2.7 Age wise distribution of chronic and non-communicable ailments according to health condition in last 30 days	Page 116-117
5.2.8 Prevalence of Tobacco and Alcohol use among different income and age group	Page 117-118
5.2.9 Distribution of Vision problems among Adults	Page 118-119
5.2.10 Child Health Status (Aggregate)	Page 119-121
5.2.11 Common ailments among Children in last 15 days	Page 121-122
5.2.12 Distribution of the ailments on the basis of age and sex in last 30 days	Page 122-123
5.2.13 Age specific ailments among Female	Page 123-125
5.2.14 Gender wise distribution of the Malaria and General fever affected persons since last year	Page 125-126
5.2.15 Gender wise distribution of the patients on the basis consulting a doctor since last 30 days	Page 126-127
5.2.16 Conclusion	Page 127-127
Section-III: Health Seeking Behaviour	Page 128-153
5.3 Introduction	Page 129-129
5.3.1 Inpatient care	Page 129-135
5.3.1.1 Gender wise hospitalisation rate in last one year	Page 129-129
5.3.1.2 Hospitalisation rate according to economic condition in last one year	Page 129-130
5.3.1.3 Hospitalisation rate among different age groups in last one year	Page 130-131
5.3.1.4 Hospitalisation rate in terms of source of care and reference in last one year	Page 131-132
5.3.1.5 Out-of-Pocket expenditure for inpatient care	Page 132-133
5.3.1.6 Out-of-Pocket Expenditure on different category	Page 133-134
5.3.1.7 Out-of-Pocket expenditure of different economic class and choice of care	Page 134-135
5.3.2 Outpatient care	Page 135-143
5.3.2.1 Gender and economic status wise distribution of ailed persons in last 30 days	Page 135-136

5.3.2.2 Gender and economic status wise distribution of treatment seeking behaviour	Page 136-137
5.3.2.3 Outpatient care of ailing persons seeking care in last 30 days	Page 137-138
5.3.2.4 Ailments wise Outpatient care from different providers	Page 138-139
5.3.2.5 Seeking Outpatient care in terms of location	Page 139-140
5.3.2.6 Outpatient care according to socio-economic status to different providers	Page 140-141
5.3.2.7 Average distance travel for Outpatient care among different providers	Page 141-142
5.3.2.8 Average out-of pocket expenditure for Outpatient care	Page 142-143
5.3.3 Maternal health care	Page 143-149
5.3.3.1 Place of delivery according to economic status since last 5 years	Page 144-145
5.3.3.2 Place of delivery according to birth order in last 5 years	Page 145-146
5.3.3.3 Institutional delivery in last 5 years	Page 146-146
5.3.3.4 Maternal hazards related with delivery in last 5 years	Page 146-147
5.3.3.5 Average distance travelled for institutional delivery	Page 147-148
5.3.3.6 Ante-natal care	Page 148-149
5.3.4 Child health care	Page 149-152
5.3.4.1 Children breastfeeding	Page 149-150
5.3.4.2 Age wise vaccination of children below 2 years	Page 150-150
5.3.4.3 Ailments among children of age below 5 years in last year	Page 150-151
5.3.4.4 Child health care from different providers	Page 151-152
5.3.5 Conclusion	Page 152-153
Chapter 6: Healthcare System of Western Dooars	Page 154-190
6.1 Introduction	Page 155-156
Section-I: Public Healthcare System	Page 157-179
6.1.1 Introduction	Page 158-158
6.1.2 Health facilities with infrastructure in Western Dooars	Page 158-159
6.1.3 Block wise Lower Tier Public Health Facilities	Page 159-160
6.1.4 Primary Health centre (PHC)	Page 160-163
6.1.5: Service rendered by PHCs	Page 163-164
6.1.6: Bed density in PHCs	Page 164-166

6.1.7: Internal Classification of Districts in terms of Distribution of PHCs	Page 166-167
6.1.8: Bed density and Female Illiteracy relation for PHCs	Page 167-168
6.1.9: Equipment density at PHCs	Page 168-170
6.1.10: Manpower density at PHCs	Page 170-172
6.1.11: Comparison of Block PHCs Performance in terms of Infrastructure and Manpower	Page 172-175
6.1.12: Bed occupancy rate for ailments at various levels of facilities	Page 175-176
6.1.13 Bed occupancy rate at PHCs for delivering birth	Page 176-177
6.1.14 Outpatient per bed day at the lower and higher level hospital	Page 177-178
6.1.15 Preparedness of Western Dooars Health Facilities	Page 178-179
6.1.12 Conclusion	Page 179-179
Section-II: Rural Medical Practitioners (Unqualified)	Page 180-190
6.2 Introduction	Page 181-181
6.2.1 Rural outpatient care market in Western Dooars	Page 181-182
6.2.2 Existence of RMPs and per day patients visits	Page 182-182
6.2.3 Medical background of RMPs	Page 183-184
6.2.4 Drug collection & distribution behaviour of RMPs	Page 184-185
6.2.5 General treatment behaviour of RMPs	Page 185-186
6.2.6 RMPs behaviour in mother and child health care (MCH)	Page 186-187
6.2.7 RMPs behaviour related to surgical intervention	Page 187-188
6.2.8 RMPs referral behaviour	Page 188-190
6.2.9 Conclusion	Page 190-190
Chapter 7: Patient Survey in PHCs of Western Dooars	Page 191-215
7.1 Introduction	Page 192-192
7.2 Determination of sample size	Page 192-193
7.2.1 Sample size for IPD and OPD	Page 192-193
7.3 Patient Choosing Methodology	Page 193-194
7.4 Socio-economic character of patients	Page 194-199
7.4.1 Economic status	Page 194-196
7.4.2 Socio-economic Status	Page 196-198
7.4.3 Educational Status	Page 198-199
7.5 Access to Healthcare	Page 199-212
7.5.1 Proportion of Ailing Persons (PAP)	Page 200-201

7.5.2 Access in IPD facilities of PHCs	Page 201-207
7.5.2.1 Access to beds	Page 202-203
7.5.2.2 Distance travelled to access the IPD services of PHCs	Page 203-204
7.5.2.3 Preference reasons for IPD in PHCs	Page 204-206
7.5.2.4 Choice between PHCs and Private Nursing homes	Page 206-207
7.5.3 Access to OPD Services	Page 207-209
7.5.3.1 Distance travelled by OPD patients	Page 207-208
7.5.3.2 Preferences for private doctors of OPD Patients	Page 208-209
7.5.4 Access to free Medicines	Page 209-212
7.5.4.1 Drugs of PHCs	Page 210-211
7.5.4.2 Block-wise receiving pattern of medicines	Page 211-212
7.6 Perception Index derived from Patients	Page 212-214
7.6.1 Manpower Index	Page 212-212
7.6.2 Cleanliness Perception Index	Page 213-213
7.6.3 Infrastructure Perception Index	Page 213-213
7.6.4 Calculation and Results of Overall Perception Index	Page 213-214
7.7 Conclusion	Page 214-215
Chapter 8: Efficiency Estimation of Existing Primary Providers	Page 216-244
8.1 Introduction	Page 217-218
8.2 Methods to measure efficiency	Page 218-233
8.2.1 Data Envelopment Analysis	Page 219-221
8.2.2 DEA Model	Page 221-233
8.3: Empirical findings of DEA Model	Page 233-243
8.4 Conclusion	Page 244-244
Chapter 9: Potential service delivery space of Primary Health Centre	Page 245-255
9.1 Introduction	Page 246-246
9.2 Service Delivery Space by Service Categories	Page 246-249
9.2.1 Maternal and Child Healthcare (MCH)	Page 248-248
9.2.2 General curative care	Page 248-249
9.3 Service Delivery Space by Geographical Divisions	Page 249-252
9.3.1 Physical accessibility Index	Page 249-250
9.3.2 Service Delivery Space Index	Page 250-252
9.4 Operating Efficiency	Page 252-254
9.5 Conclusion	Page 254-255
Chapter 10: Summary, Policy Recommendations and Conclusion	Page 256-269
10.1 Introduction	Page 257-257

10.2 Summary	Page 257-261
10.3 Policy Directions	Page 261-264
10.4 Plans for a Better Future	Page 264-268
10.4.1 Goal and Objectives of the Proposed Initiatives	Page 265-265
10.4.2 Structural Components of the Planned Initiatives	Page 265-268
10.4.2.1 Strengthening Public Health Facilities	Page 265-266
10.4.2.2 Providing basic health services at village level	Page 266-267
10.4.2.3 Establishing a Referral Transport Network	Page 267-267
10.4.2.4 Innovations in use of Information and Communication Technology	Page 267-268
10.5 Conclusion	Page 268-269
Bibliography	Page 270-280
Index	Page 281- 286

LIST OF TABLES

Sl No	Table No	Title	Page No
1	3.1	Medical Institution in West Bengal	61
2	3.2	Medical Institutions at Jalpaiguri District of West Bengal	62
3	3.3	Establishment of BPHC/CHC, PHC and SC in India since Plan period	66
4	4.1	Key Socioeconomic and Health Indicators of Jalpaiguri District	86
5	5.1	Distribution of the Sample Households on the Size of their Family	92
6	5.2	Gender Wise Classification of the Total Sample Population	92
7	5.3	Age Specific and Gender Specific Classification of the Total Sample Population	93
8	5.4	Sex of the Head of Household in the Sampled Area	93
9	5.5	Educational Qualification of the Head of the Household	94
10	5.6	Distribution of sample population (more than 5 years of age group) according to their educational qualification	95
11	5.7	Distribution of sample households on Schooling of Children (6-11) years	96
12	5.8	Distribution of sample households according to the availability of quality drinking water	97
13	5.9	Distribution of the sample population according to the Occupational Structure	98
14	5.10	Distribution of the sample households on their Electrification of houses	99
15	5.11	Distribution of the sample households on the Sanitation condition	99
16	5.12	Mean age at marriage for married women in the reproductive age	100
17	5.13	Age at first Conception for the women in the Reproductive age	101
18	5.14	Distribution of sample households based on their Specific Caste	102
19	5.15	Distribution of sample households according to the type of Dwelling	103
20	5.16	Distribution of sample households according to the level of income	103
21	5.17	Sample Households affected by natural calamity at least once in the last 5 years	104
22	5.18	Age-wise distribution of mortality among the sample households with and without medical attention	109
23	5.19	Gender wise distribution of ailments in last 30 days among the sample households	110
24	5.20	Distribution of ailments in last 30 days among children of sample households	112
25	5.21	Gender wise distribution of accidents, animal attacks in last year among the sample households	113
26	5.22	Gender wise distribution of chronic and non-communicable ailments in last five year among the sample households of age more than 40 years	114
27	5.23	Economic condition wise distribution of chronic and non-communicable ailments in last five year among the sample individuals of age more than 40 years	115
28	5.24	Distribution of chronic and non-communicable ailments according to health condition in last 30 days among the sample individuals of age more than 40 years	117

29	5.25	Prevalence of Tobacco and Alcohol use among sample individuals of different income and age group more than 40 years	118
30	5.26	Distribution of adult population who have severe vision problems among sample households	119
31	5.27	Child (below 5 years) health status in aggregate from among sample households of all blocks	120
32	5.28	Distribution of common ailments of children age below 5 years in last two weeks among sample Individuals	121
33	5.29	Distribution of the ailments on the basis of age and sex in last 30 days	122
34	5.30	Distribution of ailments among female on the basis of socio-economic status of all blocks	123
35	5.31	Gender wise distribution of the Malaria and General fever affected persons since last year	126
36	5.32	Gender wise distribution of the patients on the basis consulting a doctor since last 30 days	126
37	5.33	Gender wise distribution of hospitalisation rate in last one year among dwellers	129
38	5.34	Distribution of hospitalisation rate according to economic condition in last one year among the dwellers	130
39	5.35	Distribution of hospitalisation rate among different age groups in last one year	130
40	5.36	Distribution of hospitalisation rate in terms of source of care and reference in last one year	131
41	5.37	Distribution of Out-of-Pocket expenditure for inpatient care on the basis of economic status in last one year	132
42	5.38	Distribution of breakage of Out-of-Pocket Expenditure on different category	133
43	5.39	Distribution of Out-of-Pocket expenditure of different economic class and choice of care in aggregate form	134
44	5.40	Gender and economic status wise distribution of ailed persons in sampled area in last 30 days	135
45	5.41	Gender and economic status wise distribution of treatment seeking of the ailed persons in last 30 days	136
46	5.42	Distribution of Outpatient care of ailing persons seeking care, by source of care in last 30 days	137
47	5.43	Distribution of Ailments wise Outpatient care between different providers in last 30 days	138
48	5.44	Distribution of seeking Outpatient care in terms of location	139
49	5.45	% of Providers based Outpatient care in terms of socio-economic status	141
50	5.46	Distribution of average (Median) distance travel for Outpatient care among different providers	142
51	5.47	Distribution of average (Median) out-of pocket expenditure (Rs) for Outpatient care among different providers	143
52	5.48	Distribution of Place of delivery according to economic status among the sampled mothers since last 5 years	144

53	5.49	Distribution of Place of delivery according to birth order among the sampled mothers in last 5 years	145
54	5.50	Distribution of Institutional delivery process (Normal or Caesarean) among the sampled mothers in last 5 years	146
55	5.51	Distribution of maternal hazards related with delivery among the sampled mothers in last 5 years	147
56	5.52	Distribution of average distance travelled for institutional delivery by the sampled mothers	148
57	5.53	Distribution of Ante-natal care in sampled mothers	149
58	5.54	Distribution of children breastfeeding in sampled households	150
59	5.55	Age wise distribution of Vaccination of children below 2 years in the sampled households	150
60	5.56	Distribution of ailments among children of age below 5 years in last year	151
61	5.57	Distribution of child health care from different providers	152
62	6.1	Block wise all Public Health facilities in terms of infrastructure in Western Dooars	158
63	6.2	Public health facilities at lower tier in the Western Dooars, by Blocks	160
64	6.3	PHCs catering in terms of Population, bed, number of Sub-centres and villages of Jalpaiguri District	163
65	6.4	Service rendered by PHCs in Jalpaiguri District	164
66	6.5	Block wise Bed density in PHCs	165
67	6.6	Approximate Classification of the District and distribution of PHCs	167
68	6.7	Bed density and Female Illiteracy at PHCs, BPHCs and RHs across blocks	168
69	6.8A	List of Instruments used by PHCs	169
70	6.8B	Equipment density in blocks of Jalpaiguri district	169
71	6.9A	Manpower distribution in blocks of Jalpaiguri district	170
72	6.9B	Density of Manpower across different blocks	171
73	6.10A	Mean, S.D, and C.V. values of different types of infrastructural and manpower density in PHCs in Blocks of Jalpaiguri District	173
74	6.10B	Blocks with of different types of infrastructural and manpower density in terms of Coefficient of Variations of PHCs	174
75	6.10C	Two regions with of different types of infrastructural and manpower density	175
76	6.11	Distribution of Bed occupancy rate (%) for ailments at various levels of facilities in Western Dooars, 2011-2012	175
77	6.12	BOR at local facilities for delivering birth in Western Dooars from 2007-2011	177
78	6.13	Outpatient per bed day at the PHCs and higher level hospital in Western Dooars, 2011	178
79	6.14	Preparedness of Western Dooars Health Facilities in percentage	179
80	6.15	Existence of RMPs and per day patients visits in the study area	182
81	6.16	Medical background of RMPs in the study area	183
82	6.17	Drug collection & distribution behaviour of RMPs in the study area	184
83	6.18	General treatment behaviour of RMPs in the study area	185
84	6.19	RMPs behaviour in mother and child health care (MCH) in the study area	186

85	6.20	RMPs behaviour related to surgical intervention in the study area	188
86	6.21	RMPs referral behaviour in the study area	189
87	7.1	Sample size allocation to each PHCs	193
88	7.2	Share of MPCE1 and MPCE2 patients under different blocks of Jalpaiguri	194
89	7.3	MPCE status with BPL card among sampled patients	195
90	7.4	Socio-economic status index of sampled IPD & OPD patients	197
91	7.5	Educational Status of Sampled IPD & OPD patients	198
92	7.6	Social Caste distribution of Patients from OPD and IPD of PHCs	200
93	7.7	Access to beds in PHCs	202
94	7.8	Distance travelled to reach the PHCs for admission	204
95	7.9	Reasons for admission in PHCs	205
96	7.10	Preference of IPD patients for Private Nursing homes under ailments	206
97	7.11	Distance Travelled to reach the OPD	207
98	7.12	Preference for Private Doctors of OPD patients	209
99	7.13	Block-wise free medicine access pattern in PHCs	211
100	7.14	Perceptions of Different Groups	214
101	7.15	Correlations of Perceptions with BOR	214
102	8.1	Input and Output list of the DEA analysis	230
103	8.2	Doctors involvement index in PHCs of different blocks	231
104	8.3	Mean and SD for PHCs inputs and outputs	234
105	8.4	Technical and Scale Efficiency Scores for PHCs	235
106	8.5	Summary results of DEA for 38 PHCs	237
107	8.6	Efficiency status of PHCs in different Blocks	237
108	8.7	Rank of PHCs in terms of output & Scale expansion	239
109	8.8	Scope of Radial Expansion and Output Slacks in PHCs	240
110	8.9	Comparison of Original & Target output of inefficient PHCs	241
111	8.10	Inputs Slacks at different PHCs and their corresponding Rank	242
112	8.11	Summary of all Input Slacks	243
113	9.1	Estimation of gap in Institutional Delivery of PHCs, Western Dooars, 2011	247
114	9.2	Physical Accessibility Index	250
115	9.3	Category of Blocks of Jalpaiguri in terms of Physical accessibility	250
116	9.4	Category of Blocks of Jalpaiguri in terms of service delivery spaces	251
117	9.5	Category of blocks in terms of both service delivery spaces & physical accessibility	251

LIST OF FIGURES

Sl No	Figure No	Title	Page No
1	4.1	Geographical Location of Western Dooars in Jalpaiguri District	76
2	4.2	Soil map of Jalpaiguri District	81
3	5.1	Education Level of the Head of the Sampled Households	94
4	5.2	Percentage of Sex-wise Education Qualification of total Sampled Population	95
5	5.3	Percentage of Children of 6-11 yrs age group are attend the school or not	96
6	5.4	Percentage of Sex-wise Occupational structure of Sampled Households	98
7	5.5	% of Mean age of Marriage for married women at their Reproductive Age	100
8	5.6	% of Caste Distribution of Sampled Households	102
9	5.7	% Distribution of Sample Households on the basis of Income	104
10	5.8	% of Sampled households affected by natural calamity in last 5 years	105
11	5.9	% of age-wise mortality with or without medical attention	109
12	5.10	% of Gender wise distribution of ailments (In last 30 days)	111
13	5.11	% of ailments in last 30 days among children of sample households	112
14	5.12	% of Gender-wise distribution of accidents, animal attack in last 5 year	113
15	5.13	% of Chronic Non-communicable ailments distribution in last 5 Years	115
16	5.14	% Distribution of Chronic Non-communicable ailments as per economic conditions in last 5 years (Age>40 Yrs)	116
17	5.15	% Distribution of Chronic Non-communicable Ailments in terms Severity	117
18	5.16	% Distribution of Use of Tobacco & Alcohol among different Income Groups (Age > 40 yrs)	118
19	5.17	% Distribution of adult population who have severe vision problems	119
20	5.18A	Comparison of Sampled weight for Girls with WHO standard weight	120
21	5.18B	Comparison of Sampled weight for Boys with WHO standard weight	120
22	5.19	% Distribution of Ailments among Children (<5yrs) since last 15 days	122
23	5.20	% Distribution of Age-Sex wise Disease Prevalence Rate	123
24	5.21A	% Distribution of Vision problem among Female on different Income Groups	124
25	5.21B	% Distribution of Skin problem among Female on different Income Groups	124
26	5.21C	% Distribution of BMI (Wt & Ht) problem among Female on different Income Groups according to Weight & Height	124
27	5.22	% Distribution of Malaria and General Fever in sampled persons	125
28	5.23	% Distribution of patients on the basis of the Sex about Doctor Consultation in last one month	127
29	5.24	% of Hospitalisation Rate in terms of Sex, Income Class, & Age Group	131
30	5.25	% Distribution of Hospitalisation in terms of source of care	132
31	5.26	% Distribution of Out-of-Pocket Expenditure for Inpatient care on the basis of Economic Status	133
32	5.27	% Breakage of Out-of-Pocket Expenditure	134
33	5.28	% Distribution of Out-of-Pocket Expenditure of different Economic class & Choice of care	135

34	5.29	% Distribution Ailed Persons on the basis of Sex & Economic Status	136
35	5.30	% Distribution of Treatment Seeking on Gender & Economic Status	137
36	5.31	% Distribution of Out-patient care from Different Sources	138
37	5.32	% Distribution of Ailments wise Outpatient Care from different Source	139
38	5.33	% Distribution of seeking Outpatient care in terms of Location	140
39	5.34	% Distribution of Outpatient care in terms of Economic Status	141
40	5.35	Distribution of Median distance travel for Outpatient care among different Providers	142
41	5.36	% Distribution of Median Out-of Pocket Expenditure among different providers	143
42	5.37	% Distribution of Place of Delivery in terms of Economic Status	144
43	5.38	% Distribution of Place of Delivery according to Birth Order	145
44	5.39	% Distribution of Maternal Hazards during Delivery	147
45	5.40	% Distribution of Ante-natal care	149
46	5.41	% Distribution of Ailments among Children Below 5 Years	151
47	5.42	% Distribution of Child Health care from different Providers	152
48	6.1	Health Providers of Jalpaiguri District	156
49	6.2	Distribution of PHC bed, No of SC & No of village	162
50	6.3	Comparison of Bed Densities in PHCs and BPHCs/RHs in all Blocks of the district	166
51	6.4	Relation between Bed densities and Female Illiteracies of all Blocks	168
52	6.5	Distribution of Manpower in Position and Vacant in PHCs over Blocks	171
53	6.6	CV values of Bed, Equipment & Doctor densities over the Blocks	174
54	6.7	BOR at local facilities between Gen Adm & Adm for Delivery over 2007-2011	177
55	6.8	Rural outpatient care market in Western Dooars	181
56	6.9	Medical back ground of the surveyed RMP	183
57	6.10	% of Practice method, Drug distribution & Drug Collection behaviour of RMPs	184
58	6.11	General Treatment Behaviour of RMP	186
59	6.12	MCH Behaviour of RMP	187
60	6.13	% Distribution of RMPs Surgical intervention	188
61	6.14	% Distribution of Referral Behaviour of RMP	189
62	7.1	Distribution of MPCE1 & MPCE2 Patients for IPD & OPD Section	195
63	7.2	% Distribution of MPCE with BPL Status among Sampled Patients	196
64	7.3	Socio-economic Index of OPD & IPD Patients	197
65	7.4	Educational status of OPD & IPD Patients respectively	199
66	7.5	% of Caste distribution among OPD & IPD Patients	201
67	7.6	% Distribution of Access to Beds on the basis Income among IPD Patients	203
68	7.7	% Distribution of IPD Patients Reasons of Visits to PHC	206
69	8.1	Input and output measures of technical efficiency	222
70	8.2	The production frontier and return to scale	223
71	8.3	Slack of output	226
71	8.4	Input slack	226
72	8.5	The DII & PI value for the blocks PHCs in Study Area	232

73	8.6	Block wise average technical & scale efficiency scores of PHCs	238
74	8.7	The comparison between Target & Original output of inefficient PHCs	241
75	9.1	The best Practicing PHCs	252
76	9.2	PHCs needed special attention	254

GLOSSARY

AIIMS- All India Institute of Medical Science
AIDS-Acquired Immune Deficiency Syndrome
ANM- Auxiliary Nurse Midwife
ANC-Ante-natal Care
ASHA- Accredited Social Health Activist
ARI- Acute Respiratory Infection
AYUSH- Ayurveda, Yoga-Naturopathy, Unani, Siddha, and Homeopathy
BMOH- Block Medical Officers in Health
BMI- Body Mass Index
BOR-Bed Occupancy Rate
BPHC- Block Primary Health Centre
BPL-Below Poverty Line
CBHI- Central Bureau of Health Intelligence
CGHS- Central Government Health Scheme
CHC-Community Health service Center
CHD-Coronary Heart Disease
CHI- Community Health Insurance
CMOH- Chief Medical Officer in Health
DALE-Disability Adjusted Life Index
DANIDA-Danish International development Agency
DEA-Data Envelopment Analysis
DFID-Department for International Development
DGHS- Director General of Health Services
DH- District Hospital
DHS-Demographic Health Survey
DLHS-District Level Health Survey
DOTS- Direct Observed Therapy Short Term
EMCP- Enhanced Malaria Control Project
EMOC-Emergency and Obstetric Care
ESIS- Employees State Insurance Scheme
FHW- Female Health Worker
GDP- Gross Domestic Product
HDR - Human Development Report
HEF- Health Equity Fund
ICMR- Indian Council of Medical Research
IMCP- Intensified Malaria Control Project
IPHS - Indian Public Health Standard
IMR- Infant mortality Rate
JSY-Janani Suraksha Yojana
HA- Health Assistants
HIV- Human Immunodeficiency Virus
KAP- Knowledge Attitude and Practice
LAN-Locational Allocation Model
LDC-Less Developed Countries

LLIN- Long Lasting Insecticidal Nets
 LHV- Lady Health Visitor
 LSMS-Living Standard Measurement Survey
 MHW- Male Health Worker
 MISH- Market Information Survey of Households
 MPCE- Monthly Per Capita Expenditure
 MPI- Malmquist Productivity Index
 MPW- Multi Purpose Worker
 MR- Medical Representative
 MoHFW- Ministry of Health and Family Welfare
 NAMP- National Anti Malaria Programme
 NCAER- National Council of Applied Economic Research
 NFCP- National Filaria Control programme
 NFHS- National Family Health Survey
 NGO-Non-government Organisations
 NHA- National Health Accounts
 NHIF-National Health Insurance Fund
 NHS- National Household Survey
 NHSS- National Household Sample Survey
 NLCP- National Leprosy Control programme
 NMNL- Nested Multinomial Logit Models
 NMEP- National Malaria Eradication Programme
 NORAD- Norwegian Agency for Development Cooperation
 NSSO - National Sample Survey Organization
 NRHM-National rural Health Mission
 NUHDSS- Nairobi Urban Health and Demographic Surveillance System
 NVBDCP-National Vector Borne Disease Control Programme
 OECD- Organisation for Economic Cooperation and Development
 OLS-Ordinary Least Square
 PAP- Proportion of Ailing Persons
 PCA-Principal Component Analysis
 PPP-Public Private Partnerships
 P&RD- Panchyat and Rural Development
 PHC- Primary Health centre
 QALY-Quality Adjusted Life Years
 RCH - Reproductive & Child Health
 RDT-Rapid Diagnostic Test
 RNTCP- Revised National Tuberculosis Control Programme
 ROME-Re-Orientation of Medical Education
 RMP- Rural Medical Practitioner
 RPL- Random Parameter Logit
 SC- Sub-Centre
 SDH- Sub-Divisional Hospital
 SEM-Structural Equation Modeling
 SFA-Stochastic Frontier analysis
 SGH- State General Hospital

SPACE-Strategic Position and Action Evaluation
UNICEF- United Nations Children's Fund
UNFPA- United Nations Fund for Population Activists
USAID-United States Agency for International Development
URTI- Upper Respiratory Tract Infection
VDB- Vector Borne Disease
VHG- Village Health Guide
VHW-Village Health Worker
WHO- World Health Organisation

CHAPTER 1

INTRODUCTION

- **Introduction**
- **Statement of the Problem**
- **Objectives of study**
- **Research Questions**
- **Research Hypothesis**
- **Methodology and Data**
- **Research Gap**
- **Break-up of Chapters**

CHAPTER-1

Introduction

1.1 Introduction

Healthcare is fundamentally different from usual commodities like food, clothing and shelter. Health goods are not homogeneous in nature, as a result the market clearing situation at some part does not imply that absence of imperfection in others. Individuals are able to choose from a set of alternative providers, where each provider choice leads to a potential improvement in the expected health for both monetary and non-monetary prices. Considering this, a rational consumer tries to choose the alternative which yields highest utility. The literature on healthcare is not only confined to the qualities of healthcare use, but also extends to the quality of service provided by them. Performance of the health sector is a very important indicator of human development index of a society. Productivity factor of a society is severely affected by the poor health condition. For development a healthy population with productive workforce is the minimum precondition. World Health Organisation (WHO) emphasised in the year 2000 that each country will provide better health care with some fair financial distribution. As the health sector is now projected to have the fastest growing share of government expenditure over the next few years, it is extremely appropriate to establish which factors are the key determinants in affecting peoples' demand for healthcare, in order to maximise the benefit impact of future expenditure patterns. Thus, to understand the main determinants of healthcare demand which will be important in expanding our knowledge of how changes in government policy will impact on individuals and their demand of healthcare services. Another important aspects may arise with the increase in public expenditure on healthcare where the poor often benefit less from it. It is important to differentiate how poor and non-poor consumers of health services make decisions about treatment. The publicly provided health facilities have some common features like higher-tier hospitals or health units overloaded with patients, whereas the basic levels are underutilized. Hence it is an important and significant task for the stakeholders to consider the efficient side as well as the inefficient side of the health support function of the publicly provided institution.

1.2 Statement of the Problem

India in 2010-2011 has spent 5.2 percent of its GDP (Rs 10300 crore) for the health expenditure. After 64 years of Independence, regarding health a number of non-rural based

development programmes were taken and 25 percent of people lying below poverty line were fighting against survival with poor health. National public health policy has been based on implicit assumption that healthcare is a basic right to the people and access should not be denied on the ground of inability to pay or other socio economic reasons. The resources provided by the government for such vast majority of population to achieve better health status is insufficient. But the cost of healthcare as well as growth of healthcare seeking population increases day by day. Numerous attempts by researches across the world in recent time were made for solving such resource constraint in the public health sector for effective and efficient delivery of health output. Several studies show that people prefer private care rather than publicly provided health system during their ailments and face a large amount of out-of-pocket expenses for curative care (Sundar 1995, Visaria et al 1994). Private sector has strong capital background in medical technology, hospital construction, manufacture and sale of pharmaceuticals. As they are basically profit maximisers, price charged by them is merely possible for the poor rural people to pay. The healthcare delivery system in India has been characterised by 'four-tier network' of village Primary Health Centres and Sub-Centres (PHC and SCs), Block Level Primary Health Centres (BPHC), Sub-Divisional Hospitals / District Hospitals (SDH / DH) and State General Hospitals (SGH). Huge numbers of unqualified Rural Medical Practitioner (RMP) are submerge with healthcare practice without any professional qualification.

Following a growing literature on healthcare, the present study has a twofold investigation. One is on health seeking behaviour and other is efficiency of the existing producer with specified quality of care. World Health Organisation in 1948 stated that health is a composite function that includes biological, social, psychological, environmental and economic factors. Arrow (1963) first identified some features of health seeking behaviour in terms of demand for healthcare. The features are demand for medical care is unsteady, irregular and unpredictable in nature. Illness is not only risky but also costly as it leads to death. It is such a commodity where the product and the activity of production are identical. Before consuming such a good a patient cannot testify the quality of care. As a result, some trust elements exist within the patients and providers relation. But the physician has more information than the patients, so the product quality is uncertain and there is some asymmetry within the uncertainty. The supply of medical care is artificially controlled by licensing to maintain the quality and extensive price discrimination is practiced in the profession. The private costs are very much lower than the social cost, so society achieves optimality by non-market means.

For the attainment of better result oriented objectives, health system has to perform some basic functions. First one is service provision i.e. by providing cost effective and acceptable quality of services. Second one is resource generation i.e. by providing health workers, equipments, drugs and physical facilities. Third one is financing for health system i.e. through taxation, insurance and out of pocket payments. Last one is management of health, which is done by provision of coordination through policy formulation and supervisory regulation. Different studies highlighted that efficient health infrastructure can be determined by (i) per-capita availability of government hospitals (ii) per-capita availability of government hospital beds (iii) per-capita availability of doctor (iv) per-capita availability of primary health centres (PHCs) (v) per-capita availability of primary health sub-centers(SCs) (vi) per-capita availability of paramedical staff (vi) availability of medicine in local shops (even private) and PHC's and (vii) number of ambulance for transfer to urban health centers. The other gross indicators for the efficient functioning of public health systems are (i) the average rural population served by the health infrastructure (ii) average rural radius distance covered by the health infrastructure and (iii) average attendance of doctors and paramedical staff.

In the 65th year of Independence we have 341 blocks in the state of West Bengal and the health scenario in most of the rural blocks are not so vibrant. There are too many blocks which have more or less no primary healthcare centre and many blocks do not contain Block Primary Health Centre (BPHCs). Every BPHC is not functioning with 15-30 bed in-patient care facility. According to Indian standard the central and state health policy is to establish one BPHC per one lakh population and one Primary Health Centre (PHC) per 30 thousand populations. The existing BPHCs and PHCs are not maintaining such a standard. In West Bengal, 909 PHCs are functioning now, which are serving basically much more people than the above mentioned limit. Several blocks are functioning without such health units. In 1991, the last regulation regarding recruitment of health worker was released but after that no such initiatives have been taken to expand such employment. But the demand for healthcare is growing rapidly with the expansion of population. The important health goals are to increase institutional delivery and reduce prevalence of diseases with such growing healthcare demand. The existing regulation has identified engagement of one nursing staff for serving maximum 5 beds and thus for 30 beds facility health unit 6 nursing staff are required except the service for delivery-room, operation theatre (OT) etc. The staff are also required to perform different administrative works and the situation becomes critical during holidays and

"no-duty" days. Thus, the healthcare system suffers from critical health worker shortages during functioning. The availability of doctor is another important phenomenon. For efficient functioning of the health system continuous health training for newly recruited doctors, nurses and clerical staff is very much essential. But in West Bengal a proper data base regarding such training of health workers is not maintained. In this respect the present condition is very restrictive. The process of decentralisation is also half done in this state. Economic decentralisation is not even completed. The rural health care control is not deputed to Panchayat and Rural Development department (P&RD) though the other department of rural system is governed by this department. In Kerala the rural healthcare system is functioning under this P&RD department and 40 percent of the state budget for rural healthcare is distributed through this department.

Several studies suggest that the health seeking behaviour of a region can be observed by two important indicators i.e. health status and healthcare utilisation. The health status indicator determined by some factors like rate of general morbidity, burden of communicable and non-communicable ailments, situations of mental health, prevalence of ailments in child (below 5 years) health, proportional burden of disease among men and women, immunization rate etc. The healthcare utilisation determined by hospitalisation rate, unqualified rural medical practitioner's role in outpatient care market, institutional utilisation rate of maternal health etc. These two parts basically determine the demand side of healthcare. The publicly provided health facilities, private healthcare institution and unqualified rural medical practitioner are the three major sources in seeking such care.

Utilization of available resources in the health sector is another important issue. System endowments and efficient utilization can be another source for better health output by some appropriate measure. Thus, the efficiency of such providers is the most pertinent investigation to meet such demand. In this respect the study can also be expanded up to that limit whether the demand is supply induced or not. So, the efficiency (inefficiency) estimation of the providers is another important task of this kind of research. Farrel (1957) first proposed the idea of efficiency (inefficiency) measurement. He categorised it in two parts: technical and allocative. A firm is said to be technically inefficient (output inefficient) if it is possible to increase total output without altering the current level of input use. Similarly, a firm is allocatively inefficient which incurs a higher total input cost due to wrong choice of proportions of inputs for a given level of output. Under both the situations the firm is a price taker. However, efficiency measurement in case of health sector specially in India is a few

due to non-availability of health data. This analysis specially confined in the industrial sector and regarding health their coverage restricted to national and state level efficiency measurement only. In this regard this study makes a new attempt to extend efficiency analysis to focus healthcare system at a sub-state level (i.e. district level) in India using Western Dooars and district level panel data.

The equipped health centres are basically located in urban areas and faces an overburden of ailed patients, so these are functioning with unsatisfactory efficiency. Most recent estimates are that 85 percent of all visits for healthcare are to private practitioners, even for the poorest (NSS 60th round, 2004). Several studies suggest that the primary health centers (PHCs) and Sub-centres (SCs) are functioning in rural India with such resource constraint like doctor availability, trained nurse availability, shortages of medical equipments like beds, medicines, dispensaries etc.

The significance of this research is what is the features of health seeking behaviour and how efficiently available resources are utilized and eventually these will not only identify the cause of poor performance in the health but also strengthening the coordination between economic and social sector policies. The focus of this study on healthcare seeking behaviour and system efficiency analysis of a region like Western Dooars, which is backward itself in terms of education and health. The relative performance of some districts of North Bengal with its available resources helps us give a smooth idea about the limitation of resources, functioning of managements and utilization of health inputs. Thus diagnosis of the problems of health status, healthcare utilisation in the region for better performance and test their efficiency to meet public demand is the main task of such type of research study.

1.3 Objectives of study

Even in most affluent countries, people who are less well off are focused with shorter life expectancy and more disease prone than the rich. Thus, health differences are disturbed social justice. In modern sense, health and social environment combined indicate social determinants of health, and the product is universal access of medical care. Thus, to analyse health seeking behaviour and then efforts to estimate the efficiency of the existing producers in a sub-district (Block) level is possibly encapsulates the social welfare aspects of developments. The domain of this study deals with the availability of health resources for efficient delivery of health output. So it confirms the consumption and distribution aspects of the problem domain. The approach of the study covers both the demand and supply sides

because health seeking behaviour is a part of demand side and efficiency estimation is a part of supply side. The study encompasses following objectives:

1. To comprehend the health seeking behaviour of the dwellers and detect the health hurdle.
2. To discern the contribution of Primary Health Centres (PHCs) and unqualified rural medical practitioners (RMPs) in health output.
3. To fathom the efficiency of the existing health providers.

The study looks for to understand the disease profile including minor illness, hospitalization, situation of maternal and child health, non-communicable diseases and mental health of this region. Except price and quality effects, what other factors also affect healthcare choices is another part of health seeking behaviour. The role of education, age, duration of illness, and so forth, provide important insights into the potential opportunities and limitations of public policy to affect patterns of demand. This will help us to understand the health seeking behaviour of the inhabitants and to identify the barriers to access healthcare services encompassing social, physical and economic aspects.

The role of Primary Health centres (PHCs) and unqualified rural medical practitioners (RMPs) in the entire system of healthcare delivery and utilization is another significant objective of this study. In this regard the understanding of their referral system and weakness which are the most important causes to improve the health status of the people, especially the poor, by reducing mortality, morbidity and disability. This will focus light on the causes of bypassing the local health facilities and congestion in the upper tier hospitals.

The third objective of this study is about responsiveness (inefficiencies) of different tiers health facilities across the blocks specially in terms of preparedness. This also provides information to the policy makers about the strength and weakness of the existing health care system. It is expected that this study will provide the people of Western Dooars and its adjacent locality, the local stake holders and the Government to design a health plan for this area.

1.4 Research Questions

The need for a special focus on the Western Dooars is longstanding due to its extreme geographical barriers and huge poverty among most of the blocks which faces inadequate and ineffective public health services. Our focus not only to show why Western Dooars are different in terms of health indicators and utilization of healthcare services but also to

measure the extent of unmet need for people's health security. Thus to estimate the efficiency of health system is another main interest of this kind of research. Health of this area is very much linked to their social, environmental and economic security, so it is our aim also to measure the links and posit health security on a broader spectrum of issues related to the protection of the Western Dooars.

The study is based on three primary research questions.

1. What are the natures of health seeking behaviour of Western Dooars? Here the main areas of investigations are general morbidity, burden of communicable & non-communicable diseases, child health, maternal health and mental health of the research area.

2. What level of efficiency the existing health providers (both public & private) have in Western Dooars area? Here the study will try to prepare the performance schedule (efficiency) of public and private health providers by analysing their behaviour and this also strengthening the coordination between economic and social sector policies.

3. Is there any gap between the above mentioned questions i.e. to measure the extent of unmet need for people's health security? If yes, what factors are responsible for this by which people of Western Dooars and its adjacent locality, the local stake holders and the Government to design a health plan for this area?

As like other research, this study will also be followed by some secondary research questions or some sub-branches of primary research questions.

1. What kind of similarities or dissimilarities exist in health indicators of Western Dooars compared to the whole of West Bengal?
2. How is the health of this area linked with social, environmental and economic securities which posit health security on a broader spectrum of issues related to the protection of the Western Dooars?
3. How much health inequity performs between rural-urban areas, among various social groups, standard of livings as well as religious groups and caste groups?
4. How even (or uneven) is the healthcare distribution of accessibility problem across all blocks of the area?
5. What levels the obstructions are strong to achieve a reliable source of health care?
6. What kind of efficiency variations performs between different (primary) public health providers in this area?

1.4 Research Hypotheses

Based on the objectives of our study and the research questions just mentioned we would like to test the following hypotheses for our purpose.

1. General morbidity rate is higher than the state average. Here we go to test the prevalence of types of diseases in the research area.
2. The dual burden of communicable and non-communicable diseases is quite evident. The pattern of disease burden is tested under this hypothesis.
3. Half of the children (below 5 years) are chronically malnourished. The picture of child health of this place are discussed with the findings and compared with the state level.
4. Women share disproportionately higher burden of ailments than man do. The burden of diseases in terms of gender is tested in this hypothesis.
5. Utilisation of inpatient care is higher than the state level. This hypothesis reflects the hospitalization rate of Western Dooars in terms of local facilities for inpatient care.
6. Dominance of RMPs in outpatient care market. This hypothesis will test the network, nature of treatment, referral behaviour, drug use and risks associated with RMPs treatment behaviour.
7. Utilisation of maternal healthcare at institutions is low. Here we test the utilisation of institutional delivery, antenatal care, and prenatal care with state comparison.
8. Low bed occupancy rate at local facilities. This will test whether the large numbers of patients bypass local facilities to seek treatment in upper tier hospitals.
9. Utilisation of outpatient care at public facilities is also at sub-optimal level. Here we test the presence of unqualified RMPs how influencing the healthcare seeking behaviour over public provided health facilities.
10. Not infrastructure but frontline workers shortages are more important for inefficient functioning of the health system. In this hypothesis the study test that physical infrastructure of BPHCs is not serious problem, but shortage of frontline workers and complementary equipment keep them partially ineffective.
11. Efficiency of the primary providers are functioning at some sub-optimal level. In this hypothesis the study test the efficiency situation of the primary providers and also find the gaps between optimal and actual performance.

12. Most of the primary producers are remain unable to utilise its resources like beds, equipments, man-power, medicines at some full capacity. Here, the study test the gaps between allocation and utilisation of health inputs mainly among primary providers.

1.5 Methodology and Data

Western Dooars, a cluster of biosphere reserves and home about 2.5 million people, is a part of Jalpaiguri district of West Bengal state and it is the agglomeration of 11 blocks. The nature of the study is both the primary and secondary type. The study can be divided into three parts. First one is health seeking behaviour analysis, which is basically observed on the basis of primary observation collected from this geographical arena. Second one is estimation of the efficiency of the existing providers and for this, the present study will depend upon the data supplied by the district level authority. In the third part of this study, both the demand side and supply side efficiencies of health units will be compiled. For the last part, comparison between study findings and the survey results like DLHS-III, NFHS-3 will be analysed.

The primary data sources are (i) Households of a chosen village in the blocks (ii) Sampled patients from the Primary Health centres (PHCs), (iii) Sampled RMPs from different blocks. The secondary panel data will be collected from Primary Health Centres (PHCs) of different blocks and an in-depth interview with Block Medical Officers in Health (BMOHs) and Chief Medical Officer in Health (CMOH) of Jalpaiguri district. For comparison of the results with national and state level, the study also uses District Level Health Survey, National Family Health Survey (DLHS-III, NFHS-3) data set. For this capacity assessment of the government health facility over the region the secondary data about the Primary Health Centres (PHCs) also collected from District Hospital, Block Primary Health Centres, Sub-Divisional Hospitals, Primary Health Centres. The extensive interview with BMOHs and CMOH covered infrastructure of PHCs, availability of drugs in PHCs, availability of critical services for maternal and child health care in PHCs, available capacity and utilization of various outpatient and inpatient services in PHCs, vulnerable and difficult to reach areas in the block. The panel secondary data will be used for the part of efficiency estimation.

The study discuss the health behaviour of peoples and providers in some particular point of time and the character of data may change in another point of time. So such kind of studies is not fully static and dynamic in sense, hence comparative static nature is more appropriate here. The study methodologies are different for customer and providers of health services. But there must be some linkage between these two methodologies which also helps us to explain the significance of the research.

1.5.1 Households Study Methodology

The study has been conducted in different blocks of Western Dooars. The selection of the households involves a two-stage random sampling procedure. As per the perspective of this study, the blocks are arranged in terms of high, medium and low population density and three blocks are chosen, one from each category. Now, from every block three PSU / Villages are chosen in terms of their location (distance) from block headquarter through purposive sampling. The selection of PSU is based on their distance from the block headquarters. One PSU be selected from very remote area of block (more than 10 Km), the second one from relatively less remote area (5-10 Km) and the third one from the nearest (located within 0-5 Km) to the block headquarter. Here, we assume that the highest health facilities are mainly located near block head quarter. The selected blocks for this study of Jalpaiguri districts are Alipurduar-II, Falakata and Madarihat and from these three blocks total nine villages /PSUs were selected on the basis of distance from the block head quarters. Among these nine villages three are located close to the respective head quarters, i.e. within 0-5 Km distance, three are within the 5-10 Km distance from the block head quarters, and the last three are located more than 10 Km distance from the respective head quarters. Thus, for these selected blocks, all the highest health facilities are situated at the heart of the block head quarters. In case of Alipurduar-II the main health output producing units are one Rural Hospital (RH) and three PHCs, but the Alipurduar Sub-divisional Hospital (SDH) located at Alipurduar-I which is very close to the border of Alipurduar-II also. Thus the distance specification for the selected villages in case of Alipurduar-II block are taken on the basis of distance from the SDH located in the border of Alipurduar-I and Alipurduar-II block. In case of Madarihat block the highest health output producing unit is Birpara State General Hospitals (SGH) located at Birpara, and the corresponding PSUs are selected on the basis of distance from that SGH. Similarly for Falakata block the top level health facilities are supplied by one Rural Hospital (RH) located at the block head quarter, and here also corresponding PSUs are selected on the basis of corresponding distance from the RH.

In the second stage 50 percent of the total households has been selected from each of the selected PSU / villages. A 10 percent over-sampling (i.e. additional 10 percent of total households in each PSU) of the households have been considered in order to adjust for non-responses. The survey covers a total of 1011 Households from nine villages covering approximately 4658 individuals. We have conducted the survey using structured questionnaires which primarily focus on health status, health seeking behaviour, utilisation of

healthcare facilities, out of pocket payments, maternal health, child health, antenatal care etc. The comparison corresponds to following health indicators has been made by useful statistical techniques. More specifically, the investigations focuses on four sources of information: (i) those who were hospitalised (for inpatient care) in last 365 days; (ii) those who sought outpatient care in last 30 days, but not hospitalised; (iii) selected household members above 40 years of age to enquire whether they have been suffering from any of the selected major chronic health problems or have associated risk factors; (iv) selected women who delivered births during last five years. The focus was on the maternal health and the health and nutritional status of the last-born child. For collection of information on maternal and child health, only one mother from each household, who delivered at least one live birth during last five years, have been selected. In case a household had more than one eligible mother, the respondent mother have been selected following Kish table(a procedure adopted by the NFHS). The figures of health indicators have been compared with the state level (West Bengal) and national (India) figure. Such comparison helps us understand the relative position of Western Dooars in the state and in the country.

1.5.2 Patient Choosing Methodologies of PHCs

For the purpose of the study, detailed visits were made in all the 38 Primary Health Centres (PHCs) under structured questionnaire. The infrastructural, manpower, medicines, inpatients admission and outpatients visits was observed very carefully for each PHC under structured questionnaire. For some yearly results in case of patient's admissions and outpatients visits were collected from the district Chief Medical Officer in Health (CMOH) office at Jalpaiguri. During the visits of PHCs another parallel survey has been conduct on the inpatients and outpatients visited at that time of that concerned PHCs. In case of outpatient department (OPD) every second patient in the speciality queue was approached and briefed about the study by the investigator. If he or she agreed, they were asked about their socio economic conditions at that time. As they finished their visits in the PHCs completing all types of services like doctor's advice, medicines allocation, diagnostic tests etc., they again approached at the gateway of PHCs regarding the experiences they gathered from such facilities. By this way a total of 919 patients has been surveyed from OPD facilities of the existing PHCS. In case of inpatient department (IPD) visits the study first consider that bed size of the all 38 PHCs of Jalpaiguri district varies from 0 to 10, and there are total 256 beds providing IPD services for the 3.1 million people at the primary level healthcare. Here the study meets with the two third patients of the IPD in each PHC. The selection of the patients

has been made on the basis of every first and second patients from the three patients admitted in the respective PHCs. Thus out of 256 beds 171 patients have been interrogated regarding their perception of service quality rendered by the PHCs of the study area.

1.5.3 RMP Choosing Methodology

For RMPs same techniques have been used like PSUs selection and 30 RMPs from each block have been selected of which 15 RMPs from the block headquarter and another 15 from remote villages of block are selected. In total, 90 RMPs have been interviewed under structured questionnaire through this process. The focus of this interview is on their back ground, background of their patients, knowledge about various diseases and treatment procedures and referral behaviour.

1.5.4 Methodology regarding Efficiency of PHCs

The economic efficiency of the health providers is an important aspect for the achievement of health output. The measurement of such efficiency has been done by two techniques, namely Stochastic Frontier Analysis (SFA) and other is Data envelopment Analysis (DEA). SFA is a parametric technique for estimating the efficiency and also identifies the frontier of production. SFA uses regression analysis for estimation of production frontier and the residual term of this estimated regression measures the technical efficiency (inefficiency) of a unit. Except stochastic error, an additional error term is also included in the system known as systematic inefficiency (White Noise). It is also assumed that both the error terms follow independent identical distribution (IID). The other way to measure the economic efficiency has been by Data envelopment Analysis (DEA). It is a methodology based upon an interesting application of linear programming. Initially it has been used mainly by performance management. Now it is effectively employed for assessing relative performance of a set of firms that use a variety of identical inputs to produce a variety of identical outputs. Now a number of practical applications for measuring performance of similar units such as hospitals, health centres, diagnostic centres, a set of schools and banks are found. DEA is an indicator of efficiency, defined as the ratio of a weighted sum of the output of a productive unit to a weighted sum of its inputs. It is a non-parametric approach. In this study we use the non-parametric DEA approach to find the technical efficiency score and scale efficiency score of each PHC. Under DEA a production possibility frontier has been created which will depicts a locus of potentially technically efficient output combination that a health system is capable of producing at a point of time. An output combination below this frontier shows

technically inefficient output. Here, under DEA each PHCs units are treated as the decision making units (DMUs). There are some normal national standard of PHCs guided by Indian Public Health Standard (IPHS). Here, we ranked the PHCs in terms of efficiency scores and indentify the peer group and also the sub-optimal output producing units in that respect. In health reduction of input is not a lawful as well as justified considering its social welfare aspects. Thus from such ranking it will be helpful for the health planner to identify the low performing units and take necessary steps for the further development. For the estimation, we use secondary data collected from Human Development Reports of West Bengal 2004 (HDR, GoWB, 2004), websites of the states, Economic survey 2007 (GoI,2007), RCH survey 2006, RCH district level household survey-phase 3 (DLHS III,2009), NSSO 60th round data on morbidity, healthcare and condition of the aged (NSSO,2004), NFHS-3 and other published works. The district level information for different years have been collected from Chief Medical Officer and Block Medical Officer of the health department of the district Jalpaiguri. The interview with these respective officer is guided by a checklist about information on the available capacity and utilisation of various outpatient and inpatient services, infrastructure, availability of drugs, availability of critical services for maternal and child health care, vulnerable and difficult to reach area in the block and so on.

1.6 Research Gap

The study is expected to provide the people of this region and its adjacent locality, local stake holders and the Government to design a health plan for this area. It is our aim also to measure the links between social, environmental and economic security and posit health security on a broader spectrum of issues related to the protection of the Western Dooars. The earlier studies measured the health seeking behaviour and efficiency of the existing producer for the national or more specifically for state level. Such district level regional work is very much rare, specifically for India.

In this respect, another question may arise why a research of such district level (Block wise) study is important? The district level study has been considered important because firstly, a district has sufficient amount of capabilities required for formulating and implementing plans, secondly, a district is reasonably large to be viable for planning and thirdly, a district is not an isolated unit but an aggregate of sub-centres, PHCs and community health centres. Therefore, the adequacy of health programmes as well as peoples' participation and awareness generation, needs to flow from the district to the lower levels. But here we consider the

region which is not a district but a large part of district. Thus, within this kind of research we have highlighted the scenario of the place which is far from district conurbation but within the district. The analysis helps to analyze how relatively the variables behave differently than its district counterpart. Thus, how this area suffers by the inequities in terms of infrastructure, utilization and outcomes is an important part of the study. The inequity measures account for understanding disparities between rural-urban areas, among various social groups, standard of livings as well as religious groups and caste groups. Considering this, a reduction in health inequity with a greater public-private divide in utilization of healthcare is an interesting feature. Establishment of efficient health requires creating relationships between design of health system and performance [WHO, 2001] and observing the efficiency of the system.

The investigation here is that blocks with higher per capita health facilities (per capita public health centre) and qualified doctors in rural areas and better infrastructure in terms of beds per capita and high percentage of attended births have higher chances for better health outcomes in the forms of lower IMR.

We have tried to identify the gaps in the health care delivery system and accordingly to project the unmet health needs of the people. The available data, especially on demand side are too scattered and inadequate to identify the gaps. To discuss the health behaviour several questions remain unanswered: To what extent the health care need of Dooars are different from the rest of state? To what levels the obstructions are strong to achieve a reliable source of health care? How even (or uneven) is the distribution of accessibility problem across all blocks of the area? What proportions of population remains uncovered by the present health care delivery system? and, so on.

Thus, for such kind of study our steps for planning process are follows as: Step-I: Generation and compilation of adequate evidences to answer these and many other questions which could be used as the necessary inputs for the further progress of this study. Step-II: Preparation of a realistic, innovative and comprehensive intervention plan for the Western Dooars area.

1.8 Break-up of Chapters

Chapter 1. *Introduction*: In this chapter meaning, background and necessity of health seeking behaviour and efficiency of the healthcare system will be explained. The objective of

the study with possible research questions and research hypothesis will be discussed here. Why such study is important for a sub-district level will also be added here.

Chapter 2. Review of Earlier Studies: This chapter will contain a review of the earlier studies on health seeking behaviour and efficiency estimation of existing health providers. This chapter is made of three parts purposively. There are separate studies on both health seeking behaviour and efficiency estimation of existing providers from international and Indian scholars. Some works are found as a juxtaposition of these two things. The first part will give a review of earlier studies on health seeking behaviour. The second part will contain a review of earlier studies on provisions of healthcare facilities and their respective efficiency character. In the third and last part of the literature survey, we will consider the mixed types of study which agglomerate the demand and supply side of healthcare behaviour.

Chapter 3. Health Development and Indian Five Year Plan: The major objective of development planning in India is to accelerate economic development with social justice. The social justice is referred to as the equal opportunities in the society to access the developmental efforts and own the same. This chapter will contain two major parts. Part I will analyse the major programmes initiated for the development of health in India. Part II will analyse major policies of the government of India in regard to the health development during the planning process i.e. from first plan to eleventh plan.

Chapter 4. Profile of the Study Area: Under this chapter the natural and human face of Western Dooars be discussed thoroughly. The physical features, demographic characteristics, literacy, climate, rainfall, soils, land use, flora & fauna and economic features will be discussed briefly.

Chapter 5. Health Seeking Behaviour of Sampled Households: This chapter will present a brief overview of the demand side issues related to the health system of Western Dooars. More specifically, it will focus on three inter related components of the system: (1) Socio-economic environment (2) Health status, and (3) Health seeking behaviour. All three components be addressed largely on the basis of primary data collected from the survey conducted in 9 villages across the three blocks of Western Dooars.

Chapter 6. Healthcare System of Western Dooars: In this chapter, the study will identify the primary providers of health services in Western Dooars with both inpatient and outpatient services. Here, the study mainly deals with the Primary Health Centres (PHCs) of the district

Jalpaiguri. Their character, capacity, availability, functioning and governance are depicted from the basis of primary & secondary observations.

Chapter 7. Health Seeking Behaviour of Sampled Patients: The study concentrates on the service delivery process of the lower tier health facilities in case of both the inpatients and outpatients health facilities. Thus, in this chapter the study deals with some behaviour of the inpatients and outpatients under different services rendered by the Primary Health Centres(PHCs). The socio-economic status of both kind of patients are vividly discussed in terms of access of different kind of services of PHCs.

Chapter 8. Efficiency Estimation of Existing Primary Providers: This chapter will measure the efficiency of the existing providers with the help of DEA techniques and other descriptive statistical measures. In this chapter the study first concentrated on the basic theoretical formulation and assumptions of Data Envelopment Analysis (DEA). Some indexes are introduced to formulate the input and output of the DEA based model. The analysis of efficiencies of the existing Primary Health Centres (PHCs) of Jalpaiguri district can be done by "konSi software for estimating productivity and efficiency for step-by step benchmarking" (<http://www.dea-analysis.com>). Here, with the help of the software, the PHCs Technical score and Scale score are to be calculated and ranked in terms of those values. The ranking will generate the efficiency frontier of the PHCs performance, from where the best performing PHCs can be identified and recommended as peer group. The other inefficient or less efficient PHCs can also be identified with their corresponding position in the efficiency frontier. The scope of radial expansion and introduction of slacks are also discussed in this chapter for the inefficient PHCs of the district.

Chapter 9. Potential Service Delivery Space of Primary Health Centres: In this chapter the study will compare the gaps between demand and supply of health facilities of Western Dooars region considering the efficiency from the previous chapters.

Chapter 10. Summary, Policy Recommendations and Conclusions: In this chapter study will summarise the findings of the research. The suggested policies for better functioning of health will also be prescribed here with conclusions.

CHAPTER 2

Review of Earlier Studies

- **Introduction**
- **Section-I: Earlier Studies on Healthcare Seeking Behaviour**
- **Section-II: Earlier Studies on Provisions of healthcare facilities and their respective efficiency character**
- **Section-III: Earlier Studies on Performance of healthcare**
- **Conclusion**

CHAPTER-2

Review of Earlier Studies

2.1 Introduction

This chapter contains a review of the earlier studies relating to health seeking behaviour and efficiency estimation of existing health providers. This has been subdivided into three parts purposively. There are separate studies on both health seeking behaviour and efficiency estimation of existing providers from international and Indian scholars. Some works are found as a juxtaposition of these two things. The problem of development of health is linked with the poverty, backwardness and inherits superstition of the people in the study area. Poor people are more sensitive to the price of medical care and suffer by the greater burden of disease than non-poor. Thus low price or free cost conception of health goods and services largely increase the consumption of such goods by greater amount. World Development Report emphasizes that health goods and services should by default be treated as normal goods for providing in the market. As the people are poor, the level of savings and expenditure are low and they intake less nutritional food. As consequence they are prone to disease, ailing and malnutrition. Therefore, there is some basic need to study the earlier literature to understand health seeking behaviour. To understand the provision for such demand, the supply side behaviour of healthcare cannot be ignored. Naturally, the second part of review of earlier studies is done on the supply aspects of health facilities provided. In the third and last part of the literature survey we consider the mixed types of study which agglomerate the demand and supply side of healthcare behaviour. The segregations are as follows: SECTION-I gives a review of earlier studies on healthcare seeking behaviour. SECTION-II contains a review of earlier studies on provisions of healthcare facilities and their respective efficiency character and SECTION-III contains a review of earlier studies on performance of healthcare with respect of the requisite demand.

SECTION-I

Earlier Studies on Healthcare Seeking Behaviour

2.2 Introduction

This part provides a review of the earlier studies on the healthcare seeking behaviour. Healthcare is such a factor which influenced by different quantitative and qualitative variable. Generally the demand side determinants are defined those factors that influence demand for healthcare. These factors are operating at individual, household or community level. Identification of illness by an individual and seeking care are the two components of demand for healthcare.

Arrow KJ. (1963) firstly distinguish between health and medical care. He identifies health as a combination of nutrition, shelter, clothing and sanitation. But the concept of medical care situated around the doctors, health facility units and character of health providers. The study identifies medical care with some important feature. Demand for medical care is irregular and unpredictable and there are costs of illness which can lead to death. Medical care is such kind of goods where product and activity of production are identical and a patient cannot argue about its tests before consuming it. Thus some kinds of trust elements are there in the consumption of medical care. It is such a product where physician has more information compared to patient, as a result some kind of uncertain quality exists in the product. Regarding supply, the author suggests that supply of medical care is controlled by the government artificially (through licensing) to maintain quality. Price discrimination is followed in this profession. Since private costs are much lower than social cost, the society seeks to active optimally through non-market means. In his study the author identifies that hospitals are performing with increasing returns up to a certain point particularly in the low income areas.

Grossman, (1972) first shows that demand for health is somewhat more complicated than the demand for a normal product and estimation process of demand for healthcare is less directly derived. So a perceived kind of demand for healthcare is always faced by the providers. He identifies that consumers have demand for health but cannot directly purchase it. Consumers purchase the healthcare services that are used to produce health. Thus the study finds that healthcare has a derived demand rather than direct demand. The actual proposition of this study shows health can be viewed as a durable capital stock which produces output of healthy time. Individuals inherited by an initial stock of health which depreciate and which can be

increased by investment. 'Shadow prices' of health depends upon other factor besides the price of medical care, the identifies. He concludes that movement of such 'shadow price' will be downward with education. Because as education level increases, more efficient producers of health enriched the society.

Peter S. Heller (1982) investigates that total medical demand which is measured by absolute volume of outpatient and inpatient consumption is highly inelastic to the cash price and to the cost of time utilisation. It is also inelastic with respect to income. The study provides an empirical analysis of the determinants of the demand for medical services in Peninsular of Malaysia on the basis of World Bank designed data set. The results of the study suggest that higher level of community morbidity (which is proxy by infant mortality rate) do not lead to higher utilisation of medical services. It also suggests that within the age group 0-4 years, girls are seeking healthcare more than boys. Consumers of this area are also sensitive to the way in which the time of utilisation is spent, with high travel and treatment time causing reduced demand for services.

Gertler, Locay and Sanderson (1987) show that income is an important factor which influences the utility function of health. They first consider that due to discreteness of demand for healthcare, the price effect on health is not independent of income. Thus general utility maximization principle is not applicable here. They argue that since health is treated as normal good with discrete choice specification under such situation conditional utility function allows for a non-constant marginal Rate of Substitution (MRS) such as semi-quadratic utility functions which is linear in health and quadratic in consumption.

Gertler & Van der Gagg (1988) provides a methodology for the *ex-ante* evaluation of the welfare effects of proposals of user fees to finance improved access to social services. Their study is based on willingness to pay for improved access to medical services where willingness to pay is the maximum price that can be charged without reducing the individuals welfare. The study is based on Cote d' Ivoire and Peru and confirm the decision that when public sector provides medical services at zero prices, it is difficult there to estimate the demand function. They also have found that consumers would be willing to pay significant amount for improved quality of healthcare.

Alderman and Gertler (1989) have studied in Pakistan for the shifts of healthcare choice by the greater availability. They consider the effects of availability of health facilities locally on the health seeking behaviour. The study has found that if the average distance to the nearest

facility is reduced by 50 percent, demand at those clinics would nearly be doubled. As a result self-care or no-care is reduced remarkably. They add also that then there will be some kind of shift of choice from privately providers like traditional healers to government supported public provided facilities.

Ellis & Mwabu (1991) identify individual's decision to choose between different healthcare providers considering the cost and quality of healthcare options available to him. In their study on Kenya, they have found that higher-priced options in private health providing sector associated with higher quality of healthcare. This implies the basic assumption of varied quality care exists in the system. The study represents that actual price effects on the choice of healthcare provider is wrongly interpreted.

Litvack & Bodart (1993) enquired about: does the quality improvement financed by increased user fees primarily benefit rich people?. They have argued from the study that this is not necessarily true. The study on Cameroon finds that poor have been shown to take greater advantage of simultaneous increase in healthcare quality (drug availability) and fees than the rich people. They have established that there are combinations of price and quality that will be chosen by the average consumer which may be unaffordable by the poorer. They comment that choice of a provider more influenced by the quality of care variables like drug availability, infrastructure, and services than the distance and price. They add that the probability of using health centres is increased significantly in the treatment areas compared to those in controlled areas. Thus when drugs are available at local health facilities, the increase in the value of service far outweighed the fees charged compared to time, transportation and treatment cost.

Hotchkiss (1993) has studied choice of obstetric care in Cebu, Philippines. Regarding quality he has considered the availability of medical supplies (number of drugs available for diarrhoea), practitioner training (doctors or ANM), service facility, facility size, waiting time etc. The study found among these qualities of services provided has a significant effect on users' choices. For educated women drug availability, doctor availability and waiting time highly affect the choice of health providers during deliveries.

Levy & Quigley (1993) have studied on low income households in Ghana and observed that household income is an important factor to influence demand for health care rather than the price of medical care during ailments. They consider that user fees are not important factor

for demand of healthcare. In case of typical LDC availability and accessibility of treatment choices are more important than prices in determining decisions about medical care.

Mwabu, Ainsworth & Nyamete (1993) have studied of a rural district in Kenya and looked at treatment-related measures of quality, including the availability of a variety of drugs and diagnostic equipment. They estimate that demand side of health care using Nested Multinomial Logit models (NMNL) using individual and community level data from Living Standards Survey. They have divided the quality care character of health care into five broad categories – drug availability, number of medical staff, infrastructure, immunization and other services and presence or absence of an operation room. The individual level price factors are grouped into distance facility chooser, which are measured by travel costs, fees for consultations and the individual characteristics like age, gender, year of schooling an whether the head of the household was educated or not. In their study they conclude with impact of improving variables like drug availability, presence of qualified doctor, reducing distance i.e. improving accessibility. The study finds that demand is lower at facilities lacking aspirin. Curiously, demand is higher at facilities lacking anti-malarial drugs. The likely explanation is that high demand depletes the stock, and not that stock shortages encourage demand. The probability of a visit to a public facility is found to be positively related and most sensitive to the availability of a broad number of drugs.

Benefo & Schulz (1994) examine whether the preventive and curative health services are direct inputs that affect an individual's health status and ability to cope with ill health. In their study on fertility and child mortality on Ghana and Cote d' Ivoire they have found both the distance to clinics and price of medicines are negatively correlated with the health outcomes. Thus increased distances to clinics lead to higher mortality rate for children in Ghana and Cote d' Ivoire. They also have found that price of antibiotics is a significant determinant of mortality in Ghana. They depicted that if the drug prices are doubled, child mortality would be increased by 50 percent. They also comment that even the inclusion of community services and prices as well as household resource, the average mortality rate of other households in a community explain the probability of a child survival.

Lavy and Germin (1994) measure the responsiveness of consumer demand with various quality characters of provider choices. Their study with World Bank data on less developed countries shows that conditional utility function of healthcare is stable and consistent for healthcare choice behaviour. By this type of analysis they have fitted empirical model for the effect of quality of healthcare on household decision making. They investigate the quality of

healthcare in Ghana in terms of variables like availability of infrastructure (Bed), manpower (Doctor & ANM), basic adult and child health services, diagnostics tests, immunizations, drugs and different antenatal-postnatal care. The conclusion of this study is that first four variables has large and significant effect on demand for healthcare. They also have identified these changes in quality shifts choices from private to public providers and from self-care to scientific modern care. They have concluded that if the aim of the government is to bring more people under public health facilities then quality changes alone could be expected to reduce the probability of self-treatment.

Dreze & Sen (1995) have found that for India the government provided facilities are neither inexpensive as it seems nor of best quality and is also inaccessible. They investigate about the nature of public and private healthcare providers under the demand for healthcare seeking behaviour in India. The study shows that quality of public health services in India is not inexpensive as it seems and the quality of care is also not the best level. Private provision is much expensive and easily accessible. The quality of care in the private sector is uneven also. They have concluded that in India private sector is still accessed more than the government sector for curative primary healthcare need though it has expensive and uneven in respect of quality.

Frankenberg (1995) has studied the effect of education on health services. The study on Indonesia finds that government provided health services has only a small effect on the average mortality rate in Indonesia. But if the figure is considered for the children of uneducated women, the effect is three times larger. Thus they suggest that if the mother has at least primary education then tendency of childcare by self-treatment is reduced and visits to public health centre or maternity clinics is increased. They also have suggested from their results that investment such as government health choices by improving immunization or by providing medical drugs improve the health of the poor people. The study considers the 'placement effects' (Where the services are located and where they needed most) to analyse the nutritional impact of government investment programme.

Sundar (1995) has studied the pattern of out-of-pocket expenses in India. The study finds that out-of-pocket expenditure for curative care is not negligible for India. From this analysis it is found that preferences to visit the private facilities are remarkably higher than the public facilities visits in India. The author has questioned that whether there is any need for the existence of free healthcare facilities under public provided healthcare system. This study, based on NCAER's 1993 Market Information Survey of Households (MISH), presents

aggregated (all-India) and disaggregated (state level) data on household health care expenditure and utilization. The MISH survey is conducted over a one-month period in mid-1993, and gathered detailed data on the prevalence of illness, utilization and source of health services, types of providers, system of medicine used, expenditure associated with each illness episode, and the distance travelled to seek treatment. In addition to yielding a useful morbidity profile, this study provides a number of valuable insights on the nature of health care utilization in India. It finds, for instance, that the number of reported hospitalization cases (per thousand of the population) is considerably higher in urban than in rural areas, perhaps reflecting differences in access to hospital facilities. (Correspondingly, the percentage of untreated illnesses was found to be higher in rural areas.) Importantly, the survey finds a high dependence on private sector facilities for out-patient care; moreover, this dependence on the private sector is higher for higher-income groups and, independently, for highly-educated urban residents. In sharp contrast, when hospitalization becomes necessary, both urban and rural residents tend to use public health care facilities more than private facilities; this is especially true of Himachal Pradesh, Madhya Pradesh, Orissa and Rajasthan.

Dow W.H. (1996) has estimated both the conditional and unconditional demand elasticities for Cote d' Ivoire. The study is done on the basis of consistent data set provided by Living Standard Measurement Survey conducted by World Bank. On the basis of observation Dow suggest that conditional demand elasticities can be interpreted as short-run effects in compare to long run effects. So the study recommend calculate unconditional demand elasticities to explain the healthcare behaviour. The reason behind this is that unconditional demand elasticities consider the effects of health needs of both healthy and ailing persons.

Alderman H. & Lavy V. (1996) have studied the effectiveness of public investment on healthcare directly influence by the public response to price and quality of healthcare provided. They have analysed success of such public expenditure depends upon the improvements of health outcomes. The study is based on African countries like Ghana, Nigeria and Kenya shows that poorer income group of people are willing to pay fees if the quality of care improves. They comment that here fees are translated to improved access and reliability. But if this price translation fails the event like malnutrition, child mortality rises. The study also shows that availability of basic healthcare relatively have a greater impact on poor with low income and low education than the specialized services.

Masako Ii (1996) examines the determinants of demand for medical care in urban areas of Bolivia. The study considers the relation between cost recovery and use of health services for

different age, sex, ethnic and income groups. The study concluded that low price elasticity of demand could be used as a source of increase revenues by charging users fees. But it is found that demand for outpatient care is price elastic. So here price increase may be adversely affected the welfare implication for the low income groups.

Hitesh (1996) considers the decision making for seeking healthcare in India. The study shows that mother-in-law really dominates decisions of child birth in India. The study for rural Rajasthan finds that traditional birth attendance for home delivery or at public health facilities depends on the belief of mother-in-law. According to the author there are some factors which may reduce this old believes and male dominance over healthcare decision making. The study concludes that female dominance over household decision making increases if they are educated or contribute to household income.

Yip et.al (1998) studies the factors that influence patient choice of health providers in villages, townships and country level in China. They investigate on household survey on outpatient treatment in Beijing in 1993. The analysis is based on multinomial logit model. The study finds disease patterns have significant impact on patient choice of providers and the higher income group chooses country level health provider by self-choice of medical facilities. The effect of insurance choice creates a division among the people regarding healthcare. Government and labour health insurance beneficiaries are more likely to choose country level hospitals, but the insurance covered by rural cooperative medical system are more likely to use village level facilities.

Grossman M. (2000) analyses individual investment and consumption decisions are playing most significant role to improve health seeking behaviour. He considers a particular quality of demand for healthcare influenced by individual, community factors and the price of medical care. The demand function can be written as

$$Q_d = D(\text{Household factors, Community factors, Prices})$$

Household factors include age, sex, income, education, knowledge about characteristics of medical treatment. Community factors include religious and cultural influences. Price is a complex variable includes distance cost, time cost (opportunity cost) of treatment (since treatment require time cost e.g., a daily wage earner losing wage during the time of treatment). Thus during the purchase of health goods the price paid are measured by the distance / travel cost and the opportunity cost of time of treatment. The substitute goods also

influence the price of health. For example location existence to the facility, safe employment, and better nutrition are the substitute which reduces the probability of ill health.

Gilick P.et.al (2000) investigate the behaviour of education and health sector on the basis of World Bank data (1996) and government provided data of Madagascar. The research reported in this study has two parts. The first part is descriptive and investigates the utilization of education and health services—both public and private—by different segments of the population of Madagascar, with a particular focus on whether these benefits are reaching the poor. In addition, using unique community-level data on local schools and health care providers, the study examine the level of and variation in indicators of the quality of services and of the availability of services. The second part of this study, therefore, consists of such a behavioural analysis. Econometric techniques are used to estimate the demand for education and health services, using the community data just mentioned together with matching household survey data. Regarding household expenditure on illness, the study found that estimated indirect costs of treatment are quite significant and larger than the direct cost of healthcare. The descriptive study also identifies that inequalities exist within rural areas to access the services. The location advantages of health provision are enjoyed by a small group of population. Regarding private providers the study finds that there are not viable alternatives for the poorer section. Significant differences regarding provision of social services are not observed on the basis of gender.

Agha et.al (2000) in their study finds that maternal schooling is the most important factor in determining child survival in Pakistan. In some district level study Agha shows that the variable of maternal schooling is most significant than the variable like distance, out-of-pocket expenses. The study shows that for the child mortality rate is lower in the families where the mothers have at least primary education rather than have no education. The study explains with rigorous survey results that other than education socio-economic status also influence the child mortality rate in a place like Pakistan.

Getzen T. E. (2000) has studied the influence of income elasticity for healthcare to determine whether the good like health is a necessary or a luxury from individual or national level. The study finds that income elasticity for healthcare varies for individual and national respect. The study shows that for healthcare from individual respect with insurance, the value of income elasticity is nearly zero, but the national health expenditure elasticity is greater than unity. The study considers the value of income elasticity for both level based on the different

studies of earlier group. Since the income elasticities varies with the level of analysis, the study concluded that healthcare is neither “a necessary” nor “a luxury” but both.

Ramasubban & Rishyasringa (2000) on India show that provisions of health education advice and information are not enough for the development of health seeking behaviour. A woman with superior education and also contributing income for the households remain engaged in some boring work to maintain household’s activities. The study shows that for the above average performance of social development like healthcare higher education base is the minimum precondition. He suggested that education influences ability of individuals through better lifestyles which also reduces the dependence on health services.

Lindelow M. (2002) discusses it in his paper how the individuals of Mozambique behave during episodes of illness and what factors are responsive for such behaviours. The quantitative evidence of this study comes from Mozambique National household survey on living conditions 1996-97 considering individual, household and community level. A ‘flexible’ multinational model is used for healthcare provider choice during illness study. The theoretical framework is based on utility maximization principle and household production of health. The study concludes that for the poorer section a small change of price would have a substantial impact on access of healthcare. Primary educations have a very strong positive effect on the probability of individuals seeking care or not during illness. The results also indicate that eradication of poverty, independent of improvements in physical access to healthcare and education, will have only a negligible effect on healthcare choices.

Lohlein D. et.al (2003) analyse the determinants of access of healthcare in rural Russia. They investigate whether the factors like income and ability to pay govern the rural population access of healthcare like urban Russian people. Their study is based on household data of 2000 on two regions of Russia and show how the reduced role of state have affected access of rural healthcare.

Lawson D. (2004) investigates the impact of income and user fees on the healthcare demand in Uganda. The study is based on National household survey (NHS), 1999. In the research the author has found income is strongly associated with increased healthcare usage for all age groups and especially for females. But the user fees are less significant especially when health units are in proximate distance. It is observed that health seeking behaviour differ in relation to age, gender and increased level of education. As the education level increases the choices are also varies from government provided healthcare facilities to private indicating

the former is an inferior. He adopted nested multinomial logit (NMNL) approach which not only focuses on most important decision regarding choice of healthcare but also what type of medical care is demanded.

Ensor T. & Cooper S(2004) consider what factors are influencing the price of healthcare. In the study they argue that official, unofficial charge, travel cost, costs of work are the prices of demand for healthcare. Then they compare the price of healthcare with the quality of service the patients received. The study also determines the barriers of demand side for health seekers. They discuss the quality of healthcare, income, social characteristics, household characteristics, knowledge of healthcare available and education level are behaves as a demand side constraint.

The study by **Koenig et.al** (2007) discusses maternal health conditions in rural Bangladesh on the basis of three delays. These are delays in making decision to seek care, delays in reaching medical facility and delays in receiving adequate treatment. The study is based on Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS) 2001, and compares the result with Demographic and Health Survey (DHS) of 1996-97. The study finds that among all live births over 90 percent takes place outside the government provided healthcare institutions. Regarding maternal healthcare the study finds severe situations like placenta related diseases, prolonged or obstructed labour, convulsions and excessive bleedings. The authors confirm that cost of healthcare for seeking emergency obstetric care in Bangladesh the most inpatient barrier to achieve fruitful results on healthcare.

Bourne (2009) studies self-rated health status and healthcare seeking behaviour of Jamaicans on the basis of cross sectional study extracted from nationally representative probability sampling survey. The study uses descriptive statistics for the background information of the study area and logistic regression with multilevel analysis to explain the sample data behaviour. The results of the study established that health behaviour is a function of socio-demographic variable. The author has established also that with the increase in health literacy and public health programmes healthcare behaviour also modified and utilised the provisions.

Perkins et.al (2009) investigate the situation of out-of-pocket medical expenses to women and families for maternity care in Tanzania, Burkunja-Faso and Kenya. They followed a two stage sampling on each state considerable district. The survey has carried out both household levels as well as for women of reproductive age. The results of the study show that in two countries like Tanzania and Burkunja-Faso, the majority of birth occurs at healthcare and

dispensaries. The reason behind as identified by them is that cost of maternity care to the health cares is lowest at public health facilities.

Verma et.al (2010) study focuses on the objectives like utilisation of public provided health facilities which reduce home deliveries in rural Uttarprades state, India. The study tries to identify the barriers in delivering health facilities for child birth. A two phased survey is organized. One phase is related with household level and the second phase with healthcare provider's level. The significance of 'Janani Suraksha Yojana' (JSY) scheme and its performance in the said area is analysed critically for the state. It has suggested that following JSY performance is satisfactory in the state. But the emergency and obstetric care (EMOC) facilities are performing not satisfactorily in this state they reported.

Javali (2011) has studied the relationship among factors determining how much care peoples are willing to purchase. The study is followed by a systematic random sampling in rural Dharwad district of Karnataka. To observe the casual relationship the author fitted structural equation modelling (SEM) by using statistical software. This study has considered three determinants as the predictors of medical health care expenditure of sick persons are: age of the sick person, the duration of illness episode (in days) and the total number of visits made to source of health care during the reference period. It is suggested from this extensive study that to increase the demand for healthcare, efforts should be taken to reduce illness, minimizes the distance travelled by a sick person and also reduce the number of visits to healthcare providers. The results of this study shows that on medical healthcare expenditure, age of the sick person, episode of illness and the number of visits had significant effect.

Iyenger & Dholakia (2011) have studied the coverage of basic primary healthcare services among the below Poverty Line (BPL) population in rural areas of six states in India. The survey is done by two levels, one is at household and other is on availability of healthcare facilities of the said area. The study finds that among BPL population coverage of primary healthcare services is very low. It is found that per-capita expenditure made by the poor household by using private healthcare is significantly higher than public provision in these states. For the identification of primary healthcare situation they have considered coverage of ante-natal care, coverage of child immunization and proportion of institutional deliveries are considered among poor households. The study adds there is a preference for the poor people for private healthcare. It is also added that distance for visit to a healthcare and waste of time push rural people to visit local Rural Medical Practitioners (RMPs).

Kuttichira & Rejani (2011) have studied satisfaction of discharged inpatients in the public healthcare facility of Trissur, Kerala. The structured conducted survey identified different elements to measure the satisfaction of a functioning unit under public provision of healthcare. The study has suggested that maximum admission in the public health facilities are covered by the below poverty level (BPL) people. They are commonly referred by other hospitals or by Rural Medical Practitioners (RMPs) for better treatment. Many of the respondents have opined that they face difficulty when they are referred for some kind of diagnostics tests. The study uses descriptive statistics to analyse the survey results.

Matthews's et.al (2011) study the behaviour of maternal health in rural Karnataka state, India. The study finds antenatal care is available but with some low content care. It is also found morbidity rate during pregnancy is too high in this area. Delivery choices are made on the basis of quality of care and cultural comfort. To discuss the nature of problems abdominal pain and anaemia are found as the most frequent. The study finds existence of different socio-demographic factors associated with first antenatal care. The superstitious belief like consumption of iron tablets during pregnancy and the skin colour of projected baby have played an important role to take measures on healthcare.

2.3 Conclusion

In the section of health seeking behaviour various studies deals with the concepts and functioning of the health demand side of the society. A lot of studies considered this area as the basic instinct of health production or for which such a production takes place. The underlying uncertainty, unevenness and one sided trust of the seeking behaviour makes it more significant in compare to other market structure. There is a great difference between the health seeking behaviour between developed and developing nations, as well as between developing and less developed nations. There are several kinds of health seeking behaviour generated from the different members of the families and these are categorise between maternal health needs, child health needs, general ailments periods, accidental health needs, natural calamity based health needs etc.. Each of these health needs have some specific behaviour and are of non-homogeneous type. Thus preparedness to face such situation is very much troublesome and hard to reach specially for developing and developed countries. Here an important task of the study is to find out what factors restraints the people to take care during their ailments. Several works in this regard tries to explain the responsible factors behind this. The less education, indirect expenditure, co-payments are already identified as the major cause behind such supply induced demand behaviour.

SECTION-II

Earlier Studies on Provisions of healthcare facilities and their respective efficiency character

2.4 Introduction

In this part the literature related with providers character and the efficiency pattern is discussed. Before looking at interest specific research, it is important to cite a number of overview studies (reviewed in detail in the following section) that establish a contextual framework. These studies look at the development process in general and the delivery of social services in particular, at a holistic level. The earlier studies are observed here from the angle of objectives, methodology, models and major findings.

McFadden (1981) finds that the demand function for healthcare seeking behaviour take a Nested Multinomial Logit (NMNL) form which is more general than Multinomial Logit form. The NMNL assumes that decisions to seek care between any two alternatives do not depend upon the characteristics of any available alternatives. Thus all care considers demand as a discrete choice and price have low some impact on demand for health care.

Banker et.al (1986) have studied Data Envelopment Analysis (DEA) for the efficiency estimation of 114 hospitals of North Carolina, USA hospitals in 1978. The model is based on the study considering the age group divisions: less than 14 years, between 14 to 35 years and over 65 years in case of inpatients health seekers. The inputs variables are taken as nursing, general service expenditure, capital expenditure. They compare based on their study between return to scale and marginal rate of transformation of technical efficiency. They consider the results through DEA and non-frontier techniques, but they established that DEA captures a richer and wide set of behaviour than non-frontier techniques.

Wagstaff (1989) has followed approach Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) to analyse the efficiency of 49 Spanish hospitals on the basis of observations of 1971-1981. The study does not include capital expenditure within the total cost. In the study the author uses internal medicine, general surgery, gynaecology, paediatrics and intensive care as index of analysis and stock of beds, inflow of patients as the main independent variable. Education status of the patients is considered as dummy variable. From the observed values of the parameters estimate, the author interprets the findings of the study.

The results show that mean level of efficiency is strongly dependent upon the approach employed.

Ley E. (1991) describes the efficiency behaviour of health with the help of Data Envelopment Analysis (DEA) in 139 Spanish private and public hospitals considering the data of 1984. The inputs are measured by the availability of doctors, number of beds, technical degree of staff and the study observes the output effects on inpatient days, recovery (combining medicine, surgery, obstetric, paediatrics), number of emergency cases, operation and number of new born. The author uses descriptive analysis for explaining the behaviour of data set. From this study it is concluded that private hospitals are more efficient than public hospitals. The study also adds that health facility with teaching and no-teaching facilities produces no difference in efficiency.

Newhouse JP. (1994) first explains both the Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) deals with least cost mix of inputs to get a particular output in case of health sector performance. The study finds that DEA are not allowing measurement error. But inefficiency of health performance can be easily identified by the error distribution of the regression equation. It is concluded that since health providers are multi-output firms and empirical estimation of such output in respect of their efficiency, a translog function is more appropriate here.

Lavy, Palumbo & Stern (1995) in their study on quality of health care outcome in Jamaica use the parameters estimates of the choice of health care facilities. They investigate by using it, the effect on labour force participation rate in a simultaneous equation probit model. Thus they combine the availability, quality and utilization of health care market returns in terms of cost effectiveness of health policies that impact on adult morbidity in developing countries.

Pathak et.al (1997) try to construct several composite indices for the health system to observe the health status of Indian community under its socio-economic environment, health and family welfare service facilities and efforts. They divide the factors influencing health status into social environment factors and economic environment factors. Within the social environment factors they consider sex-ratio of SC/ST/OBC, literacy rate among male and female, and percentage of SC/ST in total population. The economic environment factors are percentage of BPL population, per-capita income and proportion of male and female workers. Each composite index has been constructed objectively using principal component analysis techniques. The data are used here from 16 major states in India provided by Central Bureau

of Health Intelligence (1991) and The Foundations for Research in Health System (1993). The study tries to associate composite index-based statistical approach between health status and all available inputs of service facilities by using multiple regression techniques.

Garg CC. (1998) has studied on 'National Health accounts' (NHA) which explains for a time period the flows of expenditure in the health sector (both private and public). According to the study there are three entities in a health sector. One is the source, second is financial intermediaries or agents and finally the providers of health services. The study explains these three sides of funds for state Karnataka, India based on 1993-94 fiscal year data and also from NCAER household survey data. The author identifies different sources of funds in the state and analyse the distribution of revenue expenditure on medical, public health and family welfare activities. The study also disaggregates health expenditure between different categories of health seeking units like medical & public health, family welfare etc.

Duncan C et.al (1998) consider the use of multiple models in health research. This paper shows how notions of context and individual heterogeneity influence the health behaviours. To understand the health outcomes, health related behaviour and health services performance the researchers focuses on the structure and potentials of existing models considering social and demographic factors.

Asenso- Okyere et.al (1998) investigate the impact of healthcare seeking behaviour of cost sharing policies in Ghana. Data have been obtained through qualitative research techniques using focus group discussions and in-depth interviews. It is reported that self-medication is spread wide and these are due to user charge and transportation costs. They observe at the same time, there was a perception of an improvement in the drug supply and general health delivery in government facilities. The study also identifies that user fee exemption criteria need to be worked out properly to develop seeking healthcare in public health facilities.

Burges & Wilson et.al (1998) followed the Data Envelopment approach (DEA) on the U.S. Hospital data for the period 1985-88. In their study they have considered number of acute care beds, long term hospital beds, registered nurses as inputs and the observed outputs are acute care inpatients days, outpatients' visits. In the explanatory variables, they have considered dummy variables for state / local government, non-profit, for-profit, veterans' affairs and teaching hospitals, Hinderfall Index of county competitions, average length of stay and administrative cost per bed day. To analyse the data they consider descriptive statistics and second stage least square regressions as for the estimation of efficiency of the health

providing hospitals. The study finds no difference in efficiency among general hospitals and teaching hospitals. They also have found that health providing units with greater efficiency implies greater expenditure on administration and nursing staff associated with it.

Evans et.al (2000) focus on measuring the efficiency of health services across the world. The study estimates the efficiency of 191 countries using panel data. According to them Data Envelopment Analysis (DEA) and free disposable hull methods are unable to separate true inefficiency from random variation. If heteroscedasticity are there then distinguish between random errors and true inefficiency is a tedious job. They also reject Stochastic Frontier Analysis (SFA) due to its distributional assumption on the efficiency term. They claim panel data estimation is more useful and efficient than the model using cross sectional data. They are used fixed effect estimation because the models do not pass Hausman test. The goal of improving health is measured in terms of Disability Adjusted Life Expectancy (DALE) as an indicator. They have defined Technical Efficiency as the ability to produce maximum possible output from a given set of inputs and it is measured by the relationship between observed output and maximum attainable output for the observed inputs. This paper produces results for the World Health Report league tables for countries. But this does not demonstrated the movement of countries performance at different times. The data are used on 191 countries on health, health expenditure and schooling.

World Health Organisation produces global health report at 2000 by using panel data to estimate efficiency of 191 countries. It considers two outcomes, one is disability adjusted life expectancy (DALE) and second one is a composite index of health distribution, responsiveness and financing. There is little criticism against this study regarding the dominating behaviour of OECD countries in the table prepared by World Health Organisation for estimation of DALE. **Hollingsworth et.al** (2002) questioned this study from different ground. The author said World Health Organisation estimation is not showing the growth of efficiency of countries, when estimation of healthcare is a continuous process. To illustrate the performance trend of technical efficiency, **Hollingsworth** uses parametric and non-parametric efficiency measurement techniques. In case of Data Envelopment Analysis (DEA) based analysis of panel data they used Malmquist Indices to explain the productivity of health behaviour. For estimating production frontier they used Stochastic Frontier Analysis (SFA) using the residuals of the regression equation. This study differs from World Health Organisation's former analysis, which considers data are homogeneous type, since countries have different health services. The study also makes comparative analysis regarding DALE,

expenditure, schooling in terms of OECD and non-OECD countries separately. From this separate analysis between OECD and non-OECD countries they have found signs and significance of the variables are also different between the samples.

Jayasuriya R & Wodon Q. (2002) have identified the determinants of efficiency and then analyse how the quality of bureaucracy, corruption and urbanisation affect efficiency. They have used Stochastic Frontier Analysis (SFA) to estimate the production frontiers of health and education outcomes. A panel data set for 76 countries over the period 1990-98 was used with two groups of variables. One estimates the production frontiers for health and education outcomes and the other analyse the determinants of efficiency. The results suggest that large differences between countries in terms of efficiency are there. The study also finds that bureaucratic quality and urbanisation both have strong positive impact on efficiency. The policy conclusions show improvements in efficiency may come automatically with urbanisation but efforts are needed to improve bureaucratic quality of countries.

This study of **Gupta I and Dasgupta P (2002)**, one of several to come out of NCAER's 1994 Human Development Index (HDI) Survey, attempts to derive demand functions for health care in rural India. It finds, as might be expected, that income and price are strongly correlated with one's choice of health care provider; further, the study finds, age is positively correlated with medical care utilization, and education is found to be an important determinant of provider choice. Lower levels of education are associated with increased demand for medical care; this is, however, likely due to higher average morbidity levels among the less educated. The most important findings of the study, from a policy perspective, concern the price elasticity of demand for health care services, disaggregated by provider type. Across much of rural India, and for different fee ranges and income levels, the demand for health services is found to be highly price inelastic. Within the lower fee ranges, in fact, the elasticity is almost zero; within the *highest* fee range, a 10 percent increase in fees is associated (for the lowest income quartile) with a small 0.03 percent decrease in demand. The richer segments of rural India are particularly insensitive to price increases.

Ramanathan R. (2003) study started with the concepts of decision making units, efficiency measurement and frontier analysis. The first chapter of the book discusses the performance evaluations by Data envelopment Analysis (DEA). Actually DEA based study will be applicable for those sector where a set of firms uses a variety of identical inputs to produce a variety of identical outputs. It is a familiar tool to measure the efficiency of health system. Second chapter deals with different formulations of DEA models. Third chapter deals with

returns to scale, technical efficiency, estimation of optimum productive scale size measurement system of the study. Fourth chapter deals with different DEA models. Time series analysis using DEA is an important part of this chapter. Fifth chapter explains how the DEA working becomes effective with the help of computer. How the MS excel spreadsheet is used to solve DEA programme has been illustrated in this chapter. The sixth chapter deals with the review of recent studies related to DEA. There are elaborations with real life performance. I think this book is very helpful as well as essential for the researchers who are doing performance measurements of healthcare system.

Hoel M. (2003) discusses the cost effectiveness of health system in terms of health benefits and expenditure of the healthcare. The author has used quality adjusted life years (QALYs) as the measures of cost effectiveness of healthcare system. He considers that a decision maker allocate his/her public health expenditure without knowing nothing about his/her future health and income. Under such situation the author uses von Neuman-Morgenstern utility function where health state and material consumption function are the arguments of the function. In this paper, the author explains the different health states and its relation with income and consumption of the decision maker. He also defines the budget constraint of the public sector to derive the optimality conditions for the hypothetical decision maker. The results of the study show that marginal utility of income are independent of the health state and there are risk aversions with respect to level of health.

Worthington AC. (2004) defines technical efficiency (TE) as maximum possible output from a given set of inputs. Thus in health technical efficiency establishes a physical relationship between health outcome and health inputs (Manpower, Capital, and Equipment). It considers that sometimes health outcomes can be explained by the inverse of infant mortality. They also describe the term allocative efficiency (AE) as ability of a health provider to use the inputs in optimal proportion and to realise prices. The productive efficiency (PE) or sometimes known as total economic efficiency is a combination of TE and AE. The author has suggested that ordinary least squares is not appropriate here. So limited dependent variable models (Probit & Logit) are usually used here. It is also found that a number of studies how incorporate 'quality' or 'specialisation' as an explanatory factor in healthcare efficiency.

Canaviri J. (2007) has studied the healthcare provider choice in Bolivia by using a Random Parameter Logit (RPL) using the data of 1999-2000. It is the first time, the author claims, to use RPL in healthcare provider choice. The study follows MECOVI (continuous household

survey) method for the investigation. The results suggest that consumption is significant for all groups of decision of choice of healthcare. The study shows more educated parents prefer to visits government facilities than self treatment. Health information is showing valuable to the consumer because it allows him/her to make better decisions about medical care. The price elasticities of the decision choice of healthcare provider show some interesting results. It is found that with the increase in user fees in government provided healthcare, a shift in demand from government to private health facilities is observed for children and women.

Jayasuriya R & Wodon Q. (2007) have studied to measure the efficiency of provisions and states with Stochastic Frontier Analysis (SFA) regarding healthcare and education outcomes using panel data for 1990-96 for health and 1994-2000 for education in Argentina and Mexico. A Stochastic frontier approach is used to determine the provincial and state-level optimal health and education outcomes. They also try to identify the factors from their analysis which are responsible for the inefficiencies. Corruption, lack of sound bureaucracy and urbanisation are the source of variables that could play a role in explaining inefficiencies at the sub-state level. Cost efficiency measurement in public expenditure of health and education are also treated by them.

Purohit BC. (2008) tries to analyse the health efficiency system of state West Bengal, India using stochastic frontier analysis and evaluate its performance. The data bases are used for such analysis collected from secondary sources i.e. HDR 2004 (Government of West Bengal), Economic survey -2007 (GOI) and Reproductive Child Health survey- 2007(RCH). The main variables considered by the author are Infant Mortality Rate (IMR), per-capita income, parameters of human development, gender development and healthcare facilities. The author observes from the Stochastic Frontier analysis that life expectancy is statistically significant and there are some positive impacts of government interventions in expansion of health facilities. Similarly success of full immunisation would enhance life expectancy. There are inadequacies of various inputs which are supplied through primary health centres (PHCs). The study also ranks the districts of the state in terms of actual life expectancy as a percentage of potential life expectancy and also by the deviation from maximum efficient districts. The author tries to identify the inter-district disparity of distribution of per-capita hospitals, PHCs bed, ANMs etc. The author also has emphasized National Rural Health Mission (NRHM) to reduce those disparities for the state.

Sengupta A. et.al (2009) discuss the public healthcare system of India using panel data of all reported hospitals in West Bengal state, India from the period 1997-2003. The authors

provide an input-output framework in analysing medical healthcare and also use Data Envelopment Analysis (DEA) approach for explaining the data behaviour. The study considers output as inpatient days, number of inpatient discharge, inpatient surgical procedure and number of out-patients visits. The inputs are divided into capital (No. Of beds) and labour (Full time doctors, staffs). In their study authors found that economically dominant districts show better performance regarding hospital efficiency. During the post liberalisation scenario a relative stagnancy of real per hospital health expenditure by the state government observed, as a result health efficiency is affected badly through the poor people who consume it mostly.

Audibert M et.al (2010) have studied nine Chinese provinces to compare their health choice behaviours with the evolution of price, income, distance, insurance, age and regional inequality. The survey is conducted over two periods from 1989-93 and 2004-2006 which are the starting phase of deregulation of Chinese health care sector and also ending phase of co-operative insurance scheme. They have used Mixed Multinomial Logit (MMNL) estimation for the analysis. The study shows for both the periods a clear price effect is present and which also become weak and heterogeneous during price increases. They also observe a strong negative distance effect, which means when patients have less possibility to discriminate providers by prices; they increase their preference in choice by distance. Regarding poorer section they observed the poorer patients have their share of consumption in income more decreased often healthcare.

Sodani P.R. (2010) in his book on managing healthcare and maintaining quality of healthcare lucidly explains the supply side behaviour of healthcare. This is a helpful guide to researcher and health managers who involve in planning, designing and implementing quality of healthcare. The book is based on outline study of Udaipur district of Rajasthan regarding system approach for seeking healthcare. Sodani has developed a framework for quality of safe motherhood and family planning services. Regarding the techniques of measuring quality of care for maternal and child health the study explain the method by the said area data set. Then he try to find factors responsible for such performance. The depth of the study can be gauged by the popular management tools like portfolio analysis, strategic position and action evaluation (SPACE).

Baru et.al (2010) in their study consider that health status of Indian is very uneven and slow. There exists large inequalities in health and access of health service which is widening across the state and between rural and urban areas. The study identifies different types of

inequalities existed in India's health sector. One is Historical inequalities which is followed from our past colonial practice. Socio-economic inequalities describe caste, class and gender differentials and inequalities in the availability of health services. The study is based on secondary data source like Central Bureau of Health Intelligence, MOHFW, Government of India and national Fertility Survey Report (NFHS) 2003. The study illustrates the inequalities in access to health services by a comparison between two states like Kerala and Uttar Pradesh (UP). They are compared in terms of infrastructure, human resources, bed-population ratio etc. Inequalities in utilisation of preventive services like childhood immunisation, ANC are also compared between these two states. Low public investment in health services over the last six-decades is found as a significant cause for the poor functioning and utilisation of services.

Androutsou L. et.al (2011) measure the performance in some homogeneous health facilities with the public provision of Thessaly, Greece over the period 2002-06. They used data envelopment analysis (DEA) by using the Malmquist Productivity Index (MPI) to measure the technical efficiency and productivity. The production function for health considering inputs labour (Medical & Nursing staff) and capital (Beds) transformed into health outputs like inpatient discharge, inpatient days etc. the study identified that size of the health facilities influences the effects on hospital performance.

2.5 Conclusion

In case of services like healthcare any state faces two sided constraints parallelly. One is cost of producing health services and other is whether these provisions are working properly or not. The first one is related with monetary provisions and the second factor is related with welfare provisions of the society. In case of developing countries where the resource provisions are limited due to different economic factor, as a result it is very important for them to use properly or optimally of the existing resources even in health sector. Several literature were discussed regarding this proper functioning of the health providing units. In this section the literatures on the provisions and performance of the health units are narrated. Many of them are tested the efficiency of the health units under some parametric and non-parametric approach. Major of these studies deal with the efficiency testing under data envelopment analysis propounded by Charnes, Cooper and Rhodes (1978), known as CCR model. In case of India many studies found a large level of inequality between the demand for healthcare and access of health care. The efficiency of the homogeneous health units were considered under some input output frame and the value of the outputs were ranked in terms

of technical efficiency score and scale efficiency score. From these scores identification of poor performing health units easily done and what kind of expansion of scale for them were needed could be done easily. Under such studies the most important task is to identify the inputs and outputs of health producing units.

SECTION-III

Earlier Studies on Performance of healthcare

2.6 Introduction

The providers of care perceive quality based on the parameters of providing care as per established practices, availability of resources, self-satisfaction with outcomes and acquisition of knowledge, skills, and competence. The organizers of care are responsible to the society for the funds they spend on healthcare. Hence they perceive quality in terms of ensuring safety of public and preventing inappropriate and/or suboptimal care. In this section the earlier studies related with the performance of healthcare sector are discussed.

Kaplan R M et.al (1982) define the health output in terms of number of years with no ailments at al. They define this as ‘well-year’. The cost of the health programme dividing by the well-years number it produces cost utility ratio, which can be used to compare the efficiency of different programs or to assess the relative contribution of different programs and providers in the health-care system. The important components of analysis are effectiveness of medical interventions, quality of care, clinical decision making, needs of different populations and causes of variations in health. The study tries to find out well standard measures of health status which helps in health decision making, planning and evaluation. In this study various results from psychology are taken for the explanation of the study.

Bothwell J L & Cooley T F (1982) argue that health maintenance organisations supplied services that are commonly free-for-service with the distinguishing characteristics. The study uses quarterly observations for the period from first quarter of 1976 to the fourth quarter of 1977 on 36 health maintenance organisations of United States. The study defines output as an improvement of health status like encounters with doctors, encounters with health personal and hospital discharge. The inputs are defined as administrative services, hospital services, medical professional staff services & health centre services. They have applied translog joint cost function for the health maintenance organisations. This approach satisfies the multi-product nature of healthcare services and no prior restrictions on cost are required. The study finds that demands for all inputs are inelastic.

Carr-Hill R A (1994) shows in his study that England health authority every year spend a huge amount for the hospital and community services. It is considered that the distribution of most of these funds is based on a formula developed on the basis of needs of the population.

This paper describes the development of a method to determine the health needs for small geographical areas. The units of analysis used in the study are 4985 "synthetic wards," (an electoral wards) small areas with average populations of 9643 covering the whole of England. Data from the hospital episodes statistics and 1991 census together with information on vital statistics and supply of health care facilities are used in the model. The health status variables include a variety of age specific standardised mortality ratios, standardised ratios of self-reported limiting longstanding illness and low birth weight data. Two stage least squares regression is used to identify true indicators of need, and these were entered into a multilevel model to take account of variations in practice in different health authorities. The resulting formula should be more statistically robust and more sensitive to needs than previous approaches.

Wouters A. (1993) study originates during the crucial situation of Nigeria, when the government initiatives for reducing healthcare expenditure during 1980s. But this is done by the manner that increasing service delivery with a cost effective method. The study uses Federal Ministry of Health in Nigeria data base of 1987 in Ogun state. The study finds that both public and private providers are not operating at the efficient level. Study also observes that service deliveries basically to poor people are not offered in low cost level. The behaviour of the cost shows that in short run it is operating at increasing returns to scale for inpatient level but constant return to scale at outpatient level. The study recommends for development in health information system, which helps to develop proper resource allocation decisions. This will also help the financial integration of health sector with the output produced by them.

Hsi-hui Chang (1998) has studied efficiency of central government owned hospitals in Taiwan over the five fiscal years between 1990 and 1994. Data Envelopment Analysis (DEA) and multiple regression techniques are used for measuring efficiency of these hospitals. Primarily DEA is used to find the efficiency considering a set of inputs and outputs for specific hospitals operations. Then the results of DEA are used in multiple regressions techniques. They consider the DEA determinants as dependent variable and a number of hospital operating characteristics are chosen as the independent variables. The results of the study showed that scope of services and proportion of retired veteran patients are negatively and significantly associated with efficiency, whereas occupancy is positively and significantly associated with efficiency. It is revealed that efficiency of the hospitals increases over the said period studied.

Berman (1998) has studied that the quality of medical services in the private sector is uneven and their issues are not monitored properly by the government measurement. Thus for curative health care is concerned the private sector with easy accessibility and asymmetric information regarding quality has resulted in a situation where the access to the private sector is more than the government sector. **Berman** (1998) confines this for India by using National Sample Survey Organisation data.

Siddharthan K et.al (1998) study uses Data Envelopment Analysis (DEA) to measure the relative technical efficiencies of 164 hospitals in the United States in 1995. Health care output measures used in the analysis are the number of commercial, Medicare lives covered in each plan. The study identifies following inputs for the measurement of healthcare utilization: the number of medical and surgical inpatient days, number of maternity and newborn stays in days, number of outpatient and emergency room visits and the number of non-invasive and invasive procedures performed on patients in an ambulatory setting. They have used multivariate analysis to try and explain variations in efficiency. The study finds that enrolment influences efficiency. They observe that health plans in operation for longer periods of time had greater outputs with the same inputs.

Singh L P & Gupta (1998) have studied health seeking behaviour of the tribal communities in four tribal districts of Rajasthan, India, namely Banswara, Dungarpur, Udaipur and Sirohi. The information for the study was collected through informal group discussions (IGDs) with groups of females and community leaders in each village under study. In addition, in-depth interviews are held with the local health providers. The study observes that health seeking among the tribals can be broadly classified into three groups. These are general problems, children's problems and problems of females. They have identified issues related with health of the community are utilisation of Government Facilities, problems faced while accessing health services, community needs, community participation, role of NGOs and role of traditional healers. It is observed that though considerable amount of money and time are spent by these tribals on health, their level of health education is extremely poor. It is revealed that the people of the tribal population living in the different sets of villages adopt more or less similar methods of health seeking.

Gerdtham et.al (1999) consider the analysis with a panel data set covering the total population of 26 Swedish County Councils hospitals from 1989 to 1995. The study uses multiple-input, multiple-output stochastic ray frontier production function model. The study considers estimation of technical efficiency and also analyse the role of influential variables

on efficiency. Here the study investigates the existence and effect on purchasers and providers due to changes in reimbursement schemes on technical efficiency. The results of the study support that output-based reimbursement improves technical efficiency. It also observes the effect of switch over from budget based allocation to output based allocation on cost reduction of the respective hospitals.

Varatharajan D (1999) considers the health infrastructure of state Tamilnadu, India which is one of the most well perform state in the country. The efficiency of healthcare for this state analysed from the point of view of financial and organisational choices. The author observed that utilization is poor in Tamil Nadu despite the fact that physical access to such facilities is better here. For underutilisation of healthcare the study finds that decelerating public expenditure is one of the most important causes. The expenditure on drugs is found underfunded and the local referral system is not very strong.

Sharma R D and Chahal H (1999) consider patient satisfaction as a helpful instrument for measuring efficiency in a health system. They have quantified patient satisfaction by measuring the attitude of regular and experienced patients. They observe that service quality is related to the prior use of services. They argue that experience of the patient with the same provider in the previous few encounters would clearly reflect the good service quality of the provider. The study is based on primary information collected from 220 randomly selected patients of three reputed private health care units operating in Jammu city and providing identical curative and preventive health services to the outdoor patients in areas like medicine, skin, eye etc. The findings identify several non-medical aspects of services encounter responsible for producing increased satisfaction in private health care units. Financial consideration is an important factor for the patient as about half of the population would think twice before availing any medical facility which is expensive. It is found that overall satisfaction is a result of number of factors like performance of doctors, performance of medical assistants, good level of communication, promptness in delivering the services, responsiveness to customer needs.

Giuffrida et.al (2000) estimate a cost function for primary care administration in England using a panel of data for Family Health Service Authorities. The model examines the welfare implications of managerial effort and then estimate efficiency in health care by standard econometric methods. By estimating an administrative cost function for primary care services the study provides some evidence of the possible effect of the internal market. The main cost determinant was the number of general practitioners, fund holding etc. The study focuses

estimated differences in costs measure welfare differences only if relevant decision makers cannot control outputs or quality and if the unobserved effort costs have negligible social significance. It is study found that numbers of general practitioners has the greatest effect on administration costs and the introduction of fund holding has a significant but small positive impact on costs.

Chirikos N & Sear A M (2000) compare the result measured by Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) over hospital data of Florida, USA during 1982 to 1983. They have assembled a panel data set and set some output, input and cost indicator to estimate DEA and SFA models. Their empirical results suggest that Florida hospitals over the study period has costs that are substantially higher than the frontier level of costs. They show that both the DEA & SFA models show same result trend for the industry level but different trend for individual level. The authors correlates of SFR and DEA scores, which also show distinctly different patterns, with sign reversals between some hospital characteristics such as bed size and occupancy rates.

Ensor T, & Witter S (2001) have studied how the motives of practitioners in developing countries may be influenced by a lack of regulation and under-funding which in turn contribute to the presence of unofficial activities. The authors observe that in low income countries government's share of health expenditure is diminishing and costs are increasingly being borne by individuals and households and the private portion of health expenditure in low income countries increased rapidly. It is observed that like developed countries no clear distinction exists between the categories of consumers and providers of health services. They add that here unofficial payments for health care are a significant, perhaps dominant, feature of the financing of public health care facilities. In these countries tertiary level services are often relatively untouched by primary care reform. The study examines the motives of practitioners may be influenced by a lack of regulation and under-funding which in turn contributes to the presence of unofficial activities.

Kak N et.al (2001) discuss the issue of competence in health sector of developing economy. They define competency as the ability to perform a specific task in a manner that yields desirable outcomes and the health workers achieve this over time. The study argues that measurement of competence can be done by following factors like healthcare reform, organisational performance, liability & ethics, planning of new services, measuring training outcomes, supervision, risk management, certification and rectification of providers. The study considers what kinds of constraints exist in the path of measuring competency. The

study also provides a conceptual framework regarding how competency acquired and what other factors affecting provider's performance. They consider validity, reliability and feasibility of competency measurement in healthcare.

Zavras A I et.al (2002) have studied the relative efficiency of Greek primary health care and public insurance provider in the context of social security. The study uses Data Envelopment Analysis (DEA) on 133 primary health centres of Greece during 1990. They chose inputs such as number of people covered by the health centres and staff of the existing health centres. The study finds that health centres functioning with proper mechanisation like radiographic examination and laboratory are shown higher efficiency. The centres functioning with a limited population pressure shows better performance according to efficiency. This study provides evidence regarding the relative efficiency of primary health care centres, as well as implications for their ideal size. This study has certain limitations with respect to the homogeneity and accuracy of the recorded data, as well as to the quality of care provided to patients.

Bhushan et.al (2002) have studied that government contracting of the provision of health services to nongovernmental entities is not only feasible, but can also potentially increase the coverage of health services in a short time. Contracting could deliver interventions to reduce infant, child, and maternal mortality to more people and faster than conventional government service delivery mechanisms. The pilot study in Cambodia suggests, moreover, that efficiency gains in the provision of health services do not come at the expense of equity. Rather, improvement in efficiency appears to also lead to better access of health services by the poor, relieving them of the burden of health care expenditures. In developing countries where governments have severe fiscal constraints, contracting NGOs or similar private entities for the provision of primary health care services may represent an attractive alternative. The constrained resources of the government may be better used in this manner to maximize the efficiency of service provision. The Cambodian experience suggests how a move away from the traditional government-financed and government-provided health services model to government-financed and monitored contracts (or, in other words, public finance and private production) for health services can be an effective approach to expand coverage especially for the low-income groups.

This paper of **Soman, Krishna** (2002) looks at the health care sector in the primarily-agricultural West Bengal district of Birbhum. Here, as elsewhere in the state, new privatization initiatives are being undertaken by the government in collaboration with

external funding agencies. In addition to public health care facilities, a range of private-sector providers have long existed, practicing different systems of medicine (allopathy, homoeopathy, ayurveda, and other traditional systems), with different ownership types (profit, not-for-profit). One of the major impediments to the spread of modern, allopathic health care provision, the paper finds, is the passive resistance of villagers. Many practitioners engage in informal, holistic practices, combining traditional healing with homoeopathy and allopathic medicine. For a range of cultural reasons, a substantial portion of villagers (estimated at over a third) prefer such services – often run out of practitioners' homes, grocery shops, or even door-to-door – to formal health institutions.

Rous J et.al (2003) investigates the determinants of household out-of-pocket health expenditures in Nepal based on Living Standard Measurement Survey (LSMS) data. They use a multi-equation joint estimation to control for endogeneity of sickness and provider choice. The study found some unobservable factors like determinants of illness, choice of provider, and health expenditures shows statistically significant result. The study also found income influence health expenditure directly and likelihood of illness & type of providers chosen indirectly. The factors like sanitation and housing have a substantial effect on illness and as a result out-of-pocket expenses increases. The study highlighted that average healthcare expenditure for urban people is lower in compare to rural.

Adam T et.al (2003) analysed from World Health Organisation (WHO) data of 49 countries for the years during the period 1973–2000. The main aim of the study was to fit a long-term solution is that all countries perform their own costing studies to predict unit costs for different countries in a standardized way for short-term use. They estimate a long-run cost-function by means of Ordinary Least Squares regression analysis. They chooses the dependent variable is the natural log of cost per bed-day because unit cost rather than total cost as the dependent variable is to avoid the higher error terms due to non-uniform variance (heteroscedasticity) in the estimated regression. The main purpose of this work is to feed into estimates of the costs and effects of many types of health interventions in different settings. Data imputation techniques are used here to impute missing data, which has the advantage of eliminating the bias.

Street A (2003) considers Stochastic Frontier Analysis (SFA) which is some kind of development of Ordinary Least Square method for the analysis of efficiency of English hospitals using cross sectional data during 1999. The paper calculates costs using data for public hospitals in a national health system. The study compares efficiency scores produced

by different estimation techniques and then produces confidence intervals around each organisation's point estimate of relative efficiency. The study also checks the relative performance over the choice of proper error term by sensitivity analysis. It concludes that estimates of relative hospital efficiency are sensitive to estimation decisions. The author also has identified that excess expenditures can be due to periodic capital investment or renovation programmes, the costs of which are not spread accurately over subsequent years.

Ahmed S. et.al (2003) discuss that socio-economic development will enhance the poor to prevent ill-health and seek appreciate for timely care. The study uses cross sectional data of a survey during 1995-99 in Matlab, Bangladesh to explain the health seeking behaviour and its development with the integrated socio-economic development. From the four year survey data they found self-care tendency was reduces and consultations with traditional healers or RMPs also reduce. It is also found that self-care is associated with female gender, non-availability of low cost health services and ailments of short duration.

Chang H et.al (2004) use Data Envelopment Analysis (DEA) to observe the impact of national health insurance programme on operating efficiency of district hospitals of Taiwan. The study uses government level health data from 1994 to 1997. Interestingly the study found that national health insurance programme has some negative impact on the average efficiency of the districts hospitals. It identifies the responsible factors for reduction of efficiency due to such insurance programme.

Naresh Kumar (2004) examines the effect of changing geographic access on locational efficiency of basic public and private healthcare providers in two north western districts of India. The study also tries to estimate the service gap created by the public healthcare providers whether substantiate by the private providers or not. It identifies inequalities in geographic accessibility and locational efficiency of both public and private healthcare services in the research area and found that the locational efficiency of private health services is significantly lower than that of public health services. The author uses Locational-Allocation Model (LAM) to observe complementary role of public and private healthcare providers. The results of this study can be extended to areas with similar geographic settings, and socio-economic and demographic conditions.

Deininger K et.al (2004) have studied the impact of abolition of user fees in case of rural Uganda. The study use data from the Demographic and Health Survey (DHS) to describe the health characteristics and to gain an appreciation of the quality of health services in Uganda

over time and in international comparison. The featured data collected before the introduction of user fee and after it. Different descriptive statistics and general regression techniques with time dummy analysed the data and explained the behaviour of different health output. The author viewed loss of income caused by sickness has generally been the economically most immediate and important impact of ill-health. The study suggested that improved access and reduced the probability of sickness in a way that was particularly beneficial to the poor. The results highlight that the abolition of fees improved access as well as outcomes, something that is likely to be at least in part attributable to the increase in health sector funding, as well as measures to improve the supply of health services that were contemporaneous to the elimination of user fees.

Puig-Junoy J et.al (2004) try to estimate a stochastic frontier cost function and an inefficiency effects model in the analysis of the primary health-care services purchased by the public authority and supplied by 180 providers in 1996 in Catalonia. The study also tries to quantify the sources of cost inefficiency in purchasing primary care. They defined cost efficiency as the ability to buy a given level of quantity and quality of primary care services at the minimum price. According to their opinion it is crucial to distinguish between cost efficiency in contracting health services from cost efficiency in producing health services. The study suggests that it is not always true that contracting out has helped improve purchasing cost efficiency in primary care.

Hardeman W et.al (2004) considered the importance of user fees in case of health seeking behaviour of poor people of Cambodia. In this respect, the study put its focus on Health Equity Fund (HEF) operated by NGOs identified the poor who needed healthcare and pays for them for seeking any healthcare related assistance. The fund is mainly generated by UNICEF. It is based on data set provided by NGOs and personal interviews of the authors. The study finds that HEF helps the extreme poor who appeared hospitals for seeking care, but the extremely poor faces difficulty to reach hospital during their ailments. Thus the study concluded that improvement in financial access does not imply improvement in the access of healthcare. The study also identified geographical and informational constraints plays important role for proper healthcare. The study added that in the Cambodian context by far the most household health expenditure takes place outside the public sector, often spent on poor quality treatments by informal private practitioners.

Das J & Hammer J (2005) make discussions regarding the quality of labour inputs (basically doctors) on the basis of competence and difference in doctor's incentives. The

study is done on capital Delhi by a two stage sampling on the doctor's practicing in poor, middle income and relatively wealthy region. The data observed by them are of three types. They find that doctor's knowledge frontier is better in Delhi. The competence and effort of the doctors are complementary according to the study. The study also found that doctors practicing in private sector (fee for service) perform closer to the efficiency frontier than the doctors who practicing at public services. The knowledge of under qualified doctors is less compared to general medical provider but they provide better care. The study suggested that for better performance increase in incentives for public providers is more significant than the expansion on competence.

Ghuman et.al (2005) discuss that in India the health care services are obstructed by class inequalities, denial of opportunities to disadvantaged groups, low accessibility to lower strata and rampant corruption. They observed the same trend is noticeable in Punjab state also. Authors describe the three policy initiatives are in progress for health care for the poor. Those are exemptions to the poor from users' fee in government hospitals, provision of free of cost treatment to poor (subject to a proportion of total patients) in private super-speciality hospitals and health insurance schemes for the poor. The objective of this paper is to examine health care for the poor in India with special reference to Punjab State. The study has used both primary and secondary data. The secondary data have been collected from reports of Ministry of Health and Family Welfare, Government of India, National Planning Commission. The empirical evidence gathered from both secondary and primary sources and data suggests that the benefits promised to the poor in the form of free treatment in government hospitals after the setting up of Punjab Health systems Corporation, have not really reached the target groups. Mainly two factors, namely, ignorance among the poor for free treatment, and complex and cumbersome procedure for getting and renewing of the yellow cards are constraining the access of the poor to public health care services.

Ahmed MS (2005) has studied health seeking behaviour of some identified socially disadvantaged group of people of rural Bangladesh. The disadvantaged population are identified by the feature like poverty and in ability to access necessary healthcare due to their position in the society. The study uses data of five previous projects of which three was cross-sectional and two was quasi-experimental. The study reveals that chance of access of a healthcare for male is greater than a female and majority of the ethnic group of people take healthcare supporting from unqualified allopathic practitioners. Poverty emerged as a significant factor of health seeking behaviour and all over the area predominance of self-care

found specially among rural poor. The study suggest that grant based intervention needed for to overcome the demand side barriers of health seeking behaviour.

Ved RR, Dua AS (2005) studied whether the reductions in the maternal and infant mortality implied strength full health systems and ensuring competent and trained providers at the grassroots and primary health centre levels, which will yield benefits that can be realized for other health needs of women. The author explains the case of status and trends in maternal mortality in terms of antenatal mortality and delivery care in national level. The study suggested that an increase in financial resources is necessary to expand the number of facilities that can provide facility based neonatal and child care. The paper approaches that community based interventions can only be implemented through education, sensitization and mobilization, and is focused towards advocacy for maternal and child health.

Gupta I (2005) observes that India continues to face scarce public financing of the health sector. In spite of an extensive government network of hospitals, evidence indicates that a large percentage of individuals visit private facilities both for outpatient care and hospitalisation. The author analyses different health insurance schemes like employees state insurance scheme (ESIS), the central government health scheme (CGHS), voluntary (commercial) health insurance, community health insurance (CHI) in terms of their drawbacks. For this the author carefully explains the nature of service and conditions of health insurance schemes provided for poor person of the society. The author explains in terms of beneficiaries from such scheme and found that only 10 percent of the population are situated under the health insurance scheme. It is suggests that community-based health insurance has narrow limits due to organisational and technical constraints.

Chilingerian J.A et.al (2006) observe the practice patterns of 326 primary care physicians in a health maintenance organisation for one year in United States. The research uses Data Envelopment Analysis (DEA) as an instrument for studying profile and practice patterns of the physicians in primary care. The study finds that practice pattern is the most sensitive variable for health outcome and possibly maintenance of it is the important challenges for the economy. The study has pooled DEA for comparison of utilisation of hospital days. They have developed a cone ratio DEA model which observes excess utilisation of more hospital days over fewer visits. They have applied cone ratio DEA model for the explanation of strategic reasons responsible for clinical benchmarks.

Kontodimopoulos N et.al (2006) analyse the efficiency of few Greek hospitals located in both urban and rural side on the basis of primary data. The study uses Data Envelopment Analysis (DEA) considering primary and secondary care in terms of preventive medicines, hygiene aspects and public health issues. The character of production is identified by numbers of doctors, nurses and beds as inputs, whereas admissions, outpatient visits and preventive medical services as outputs. They have used DEA model as input oriented frame and assume constant return to scale are operating at the production level. The study observes that location is an important factor of performance i.e. rural side hospitals performed less than the urban side. Thus from this ground they raises the question of equity of service access which is the main factor for obstructive efficiency performance in health sector.

Suraratdecha C (2006) has studied how the medical resource influences the efficiency of healthcare system in Thailand. They arose the question due to the fact that resource constrained health aspects faces a huge demand and as a result national health expenditure increases over time. The study uses annual operational data for the period 1982-1987 comprising five cross-sectional regions per year. It uses translog production function and three derived demand for factor input equations which were jointly estimated using systems regression method. It is found that health workers influenced the efficiency level differently. The estimates of factor substitution possibilities indicate difficult factor adjustments over the region. No regional variations are found in case of live birth between rural and urban area. The study also added that physician and pharmacist services are basically labour using but capital and nursing services are labour saving type.

Siciliani & Luigi (2006) try to estimate the developing performance indicators in case of hospitals efficiency. The study uses panel data collected from 17 Italian hospital from period of 1996-1999 and compare between different parametric (econometric) and non-parametric (linear programming) techniques for the measurement of a hospital's technical efficiency. Highest correlations are found in the efficiency scores between the non-parametric data envelopment analysis under the constant returns to scale assumption and several parametric models. But in case of DEA under the variable returns to scale assumption they have found this correlation reduces markedly. They have added also correlation generally reduces when hospitals moving from one output to two-output specifications.

Borah B J (2006) considers the persistent problems of access to and delivery of health care in rural India and investigates about individual provider choice decision. In this regard the author investigates the determinants of outpatient health care provider choice in rural India.

Mixed multinomial logit (MMNL) framework is used in this study. Also it uses multiple imputation technique to identify the missing prices of providers that an individual has not visited during their ailments. NSSO data are being used and it is observed that price and distance to a health facility play significant roles in health care provider choice decision. They also observe that price elasticity of demand for outpatient care varies with income and low-income groups being more price-sensitive than high-income ones. It is found that outpatient care for children is more price-elastic than that for adults, which means in rural India where an adult's health is more important than that of a child.

Amrith S (2007) explains the historical perspectives of public health and how it is influenced by the political culture since independence. The author suggested that India is performing the trend of declining mortality with the coexistence of persistently high levels of ill-health and disability. The author has identified contradictions in the intellectual, cultural and institutional forces shaping the Indian state's commitment to public health help to explain why it was both short-lived and inherently limited. The study finds that in case of a populist state like India infrastructure and resources were always lagging behind the actual need in case of healthcare services. As a result dependency on foreign aid increases over time. Considering malaria eradications programme as a case study the author narrates lucidly the history of healthcare in our country.

Kjekshus L & Hagen T (2007) analyse the effects on technical and cost efficiency of seven hospital mergers over the period 1992–2000 in Norway where the mergers involved 17 hospitals. They use Data Envelopment Analysis (DEA) to generate the efficiency scores of merged and non-merged hospitals over a long period of time frame. The merger effect of this study is evaluated by panel data analysis. The result of the study shows that technical efficiency of the hospitals were not improved by the merger but the cost efficiency reduces, which is not good for the providers. The restructuring of productive efficiency like treatment process due to this merger is not improved.

Padma P et.al (2007) consider the quality of service provided by the hospitals of India for the patients and to their family members. The methodology they used is basically parametric approach (Data Envelopment Analysis) to measure the quality of services of hospitals. This study enables us to understand how patients and their attendants evaluate the quality of healthcare provided in respect of every dimension. Two instruments for measuring the dimensions of hospital service quality are used in this study, one for the patients and other for

their family members. This study will be a helpful guide for the health managers for providing qualitative services.

Hollingsworth B (2008) studies lots of published paper on frontier efficiency measurement. The study uses Data Envelopment Analysis (DEA) which is basically non-parametric techniques, but the author finds from different paper that an increasing tendencies to use parametric techniques like Stochastic Frontier Analysis (SFA). The author has pointed out that various studies shows that public provisions are more efficient than the private providers. Considering all the different studies the author tries to develop a concept of efficiency, and also marking the limits of danger for functioning at an inefficient level. The author lucidly explains the necessity of efficiency studies in healthcare analysis.

Mukhopadhyay P (2008) studies and recommends public– private partnership (PPP) that has the potential of using healthcare facilities much more efficiently and providing better service to the people, especially the poor. They support this argument in favour of PPP in the ‘India Infrastructure Report 2008’ because higher efficiency arising from accountability for the service delivery and it reduces the requirement for public funds by increasing the efficiency of revenue generation i.e. government resources can be used for alternative purpose or for expansion of effective health services to newer areas with improved service levels. The study cites examples from countries like Australia and Brazil which have received fruitful results from such transformations. The study also cites that in case of India PPP model in healthcare are already functioning in some state and the performance is very much attractive. The study proposes some structure of PPP planning in case of healthcare development. From the context of speed, focus and resource generation the author thinks that this kind of policies will be gainful for our country.

Bloom G et.al (2008) have studied the healthcare market evolution of two countries China and India from the periods 1960. The study considers four aspects regarding government regulation in healthcare, these are quality of care (competency of providers), value for money (Price of healthcare provided), social agreement (fairness and equity ground of access) and accountability (transparency of the system). The study narrates the process of development of healthcare markets in two countries considering nature of healthcare demand and existing situations of the providers. They observe for China’s health sector as transformation from rural health system to a market economy but for India a growth of the private sector is observed. They describe the story of how each country has tried to regulate the front-line

provision and financing of health care has highlighted some key gaps in the approaches taken.

Mahmoodet.al (2009) conduct a survey based study on Chakaria, Bangladesh the author tries to identify the factors of poor health. The study tries to find the lag between attack of disease and the first visit to a doctor. The variables influencing health status are health seeking behaviour, home based remedy, socio-economic status, illness etc. It is found that rate of ailments for male children is higher than female at younger group but the scenario is just changes for female age group higher than 10 years. They observe a gender difference exist in treatment seeking behaviour also. Shortage of health workers also identified as an impediments for the development of health. The study highlights that people of Chakaria prefer village doctor (unqualified) or a drug seller because they are cheap than the transport cost which arises when they uses publicly provided doctor.

Gobind M. (2009), in his book examines the availability of services and facilities at the primary health centres (PHCs) and health sub-centres (SCs) at selected rural areas in Bihar. The author has collected the information regarding availability of services, infrastructure, equipment, medicines, staffs etc. The study finds that PHCs and SCs are not functioning according Indian Public Health Standards (IPHS), which obstruct Bihar to utilise the primary healthcare as per need. The study analyses also that poverty and socio-economic backwardness are the root cause behind the low strength of rural health of Bihar.

Purohit BC. (2010) examines the efficiency variation in the performance of health system of Karnataka state, India on the basis of Human Development Report 2006 (Govt. of Karnataka), economic survey 2007, and Reproductive Child Health survey- 2007(RCH). The author uses Stochastic Frontier Analysis (SFA) for the estimation of performance of health units by two stage estimation process. In the first stage it considers life expectancy as dependent variable and the explanatory variables are infrastructure, manpower and material inputs. In the second stage estimation, technical efficiency is considered as the dependent variable which is a function of per-capita income, GDP per worker, total literacy, total enrolment, proportion of out-of-school children, population density, gender development index, safe drinking water and toilets and electricity. From the first stage estimation the author concludes that due to disparities across districts per-capita availability as well as utilisation of hospitals, bed and manpower inputs hamper improvements in life expectancy in the state. The second stage estimation suggests that in rural areas improvements in the infrastructure facilities as well as better co-ordination between social sector and economic

policies, especially at the district level can improve the life expectancy more quickly and equitably in the said areas.

Qian D. et.al (2010) study the relation between community health service centres (CHCs) with urban health delivery system in China in respect of healthcare demand utilisation. The study is based on National households sample survey (NHSS) of China in 2008, regarding illness study of upper respiratory tract infections (URTI). They examine the factors which offset their use of different outpatient healthcare providers. It is found that private clinics are the imperfect sources of healthcare for low consumption households. But the insured people are mostly use public provided healthcare in CHCs. In this type of utilisation they also found factors like city size, severity of ailments were played important role.

Kimani JK et.al (2010) have studied the determinants associated with participation in the National Hospital Insurance Fund (NHIF) among residents of urban slums in Nairobi city. This study seeks to determine the proportion of people without health insurance coverage in the slums of Nairobi. The data used in this paper have come from the African Population & Health Research Centre. This research project is nested in the Nairobi Urban Health and Demographic Surveillance System (NUHDSS). The authors also have studied migration histories, which is part of the project, aimed at documenting information on the inter-linkages between migrations, poverty and health outcomes at the different stages of the life course. The descriptive and bivariate analyses are used to describe the characteristics of the sample. The study tries to identify the proportion of people without health insurance coverage in the slums and exploring the associations between the dependent & independent variable. The dependent variable considers enrolment in NFHS programme and the independent variables are type of employment sector, participation in welfare programs, membership in savings and credit cooperative organizations and community-based savings groups. Their multivariate results show that a number of factors are significant predictors for participation in the public health insurance program. Those are employment in the formal sector, participation in social welfare programs (i.e., the national social security fund), participation in microfinance institutions and informal community-based savings groups', and being female. Their study suggests that more efforts are needed to integrate informal sector workers into the NHIF.

Chauhan I. S. (2011) considers that health is not only determined by medical sector but also from the outsider of medical sector. The study establishes that a triple disease burden exist in India i.e. communicable, non-communicable and infection types. The study finds that growth of public health system in India is very slow for low public expenditure on health. A multi-

sectoral collaboration and inter-disciplinary co-ordination are needed to solve the problem. The programme like National Rural Health Mission (NRHM) and upgradation of health centres as per Indian Public Health Standards (IPHS) standard can bring some development.

Ray SK et.al (2011) study the extent of utilisation, strength and weakness of healthcare delivery system of West Bengal during 2006. The study considers a cross sectional observation of three districts Murshidabad, Uttar Dinajpur and Purulia. The quantitative methods follow basically a household level survey for the utilisation aspects of healthcare for both public and private care and exit interview to understand morbidity pattern, time taken for registration and distance travelled. The qualitative methods consist of in-depth interview, focus discussion group and observation facility mainly in BPHC and Sub-center level. The study finds majority of the people used public provided healthcare system at the lower tier level. The study indicates that 30 percent people seek no care and 30 percent goes to local unqualified practitioners during their ailments. The study observes that free drug supply, good treatment, round the clock availability and closer proximity are the main reasons for the visit to a healthcare.

Pushkar & Gupta M (2011) consider infant mortality rate (IMR) as an indicator to observe the functioning of democracy on health. The study considers the relationship between demand and supply side of public goods how influences democracy. The Indian states are dividing in categories in terms of IMR (poor, moderate and best performer) to explain the relationships. They also compare the rate of decline in IMR between 1981 and 2009 for every state and found that number of entries in poor performing states reduces in terms of IMR decline rate. But the situation is not fair for the states like AP, Bihar, MP and UP which imply promise of democracy remains unfulfilled in populous states. The authors explain for better provisions of healthcare facilities the axis of political competition and size of the minimum winning coalition are two important factors. They add that other than the many obstacles to collective action for public goods rooted in the structure and ideologies of the civil society. When health deficits are obvious and people suffer from poor health, they appear to be satisfied with whatever healthcare they get, perhaps because they have few expectations or do not know any better.

Lhamsuren K et.al (2012) have studied over urban Mongolia regarding the governmental effort for the spreading of healthcare services over every district. The study finds that the main barriers to health access for the urban poor relate to interacting effects of poverty, unhealthy daily living environments, social vulnerability and isolation. The study observe

that for implementation of this strategy developed the issues like immunisation, family planning and ante-natal care services, and increased civil registrations. The findings illustrate the extent to which the health sector performed to replace heavily centralized administrative systems with more inclusive and participatory models of governance, particularly as these systems apply to the health and social needs of the very poor.

2.7 Conclusion

After getting the poor efficiency scores for the health units it is important to identify the reliable causes for such performances. From the identification of such causes it becomes easier for the authority to take necessary steps for increasing the efficiencies. In case of developing countries various studies concluded that scope of reductions of inputs for healthcare providing units were very much limited, as many of them prevail in a very few health providing units in compare to their seeking needs. Various studies suggested for health promoting strategies through conscious persuasion for the facing of induced health demand. The strategies are by improving people's ability to access health information to increase their capacity to make informed choices concerning their health related behaviour. Health education was meant to foster motivation, skills and confidence among communities to take action to improve their health. Various studies confirmed that the amount of health output could be increased tremendously without increasing the quantity of inputs used. Thus, many studies agreed that with the potential increase in outputs it is possible for the health system to signify increase coverage by different health interventions and contribute to the achievement of the various national and global health targets.

CHAPTER 3

Health Development and Indian Five Year Plan

- **Introduction**
- **Healthcare Structure**
- **Different Committees for Better Health Functioning during Plan Period**
- **Ailments wise Health Programmes during Plan Period**
- **National Rural Health Mission (NRHM)**
 - **Accredited Social Health activist (ASHA)**
 - **Janani Suraksha Yojana (JSY)**
 - **To make more powerful health Institutions**
 - **Evaluation of NRHM**
- **Conclusion**

CHAPTER-3

Health Development and Indian Five Year Plan

3.1 Introduction

In the pre-independence period, the British had started a number of Public Health initiatives. Quarantine act was passed in 1825. Commission of Public Health in 1859 had pointed out the need of safe water and environmental sanitation to prevent occurrence of epidemics. In 1864, Sanitary commissioners were appointed in all three provinces of Bombay, Madras and Bengal to study the health problems and initiate measures for improvement. Local Self Government Act was passed in 1885. Decentralization of health administration had begun in 1919 with Montague- Chelmsford constitutional reforms. The colonial era was marked by the dichotomy which continues to operate in the country's health policy to date. They acknowledged the existence of the gaps in coverage of health services, proclaiming the responsibility for the same and recommending suitable action while simultaneously not providing resources for implementation. This trend was unfortunately perpetuated even in free India. In 1940, the resolution adopted by the National Planning Committee based on the Sokheys Committee's recommendations recommended integration of preventive and curative functions and the training of a large number of health workers. Bhore committee constituted in 1943 laid the framework on which the health care was eventually built in the independent India. The health care in India has since moved from bureaucratic government based top down approach to decentralized community based bottom- up system after the Panchayati Raj came into being. This model was long ago propagated by the Father of the nation, "Mahatma Gandhi".

The British Empire realised the importance of Public Health and instituted the 'Health Survey and Development Committee,' in the year 1943 under the chairmanship of Sir Joseph Bhore. The *Bhore Committee* (1943-1946) was asked to survey the health conditions and health organisations in the country, and to make recommendations for future development. The committee submitted its report in 1946. The integration of preventive, promotive and curative health services and establishment of Primary Health Centres in rural areas were the major recommendations made by this committee. The major recommendations were (1) Integration of Preventive, Promotive and Curative services at all administrative levels. (2) The development of Primary Health Centres for the delivery of comprehensive health services to the rural India. Each PHC should cater to a population of 40, 000 with a Secondary Health

Centre (now called Community Health Centre) to serve as a supervisory, coordinating and referral institution. (3) In the long term (3 million plan), the PHC would have a 75 bedded hospital for a population of 10,000 to 20,000. (4) It also reviewed the system of medical education and research and included compulsory 3 months training in Community Medicine. (5) Committee proposed the development of National Programmes of health services for the country. The Bhore committee model was based on the allopathic system of medicine. The traditional health practices and indigenous system of medicine prevalent in rural India, which had great influence and were part of their socio-cultural milieu were not included in the model proposed by Bhore committee. The approach was not entirely decentralized but had a top down approach.

3.2 Healthcare Structure

Since independence, several measures have been undertaken by the National Government to improve the health of the nation. To eradicate communicable diseases, to improve environmental sanitation, to raise the standard of nutrition, to control the population growth and to improve the rural health the Central Government adopted National Health Programmes. Different international agencies like World Health Organisation (WHO), United Nations Children's Fund (UNICEF), United Nations Fund for Population Activities (UNFPA), World Bank and different foreign agencies like Department for International Development (DFID), Swedish International Development Cooperation Agency (SIDA), Danish International Development Agency (DANIDA), Norwegian Agency for Development Cooperation (NORAD) and United States Agency for International Development (USAID) providing technical and material assistance for the proper implementation of the programme. After independence in 1947, the Indian Government constituted the Planning Commission in 1950, and started Five year plan system for socioeconomic development of the country of which health was the important and integral part. Besides the planning commission the government also set up various committees to plan specific public health services or review existing health situations.

The healthcare services in our country functioning from five levels. These are (1) Central Level: The Union Ministry of Health and Family Welfare (MoHFW) is the main pillar working with its three branches like Department of Health & Family Welfare, Department of Ayurveda, Yoga-Naturopathy, Unani, Sidha & Homeopathy (AYUSH) and Department of Health Research. (2) State Level: State Department of Health and Family Welfare in each State is the main functioning unit. The State Directorate of Health Services, as the technical

wing, is an attached office of the State Department of Health and Family Welfare and is headed by a Director of Health Services. Some states have created the posts of Director (Ayurveda) and Director (Homeopathy). These officers enjoy a larger autonomy, although sometimes they still fall under the Directorate of Health Services of the State. (3) Regional Level: In some states zonal or regional or divisional set-ups have been created between the State Directorate of Health Services and District Health Administration. Each regional/zonal set-up covers three to five districts and acts under authority delegated by the State Directorate of Health Services, e.g., Bihar, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, Karnataka and others. (4) District Level: All health care programmes in a district are placed under a unified control. It is a link between the State/ regional structure on one side and the peripheral level structures such as PHC/ sub-centre on the other side. The district officer with the overall control is designated as the Chief Medical and Health Officer (CM & HO) or as the District Medical and Health Officer (DM & HO). These officers are popularly known as DMOs or CMOs, and are overall in-charge of the health and family welfare programmes in the district. These DMOs/CMOs are assisted by Dy. CMOs and programme officers. (5) Community Level: For a successful primary health care programme, effective referral support is to be provided. For this purpose one Community Health Centre (CHC) has been established for every 80,000 to 1,20,000 population, and this centre provides the basic specialty services in general medicine, paediatrics, surgery, obstetrics and gynaecology.

The main structure of healthcare in India depends upon the functioning of Community Health Centre (CHC), Primary Health Centre (PHC) and Sub Centre (SC). These are basically served as the first visit under ailments. These are being established and maintained by the State Government. The CHCs are manned by four medical specialists i.e. Surgeon, Physician, Gynaecologist and Paediatrician supported by 21 paramedical and other staff. It has 30 in-door beds with one OT, X-ray, Labour Room and Laboratory facilities. It serves as a referral centre for 4 PHCs and also provides facilities for obstetric care and specialist consultations. As on March, 2007, there are 4, 045 CHCs functioning in the country.

PHCs are the cornerstone of rural health services. It is a first point of call to a qualified doctor of the public sector in rural areas for the sick and those who directly report or referred from Sub-centres for curative, preventive and promotive health care. The Bhore Committee in 1946 gave the concept of a PHC as a basic health unit to provide as close to the people as possible, an integrated curative and preventive health care to the rural population with emphasis on preventive and promotive aspects of health care. The central Council of Health

at its first meeting held in January 1953 had recommended the establishment of PHCs in Community Development Blocks. These centres were functioning as peripheral health service institutions with little or no community involvement. They were not able to provide adequate health coverage, partly, because they were poorly staffed and equipped and lacked basic amenities. The 6th Five year Plan (1983-88) proposed reorganization of PHCs on the basis of some character. One PHC for every 30,000 rural population in the plains and one PHC for every 20,000 population in hilly, tribal and backward areas for more effective coverage. PHC is the first contact point between village community and the Medical Officer. The PHCs were envisaged to provide an integrated curative and preventive health care to the rural population with emphasis on curative, preventive, Family Welfare Services and promotive aspects of health care. Many rural dispensaries have been upgraded to create these PHCs. At present, a PHC is manned by a Medical Officer supported by 14 paramedical and other staff. It acts as a referral unit for 6 sub-centres and refer out cases to Community Health Centres (CHCs-30 bedded hospital)/sub-district/district hospitals. It has 4-6 indoor beds for patients. There are 22, 370 PHCs functioning as on March 2007 in the country.

The Sub-Centre is the most peripheral and first contact point between the primary health care system and the community. Sub-Centres are assigned tasks relating to interpersonal communication in order to bring about behavioural change and provide services in relation to maternal and child health, family welfare, nutrition, immunization, diarrhoea control and control of communicable diseases programmes. The Sub-Centres are provided with basic drugs for minor ailments needed for taking care of essential health needs of men, women and children. Currently a Sub-centre is staffed by one Female Health Worker commonly known as Auxiliary Nurse Midwife (ANM) and one Male Health Worker commonly known as Multi Purpose Worker (Male). One Health Assistant (Female) commonly known as Lady Health Visitor (LHV) and one Health Assistant (Male) located at the PHC level are entrusted with the task of supervision of all the Sub-centres (generally six sub-centres) under a PHC. The Ministry of Health & FW, GOI provides assistance to all the Sub-centres in the country since April 2002 in the form of salary of ANMs and LHVs, rent (if located in a rented building) and contingency, in addition to drugs and equipment kits. The salary of Male Health Worker is borne by the State Governments. There are 1,45,272 Sub Centres functioning in the country as on March 2007.

Table-3.1: Medical Institution in West Bengal

Type of Medical Institution	No	Total No of beds (Sanctioned)
Medical College Hospital (MCH)	13	13441
District Hospital (DH)	21	9370
Sub-Divisional Hospital (SDH)	38	7680
State General Hospital (SGH)	33	4899
Other Hospitals	33	6504
Rural Hospital (RH)	268	8790
Block Primary Hospitals (BPHC)	79	1086
Primary Health Centre (PHC)	909	6592
Sub-Centre (SC)	10356	0
Total	11750	58362

Source: Health on March 2011-12

The health structures with all possible bed supply are shown in the table 3.1 for the state West Bengal. Here, 11750 medical institutions providing 58362 beds for the inpatients and outpatients services. Out of these medical institutions 10356 Sub-Centres functioning as the first meet point with patients and providing only the outpatient services. Thus without SCs there are 1394 institutions providing 58362 beds, since the SCs are performing without beds. There are 909 PHCs which is 65 percent of the total medical institutions with bed facilities providing 6592 beds which is 11.29 percent of total available beds. In our study area these facilities are shown in table 3.2. Here at Jalpaiguri district 594 institutions providing 1881 beds for inpatients and outpatients services. There are 38 PHCs are performing with 256 beds, and the number of PHCs at Jalpaiguri district is 4.18 percent of total PHCs of the state and its bed provision is 3.88 percent of the total PHC beds of West Bengal.

Table-3.2: Medical Institutions at Jalpaiguri District of West Bengal

Type of Medical Institution	No	Total No of beds (Sanctioned)
Medical College Hospital (MCH)	0	0
District Hospital (DH)	1	700
Sub-Divisional Hospital (SDH)	2	350
State General Hospital (SGH)	1	100
Other Hospitals	1	60
Rural Hospital (RH)	12	390
Block Primary Hospitals (BPHC)	2	25
Primary Health Centre (PHC)	38	256
Sub-Centre (SC)	537	0
Total	594	1881

Source: Health on March 2011-12

3.3 Different Committees for Better Health Functioning during Plan Period

During second five year plan (1956-1961), Government decided to relook at the health needs and resources of the country to provide necessary guidelines to national health planning. Also to review the progress made since submission of Bhore committee report, Government appointed “*Health Survey and Planning Committee*” (Mudaliar Committee) under the chairmanship of *Dr A Lakshmanswami Mudaliar* in 1959 to make future recommendations for development and expansion of health services. It admitted that the basic health facilities had not reached at least half the nation and there was gross mal distribution of hospitals and beds in favour of urban areas. The committee found that the quality of services provided by PHCs were grossly inadequate with poor functioning, lack of referral system, and gross under staffing due to insufficient resources. Important recommendations of the Mudaliar committee are depicted. The important recommendations of the Mudaliar committee were to strengthening of existing PHCs and development of referral centres before new centres were established. To make powerful Sub-divisional and district hospitals is another recommendation. It also recommend for integration of medical and health services. It also suggested constitution of an All India Health Service in the pattern of Indian Administrative service.

The third Five Year Plan launched in 1961 discussed the problems affecting the provision of PHCs, and directed attention to the shortage of health personnel, delays in the construction of PHCs, buildings and staff quarters and inadequate training facilities for the different categories of staff required in the rural areas. The Third Five Year Plan highlighted inadequacy of health care institutions, doctors and other personnel in rural areas as being the major shortcomings at the end of the second Five Year Plan. The doctor syndrome loomed large in the minds of planners, and increase in supply of human power in health meant more doctors and not other health personnel. While the 3rd plan did give serious consideration to the need for more auxiliary personnel no mention was made of any specific steps to reach this goal. Only lip service was paid to the need for increasing auxiliary personnel but in the actual training and establishment of institutions for these people, inadequate funding became the constant obstacle. On the other hand, the proposed outlays for new Medical Colleges, establishment of preventive and social medicine and psychiatric departments, completion of the All India Institute of Medical Sciences (AIIMS) and schemes for upgrading departments in Medical Colleges for post graduate training and research continued to be high (Batliwala, 1978).

During 1963 Dr M S Chadha, the then DGHS, was appointed to study the details of the necessary requirements related to PHCs and maintenance of National Malaria Eradication Program (NMEP). Important recommendations of the *Chadah committee* are strict monitoring and vigilance of implementation of NMEP is responsibility of general health services at all levels i.e. health workers of PHC, CHC, Zilla Parishod. One basic health worker (now called Multi Purpose worker) for every 10,000 population was recommended and these basic health workers should visit house to house once in a month to implement malaria activities. Basic Health worker should take additional duties of collection of vital statistics, family planning etc.

By recommending basic health workers to take on additional responsibilities and work as multipurpose worker, both NMEP and family planning programme got a major setback. A committee under the chairmanship of Sri Mukerji, then Health Secretary to Government of India was appointed to review the health system at different levels from the point of manpower and financial planning. Major important recommendations of the *Mukerji committee* (1966) are strengthening of the administrative set up at different levels from PHC to state health services. Separate staff was recommended for family planning program. It also recommend for utilisation of basic health workers for all duties except for family planning.

In 1967, Central Council of Health appointed “*Committee on integration of Health Services*” headed by Dr N. Jungalwalla, then Director, National Institute of Health Administration and Education. Important recommendations of the *Jungalwalla committee* are to promote integrated health services with unified cadre, Common seniority, recognition of extra qualifications, equal pay for equal work, no private practise, special pay for specialised service, improvement in their service conditions, medical care of the sick and conventional public health programmes functioning under single administrator.

The 4th Plan which began in 1969 with a 3 year plan holiday continued on the same line as the 3rd plan. It also quoted extensively about the socialist pattern of society but its policy decisions and plans did not reflect socialism. It lamented on the poor progress made in the PHC programme and recognized again the need to strengthen it. For the first time PHCs were given a separate allocation. It was reiterated that the PHC's base would be strengthened along with, sub-divisional and district hospitals, which would be referral centers for the PHCs. The importance of PHCs was stressed to consolidate the maintenance phase of the communicable diseases programme. This acknowledgement was due to the fact that the entire epidemiological trend was reversed in 1966 with the spurt in incidence of malaria which rose

from 100,000 cases annually between 1963-65, to 149,102 cases (GOI, 1982). It was also during this period that water supply and sanitation was separated and allocations were made separately under the sector of Housing and Regional development.

The *Kartar Singh Committee (1973)* headed by then additional secretary, Ministry of Health and Family planning, Shri Kartar Singh, was constituted to study and make recommendations on the structure for integrated health services at peripheral and supervisory levels. It was to study the feasibility of dual purpose and multipurpose workers in the field. Important recommendations of the Kartar Singh committee are to substantiate “Female Health Worker” in place of ANM and “Male Health Worker” in place of malaria surveillance worker, vaccinators, health education assistants and family planning health assistants. The committee proposed a PHC per 50, 000 population with 16 sub-centres, each covering a population of 3000- 3500. Each sub-centre to have one male and one female health worker. There should be one male and one female health supervisor at PHC to monitor and supervise the activities of staffs of 3-4 sub centres. It also recommends that PHC will be the overall in charge of all peripheral staff. Training for all workers engaged in the field of health, family planning and nutrition should be integrated.

The “*Group on Medical Education and Support Manpower*” constituted in 1974 by the Government. The concept of community participation in the health sector originated which has given concept of “*people’s health in people’s hand*”. Convened under the chairmanship of Dr J B Shrivastav, Director General Health Services, this committee made the recommendations. Based on these recommendations “Rural Health Scheme” was launched by the government in 1977-78. The programme of training of community health workers was initiated during 1977-78. The major steps initiated were : a) Involvement of medical colleges in health care of selected PHCs with the objective of reorienting medical education according to rural population called Re-Orientation of Medical education (ROME). It led to teaching and training of undergraduate students and Interns at PHCs. b) Training of Village Health Guides and utilising their services in the general health service system. Important recommendations of the *Shrivastav committee (1974-75)* are to create Village Health Guide (VHG) or community health volunteers from the community itself like teachers, postmasters, gram sevaks who can provide comprehensive health services as paraprofessionals. Primary health care be provided within the community itself through specially trained workers so that the health of the people is placed in the hands of people themselves. Creation of MPW and Health Assistants (HA) in between the VHG and PHC.

A Committee on Basic Rural Doctors was framed under the guidance of Sri Shivaraman, the member of planning commission. The committee recommended establishment of countrywide cadre of basic rural doctors consisting of trained paraprofessionals to extend comprehensive health care delivery to rural community.

A expert committee for 'health manpower planning, production and management' was constituted under the chairmanship of Dr J S Bajaj, then member of planning commission, to tackle the problem of health manpower planning, production and management. An important recommendation of the Bajaj committee (1986) was to formulate national health manpower planning based on realistic survey. It also recommend to develop different educational commission for health sciences on the lines of UGC. It recommended for National and Medical education policy in which teachers are trained in health education science technology. Uniform standard of medical and health science education by establishing universities of health sciences in all states was its another recommendation. It also support for the establishment of health manpower cells both at state and central level and different vocational courses in paramedical sciences to get more health manpower.

The committee under the chairmanship of Dr Krishnan (1992) reviewed the achievements and progress of previous health committee reports and also made comments on shortfalls. The committee address the problems of urban health and devised the health post scheme for urban slum areas. The committee had recommended one voluntary health worker (VHW) per 2,000 populations with an honorarium of Rs 100. Its report specifically outlines which services have to be provided by the health post. These services have been divided into outreach, preventive, family planning, curative, support (referral) services and reporting and record keeping. Outreach services include population education, motivation for family planning, and health education. In the present context, very few outreach services are being provided to urban slums.

Sixth plan (1980-1985) and the seventh (1985-1990) plan made a lot of radical statements and recommended for progressive measures. But the story is the same like before i.e., progressive thinking and inadequate action. The underprivileged get worse off and the already privileged get better off. However, the Sixth and the Seventh plans are different from the earlier ones in one respect. They no longer talk of targets. The keywords are efficiency and quality and the means to realize them is privatisation. Privatisation is the global characteristic of the eighties and the nineties and it has made inroads everywhere and especially in the socialist countries. The 7th Five Year Plan recommended that development

of specialties and super-specialties need to be pursued with proper attention to regional distribution and such development of specialised and training in super specialties would be encouraged in the public and the private sectors. This plan also talks of improvement and further support for urban health services, biotechnology and medical electronics and non-communicable diseases. The special attention that AIDS, cancer, and coronary heart diseases are receiving and the current boom of the diagnostic industry and corporate hospitals is a clear indication of where the health sector priorities lie.

Table-3.3: Establishment of BPHC/CHC, PHC and SC in India since Plan period

Period	Year	BPHC/CHC	PHC	SC
First 5 Year Plan	1951-1956	x	725	x
Second 5 Year Plan	1956-1961	x	2565	x
Third 5 Year Plan	1961-1966	x	4631	17521
Interim Plan	1966-1969	x	4919	22826
Fourth 5 Year Plan	1969-1974	x	5283	33509
Fifth 5 Year Plan	1974-1979	214	5484	47112
Sixth 5 Year Plan	1979-1984	761	9115	84376
Seventh 5 Year Plan	1984-1989	1910	18671	130165
Interim Plan	1989-1992	2188	20407	131369
Eighth 5 Year Plan	1992-1997	2633	22149	136258
Ninth 5 Year Plan	1997-2002	3222	23109	142655

Source: Infrastructure division, MOHFW, GOI, 2011

The establishment of BPHC/CHC, PHC, and SC in India since from plan period are shown in table 3.3. The data of the following table shows that initiation of establishment of BPHCs/CHCs are started from fourth five year plan period, where as PHCs are started functioning since the first five year plan. The initial PHCs are upgraded to BPHCs/CHCs in terms of functioning as well as needs during fourth plan. It is also clear from the table 3.3 that growth of establishment of PHCs almost doubled in between fifth to sixth plan period, and SCs are also growing in more or less same rate during that period. But from second inter phase plan period to eighth plan the growth rate of establishing PHCs, BPHCs, and SCs remain more or less stagnant. During 8th five year plan selective healthcare approach was adopted due to severe economic crisis and the slogan of health for all changes to health for underprivileged. But introduction of privatisation was continuously supported and encouraged with some minimum standards.

3.4 Ailments wise Health Programmes during Plan Period

The National Vector Borne Disease Control Programme (NVBDCP) is implemented in the state and union territories for the prevention and control of vector borne diseases like Malaria, Filariasis, Kala- azar, Japanese Encephalitis (JE), Dengue and Chikungunya. The states are responsible for planning, implementation and supervision for the programme under

the technical guidance of NVBDCP. The total process is very complex as their transmission depends upon ecological, biological, social and economic factors including migration. These vector borne diseases (VDB) are transmitted by mosquitoes and sand flies.

During the first five year plan (1951-1956), 1953 National Malaria Control Programme (NMCP) implemented and due to its huge success it was converted as an National Malaria Eradication Programme (NMEP) during 1958. Prior to 1953 estimated malaria infected cases was about 75 million and of which 0.8 million mishaps were take place and the situation reduces to 0.1 million during 1965. The resurgence of malaria started again during early 1970s and during 1976, malaria infected cases increases to 6.46 million. With the increasing number of malaria cases, the demand for anti-malarial drugs has increased for which different drug distribution centres and fever treatment depots were established under the Modified Plan of Operations during 1977. During 1997-2005 World Bank assisted Enhanced Malaria Control Project (EMCP) launched for the tribal areas of 100 high malaria burden districts of 8 states like A.P, Chhattisgarh, Gujarat, Jharkhand, M.P, Orissa, Rajasthan and this programme was also converted to National Anti-Malaria Programme (NAMP) during 1999. Malaria control is now incorporated into the health service delivery programmes under the umbrella of National Rural Health Management (NRHM). All available methods and means were being used to deliver these interventions by CHCs, PHCs and Sub-Centres and community outreach services using community health workers and volunteers like Accredited Social Health Activist (ASHAs) at village level, NGOs, Private sector providers and district and regional health facilities and hospitals. During 2005-2010 global fund assisted Intensified Malaria Control Project (IMCP) launched specially for the 7 north-eastern states along with the part of Orissa, Jharkhand and West Bengal. There are about 100 million blood slides collected from fever cases in India annually from which about 1.5 million malaria cases are detected and during 2005 introduction of Rapid Diagnostic Tests (RDT) in the programme started. In 2006, Artesunate Combination Therapy (ACT) introduced in the areas showing chloroquine resistance in falciparum malaria. During 2008, ACT extended to high falciparum predominant districts covering about 95 percent falciparum cases. World Bank supported National Malaria Control Project launched in 2008. and in 2009 Long Lasting Insecticidal Nets (LLINs) introduced to combat malaria. The 11th five year plan considers the use of Insecticides-treated nets (ITN), Indoor residual spraying (IRS) with RDT and ACT for eradication of malaria up to 80 percent at national level. The 12th plan (2012-2017) targeted use of LLINs for the 7 states of north-east up to 90 percent level and for urban India effective

coverage will be transfer to municipality. By 2017 the target fixed as rural malaria will be reduced by less than 30 percent level.

The disease of Lymphatic Filariasis (LF) is endemic in 250 districts in 20 states and union territories. According to recent estimates about 600 million people are exposed to the risk of infection. The National Filaria Control Programme (NFCP) has been effective since 1955 and during 1978 the operational component of the NFCP was merged with the urban malaria scheme for maximum utilisation of available resources. Filaria control strategy includes vector control through ant larval operations, source reductions, detections and treatment of microfilaria carriers, morbidity management. In India National Health Policy (2002) envisages elimination of lymphatic filariasis (ELF) by 2015.

Kala-azar is now endemic in 31 districts of Bihar, 4 districts of Jharkhand, 11 districts of West Bengal and 6 districts of Uttarprades. A centrally sponsored programme was launched in 1990-1991 which brought down the incidence and death rate of the disease by 75 percent by the year 2002. The National Health Policy (2002) envisages Kala-azar elimination by the year 2010. The government of India has decided to provide 100 percent central support from the year 2003-04 to achieve this goal. World Bank also providing assistance in 46 districts in 3 states namely Bihar, Jharkhand and West Bengal.

Japanese encephalitis is a disease with high mortality rate and those who survive do so with various degrees of neurological complications. During the last few years it has become a major public health problem. As there is no specific cure for this disease, early case management is very important to minimize the risk of complications and death. Epidemiological monitoring of the disease for effective implementation of preventive and control measure and technical support is provided on request by the state health authorities.

The National Leprosy Control Programme (NLCP) has been in operation since 1955, as a centrally aided programme to achieve control of leprosy through early detection of cases and DDS (dapsons) monotherapy on an ambulatory basis. To strengthen the process of elimination of leprosy in the country, the first World Bank supported project was introduced in 1993. On completion of the project, the 2nd phase of the project with World Bank support was started in 2001-02 which ended in December 2004. In 1980 the government of India declared its resolve to "eradicate" leprosy by the year 2000 and constituted a working group to advise accordingly. Accredited Social Health Activists(ASHA) have been involved in

bringing out suspected leprosy cases from their villages for diagnosis and treatment at PHC and follow up of confirmed cases for their treatment completion.

National Tuberculosis Programme (NTP) has been in operation since 1962. Its main objective is to reduce tuberculosis in the community to that level when it ceases to be public health programme. The programme was operating through the District Tuberculosis Programme (DTP) which was the backbone of the NTP. Over 600 TB clinics were set up in the country, of which 390 were upgraded as District TB Centres (DTC) to undertake district-wise TB control in association with general health and medical institutions. The government of India, WHO and World Bank together reviewed the NTP in the year 1992. Based on the findings a revised strategy for NTP was evolved which was familiar by Revised National Tuberculosis Control Programme (RNTCP). RNCTP worked by three phase and by the end of 1998, only 2 percent of the total population of India was covered by this programme. The RNCTP phase-II of the World Bank project has been approved for a period of 5 years from 2006 to 2011. Direct Observed Therapy Short-term (DOTS) a community based tuberculosis treatment and care strategy which combines the benefits of supervised treatment and the benefits of community based care and support.

National AIDS control programme (NACP) was launched in India in 1987 and National AIDS Control Organisation (NACO) was set to implement and closely monitor the various components of the programme. The milestones of AIDS control programmes are, during 1986 first case of HIV detected and AIDS taskforce was set up by the Indian Council of Medical Research. In 1990 medium term plan launched for four states and four metros. In 1992 NACP-I launched to slow down the spread of HIV infection and NACO established. In 1999 NACP-II begins with NGOs involvement and State AIDS control Societies formed. During 2002 National AIDS control policy adopted and National Blood Policy also adopted. In 2004 antiretroviral treatment (ART) was initiated and in 2006 National Council on AIDS constituted under the chairman ship of Prime Minister.

3.5 National Rural Health Mission (NRHM)

India Government started the National Rural Health Mission (2005-12) or NRHM seeks to provide effective healthcare to rural population throughout the country with special focus on 18 states, which have weak public health indicators and/or weak infrastructure. It committed to increase the contribution of GDP from 0.9 percent to 2-3 percent in favour of healthcare spending. For better management of health programme NRHM allocated funds through

National Common Minimum Programmes and promote policies which strengthen public health management and service delivery in the country. It proposed for the implementation of accredited female health activist at village level and a village health plan should be prepared through a local team headed by the Health & Sanitation Committee of the Panchayat. It suggested to strengthen the rural hospitals for producing effective curative care for the community as per Indian Public Health Standards (IPHS). It also tries for integrating health and family welfare programmes vertically with funds for optimal utilisation. It also tries to assimilate local health traditions and AYUSH with public health system. It aims at effective integration of health concerns with determinants of health like sanitation & hygiene, nutrition, and safe drinking water through a District Plan for Health. It seeks decentralization of programmes for district management of health. It seeks to improve access of rural people, especially poor women and children, to equitable, affordable, accountable and effective primary healthcare. The main target of NRHM was to reduce Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR), and universal access to public health services such as Women's health, child health, water, sanitation & hygiene, immunization, and Nutrition. The other goals followed with these are prevention and control of communicable and non-communicable diseases including locally endemic diseases, access to integrated comprehensive primary healthcare, to bring population stabilization, gender and demographic balance, and to promote healthy life styles.

3.5.1 Accredited Social Health activist (ASHA)

The working of NRHM can be viewed by different angles. It considers every village or large habitat will have a female Accredited Social Health Activist (ASHA) can be chosen by and accountable to the Panchayat, and who will be act as the interface between the community and the public health system. For example, ASHA would act as a bridge between the ANM and the village and be accountable to the Panchayat. She will be working as an honorary volunteer and receiving performance-based compensation for promoting universal immunization, referral and escort services for RCH, and also look after the matter like construction of household toilets, and other healthcare delivery programmes. ASHA will be trained by community health resource organizations developed by standing mentoring group at national level and in this training would require partnership with NGOs/ICDS training centres and state health institutes. She will facilitate preparation and implementation of the 'Village Health Plan' along with Anganwadi worker, ANM, functionaries of other departments, and Self Help Group members, under the leadership of the Village Health

Committee of the Panchayat. A drug kit containing generic AYUSH and allopathic formulations for common ailments. The drug kit would be replenished from time to time.

3.5.2 Janani Suraksha Yojana (JSY)

A safe motherhood intervention programme under NRHM was implemented with the objective of reducing maternal and neo-natal mortality by promoting institutional delivery for poor pregnant mother. The programme was named as Janani Suraksha Yojana (JSY) initiated during 12th April, 2005. The basic aim of the programme was to initiate cash transfers for making institutional delivery as most attractive for poor pregnant women, and accordingly it will bypass the risk of cheaper home delivery. To make success of such programme role of ASHA is very much significant because they will identify the pregnant women as beneficiary of the scheme and provide them at least three ante-natal care checkups including TT injections and IFA tablets. ASHA also acted as a medium to bridge the gap between non-institutional delivery and institutional delivery by identifying the proper location of the delivery as well as referral centre.

3.5.3 To make more powerful health Institutions

NRHM allocated funds for making more powerful lower as well as upper health facilities. For Sub-centres it allocated untied funds for local action @ Rs. 10,000 per annum. This Fund will be deposited in a joint Bank Account of the ANM & Sarpanch and operated by the ANM, in consultation with the Village Health Committee. Not only fund but also supply of essential drugs, both allopathic and AYUSH, to the Sub-centres are allocated by NRHM. In case of additional Outlays, Multipurpose Workers (Male)/Additional ANMs wherever needed, sanction of new Sub-centres as per 2001 population norm, and upgrading existing Sub-centres, including buildings for Sub-centres functioning in rented premises will be considered. NRHM aims at Strengthening Primary Health Centre (PHC) for quality preventive, promotive, curative, supervisory and Outreach services by different ways. Firstly, adequate and regular supply of essential quality drugs and equipment (including Supply of auto disabled syringes for immunization) to PHCs, secondly provision of 24 hour service in half of the PHCs by addressing shortage of doctors, especially in high focus States, through mainstreaming AYUSH manpower, and thirdly in case of additional Outlays, intensification of ongoing communicable disease control programmes, new programmes for control of non-communicable diseases, upgradation of all PHCs for 24 hours referral service, and provision of 2nd doctor at PHC level (1 male, 1 female) would be undertaken on the basis of felt need.

It also identified the Block Primary Health Centres (BPHCs) or Community Health Centres (CHCs) as 30-50 bedded 24 hour first referral units with a post of anaesthetists. It also promote 'Rogi Kalyan Samiti' for integrating stakeholders with hospital management.

3.5.4 Evaluation of NRHM

The NRHM activity was spread over the entire country. The state also have some important role for the proper implementation of the health actions. The funding of NRHM generated for the state governments to reduce the gaps between inter-state as well as for inter-district disparities in terms of health infrastructure and man power. States would sign memorandum of understanding with Government of India, indicating their commitment to increase contribution to public health budget (preferably by 10 percent each year), increased devolution to Panchayati Raj Institutions as per 73rd Constitution (Amendment) Act, and performance benchmarks for release of funds. The NRHM is conceived as an umbrella programme subsuming the existing programmes of health and family welfare, including the RCHII, National Disease Control Programmes for Malaria, TB, Kala Azar, Filariasis, Blindness & Iodine Deficiency and Integrated Disease Surveillance Programme. The total outlay of the NRHM for 2005-06 is in the range of Rs.6700 crores and it envisages an additional 30 percent over existing annual budgetary outlays every year for the fulfilment of the mandate of Common Minimum Programme. It works for the success of reducing IMR to 30 per 100 live birth and MMR to 100 per 100,000 women. The NRHM reduces the TFR to 2.1 and the reduction rate for malaria mortality reduction rate is 50 percent and Kala Azar mortality reduction rate is 100 percent by 2010, Leprosy prevalence rate is reduce from 1.8/10,000 in 2005 to less than 1/10,000 thereafter, maintain 85 percent cure rate through entire Mission period for Tuberculosis DOTS services, Increase utilization of First Referral Units from less than 20 percent to 75 percent, and it Engaging 250,000 female Accredited Social Health Activists (ASHAs) in 10 States. A programme like 'Health Day' at Anganwadi level on a fixed day/month for provision of immunization, ante/post natal checkups and services related to mother & child healthcare, including nutrition also initiated by NRHM.

3.6 Conclusion

Therefore it is essential to specify adequate minimum standards of health care facilities which should be made available to all people irrespective of their social, geographical and financial position. There has been some amount of debate on standards of personnel requirements [doctor: population ratio, doctor: nurse ratio] and of facility levels [bed: population ratio,

PHC: population ratio] but no global standards have as yet been formulated though some ratios are popularly used, like one bed per 500 population, one doctor per 1000 persons, 3 nurses per doctor, health expenditure to the tune of 5% of GNP etc.. In contrast, the public health sector presents a vastly different picture. In urban areas the public health sector has hospitals and dispensaries which provide both outpatient and inpatient care. These hospitals are generally overcrowded; firstly, because their number is inadequate and they are insufficiently staffed, and secondly, populations from peripheral rural areas also utilise urban hospitals for both outpatient and inpatient care because rural areas lack these services. The transformation of the existing system into an organised system to meet the requirements of universality and equity will require certain hard decisions by policy-makers and planners.

CHAPTER 4

Profile of the Study Area

- **Introduction**
- **Natural Face (Physical Features)**
- **Human face (Demographic Character)**
- **Literacy**
- **Climate**
- **Rainfall**
- **Soil**
- **Land Use**
- **Flora and Fauna**
- **Economic Features**
- **Animal Husbandry**
- **Tea Garden**
- **Minerals**
- **Industries and power**
- **Transport and Communications**
- **Conclusion**

CHAPTER-4

Profile of the Study Area

4.1 Introduction

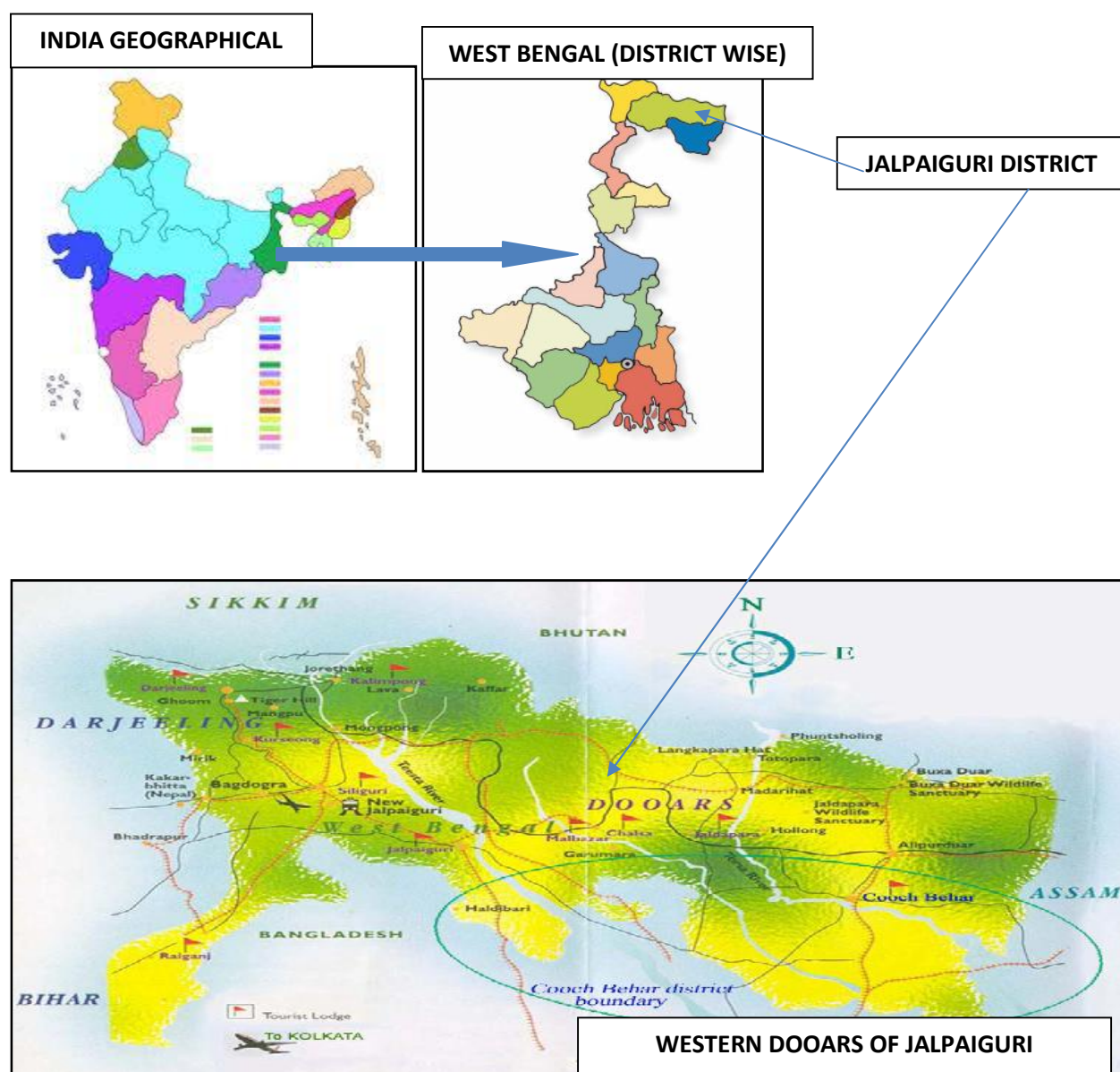
Like other rural parts of our state, Western Dooars reflects two faces as its common profile. One is natural face, basically describing the geographical position, climatic conditions, and both the geographical and geological composition. The other face is human face, which is constructed with social, economical and cultural aspects of human life. The study attempts to describe both the faces shortly and then tries to highlight some specific factors influencing the health behaviour specifically.

4.2 Natural Face (Physical Features)

Dooars is a huge bio-reserve situated in the extreme north of West Bengal and famous for its tourists attraction for traditional natural beauty and tea garden. The name 'Dooars' comes from the term '*Duar*' which means 'doors' in Bengali, Assamese and in Nepalese language (Debnath, 2010). The name 'Dooars' is also derived from 'doors' as the region is the gateway to the entire north-east India and Bhutan. It is also the gateway to the hill stations of Darjeeling - Sikkim region. There are 18 gateways through which Bhutanese people can communicate with the people living in the plains. Among this 18 gateways 11 are in West Bengal and 7 are in Assam. River Sankosh was demarcated as the boundary between Western and Eastern Dooars. The present tract, as will be dealt in under this study, belongs to the Western Dooars which was a piece of land covering about 80 miles in length, east to west and 20 to 30 miles in breadth, north to south (Sunder D H E, 1895). There are different opinions regarding creation of geographical location of Western Dooars. Historically, the so called Western Dooars was formed in 1864 and constituted of that portion of lands taken from Bhutan at the end of war which lies between eastern part of *Tista* and western part of *Sankosh* river. The geographical location of Western Dooars is identified as (i) Tract lays between river *Dharala* and *Tista* is known as *Dalimkotduar*. It starts from hilly region of present Kalimpong sub-division of Darjeeling district. (ii) The region between south-east bank of river *Dharala* and spread upto *Jaldhaka* river is known as *Maynaguriduar*. (iii) The tract between river *Mujnai* and *Torsha* is known as *Lakshmiduar*. At present the market centres of Falakata block, Madarihat block were part of it. (iv) The eastern side of Maynaguri and western side of *Lakshmiduar* is known as *Chamurchiduar*. It is in between the river Jaldhaka

and Mujnai. (v) The region spread over the terrains of Sinchula hills upto the border of Cooch Behar district and between the river *Torsha* and *Rydak* is known as *Buxaduar*. (vi to viii) The region between the river *Rydak* and *Sankosh* is known as *Baraduar*, *Volkaduar* and *Gumaduar* respectively starting from the north.

Figure-4.1 Geographical Location of Western Dooars in Jalpaiguri District



Source: www.jalpaigiri.nic.in

The present border of West Bengal to the west of Assam, like Kumargramduar, Barovisha etc. were under this tract. In this study we consider the well accepted geographical location of Western Dooars which is mainly within the Jalpaiguri District. But the total areas of this district are not a part of Western Dooars, some blocks of them are demarcated as geographical position of Western Dooars. It consists of plains, hills and forest areas of the

Jalpaiguri districts. The place is surrounded by Bhutan at north, Assam our neighbouring state at east, neighbouring country Bangladesh and neighbouring district Cooch Behar at south and Darjeeling district at west side. It contains mainly the forest and tea garden areas of Jalpaiguri district with variety of flora and fauna. It is one of the large sources of state revenue from tea and representing a unique ecosystem with magnificent biodiversity. The eastern part of river Tista is the most impressive greenery, i.e., the major reserve forests, like Chapramari, Jaldapara, Garumara, Chilapata, Nilpara and Buxa. The area of Dooars has common forest with Bhutan our neighbouring country and state Assam. Forest area of Dooars is the initial part of the great Asian bio-diversity which is initiated from Nepal (*Tarai*) and spread up to Myanmar. The forest of Western Dooars consists of variety of wild lives and exotic collection of herbal products. Apart from its historical, political and ecological importance, the Western Dooars has been adobe of a good number of tribal communities from time immemorial. In modern phase, these people are seen to earn their livelihood primarily from plantation work, agriculture and forestry and so on. The area is however still regarded as the only ecological zone of the state, where majority of the tribal communities scheduled for West Bengal are seen to reside together.

In independent India, Jalpaiguri district presently has twelve assembly constituencies and two parliamentary segments. Considering the scheduled castes and scheduled tribes population four and five constituencies have been earmarked as reserved for scheduled castes and scheduled tribes respectively leaving three general category seats for the Assembly. Of the two parliamentary seats, one (Alipurduar) is reserved for scheduled tribes. The total area of Western Dooars consists of eleven blocks under Jalpaiguri district. The geographical settlement of this place is mainly agglomerated with the blocks Kumargram, Alipurduar-II, Alipurduar-I, Kalchini, Falakata (Partly), Madarihat, Dhupguri, Maynaguri, Nagrakata, Matali, Mal, Rajganj(Partly). The eco geography of this area depends upon the tea plantation and forest livelihoods.

The district lies between $26^{\circ} 16'$ and $27^{\circ} 0'$ north Latitude and between $88^{\circ} 04'$ and $89^{\circ} 53'$ east Longitude . Its altitude ranges from 90 to 1750 mt. A vast texture of dense forest teeming with beautiful wildlife covers the region. There are altogether more than eighty rivers, small and big, flowing through the district besides the innumerable *Jhoras*, streams and streamlets. These rivers originate in Sikkim, Bhutan and Darjeeling hills with few flowing from as far as Tibet are passes through the fertile plains of Western Dooars. The major rivers

in the Western Dooars are *Teesta, Jaldhaka, Murti, Torsha, Sankosh, Dyna, Karotoya, Raidak, Kaljani* etc.

In the Jalpaiguri districts out of 186 tea gardens 163 are in the Western Dooars. The total area under reserve forest is 1790 sq km. The forests are divided into three parts, one is core area which is basically reserved for different endangered species by some wild life funds and the balance areas divided into buffer zone and wild life sanctuary. There are 174 forest villages in this region. Government of India termed this as protected bio-sphere in the country. The area under tea garden of Jalpaiguri district is 1987 sq. km. The importance of Western Dooars increases after partition of India in 1947 because it is the main entrance corridor of India with seven eastern states. The strategic importance of this place is also important due to its international boundary with Bhutan, Tibetan China and Bangladesh.

4.3 Human face (Demographic Character)

The area outside the reserve forest is 4455 sq. km. and 3016836 peoples are settled there. This is the human face of Western Dooars. People with various language and diverse religious make this place special interest. Historically the forest core area coverage was 2718 sq km during 1900 (Milligan J A, 1919) but the British people during their expansion of economic activity for drainage of resources identified this place for plantation work (Milligan J A, 1919). But the labour crisis was an acute problem during that time. As a result, policy initiatives of transferring people from Chotonagpur region adopted (Milligan J A, 1919). The people are different tribals who were moving from Chotonagpur region during the British rule in India. British projected this area as tea plantation which required huge cheap labour at that time. As a result, tribals from Santhal, Murmu, Lech, Boro were transferred to this region for clearing of forest and plantation. Other than tribal people from East Pakistan (Newly Bangladesh) are also migrated to this place during the division of Bengal (Debnath, 2010) . The human flow of multiple origins has made it a land of mixed culture.

J.A. Milligan (1919) prepared the “Final report on the survey and settlement operations in the Jalpaiguri District” highlighted the sanitation problems of this place was a major cause of ill health during that time. In that time, diseases like malaria, cholera, smallpox, and hydrophobia spread over this place. Death rate was enormous for these diseases during that time. Even if Milligan reported that their survey work disrupted many times due to all of these diseases. He at that time felt for better water supply, vaccinations, prophylactic measures against malaria as a stand point of public health.

The extent of poverty is severe, because 35.87 percent (Census, 2001) of people living below the poverty line. Considering the demography the SC/ST proportion of this area is 55.58 percent and the percentage of land less community is 40.6 (Census, 2001).

The physical infrastructure of this referral area is not satisfactory. Though this area is on the main connection between north east part of India with the rest of the country the total railway line is 282.5 Km and 1256 Km metal roads in the total area of about 6227 sq Km. almost half of which are inaccessible during monsoons seasons. Almost 15 percent of total people work in tea gardens and live under distress and most of them do not have conventional electric supply. Only 17.33 percent of rural houses are electrified in this area. Ironically the area which is surrounded by forest and hills of Bhutan, chronically suffer from lack of safe drinking water. Nearly 32 percent of people depends upon other than safe drinking water or rivers water which are flowing from Bhutan. The river of this area changes its track frequently and inhabitants have built their settlement in the embankments. During monsoons the floods cause them to collapse. In brief, Western Dooars symbolize a world of human poverty and tragedy packaged with natural richness. Poverty here is cyclically entwined with the ecosystem. The increasing economic stress makes the people recklessly feed on forest resources. As a result, erosion of traditional source of livelihood for the poor continued and creates more stress. The cycle of poverty got huge strength due to pressure of population, unregulated drive towards commercialization of natural products and poor resource management system. A glaring example of this conflicting relation is the practice of collecting timber by illegal ways from the forest. A significant proportion of forest villagers are engaged in this activity primarily to meet the demand of the local timber merchant. The relatively easy money that comes to the people faces a high occupational risk of falling prey of animals and people of forest protector. This type of activity is showing serious ecological damages, like extinction of many indigenous varieties of forest species which were abundant a few years ago.

The policy makers and other key stake holders identified the typical man-nature conflicts and consider special attention from all quarters. The initiative from local stake holders helped the market expansion and economic transformation of western Dooars area. This can be observed if we compare the different developmental variables of today with the few decades ago. The local economy is opening up with links to different block headquarters of Jalpaiguri and Siliguri. Access to education is improving not only within the area of Western Dooars but out of the area also. A huge youth population are migrating out to seek jobs in the cities across

the country. Purchasing power among a section of population rises, which is evident from their changing lifestyles and growing aspirations.

However the economy focuses a serious cost of unregulated market-led growth. The market actors enter the remotest villages of western Dooars to sale consumer products and at the same time they extract natural products from forests and plantation with cheap and abundant labour. While better accessibility to economic opportunities has entitled a section of population with cash and increased purchasing power, a large section is still under poverty and aspirations failures. For future research work the impact of this linkage effect on the economy of western Dooars is yet remains vacant. The local village market with modern consumer goods and services are ranging from mobile phone connections to packets of snacks, while a huge number of tribal children grow up with malnutrition. The spreading access to chemical insecticides and fertilizers which help them not only to increase productivity but also to increase suicide rates. The percentage of girls going to school increases, but as newspapers flashes regularly that many others being trafficked out to unknown destinations. The native communities, who were careful in maintaining ecological balance, are now seeking benefits from irrational exploitations of the natural resources and, hence, destroying the balance. The western Dooars is a world of asymmetries and contrasts produced by a liberalized development process often with serious implications on people health and their health seeking behaviour.

It is estimated that about 1000 sq Km forest land has already disappeared in the last three decades (1980-2010). Nearly 0.32 million people lose their jobs as 780 sq Km tea gardens are transferred to build real estate business and eco-tourism park in between 1990 to 2009.

4.4 Literacy

Literacy is one of the prime factors of human interference hazard and creating awareness. Health and literacy both are complementary steps for better future. But unfortunately literacy rate is very poor in the tea garden area compared to the other part of Western Dooars. In 2001 census, literacy rate is 63.62 percent in whole district whereas 37.48 percent in tea garden area of Western Dooars. Illiterate people do not know how to combat with the hazard. To tell of the backwardness of the tea garden people the incidence of witch-hunting is still on these days of 21st century. Total literacy rate of the district is 62.85 percent and for the female it is 52.21 percent according to census report 2001. The literacy rate is quite lower for the female under scheduled caste (49.62 percent) and scheduled tribe (30.67 percent). The gender gap in literacy is 20.62 percent. But unfortunately, literacy rate is very poor in the tea garden area

compare to the district. In recent census (Census Provisional, 2011) literacy rate is 63.62 percent in whole district where as 37.48 percent in tea garden area. There are 1968 primary schools, 70 middle schools, 182 high schools, 84 higher secondary schools, 12 colleges are supported 706753 students with the help of 12247 teachers in terms of census 2001.

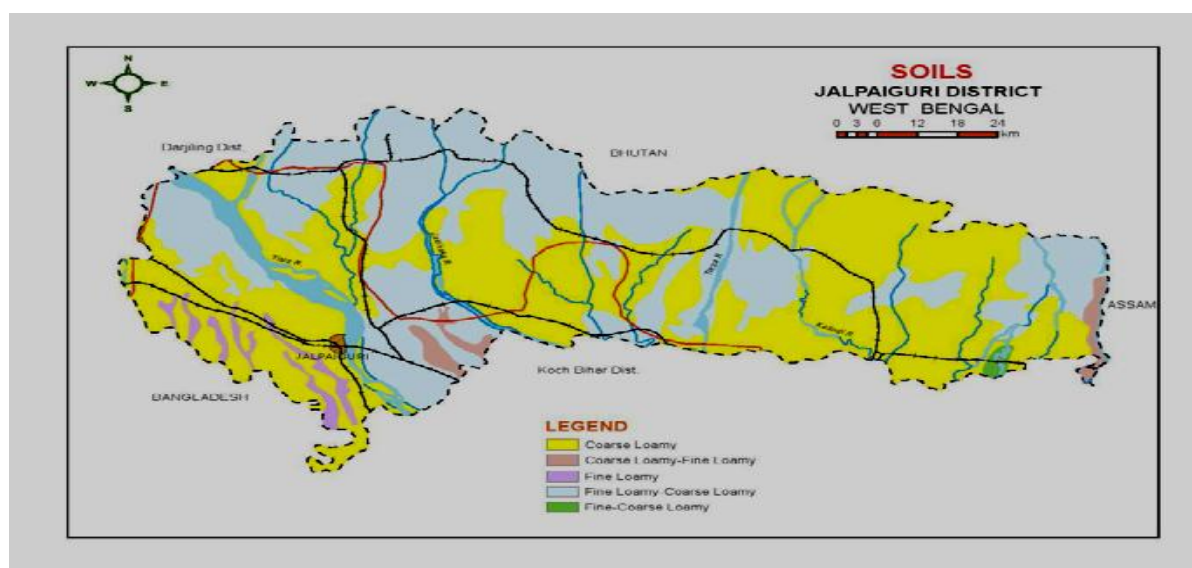
4.5 Climate

The climatic character is sub-tropical and humid. The average temperature range (Maximum to Minimum) varies between 33⁰ Celsius to 6⁰ Celsius between summer to winter. As a result of drizzling the climate is enriched with maximum relative humidity, which is 86 percent on an average throughout the year. Summer seems to mild and the temperature is rarely excessive. An appreciable variation between day and night temperature is also noticed throughout the year. Foggy and misty weather is also usual during December and January. Heavy rainfall and excessive humidity cause the tract to be unhealthy during most part of the year. Severe storms during April-May and September-October accompanied with rain occur and the general rural life becomes severely disrupted.

4.6 Rainfall

The issues related to biodiversity, ecological balance, and livelihoods in western Dooars, are, however dwarfed by a major serious threat which is generated by the worldwide climatic changes. The percentage of rainfall reduces to 3205 millimetre during 2007 from 4311 millimetre during 1980 (Indian metrological department, 2010). Though till on an average 117 rainy days occurred in a year. As a result of global warming the average temperature in this area has been rising at an alarming rate 2.1 Celsius per decade from 1980 (Indian metrological department, 2010). Thus environmental damage not only affected the floral and faunal diversity but also many of million peoples of the western Dooars. The average rainfall of the districts is about 3160 mm per year and it is most frequent between the months of April to October. However, about 90 percent of the rainfall occurs between the months of May to September.

Fig-4.2: Soil map of Jalpaiguri District



Source: NBSS & LUP Regional centre, Calcutta

4.7 Soil

The soil character of Western Dooars consists of high percentage of alluvial deposits. The porous nature of the soil restricts surface irrigation because of its poor water retaining capacity. All over the region the deficiency of nitrogen and organic components is noticed. A patch of black clay can be found in the area between river *Tista* and *Jaldhaka*. The surface area of this region is composed with a large number of bumps, but sloping down generally to the south. The soil combination shows that 43.04 percent of the total geographical area are of shallow to moderately coarse loam soils, 19.05 percent are of deep to very deep clay loamy soils, and 31.38 percent are of deep to very deep clayey soils.

4.8 Land Use

The total geographical area of the district Jalpaiguri is 6161 Sq. km. of which 29 percent (1790 Sq.km) is under forest and 52 percent (3195 Sq. km) alone is arable. The rest is distributed among barren and uncultivable land about 19 percent. Out of the arable area, the net area shown from 45.4 percent while cultivable waste and fallow lands constitute about 6.4 percent during 2010-2011. The Western Dooars part of the district can be divided into three parts on the basis of agro-climatic condition. The northern part of the blocks of Western Dooars like Mal, Meteli, Nagrakata, Dhupguri, Kalchini, Madarihat and Kumargram consists of sandy soil and 7.51 percent is net cultivable area of the district is under this region. This region consists of 15 percent of total geographical area of Jalpaiguri district. The southern

part of the above mentioned blocks with Falakata block have sandy loam type soil character. 91 percent of the net cultivable area of the district falls under this zone and it consists of 85 percent of the total geographical area of the district. The third part of the zone constitutes most southern part of the Kumargram block, south-western portion of Falakata and contiguous Dhupguri blocks. The soil is called Silti-loam with high PH power. Only 2 percent of the net cultivable area is located in this zone which does not have even 1 percent of the total geographical area of the district.

4.9 Flora and Fauna

More than one third of the area in the district Jalpaiguri is covered by forest. The forests are of moist and evergreen type. The common species available in them are Sal forest, teak, heavy grass, wild cardamoms, mango, jackfruit, pipal, tamarind and betel nut palms. But the forest area in this region has been showing a quiescent decline perhaps due to indiscriminate grazing and browsing. It was during the end of nineteenth century, when tea gardens of Dooars were mushrooming. Sunder (1895) observed during his survey that the area between river Tista and Torsha, where heavy grass and reed jungle formerly existed, were replaced by numerous gardens planted out with tea.

4.10 Economic Features

Agriculture is the main stay of nearly 70 percent of the households. The human face of the Western Dooars epitomizes abject poverty, deprivation and acute suffering. The geographical challenges during the monsoons and winter the people of Western Dooars struggle to survive on subsistence level return from diminishing natural endowments. The people of this area depend upon monsoons and single cropping, forest products which provide adequate support to the households in terms of income and employment. Rice is the main agricultural crop in the district grown in pre-*Kharif* and *Kharif* season and is known as *Aush* and *Aman* respectively. Due to high humidity seeds cannot be preserved here properly. In recent days of massive extension farmers are getting interested in introducing high yielding variety of seeds, but cannot proceed effectively because of irregular and inadequate supply of the same. Coldstorage as well as general storage is a problem in the district. From the information of 2001 census report it was found that work participation rate of the district for male is 52.2 percent and 26.2 percent for the female in rural areas. The value of Human Development Index is 0.53 and rank is 10th within the state (2001 Census). The gross cropped area of Jalpaiguri district is 4764 sq. Km. with cropping intensity 142 percent. But the scope of

irrigation is very much limited because only 877 sq. Km. is the net irrigated area and the gross irrigated area is 2343 sq. Km of 4764 sq. Km.. The rain-fed area of agricultural is 2421 sq. Km. The source of irrigation for 62.4 percent of the total irrigated areas are the canals, and there are 440 tractors for the purpose of agricultural production process. Among the major crops paddy for both Rabi and Kharif season are cultivated in 1024 sq. Km. and jute is cultivated in 375 sq. Km. area. But the disaggregated picture shows that for paddy irrigation used in greater percentage (775 sq. Km.) in compare to jute. Jute production in this area is purely seasonal and depends upon rain (333 sq. Km.). The average production from 2004 to 2008 shows that for paddy total production is 470.8 thousand tonnes with productivity 9526 Kg/Hectare and similarly in case of Jute for the same year the total production is 550.1 thousand tonnes with productivity 2114 Kg/Hectare.

4.11 Animal Husbandry

Animal Husbandry is an important allied economic activity to agriculture. It is an integral part of each of the tribal peasantry. Traditionally milch animals, sheep, pig, poultry-birds and goat are important for income generation of the rural households. A sizable number of households earn subsidiary income by selling milk in local markets. But this old practice is seen to be under threat in the overall changing circumstances today, for grazing land is threatened, the forest is being protected and for the conversion of cattle-sheds of the past into human inhabitants. Yet, tribals of this peasantry are still found to be usually with domestic animals around them. The number of low yielding local non descriptive cattle is 921500 and the number of crossbred cattle is 94400. Here one government owned commercial poultry firm is performing with 250740 birds. In the rivers of Jalpaiguri district 18745 fisherman with 150 mechanised and 550 non-mechanised boats are engaged in fish production of the area.

4.12 Tea Garden

The mushrooming of more than 70 percent of the total populations in tea garden area are working as daily-labourers. The percentage of Below Poverty Line (BPL) families have decreased from 62.01(1997) to 59.53 (2002) in all over the district. But the percentage of BPL families in Tea Garden area is 67.07 percent. Tea garden labourer gets minimum wage in relation to labourers of other spheres. The feudalistic character of tea garden management still treats them as their bonded labourers. Tea garden labourer gets minimum wage in relation to labourers of other spheres. The feudalistic character of tea garden management still treats them as their bonded labours. The amenities are to be provided as per rule to the labourers which is absent in almost all tea gardens. The development and living-standard of

the people of village of West Bengal is induced by Panchayati Raj since 1978 but the tea garden people were deprived. Since 1997 the tea gardens were brought under Panchayet system. But Panchayet could not provide any development or make any expenditure for the betterment of the people, as the tea gardens are bound by Tea-Plantation Act.

4.13 Minerals

The geological formation of the region is composed of a series of rocks like quartzite, dolomite variegated slates. In the *Buxaduars* region presence of limestone bands is the most important mineral deposits of the region. The minerals of the region include coal, graphite, lignite, iron-ore, copper-ore etc. Lignite occurs in patches throughout the entire length of the west side of river *Jainti*. The lime obtained from dolomite of this region is a very good quality. The presence of magnesium sulphate is found in the foothills of this region.

4.14 Industries and power

The Western Dooars locality consists with some medium and small scale industries and handicrafts industry. The existence of large scale industries are not found within this locality. In 2004 there are 14134 small scale and cottage industries which employed 80568 persons of this locality. Among the existing industries, the food products and beverage, tobacco products, chemical products, wood products and repairing of personal and household goods are found. Sericulture is also an important sector in terms of production over the area. From the district sericulture office the data for 2003-04 shows that in terms of cocoons 53.78 thousands *kahan* Mulberry, 1.1 thousands *kahan* Eri, and 0.93 thousands *kahan* Muga were produced with corresponding value in that time prices were Rs 22.23 lakh, 12.15 lakh, and 6.74 lakh respectively. From a superficial observation, one may be inclined to believe that tea is an important industry of the district, and that in the forest there is a vast exploitable resources which can be expected to contribute towards the general development of the district. Unfortunately this two sizeable income generating sectors remain almost as enclaves and do not have either inter-dependence or complimentary with the agricultural and agro-industrial sector which is the primary field of economic activity of the major part of population. There are 163 tea gardens in this area and 2.5 lakh people are engaged for production related activity. Out of 756 mouzas 724 (2204) are found electrified partially. The census 2001 data shows that in Jalpaiguri district 248 factories are performing with Rs 28770 lakh as fixed capital and Rs 44148 lakh as invested capital producing Rs 93665 lakh value of outputs. The net value added by theses factories was Rs 5845 lakh with net income of Rs

3317 lakh (District Information Office, Jalpaiguri). The availability of electricity is also limited in this region. There is no power generating units are performing in the district, but one hydroelectric units is performing in the neighbour district Darjeeling (on *Jaldhaka* river at *Bindu*) with limited capacity.

4.15 Transport and Communications

As stated earlier the importance of this district increases in terms of national as well as for international purposes. The district is situated in the main entrance corridor of north eastern states and have some international boundary with Bangladesh, Bhutan and Tibetan China. One main national highway (NH-31) passes through this district and two main railway lines towards north east states supervised by north-east frontier railway also bifurcate the districts. The condition of rural roads is not at upto the mark. Among these 1256 Km. roads with surfaced and un-surfaced areas are maintained by state public works department (P.W.D) of the government, 718.2 Km. roads are maintained by zilla parishad, and 413.35 Km. roads are maintained by the municipalities of the districts (2003-04). Out of total 1256 Km. roads maintained by P.W.D, only 305 Km. is of national highway, 222 Km. of state highways, 501 Km. of district roads, and 228 Km. of village roads. During 2004 the district transport system depends upon 4227 goods vehicles, 3153 motor cars and jeeps, 105 private mini buses, 395 state buses, 825 taxi and contract carriage, and 269 auto rickshaws. The 2003-04 data shows that 629 accidents occurred in the districts from which 717 peoples are injured and 296 were killed at that time. The district includes 346 post office with one telegraphic office facilities.

Now the above information of the district can be shown in a tabular form to highlight its special social indicator and special economic variables. Table 4.1 shows that statistics at a glance. Not only the socio-economic indicators but also with some health indicators are shown in this table also.

4.16 Conclusion

Thus Western Dooars a part of current Jalpaiguri district is predominantly rural and highly concentrated with reserved categories people. The peoples are living in this place with in-advancement of scientific and technological development. Most of the time of the years they are engaged in agricultural activity due to the lacking of industrial expansion.

Table-4.1: Key socioeconomic and health indicators of Jalpaiguri district

Indicator	Value
DEMOGRAPHY	
Surface Area (Sq. Km.)	6227
Total Populations with Male & Female %	3401173 (Male=51.5% , Female=48.5%)
% of Rural-Urban Population	Rural=82.16%, Urban=17.84%
% of Caste in total Populations	SC=36.71%,ST=18.87%,Gen & Oth=44.42%
% of Major religious Groups	Hindu=83.3%, Muslims=10.85%
Populations decadal growth rate	21.52%
Percentage share of State population	4.24%
% Share of Children	15.33%
Sex Ratio	942
Population density Per Sq. Km.	546
EDUCATION	
Total literacy Rate With Male & Female %	62.85%, Male=72.83%, Female= 52.21%
% of Rural-Urban Literacy	Rural=58.93%, Urban=80.02%
% of SC & ST Literacy	SC=61.87%, ST=42.59%
% of Gender Gap in Literacy	20.62%
Net Enrollment Ratio	60.9
Drop-out rate	19.55
Education Index Value & Rank	Value=0.6, Rank=13/18
ADMINISTRATIVE INFORMATION	
No of Blocks	13
No of Inhabited Villages	742
No of Sub-divisions	3
No of Households	688139
Average Family Size	5
Human Dev Index Value & Rank	Value=0.53, Rank=10/18
Drinking water Facility available in Villages	732
Electricity Facility available in Villages	462
Types of House	Pacca=28.4%, Semi-Pacca/Thatched=71.5%
SOCIAL & ECONOMIC CHARACTER	
Per-capita Income	19103.63
% of BPL Famalies	35.87%
% of Cultivable area to total area	57.55
% of Adricultural Worker	Male=14.2%, Female=25.7%
Income Index Value & Rank	Value=0.38, Rank=12/18
HEALTH	
Infant Mortality Rate	Male=45%, Female=34%
Life Expectancy	Male=61 yrs, Female=63 yrs
Mean age of Marriage	Male=25.2yrs, Female=19yrs
Beds per lakh of Population	124
No of Primary Health Centres	38
No of Sub-Centres	181
Health Index Value & Rank	Value=0.61, Rank=12/18
Gender Dev Index Value & Rank	Value=0.45, Rank=12/18

Source: Census Report 2001

Natural calamities like storm and flood is very common in their life. In brief, Western Dooars symbolise a world of human poverty and fragility packaged with natural richness. The life of peoples of this area are heavily influenced by three natural phenomenon, and these are rivers of this area, forest of this district and the tea gardens. Many of the tribals directly depends

upon tea, and during household survey the study observed that some tribals feels that they are not compatible with any other types of production except tea. Many villages located in the core and buffer areas of the reserve forests of the district, and the villagers always faces some threat of animal attack during cropping season. The growing political tension between tribes and non-tribes regarding the ownerships of land is another aspects of the districts. In this chapter the study tries to touch those sector which are directly or indirectly entwined with the health of the inhabitants of this geographical location. In a short term the Western Dooars a world which is so close to the lights of development, yet so far.

CHAPTER 5

Health Seeking Behaviour of Sample Households

CHAPTER-5

Health Seeking Behaviour of Sample Households

5.1 Introduction

In recent times, the development paradigm has shifted towards people centric approach which recognises human and social capital for leading to sustainable development. People of Western Dooars encounter different problems in the context of socio-economic, cultural and political development. In India imbalance in the development front is conspicuous because of economic growth has not been properly tuned to establish social justice. According to World Health Organisation (WHO), responsiveness of the clients is an intrinsic goal of any national healthcare system (WHO, 2000). Considering such responsiveness, a fundamental duty of the health researcher is to find out the cause for such behaviour of those feeling sick but not to visit the doctor. This means that how much medical service to consume depends not only on the decisions by the patients. Although to study this responsiveness one cannot ignore the role of demand side in health research study.

The present chapter overviews the demand side issues related to the health system of the Western Dooars locality. The study is categorised into three parts, each one explaining a special feature of the demand side issues of health. More specifically, it focuses on three interrelated section of the demand side of health system, viz, the demographic and socio-economic environment of the sample households, the analysis of the health status of the sample households, and the discussion on the health seeking behaviour of the sample households.

All three sections are addressed largely on the basis of the primary data collected from nine villages across the three blocks of Western Dooars. Thus, reflection of the behaviour of the households under different health crises are focused and captured under structured questionnaire to explain their health seeking behaviour.

Section-I

Demographic and Socio-economic Environment of Sample Households

- **Introduction**
- **Family Size**
- **Gender Classification**
- **Age Specific and Gender Specific Classification**
- **Gender distribution of Head of the Households**
- **Educational qualification of the head of the Household**
- **Educational qualification of more than 5 years**
- **Schooling of children of age 6-11 years**
- **Uses of drinking water**
- **Occupational Structure**
- **Electrification of their houses**
- **Sanitation Condition**
- **Mean age at marriage for married women**
- **Age at first Conception for the women**
- **Caste Distribution**
- **Dwelling condition**
- **Income distribution**
- **Natural calamity affected in last 5 years**
- **Conclusion**

SECTION I

Demographic and Socio-economic Environment of Sample Households

5.1.1 Introduction

This section deals with the geographic, demographic, economic and social profile of the sample households like family size, sex composition, age composition, caste, size of the population, sex-ratio, mean age of marriage, occupational pattern, basic amenities, educational qualification, type of drinking water, specific classification of caste etc. In 2001, the average population of a block in the Western Dooars was about 225000. Each block has about 29 - 105 villages, surrounding the block headquarter town which is the prime centre for major administrative, development, and economic activities of all villages under the block.

Although geography plays a very important role in defining the socio-economic environment of the Western Dooars, it is important to note the variations in geographical challenges across the blocks. People, who live in the 'remote' Western Dooars - the villages of the blocks adjacent to forest area or the hilly region face much harder problems compared to those who live in the 'peripheries'. The areas in this group include the blocks like Meteli, Nagrakata, Madarihat-Birpara, Kumargram, Kalchini, Falakata, Mal and Alipurduar-II. The rest area of the above mentioned blocks and Jalpaiguri, Alipurduar-I, Dhupguri, Maynaguri, Rajganj blocks located closer to the urban centres were identified as peripheries of Western Dooars. The peripheries are benefitted in differing degrees by the spread of basic amenities including road and electricity. The variation in accessibility may be gauged by the time taken to reach the block town from the remotest village in a block. For example, it takes less than one hour to reach the headquarter town from the remotest (Ethelbari Tea Estate) village in the block Falakata, while the minimum estimated time between the remotest village and town in Madarihat, a remote block, is more than four hours.

5.1.2 Family Size

Table 5.1 explains the size of family and the average size of the family. Majority of the sample households at the aggregate and random levels are in the region of three to six members per household. The average size of the family in the Alipurduar-II block lies to be 4.7 and that of Madarihat and Falakata blocks, these are 4.52 and 4.61 members for a single family respectively. The overall sample population lies at 4658 persons of 1011 families making the average size of the family to be 4.61 members for a family. The average household size in the sample households is 4.61 which is slightly lower than the national rural average (4.7, By NFHS 3, 2005/2006, West Bengal).

Table- 5.1: Distribution of the Sample Households on the Size of their Family

Size of the Family	Alipurduar-II	Madarihat	Falakata	Total
1	6(1.86)	10(2.85)	4(1.18)	20(1.98)
2	23(7.14)	17(4.84)	14(4.14)	54(5.34)
3	32(9.94)	44(12.54)	37(10.95)	113(11.16)
4	97(30.12)	108(30.77)	109(32.25)	314(31.03)
5	58(18.01)	93(26.50)	87(25.74)	238(23.51)
6	56(17.39)	39(11.11)	64(18.94)	159(15.71)
7 & Above	50(15.53)	40(11.40)	23(6.81)	113(11.17)
Total Households	322(100)	351(100)	338(100)	1011(100)
Total Sample Population	1512	1587	1559	4658

Figures in the parentheses indicate their percentages with their respective totals,

Source: Household Survey of the study, 2012

5.1.3 Gender Classification

Table-5.2: Gender Wise Classification of the Total Sample Population

Gender	Alipurduar-II	Madarihat	Falakata	Total
Male	782(51.72)	841(52.99)	846(54.27)	2469(53.00)
Female	730(48.28)	746(47.01)	713(45.73)	2189(47.00)
Total	1512(100)	1587(100)	1559(100)	4658(100)
Overall Sex Ratio	933.5	887	842.8	886.6
Child Sex Ratio	945	917	927	930

Figures in the parentheses indicate their percentages with their respective totals,

Source: Household Survey of the study, 2012

Table 5.2 explains the gender wise classification of the total sample population and sex ratio. In Alipurduar-II block, out of sample population of 1512, 782 persons are male and the remaining 730 are females. The sex-ratio is 933.5 females per 1000 males. If we compare it with our national and state average sex-ratio the situation is slightly better. In Madarihat and Falakata, out of the sample population of 1587 and 1559 persons respectively, 841 and 846 persons are males and the remaining 746 and 713 are females, respectively. Thus, the sex-ratio of these two blocks are 887 and 842.8 females for one thousands males respectively. The situation is quite disheartening because it is less when we compare it with state and national average. With regard to the total sample population of 4658 persons, 2469 are males and the remaining 2189 are females, fixing the sex-ratio at 886.6 females per one thousand males. The situation of child sex-ratio is comparatively better in block Alipurduar-II than the other two blocks.

5.1.4 Age Specific and Gender Specific Classification

Table 5.3 illustrates the age specific and gender specific classifications of the total sample population. In Alipurduar-II block, out of the total sample population (1512 persons), majority

of the population is under the category of productive age group i.e., 15-59 years, while the unproductive categories i.e., below 14 years and above 60 years comprise 31.94 and 15.08 percent of the total sample population respectively. With slight variations, same picture can be found in case of Madarihat and Falakata blocks and at the aggregate level. The analysis indicates that the population under the productive age group and under 14 years age group is very high and in the category of above 59 years is very low. The age-sex distribution of the household members shows a wide base and a narrow apex with a high proportion of children in the households, which matched with the pattern found in a typical developing region.

Table-5.3: Age Specific and Gender Specific Classification of the Total Sample Population

Age Group	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
0-14	256 (53.0)	227 (47.0)	483 (31.94)	252 (54.55)	210 (45.45)	462 (29.11)	291 (54.7)	241 (45.3)	532 (34.12)	799 (54.1)	678 (45.9)	1477 (31.71)
15-59	419 (52.3)	382 (47.7)	801 (52.98)	473 (54.18)	400 (45.82)	873 (55.01)	429 (56.15)	335 (43.85)	764 (49.01)	1321 (54.18)	1117 (45.82)	2438 (52.34)
60 & above	107 (46.92)	121 (53.08)	228 (15.08)	116 (46.03)	136 (53.97)	252 (15.88)	126 (47.91)	137 (52.09)	263 (16.87)	349 (46.97)	394 (53.03)	743 (15.95)
Total	782 (51.72)	730 (48.28)	1512 (100)	841 (52.99)	746 (47.01)	1587 (100)	846 (54.27)	713 (45.73)	1559 (100)	2469 (53.0)	2189 (47.0)	4658 (100)

Figures in the parentheses indicate their percentages with their respective totals,

Source: Household Survey of the study, 2012

5.1.5 Gender distribution of Head of the Household

Table-5.4: Sex of the Head of Household in the Sampled Area

Gender	Alipurduar-II	Madarihat	Falakata	Total
Male	313(97.21)	337(96.01)	333(98.52)	983(97.23)
Female	9(2.79)	14(3.98)	5(1.48)	28(2.77)
Total	322 (100)	351 (100)	338 (100)	1011 (100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.4 describes the gender-wise classification of the head of the household in the sample. Out of sample 322 in Alipurduar-II block male head households are 313 and the remaining 9 are by the females. In the Madarihat and Falakata blocks the sample sizes are 351 and 338 In that, male-headed are 337 and 333 respectively and the females head are 14 and 5 households respectively. We see that in each block males are dominating as the head of the household. In the total sense only 2.77 percent of the households are headed by the females. The families with female head do not indicate matrilineal societies but

actually in those families male heads are not alive. These may be due to reduced level of life expectancy and spreading epidemics in those areas.

5.1.6 Educational Qualification of the Head of the Household

Table-5.5: Educational Qualifications of the Heads of the Households

Educational level	Alipurduar-II	Madarihat	Falakata	Total
Illiterate	208(64.6)	242(68.95)	210(62.13)	660(65.28)
Primary	89(27.64)	83(23.65)	105(31.07)	277(27.39)
Secondary	19(5.9)	23(6.55)	16(4.73)	58(5.74)
Higher	6(1.86)	3(0.85)	7(2.07)	16(1.59)
Total	322(100)	351(100)	338(100)	1011(100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

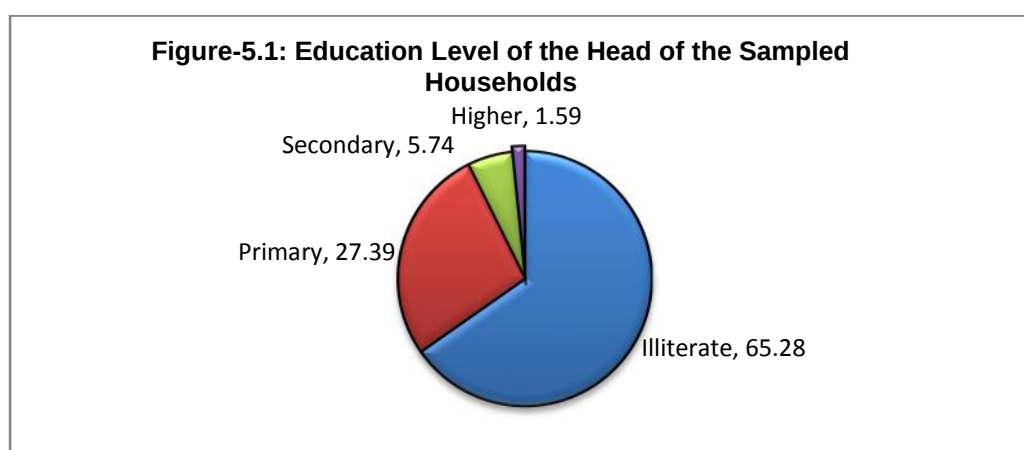


Table 5.5 illustrates the educational qualification based classifications of the head of the households in the total sample households. In Alipurduar-II block, out of 322 households, 64.6 percent (208) peoples are illiterates. The persons having primary and secondary educational qualifications of head of families are 27.64 percent (89) and 5.9 percent (19) of the households. In Madarihat and Falakata, the educational level of families head is deteriorating. The percentage of illiterates in Alipurduar-II and Madarihat blocks are higher than Falakata block. With regard to the overall sample, more than illiterate heads constitute 65.28 percent of the households. In all, we see that 92.66 percent of the heads of the households are either illiterate or with primary education. This identifies the inadequate performance of the government provided developmental programmes, which are to raise the educational status of the people of Western Dooars. In the figure 5.1 the education level of the head of the household is shown by a pie diagram.

5.1.7 Educational Qualification of more than 5 years

Table 5.6 brings out the educational qualifications of the sample population. The levels of education are divided into three categories. Primary level indicates the standard from first to

fifth class, Secondary level indicates the standard from fifth to 10th class, and the higher education level indicates the classes above 10th standard, this classification stands for the operational purpose. In Madarihat block, out of 1199 persons who are above seven years, 492 are illiterate, which is more than 40 percent showed that majority people do not know how to read and write. Although there are persons who have educational qualifications, that number is far below the level of illiterates.

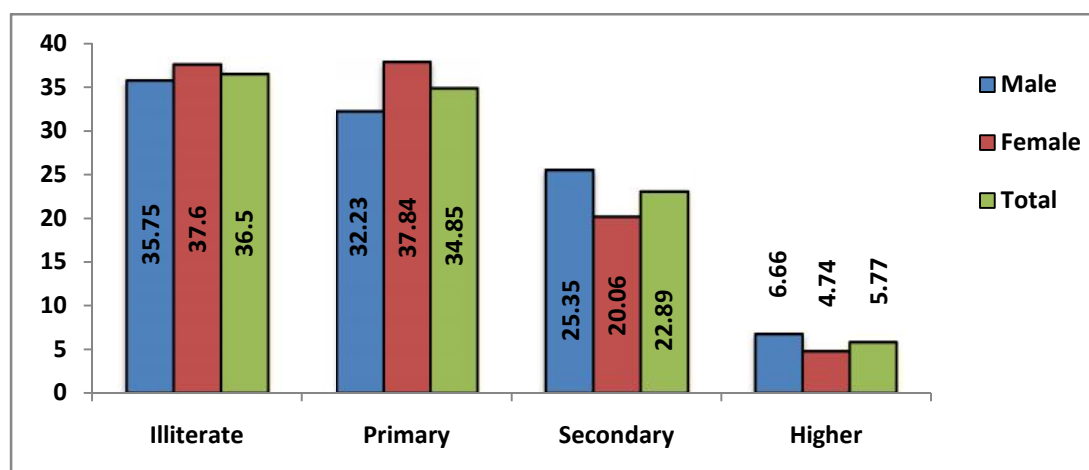
Table-5.6: Distribution of sample population (more than 5 years of age group) according to their educational qualification

Level of Education	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
Illiterate	193 (31.95)	181 (32.26)	374 (32.1)	252 (39.50)	239 (42.6)	492 (41.03)	236 (35.6)	202 (37.2)	438 (36.32)	681 (35.75)	622 (37.36)	1303 (36.5)
Primary	211 (34.93)	229 (40.82)	440 (37.77)	187 (29.30)	199 (35.47)	386 (32.19)	216 (32.58)	202 (37.2)	418 (34.66)	614 (32.23)	630 (37.84)	1244 (34.85)
Secondary	153 (25.34)	124 (22.10)	277 (23.78)	161 (25.24)	98 (17.47)	259 (21.6)	169 (25.49)	112 (20.63)	281 (23.3)	483 (25.35)	334 (20.06)	817 (22.89)
Higher	47 (7.78)	27 (4.81)	74 (6.35)	38 (5.96)	25 (4.46)	63 (5.25)	42 (6.33)	27 (4.97)	69 (5.72)	127 (6.66)	79 (4.74)	206 (5.77)
Total	604 (100)	561 (100)	1165 (100)	638 (100)	561 (100)	1199 (100)	663 (100)	543 (100)	1206 (100)	1905 (100)	1665 (100)	3570 (100)
Literacy Rate %	68.05	67.74	67.9	60.5	57.4	58.97	64.4	62.8	63.68	64.25	62.64	63.5

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.2: Percentage of Sex-wise Education Qualification of total Sampled Population



The male literacy rate in this block is 60.5 percent and that of females is 57.4 percent. In Falakata block, out of eligible population of 1206 persons, 663 are males and 543 are females. The male literacy rate is 64.4 percent, and that of the female is 62.8 percent. In case of Alipurduar-II block the literacy rate is higher in compare to other two blocks but it is

far below the national average. In regard to the overall sample, the eligible population is 1165 , in that 604 are males and 561 are females. In literacy, the male literacy rate is 68.05 percent, whereas female counterpart is 67.74 percent.

The overall literacy rate in the sample area is 63.5 percent. In literacy area, the government is doing a lot but the actual picture expects more than that is being implemented till now. Thus, the progress of education is mixed, and it is however important to add that the proportion of illiterate is much less among the youngest population (10-14 years) implying that children of the surveyed household have now better access to school education compared to their parents. The gender gap in literacy is observed decreasing across the age groups over time. The figure 5.2 describe the education level according to sex in the sampled areas.

5.1.8 Schooling of children of age 6-11 years

Table-5.7: Distribution of sample households on Schooling of Children (6-11) years

Expression	Alipurduar-II	Madarihat	Falakata	Total
Yes	218(67.70)	213(60.68)	211(62.43)	642(63.50)
No	76(23.60)	105(29.92)	98(28.99)	279(27.60)
NA	28(8.70)	33(9.40)	29(8.58)	90(8.90)
Total	322(100)	351(100)	338(100)	1011(100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

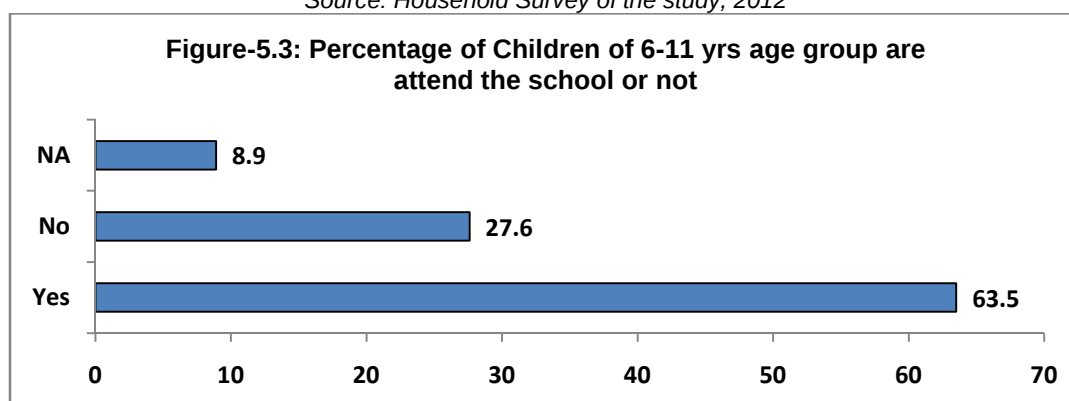


Table 5.7 brings out the classification of the sample households based on whether their children of 6-11 years are in school or not. In the sample of Alipurduar-II block, 23.60 percent of the households have eligible children not going to school, but in Madarihat and Falakata block it is comparatively high. At the aggregate level, 27.60 percent of the eligible children are not in school. This needs to enhance the incomes of the parents so that they can send their children to school. In figure 5.3 the school attendance of 6-11 years age group children of the sampled household are shown by horizontal bar diagrams.

5.1.9 Uses of drinking water

Access to basic amenities within a village in the Western Dooars has improved over the years; however, there is still a huge scope to make it better. Poor availability of drinking water is a chronic problem within the region.

Table-5.8: Distribution of sample households according to the availability of quality drinking water

Sources	Alipurduar-II	Madarihat	Falakata	Total
Protected	103(31.99)	86(24.50)	103(30.47)	292(28.88)
Unprotected	219(68.01)	265(75.50)	719(69.53)	719(71.12)
Total	322(100)	351(100)	338(100)	1011(100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.8 identifies the classification of the sample households based on the type of the source of drinking water. This variable is considered because in the forest and hilly areas, lack of safe drinking water is the main reason for high disease prevalence. This is reconfirmed by the study since the major source of drinking water for more than three-quarter of the surveyed villages was low-deep tube well, hand pump and unprotected dug well. This is vulnerable source especially in the river bank based villages, which are flood prone. In Alipurduar-II block, out of 322 households only 31.99 percent are able to get protected drinking water. This indicates that the majority of the sample households are far away from the use of safe drinking water. In Madarihat and Falakata blocks the situation is more worse. In Madarihat block, out of sample 351 households, nearly 25 percent avail safe and protected drinking water. With regard to the overall sample households, 29 percent are in the ambit of safe drinking water. This indicates that a bit more action-oriented activities are needed in this part. Moreover, during survey the cases of arsenic poisoning are found among the dwellers of Madarihat and Falakata. Some areas of these blocks have groundwater heavily contaminated with arsenic; due to lack of alternative source, the people are therefore exposed to arsenic poisoning.

5.1.10 Occupational Structure

Table 5.9 depicts the occupational pattern in the study area. For operational purposes, they are taken as, persons practising cultivation, wage labour, non-agricultural activities, employees, students and housewives. In the Madarihat block, 233 persons are cultivators, in which, males go for the major share but it is interesting to see some women also depend on cultivation. It is also observed that both men and women are wage labourers and maximum

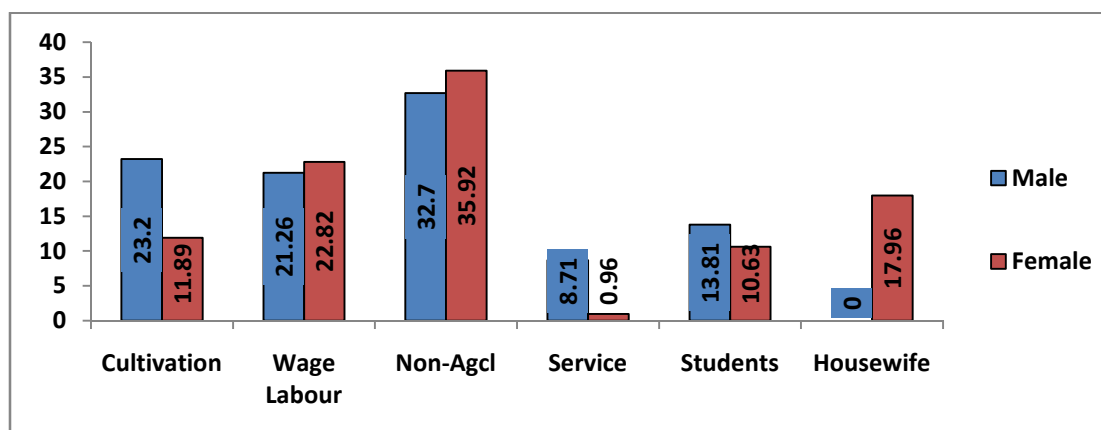
Table-5.9: Distribution of the sample population according to the Occupational Structure

Occupation	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
Cultivation	116 (19.21)	84 (14.97)	200 (17.17)	167 (26.18)	66 (11.77)	233 (19.43)	159 (23.77)	48 (8.79)	207 (17.16)	442 (23.2)	198 (11.89)	640 (17.93)
Wage Labour	132 (21.85)	121 (21.57)	253 (21.72)	111 (17.4)	137 (24.42)	248 (20.68)	162 (24.22)	122 (22.34)	284 (23.55)	405 (21.26)	380 (22.82)	785 (21.99)
Non-Agcl	192 (31.79)	188 (33.51)	380 (32.62)	229 (35.89)	212 (37.79)	441 (36.78)	202 (30.19)	198 (36.26)	400 (33.17)	623 (32.7)	598 (35.92)	1221 (34.2)
Service	76 (12.58)	6 (1.10)	82 (7.04)	36 (5.64)	4 (0.71)	40 (3.34)	54 (8.07)	6 (1.1)	60 (4.98)	166 (8.71)	16 (0.96)	182 (5.1)
Students	88 (14.56)	63 (11.23)	151 (12.96)	83 (13.01)	51 (9.09)	134 (11.18)	92 (13.75)	63 (11.54)	155 (12.85)	263 (13.81)	177 (10.63)	440 (12.33)
House wife	NA	99 (17.65)	99 (8.5)	NA	91 (16.22)	91 (7.59)	NA	109 (19.96)	109 (9.04)	NA	299 (17.96)	299 (8.38)
Total	604	561	1165	638	561	1199	669	546	1206	1905	1665	3570

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.4: Percentage of Sex-wise Occupational structure of Sampled Households



of them are in non-agricultural labourers. In Falakata block the same pattern exists. But in case of Alipurduar block, a large number of people are engaged as non-agricultural labourers and wage labourers. Among three blocks, we see that in Alipurduar-II highest percentage of people are engaged in services of various type. With regard to the total samples, majority are found working as non-agricultural labourers followed by wage labour and cultivation. But as the agricultural sector can provide only seasonal employment, the government should encourage the people who are willing to take up self-employment, and encourage small scale industries in such areas that they should create employment for many a number of persons than the number of persons they displace. Figure 5.4 shows the percentage of sex wise occupational structure in the sampled households.

5.1.11 Electrification of their houses

Table-5.10: Distribution of the sample households on their Electrification of houses

Electrified	Alipuduar-II	Madarihat	Falakata	Total
Yes	84(26.09)	89(25.36)	119(35.21)	292(28.88)
No	238(73.91)	262(74.64)	219(64.79)	719(74.12)
Total	322(100)	351(100)	338(100)	1011(100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.10 brings out the classification of the sample households based on whether the houses are electrified or not. This electrification is a development indicator, because this plays a favourable role in improving their standard of living. With regard to this, in the Madarihat block, out of the 351 sample households, only 89 houses are with the facility of electricity. About 75 percent of the houses are not electrified. In this regard, this area is very backward; the government should take more steps to provide the facility of electricity to these areas. In Falakata more or less same scenario is observed during the survey. Similarly, in Alipurduar-II, out of the sample 322 households as many as 84 houses are electrified. However, many a number are not electrified.

5.1.12 Sanitation Condition

Table-5.11: Distribution of the sample households on the Sanitation condition

Sanitation	Alipurduar-II	Madarihat	Falakata	Total
Proper	96(29.81)	83(23.65)	83(24.55)	262(25.92)
Improper	226(70.19)	268(76.35)	255(75.44)	749(74.08)
Total	322(100)	351(100)	338(100)	1011(100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.11 represents the classification of the sample households based on whether the houses have proper sanitation or not. The snapshot on nine villages of three blocks also reflects some progress towards better sanitation. With regard to this, in the Madarihat block, out of the 351 sample households, only 83 houses are with the facility of proper sanitation, which means only 24 percent have proper sanitation facilities. The picture of Alipurduar-II block are showing something better than the Madarihat block and Falakata block in terms of sanitation. During the survey conversation with the household members focuses that healthy sanitation habits started from last five to six years back. In all, only 26 percent of the surveyed households have proper sanitation facilities.

5.1.13 Mean age at marriage for married women

Table-5.12: Mean age at marriage for married women in the reproductive age

Age of Marriage	Alipurduar-II	Madarihat	Falakata	Total
< 15 years	83 (25.46)	101 (28.77)	93 (25.07)	277 (26.43)
15-20	145 (44.48)	163 (46.44)	172 (46.36)	480 (45.8)
> 20 years	98 (30.06)	87 (24.79)	106 (28.57)	291 (27.77)
Total	326	351	371	1048

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.5: % of Mean age of Marriage for married women at their Reproductive Age

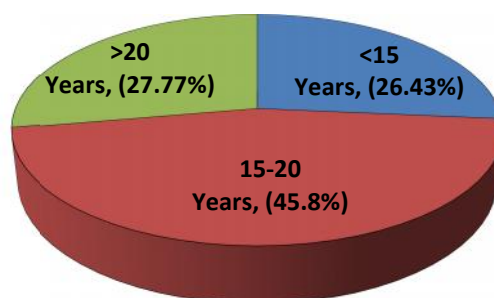


Table 5.12 classifies the married women in the reproductive age based on their mean age at marriage. In Alipurduar-II block, out of the women in reproductive age, 326 who are married, 83 (25.46 percent) are married on or before they have attained the age of fifteen years. Even though, the child marriage is prohibited in India these people are averse to change their way of life. Only 145 (44.48 percent) females are married in the age group of 15-20 years. In Madarihat and Falakata blocks, 351 and 371 women are married and are in the reproductive age group respectively. Among them 101 and 93 persons (28.77 percent and 25.07 percent) were married on or before 15 years of age respectively. With regard to the overall sample, around 26.43 percent are married before 15 years of age and the remaining are after 15 years of age. In this regard, government should initiate more motivational measures about the demerits of the early marriage, like infant mortality, maternal mortality, stillbirth, and early birth and to stop the child marriage. The pie diagram of figure 5.5 describes the distribution of mean age of marriage for married women at their reproductive age in the study area.

5.1.14 Age at first Conception for the women

Table 5.13 brings out the classification of the women in the reproductive age based on their age at first conception. This is an important indicator in the demographical development of

any society. As already explained, the chances for infant mortality, maternal mortality and stillbirth are very high, when the women's age is very less or when it is high. When going through the mean age at marriage, child marriage are still prevalent in these areas to much extent; giving chances for other consequences have been explained. In the Falakata block, more than 15 percent women in reproductive age have conceived before attaining age of 15 years. It is also interesting to see some in fecund women. With regard to the Madarihat block, again around 17 percent of the women in the reproductive age conceived before they attained the age of 15 years. The number of in-fecund women existed here also. With regard to the Alipurduar-II block, around 14 percent of the women in the reproductive age conceived before they attained the age of 15 years. The number of in-fecund women existed here also. With regard to the overall sample, around 16 percent have conceived on or before they attained the age of 15 years. In this context, it is imperative to initiate some motivational measures to eradicate this social evil of child marriage, which brings out unhealthy citizens of the future, which brings down their health status and the level of their resistance towards some diseases.

Table-5.13: Age at first Conception for the women in the Reproductive age

Age at Ranges	Alipurduar-II	Madarihat	Falakata	Total
< 15 years	53 (13.91)	71 (17.28)	64 (15.61)	198 (16.34)
15-20	156 (40.94)	173 (42.09)	196 (47.81)	525 (43.32)
20-25	141 (37.01)	155 (37.71)	133 (32.43)	429 (35.39)
In fecund	31 (8.14)	12 (2.92)	17 (4.15)	60 (4.95)
Total	381	411	410	1212

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

5.1.15 Caste Distribution

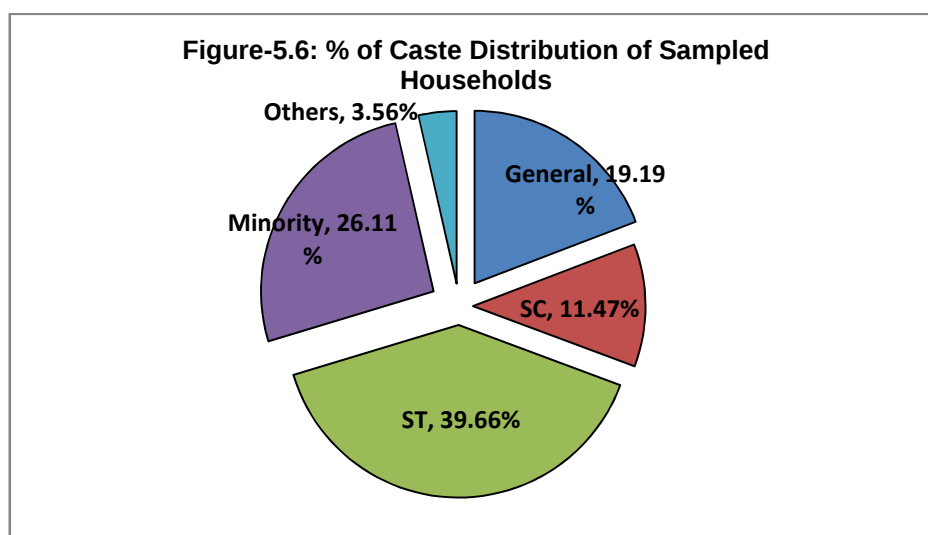
Table 5.14 and figure 5.6 shows caste-wise classification of the total sample households. Although this is not a predetermined one, only these types of tribes have come under in the selected sample villages. In Madarihat block more than half (55 percent) of the households in the sample households belong to SC/ST, the traditionally marginalised groups in India. In Falakata and Alipurduar, the proportion is also quite high in favour of reserved category. Specially in Falakata the presence of minority category (28.99 percent) with other caste is observed during the survey. It is observed that there is high concentration of scheduled tribes in Jalpaiguri district compared to other districts of West Bengal. The community-wise

distribution of scheduled tribes shows the presence of Oraon, Munda, Lodha, Santal, Mech, Lohra, Rabha, Bhutia, Garo, Toto, Negesia, Gond, Lepcha, Murmu, and other unclassified communities in this region.

Table-5.14: Distribution of sample households based on their Specific Caste

Caste	Alipurduar-II	Madarihat	Falakata	Total
General	72 (22.36)	63 (17.95)	59 (17.46)	194 (19.19)
Schedule Caste	24 (7.45)	37 (10.54)	55 (16.27)	116 (11.47)
Schedule Tribe	128 (39.75)	156 (44.44)	117 (34.62)	401 (39.66)
Minority(OBC)	87 (27.02)	79 (22.51)	98 (28.99)	264 (26.11)
Others	11 (3.42)	16 (4.56)	9 (2.66)	36 (3.56)
Total	322 (100)	351 (100)	338 (100)	1011 (100)

Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012



5.1.16 Dwelling condition

According to Demographic Health Survey (DHS) it is the significant indicator of economic status of the family in the developing countries. Table 5.15 describes classification of the sample households based on the type of their house. Houses have been classified into three types. Pucca house is a type of house built by concrete and having some facilities like own toilet facility, separate rooms for persons and so on. Semi-Pucca house is a typical house in the tribal areas. The walls of semi-pucca houses are built by brick; have large tiles on the top, provided through the food for work programme. The thatched houses have mud walls and palm leaves as their roofs. In Madarihat block, out of sample of 351 households, more

than 23 percent have a typical semi-pucca tribal house. In addition, nearly 66.10 percent of them have thatched houses. Nearly 65 percent of the households do not have proper housing facilities in the sample area of this block. In Alipurduar-II block, out of 322 households, majority of them (67 percent) have good housing facilities. With regard to the overall sample households, nearly half of the households lived in thatched houses (made of mud, thatch and other locally available material).

Table-5.15: Distribution of sample households according to the type of Dwelling

Type	Alipurduar-II	Madarihat	Falakata	Total
Pucca	49(15.22)	38(10.83)	47(13.91)	134(13.25)
Semi-pucca	167(51.86)	81(23.08)	94(27.81)	342(33.83)
Thatched	106(32.92)	232(66.10)	197(58.28)	535(52.92)
Total	322(100)	351(100)	338(100)	1011(100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

5.1.17 Income distribution

Table-5.16: Distribution of sample households according to the level of income

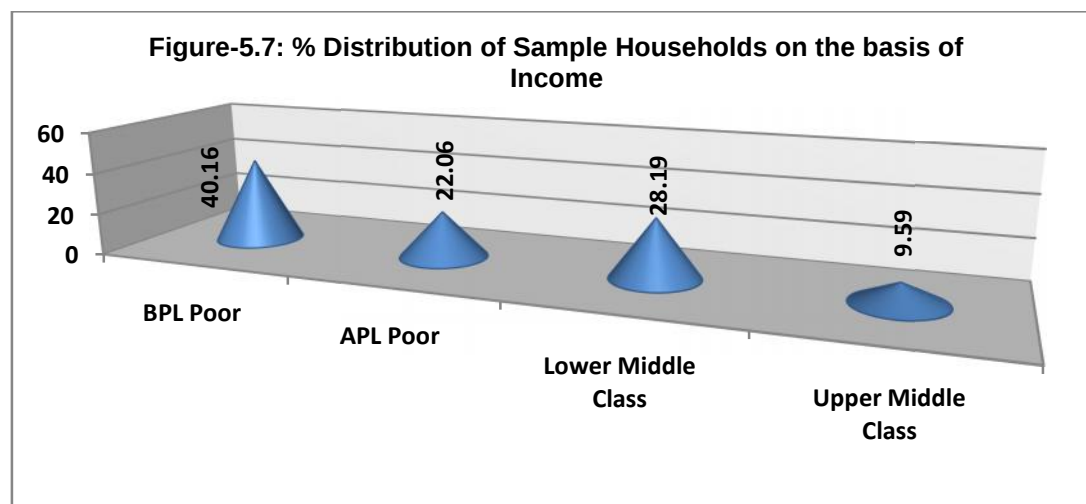
Category	Alipurduar-II	Madarihat	Falakata	Total
BPL Poor	118(36.65)	157(44.73)	131(38.76)	406(40.16)
APL Poor	67(20.81)	82(23.36)	74(21.89)	223(22.06)
Lower Middle Class	102(31.68)	84(23.93)	99(29.29)	285(28.19)
Upper Middle Class	35(10.87)	28(7.98)	34(10.06)	97(9.59)
Total	322(100)	351(100)	338(100)	1011(100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.16 brings out the classification of sample households according to their level of Income. In the study on the sample villages the four categories are found, namely poor with BPL certificate, poor with APL certificate, lower middle class and upper middle class on the basis of income level. Such categorisation can be done on the basis of income level. Both for BPL and APL poor, the study consider the level of monthly income percapita is Rs 1000 and less. In case of lower middle class, the level of percapita monthly income is more than Rs 1000 but less than Rs 5000. For upper middle class such income level is above Rs 5000. In Madarihat block, out of 351 sample households 157 (44.73 percent) are in BPL poor category and 82 (23.36 percent) in APL poor. In Falakata, the situation is more or less same, but in case of Alipurduar-II, out of 322 sample households 118 (36.65 percent) are in BPL poor category and 67 (20.81 percent) in APL poor. In case of lower middle class, the share

of Alipurduar-II and Falakata block is relatively high, and for upper middle class, it is for Alipurduar-II. With regard to the overall sample households, more than 40 percent of the households were BPL and 19 percent among them are officially 'poorest among the poor'. The figure 5.7 describes the distribution of sample households on the basis of their income.



5.1.18 Natural calamity affected in last 5 years

Table-5.17: Sample Households affected by natural calamity at least once in the last 5 years

Category	Alipurduar-II		Madarihat		Falakata		Total	
	Affected	Not Affected	Affected	Not Affected	Affected	Not Affected	Affected	Not Affected
Poorest	114 (35.04)	50 (15.53)	146 (41.60)	21 (5.98)	128 (37.87)	45 (13.31)	388 (38.38)	116 (11.47)
Middle	69 (21.43)	62 (19.26)	99 (28.21)	58 (16.52)	78 (23.08)	58 (17.16)	246 (24.33)	178 (17.61)
Least Poor	4 (1.24)	23 (7.14)	12 (3.42)	15 (4.27)	10 (2.96)	19 (5.62)	26 (2.57)	57 (5.64)
Total	187 (58.08)	135 (41.92)	257 (73.22)	94 (26.78)	216 (63.91)	122 (36.09)	660 (65.28)	351 (34.72)

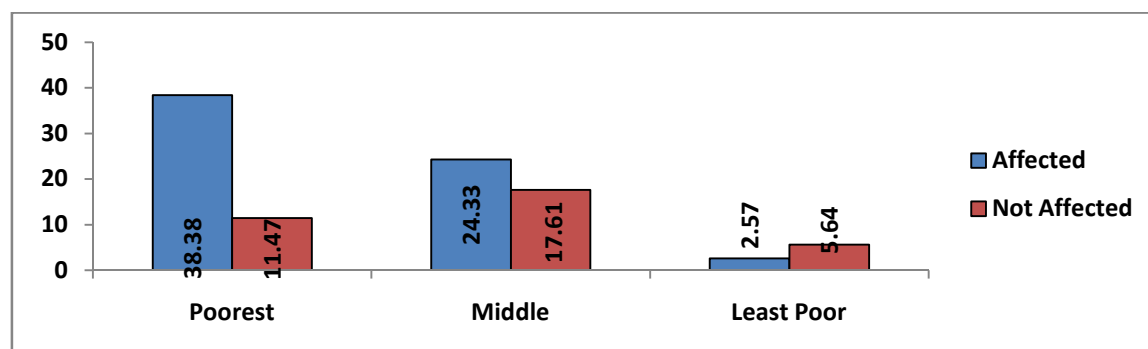
Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Natural calamity is closely correlated with the lives of the Western Dooars. During the starting and end season of monsoons every year, a vast area of Western Dooars become flooded by the rivers. Especially, the villages located closer to the river bank suffer mostly during this season. The erosion of land due to change of tracks of the river creates large number of environmental refugees - a new brand of helpless people become uprooted by nature's whims. Table 5.17 and figure 5.8 describes the situation of households affected by the natural calamity once in last five years. For Falakata and Madarihat blocks, out of 338

and 351 sample households, 216 and 257 are affected by the natural calamities once or more since last five year from the poorest (self-assessed) income group. In case of Alipurduar-II, the situation is better, as out of 322 sample households 187 are affected by the natural calamities from the poorest income group. The close link between calamity and poverty is also evidenced by the result that poor households were affected in greater proportion than the non-poor households.

Figure-5.8: % of Sampled households affected by natural calamity in last 5 years



5.1.19 Conclusion

The demographic variables of the sample households are explained in the above section. Majority of the sample households at the aggregate and disaggregate levels in the region of three to six members for each household. The average family size in the study area is around 4-5. The family size in the sample households is larger than the national average. The sex ratio of the sample population shows that for Alipurduar-II it is 933.5, for Madarihat block it is 887 and for Falakata block it is 842.8. The child sex ratio is better in Alipurduar block compared to other two blocks. The issue of sex ratio is quite bad in the sample of Falakata and Madarihat blocks and the child sex ratio is also alarming. The percentage of children in the sample population is high in Alipurduar-II and Falakata blocks. The percentage of working group population in the sample is higher in Madarihat block. In the total sample population 2189 are females. The working age group population in the sample population is higher than the national average.

The basic social head of the sample households are discussed in the above section also. More than 97 percent of the total sample households are male headed and 3 percent of the total households are female headed. In case of female headed families, predominance of diseases leading to death are the root cause for such situation in this region. In Madarihat block, the males head 96 percent households only. More than 68 percent of the households in Madarihat block are headed by illiterates. Moreover only 1.59 percent of the households

are headed by persons with higher education. This calls more attention from the part of the government for overall improvement of the region.

It is found that more than 36.5 percent of the total sample population are illiterate. Progeny are also there like illiteracy of the heads of the households. More than 37 percent of the female population are illiterate. With regard to total sample population only 37.84 percent have primary education. The number of illiterates is more in Madarihat and Falakata blocks compared to Alipurduar-II block. In Madarihat block, more than 29 percent of the sample households have children not going to school, whereas in Alipurduar-II block the corresponding figure is 24 percent. Thus, more measures are required to check such major problems in this region. The households having availability of safe drinking water is 29 percent for the total sample households; this is only 25 percent for Madarihat block. Comparatively Alipurduar-II and Falakata blocks are doing better in this regard. Drinking protected water reduces the disease prevalence, as most of the diseases are due to contaminated water. So to reduce the prevalence of diseases in these areas providing safe drinking is the first measures to be adopted.

Cultivation is primary occupation practiced by 18 percent of heads of the sample households and the non-agricultural labour occupied the first position. There is a need to increase the employment generation activities in this areas as lack of sufficient income is root cause for all the problems in any society. But the results for the total samples are vice versa. The non-agricultural labour is primary occupation for most of the sample population followed by wage labour and cultivation. More than 22 percent of the eligible total sample households are having wage labour as their subsidiary occupation for their livelihood. In case of sanitation, comparative proper process is followed in the block Alipurduar-II. But in case of Madarihat and Falakata improper sanitation habits are found prominently. Government level initiatives are taken to change the habits. In all, the district shows some improvement for the development of sanitation habits.

In the total sample population 26.43 percent of the married women got married before they attain fifteen years of age. The mean age at marriage for the sample population is not encouraging. It is very less, and may be the cause for high mortality rate among the scheduled tribes. As the mean age at marriage is low, the age at first conception for the eligible sample women is also very low. On average, each block has 41 , 42 and 48 percent of women who have their first conception in the age group of 15-20 years. In-fecund women are of five percent of the total eligible sample married women. Observation regarding the caste pattern shows dominancy of scheduled tribes in case of Madarihat Block (44.28 percent), but in case of Falakata minority community is an important factor (28.9 percent). In

case of Alipurduar-II, the study finds dominance of scheduled tribe. In the district dominance of scheduled caste and scheduled tribes is a common feature which is also supported by the government level data.

The sample households with kutcha houses in the total sample are of 58.53 percent. Alipurduar-II block is relatively better in this aspect. But 'all season houses' are the need of the hour. Regarding income level, the situation of Alipurduar-II block is better compared to other two blocks. We have noticed overall prevalence of BPL poor and APL poor in this region. During rainy season, people of this region are suffer from bad condition of road and some villages located near the river bank have lost their ancestral property by the erosion of soil in the river embankment. Thus natural calamity has some significant role to play in determining the economic status and quality of life of people of this region.

Section-II

Health Status of the Sampled Households

- **Introduction**
- **Mortality rate with and without Medical attention**
- **Gender wise distribution of ailments in last 30 days**
- **Children Ailments in last 30 days**
- **Gender wise distribution of accidents, animal attacks in last one year**
- **Gender and age wise distribution of chronic and non-communicable ailments in last five year**
- **Economic condition and age wise distribution of chronic and non-communicable ailments in last five year**
- **Age wise distribution of chronic and non-communicable ailments according to health condition in last 30 days**
- **Prevalence of Tobacco and Alcohol use among different income and age group**
- **Distribution of Vision problems among Adults**
- **Child Health Status (Aggregate)**
- **Common ailments among Children in last 15 days**
- **Distribution of the ailments on the basis of age and sex in last 30 days**
- **Age specific ailments among Female**
- **Gender wise distribution of the Malaria and General fever affected persons since last year**
- **Gender wise distribution of the patients on the basis consulting a doctor since last 30 days**
- **Conclusion**

SECTION II

Health Status of the Sampled Households

5.2 Introduction

This section deals with the health status of the sample households based on disease prevalence rate, distribution of infected persons by sex and age groups and etc. How the health condition of the inhabitants in this area is the core part of analysis of this section. The study considered this health status in terms of short run and long run time frame.

5.2.1 Mortality with and without Medical Attention

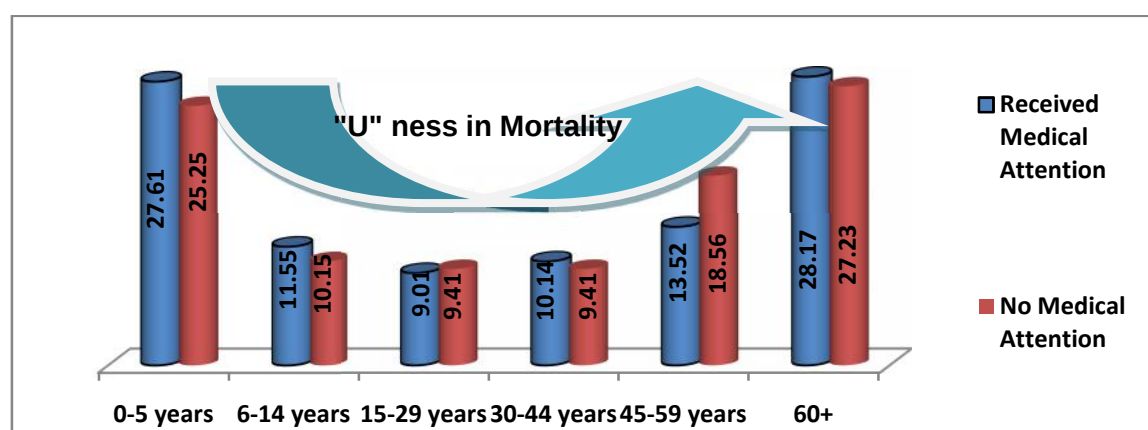
Table-5.18: Age-wise distribution of mortality among the sample households with and without medical attention.

Age	Alipurduar-II		Madarihat		Falakata		Total	
	Medical Attention		Medical Attention		Medical Attention		Medical Attention	
	Yes	No	Yes	No	Yes	No	Yes	No
0-5 years	28 (23.53)	24 (19.35)	36 (31.30)	41 (28.87)	34 (28.1)	37 (26.81)	98 (27.61)	102 (25.25)
6-14 years	12 (10.08)	14 (11.29)	12 (10.43)	13 (9.15)	17 (14.05)	14 (10.14)	41 (11.55)	41 (10.15)
15-29 years	11 (9.24)	13 (10.48)	10 (8.7)	12 (8.45)	11 (9.09)	13 (9.42)	32 (9.01)	38 (9.41)
30-44 years	11 (9.24)	9 (7.26)	12 (10.43)	13 (9.15)	13 (10.74)	16 (11.59)	36 (10.14)	38 (9.41)
45-59 years	21 (17.65)	25 (20.16)	12 (10.43)	31 (21.83)	15 (12.4)	19 (13.77)	48 (13.52)	75 (18.56)
60 +	36 (30.25)	39 (31.45)	33 (28.7)	32 (22.53)	31 (25.62)	39 (28.26)	100 (28.17)	110 (27.23)
Total	119	124	115	142	121	138	355	404

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.9: % of age-wise mortality with or without medical attention



The estimated crude death rate in the Western Dooars is 8.12 (759 died in the last 365 days before the survey) which is higher than that of rural West Bengal (6.3, SRS 2007). As expected, the rate is much higher among people above 60 years of age (12.21) followed by under 5 children (10.1). Almost half of those who died (46.7 percent) received some sort of medical attention before death although only 23 percent of them were hospitalised before death implying that the underlying cause of death might have remained largely unknown. Figure 5.9 shows the percentage distribution of age-specific mortality in terms of whether they receive medical attention or not. The figure 5.9 develop the most common "U" ness shown by the vertical bars in case of received or not any medical attention.

5.2.2 Gender wise distribution of ailments in last 30 days

How sick are the people of the Western Dooars? The scenario emerging from the self-perceived morbidity reflects a worrying health profile of the region.

Table-5.19: Gender wise distribution of ailments in last 30 days among the sample households

Ailments	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
Respiratory	58 (20.57)	61 (19.87)	119 (20.20)	72 (20.45)	55 (16.98)	127 (18.79)	41 (15.36)	70 (19.77)	111 (17.87)	171 (18.98)	186 (18.88)	357 (18.93)
Digestive	51 (18.09)	41 (13.36)	92 (15.62)	69 (19.60)	39 (12.04)	108 (15.98)	39 (14.61)	68 (19.21)	107 (17.23)	159 (17.65)	148 (15.03)	307 (16.28)
General	106 (37.59)	112 (36.48)	218 (37.01)	117 (33.24)	108 (33.33)	225 (33.28)	115 (43.07)	125 (35.31)	240 (38.65)	338 (37.51)	345 (35.03)	683 (36.21)
Skin	27 (9.57)	42 (13.68)	69 (11.71)	43 (12.22)	63 (19.44)	106 (15.68)	35 (13.11)	45 (12.71)	80 (12.88)	105 (11.65)	150 (15.23)	255 (13.52)
Musculoskeletal	40 (14.18)	51 (16.61)	91 (15.45)	51 (14.49)	59 (18.21)	110 (16.27)	37 (13.86)	46 (12.99)	83 (13.37)	128 (14.21)	156 (15.83)	284 (15.06)
Total	282	307	589	352	324	676	267	354	621	901	985	1886

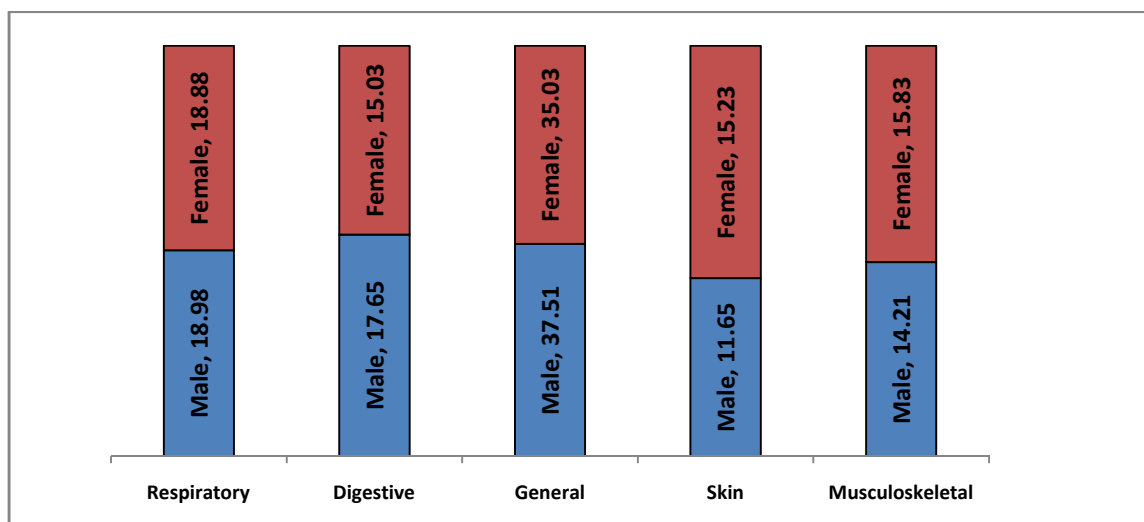
Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

About 36.49 percent of the male and 45 percent of the female population have experienced some sort of ailments in the last one month, either old or new. These rates are significantly higher than the state average which is 24 percent for the male and 26 percent for the female population as reported by the NSSO report in 2004. When we disaggregate the rate by age groups shows usual 'U' shape (from Table 5.18) indicating higher concentration of morbidities among the children and older aged persons. Among the blocks, we observe that in Madarihat and Falakata blocks the ailments like gastro-intestinal problem is major disease than any other, but in Alipurduar-II respiratory ailments is the major one. Almost all types of communicable diseases primarily related to respiratory and gastro-intestinal systems - are

highly prevalent in the Western Dooars in varying degrees making it perfect public health laboratory for health managers.

Figure-5.10: % of Gender wise distribution of ailments (In last 30 days)



During survey, the study shows 42 Tuberculosis cases (diagnosed and under treatment) implying an estimated rate of 9.02 per 1000 population which is very higher than the national average of 2.27 (Chakraborty, A. 'Epidemiology of Tuberculosis: Current status in India' Indian Journal of Medical Research 120, Oct 2004 pp 248-276). The link between geo-climatic environment of the Western Dooars and people's health is evident by high prevalence of a few environmental health problems. Skin related problems, such as itching in hands and legs are found very common across all surveyed villages of the respective blocks. The impact of arsenic poisoning is quite visible in the Madarihat and Falakata blocks and here ground water probably is contaminated with arsenic. The figure 5.10 depicts that in terms of all types of non-communicable diseases the burden of disease is distributed more or less evenly over the gender. The symptoms reported by the ailing respondents indicate that most of the ailments are common and related to either digestive system or respiratory system, or partially disability due to general symptoms such as weakness. The most common symptoms for respiratory ailments were (1) fever with cold and cough and (2) difficulty in breathing. The major digestive system related symptoms were (1) intestinal gas, and (2) pain in lower abdomen. Among all musculoskeletal problems, the most common symptom is 'back pain'. However the nature of morbidity derived from a symptomatic search may not be adequate to conclusively determine the burden of disease in an area.

5.2.3 Children Ailments in last 30 days

The study shows that children (below 5 years) are three times more vulnerable to respiratory ailments than the rest. For the digestive ailments, this also shows that Madarihat and

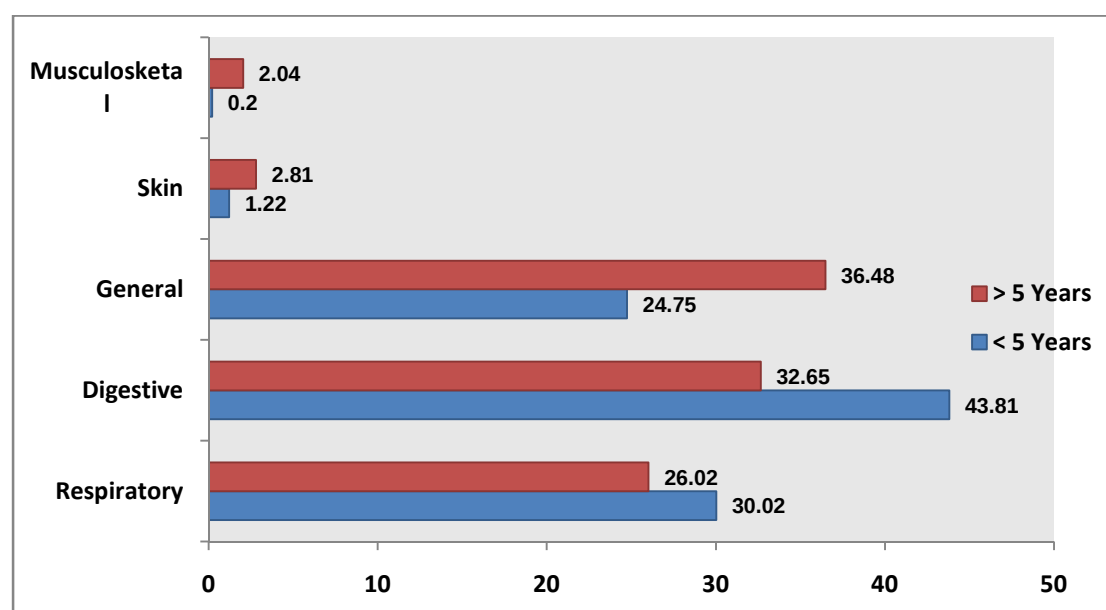
Falakata block prevalence rate is very high compared to Alipurduar-II block. In all the study shows that 33.4 percent child of age under 5 years have ailments. During monsoons digestive problems occur in every block. The survey time cover July month of year 2012 hence the prevalence rate observes the cases for digestive problems not only for the child of under 5 years of age but also for the young also. The figure 5.11 shows that presence of digestive and respiratory ailments is remarkable among the age group of less than 5 years, but in terms of general ailments the higher age groups is more vulnerable position.

Table-5.20: Distribution of ailments in last 30 days among children of sample households

Ailments	Alipurduar-II		Madarihat		Falakata		Total	
	< 5 yrs	> 5 yrs	< 5 yrs	> 5 yrs	< 5 yrs	> 5 yrs	< 5 yrs	> 5 yrs
Respiratory	47 (34.06)	34 (29.82)	62 (31.63)	35 (26.52)	39 (24.53)	33 (22.60)	148 (30.02)	102 (26.02)
Digestive	56 (40.58)	34 (29.82)	89 (45.41)	49 (37.12)	71 (44.65)	45 (30.82)	216 (43.81)	128 (32.65)
General	32 (23.19)	38 (33.33)	43 (21.94)	44 (33.33)	47 (29.56)	61 (41.78)	122 (24.75)	143 (36.48)
Skin	3 (02.17)	6 (5.26)	1 (0.51)	0 (0.00)	2 (1.26)	5 (3.42)	6 (1.22)	11 (2.81)
Musculoskeletal	0 (0.00)	2 (1.75)	1 (0.51)	4 (3.03)	0 (0.00)	2 (1.37)	1 (0.20)	8 (2.04)
Total	138	114	196	132	159	146	493	392

Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012

Figure-5.11: % of ailments in last 30 days among children of sample households



5.2.4 Gender wise distribution of accidents, animal attacks in last one year

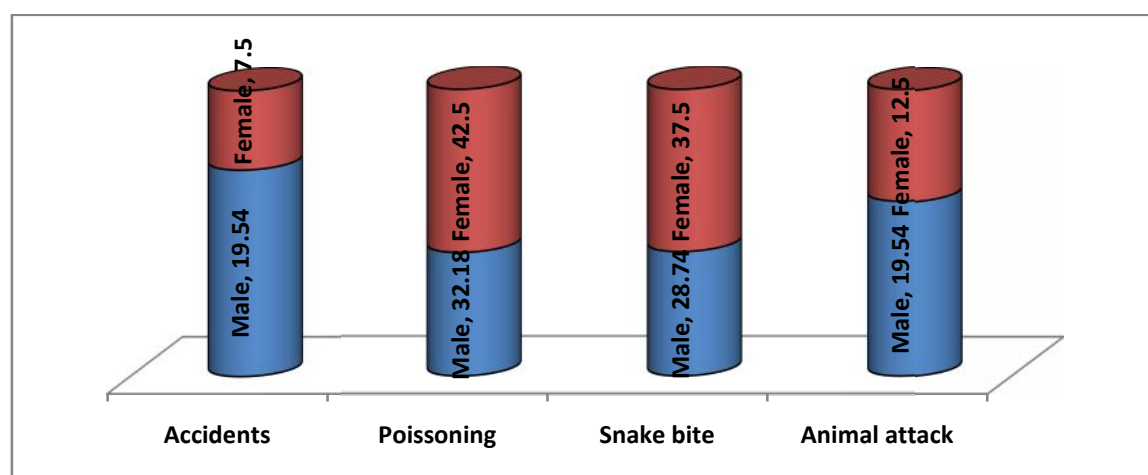
Table-5.21: Gender wise distribution of accidents, animal attacks in last year among the sample households

Incidents	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
Accidents	6 (27.27)	1 (8.33)	7 (20.59)	5 (13.16)	0 (0.00)	5 (9.62)	6 (22.22)	2 (14.29)	8 (19.51)	17 (19.54)	3 (7.50)	20 (15.75)
Poisoning	5 (22.73)	6 (50.00)	11 (32.35)	10 (26.32)	3 (21.43)	13 (25.00)	13 (48.15)	8 (57.14)	21 (51.22)	28 (32.18)	17 (42.5)	45 (45.43)
Snake bite	9 (40.91)	5 (41.67)	14 (41.18)	9 (23.68)	6 (42.86)	15 (28.85)	7 (25.93)	4 (28.57)	11 (26.83)	25 (28.74)	15 (37.5)	40 (31.50)
Animal Attack	2 (9.09)	0 (0.00)	2 (5.88)	14 (36.84)	5 (35.71)	19 (36.54)	1 (3.70)	0 (0.00)	1 (2.44)	17 (19.54)	5 (12.50)	22 (17.32)
Total	22	12	34	38	14	52	27	14	41	87	40	127

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.12: % of Gender-wise distribution of accidents, animal attack in last 5 year



Besides water-borne and air-borne diseases, there are other concerns where environment plays a major role. The study shows that 20 case of accidents or injuries have occurred among the persons who basically linked with rural transportation services. The case of poisoning arises among basically from the intoxication of local drinking water. In Madarihat block, 13 cases are found and these are dominated by the tribal families. The cases of snake bites may be over estimated, as because the survey occurred during the end of monsoons. In Falakata and Madarihat block, 26 cases are found of snake bites. The high incidence of snake bites is evident from the official estimates of the block level health

centres which, taken together, recorded about 12 cases (Outpatient and inpatient) in the year 2011. The threat of animal attacks (elephants and tiger) is grave especially among those who collect forest products illegally. During winter when the crops are matured, elephants enter into the cropping fields for matured crops, fact full encounter occurs between human and animal resulting possibly loss of both. This can be interpreted as an environmental problem due to shortages of animal food in the forests. According to official estimates of this region, every year 17 percent fall prey of animal attack.

5.2.5 Gender and Age (> 40 years) wise distribution of chronic and non-communicable ailments in last five year

Ailments related to communicable and acute health conditions, however, present an incomplete health scenario of the Western Dooars. To complete the picture one needs to look at the non-communicable and chronic ailments which usually remain neglected by the policy makers despite significant poverty dimensions of these ailments. The present study, which investigates the prevalence of six major chronic ailments (Arthritic Pain, Cardio-vascular Problems, Asthma, Diabetes, Skin related Problems, and Vision Problems) among 1990 persons of more than 40 years old (1056 male and 934 female members), has come up with some serious concerns in this regard. Coronary Heart Diseases (CHD), which are usually linked to urban lifestyles, are estimated to affect 9.07 percent of population aged 40 years or more. About 37.35 percent of adult population (> 40 Years) indicated high risk of arthritis. Bronchial Asthma chronically affects the elderly population at 24.17 percent prevalence rate.

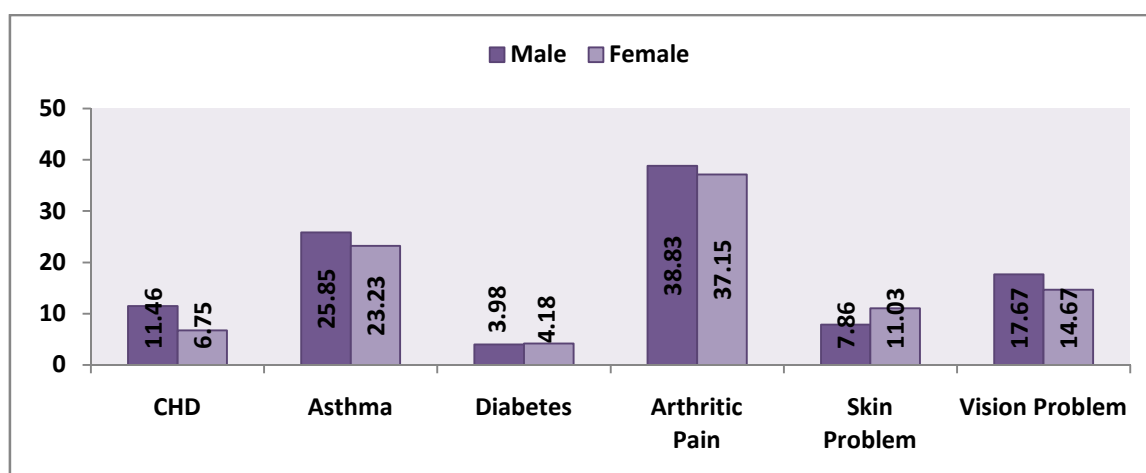
Table-5.22: Gender wise distribution of chronic and non-communicable ailments in last five year among the sample households of age more than 40 years

Ailments	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
CHD	22 (6.85)	14 (4.65)	36 (5.79)	41 (10.62)	22 (6.69)	63 (8.81)	58 (16.62)	27 (7.92)	85 (12.32)	121 (11.46)	63 (6.75)	184 (9.25)
Asthma	96 (29.91)	63(20.93)	159 (25.56)	103 (26.68)	102 (31.00)	205(28.67)	74 (21.20)	52 (15.25)	126 (18.26)	273 (25.85)	217 (23.23)	490 (24.62)
Diabetes	16 (4.98)	8 (2.66)	24 (3.86)	11 (2.84)	14 (4.26)	25 (3.50)	15 (4.30)	17 (4.99)	32 (4.64)	42 (3.98)	39 (4.18)	81 (4.07)
Arthritic Pain	116 (36.14)	137 (45.51)	253 (40.68)	156 (40.41)	90 (27.36)	246 (34.41)	138 (39.54)	120 (35.19)	258 (37.39)	410 (38.83)	347 (37.15)	757 (38.04)
Skin Problem	28 (8.72)	41 (13.62)	69 (11.09)	21 (5.44)	42 (12.77)	63 (8.81)	34 (9.74)	57(16.72)	91(13.19)	83 (7.86)	103 (11.03)	186 (9.35)
Vision Problem	43 (13.40)	38 (12.62)	81(13.02)	54 (13.99)	59 (17.93)	113 (15.80)	30 (8.60)	68 (19.94)	98 (14.20)	127 (12.03)	165 (17.67)	292 (14.67)
Total	321	301	622	386	329	715	349	341	690	1056	934	1990

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.13: % of Chronic Non-communicable ailments distribution in last 5 Years



5.2.6 Economic condition and Age (> 40 Years) wise distribution of chronic and non-communicable ailments in last five year

Table-5.23: Economic condition wise distribution of chronic and non-communicable ailments in last five year among the sample individuals of age more than 40 years

Ailments	Alipurduar-II			Madarihat			Falakata			Total		
	Poor	Middle	Least Poor	Poor	Middle	Least Poor	Poor	Middle	Least Poor	Poor	Middle	Least Poor
CHD	4 (1.35)	11 (5.67)	21 (16.03)	8 (2.17)	14 (6.86)	41 (28.67)	9 (2.67)	41 (20.40)	35 (23.03)	21 (2.10)	66 (11.02)	97 (22.77)
Asthma	97 (32.66)	41 (21.13)	21 (16.03)	113 (30.71)	73 (35.78)	19 (13.29)	83 (24.63)	28 (13.93)	15 (9.87)	293 (29.24)	142 (14.17)	55 (12.91)
Diabetes	4 (1.35)	7 (3.61)	13 (9.92)	2 (0.54)	12 (5.88)	11 (7.69)	6 (1.78)	16 (7.96)	10 (6.58)	12 (1.20)	35 (5.84)	34 (7.98)
Arthritic Pain	136 (45.79)	76 (39.18)	41 (21.30)	166 (45.11)	53 (25.98)	27 (18.88)	146 (43.32)	68 (33.83)	44 (28.95)	448 (44.71)	197 (32.89)	112 (26.29)
Skin Problem	38 (12.79)	20 (10.31)	11 (8.40)	35 (9.51)	17 (8.33)	11 (7.69)	46 (32.17)	24 (11.94)	21 (13.82)	119 (11.88)	61 (10.18)	43 (10.09)
Vision Problem	18 (6.06)	39 (20.10)	24 (18.32)	44 (11.96)	35 (17.16)	34 (23.78)	47 (32.87)	24 (11.94)	27 (17.76)	109 (10.88)	98 (13.36)	85 (19.95)
Total	297	194	131	368	204	143	337	201	152	1002	599	426

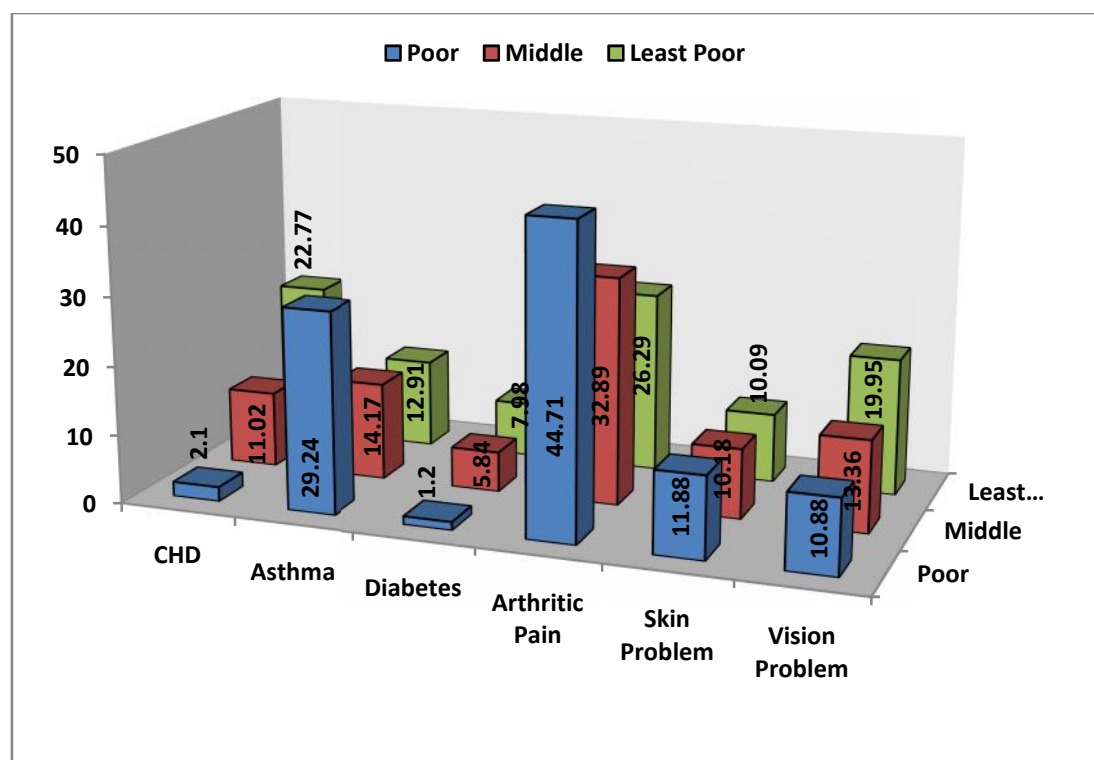
Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

The vulnerability to chronic and non-communicable diseases on people's health may be more meaningful to discuss according to economic conditions of the individuals. Table 5.23 and figure 5.14 generates this classification among three income category like poor, medium and least poor. Out of 715 sample households of Madarihat block, the study found CHD is

more vulnerable among the least poor income group (58.33 percent), whereas in Falakata block Arthritis is a major problem among the poor income group. From the overall data, the vulnerability of Bronchial Asthma than the other ailments shows significantly present among poor income group and it is six times higher than among better-offs.

Figure-5.14: % Distribution of Chronic Non-communicable ailments as per economic conditions in last 5 years (Age>40 Yrs)



5.2.7 Age wise (> 40 Years) distribution of chronic and non-communicable ailments according to health condition in last 30 days

The vulnerability or risk for each of the above health condition was estimated on the basis of a set of symptoms and risk factors, similar to the procedure followed in the World Health Survey (WHS). The persons who reported all the primary symptoms and have additional risk factors (e.g., smoking and overweight for CHD) are identified as 'high risk' population. The study shows that 63 persons in the Western Dooars are highly vulnerable to CHD. About 6.73 percent are already diagnosed which is higher than the corresponding state average (3 percent, De Auley et.al IJMRHS Vol-2, 2013). Among the blocks the severity of CHD is high in Madarihat block in compare to other two blocks. The data also suggest that, contrary to the conventional beliefs, the prevalence of CHD risk would be considerably high among the poor people.

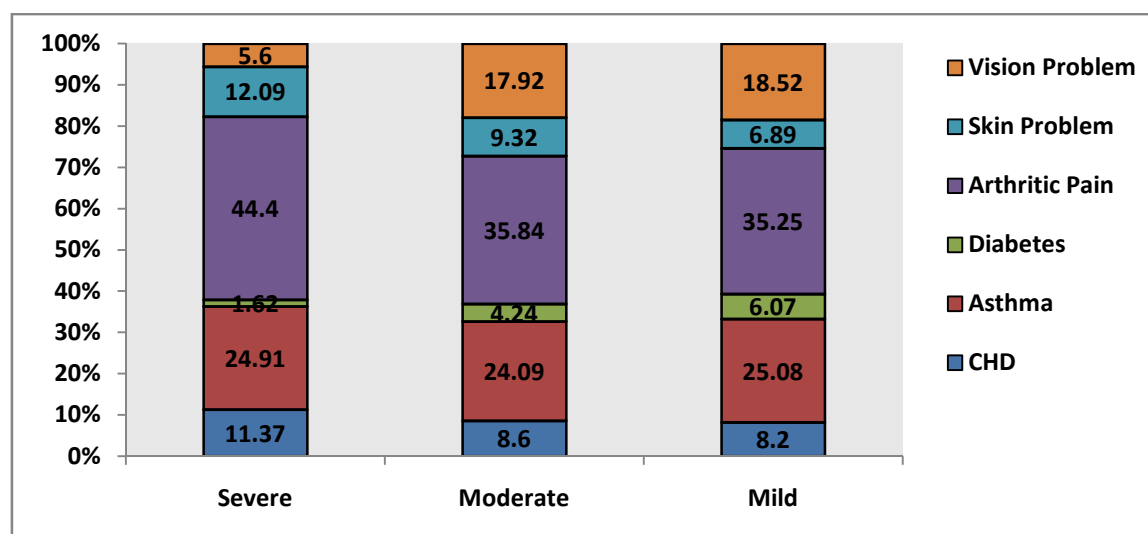
Table-5.24: Distribution of chronic and non-communicable ailments according to health condition in last 30 days among the sample individuals of age more than 40 years

Ailments	Alipurduar-II			Madarihat			Falakata			Total		
	Severe	Moderate	Mild	Severe	Moderate	Mild	Severe	Moderate	Mild	Severe	Moderate	Mild
CHD	12 (7.10)	16 (6.43)	8 (3.92)	19 (8.26)	21 (6.89)	23 (12.78)	32 (17.02)	34 (12.32)	19 (8.41)	63 (11.37)	71 (8.60)	50 (8.20)
Asthma	33 (19.53)	79 (31.73)	47 (23.04)	77 (33.48)	60 (19.67)	68 (37.78)	28 (14.89)	60 (21.74)	38 (16.81)	138 (24.91)	199 (24.09)	153 (25.08)
Diabetes	2 (1.18)	14 (5.62)	8 (3.92)	3 (1.30)	11 (3.61)	11 (6.11)	4 (2.13)	10 (3.62)	18 (7.96)	9 (1.62)	35 (4.24)	37 (6.07)
Arthritis Pain	85 (50.30)	71 (28.51)	97 (47.55)	93 (40.43)	122 (40.00)	31 (17.22)	68 (36.17)	103 (37.32)	87 (38.50)	246 (44.40)	296 (35.84)	215 (35.25)
Skin Problem	28 (16.57)	30 (12.05)	11 (5.39)	21 (9.13)	32 (10.49)	10 (5.56)	42 (22.34)	28 (10.14)	21 (9.29)	67 (12.09)	77 (9.32)	42 (6.89)
Vision Problem	9 (5.33)	39 (15.66)	33 (16.18)	17 (7.39)	59 (19.34)	37 (20.56)	14 (7.45)	41 (14.86)	43 (19.03)	31 (5.60)	148 (17.92)	113 (18.52)
Total	169	249	204	230	305	180	188	276	226	554	826	610

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.15: % Distribution of Chronic Non-communicable Ailments in terms Severity



5.2.8 Prevalence of Tobacco and Alcohol use among different income and age group (> 40 years)

Analysis of risk factors for cardiovascular disease shows that throughout the Western Dooars, the prevalence of tobacco and alcohol use is higher among the poor, which increases their risk of cardiovascular disease. Alcohol and Tobacco use is very common habit among the tribals and it is also related with their rituals. The study shows that both tobacco and alcohol use is very common among the poorer of age more than 40 years of Madarihat block (39.12 percent) and Falakata block (32.37 percent). But in case of

Alipurduar-II, only tobacco use is more frequent (32.27 percent) among the surveyed households of age more than 40 years. In the future, these higher risks may lead to higher rates of cardiovascular disease, cancer, liver disease and injuries among the poor relative to the nonpoor. The aggregate results are shown in figure 5.16 in terms of horizontal bars which established that poor section had the highest risk of CHD diseases due to consumption of tobacco and alcohol.

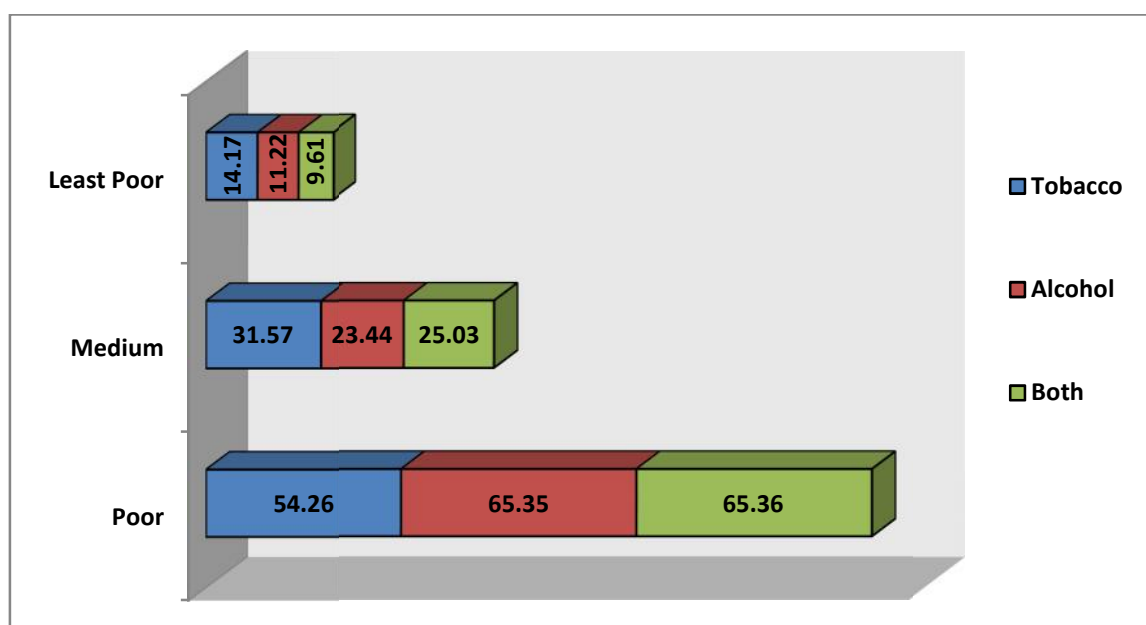
Table-5.25: Prevalence of Tobacco and Alcohol use among sample individuals of different income and age group more than 40 years

Income Group	Alipurduar-II			Madarihat			Falakata			Total		
	Tobacco	Alcohol	Both	Tobacco	Alcohol	Both	Tobacco	Alcohol	Both	Tobacco	Alcohol	Both
Poor	436 (55.33)	380 (67.49)	316 (67.81)	488 (56.68)	601 (72.23)	458 (71.67)	401 (50.57)	324 (53.82)	294 (55.58)	1325 (54.26)	1305 (65.35)	1068 (65.36)
Medium	231 (29.31)	111 (19.72)	91 (19.53)	299 (34.73)	135 (16.23)	121 (18.94)	241 (30.39)	222 (36.88)	197 (37.24)	771 (31.57)	468 (23.44)	409 (25.03)
Least Poor	121 (15.36)	72 (12.79)	59 (12.66)	74 (8.59)	96 (11.54)	60 (9.39)	151 (19.04)	56 (9.30)	38 (7.18)	346 (14.17)	224 (11.22)	157 (9.61)
Total	788	563	466	861	832	639	793	602	529	2442	1997	1634

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.16: % Distribution of Use of Tobacco & Alcohol among different Income Groups (Age > 40 yrs)



5.2.9 Distribution of Vision problems among Adults

There are several other chronic problems which are often overlooked possibly due to their low perceived severity. Ailments related to vision are one example which loads the Western

Dooars' health with significant burden. The extent of vision difficulties is evident from the results that the prevalence of Presbyopia (or farsightedness) in the Western Dooars (13.83 percent) is much higher for all age groups above 45 years than the state. The pattern is similar in myopic cases except in the 70-79 age group where the prevalence rate is 3.7 percent. This rate is quite higher than the state rate (0.96 percent). The prevalence of diagnosed cataract among the elderly female population (60 years and above) is also found higher in the sample area (43.30 percent) compare to the males (35.04 Percent).

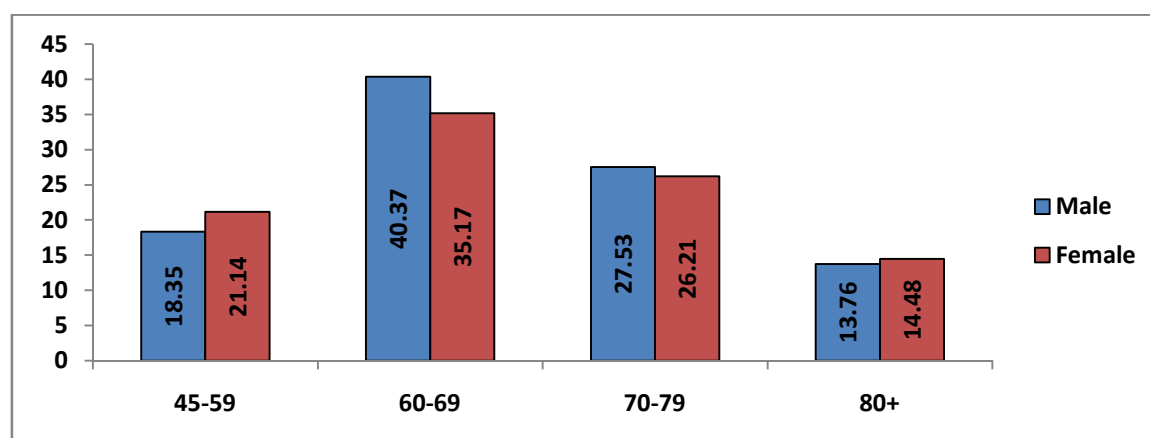
Table-5.26: Distribution of adult population who have severe vision problems among sample households

Age Group	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
45-59	6 (16.67)	13 (39.39)	19 (27.54)	10 (21.74)	11 (21.15)	21 (21.43)	4 (14.81)	11 (18.33)	15 (17.24)	20 (18.35)	35 (24.14)	55 (21.65)
60-69	13 (36.11)	12 (36.36)	25 (36.23)	18 (39.13)	16 (30.77)	34 (34.69)	13 (48.15)	23 (38.33)	36 (41.38)	44 (40.37)	51 (35.17)	95 (37.40)
70-79	12 (33.33)	3 (9.09)	15 (21.74)	10 (21.74)	16 (30.77)	26 (26.53)	8 (29.63)	19 (31.67)	27 (31.03)	30 (27.53)	38 (26.21)	68 (26.77)
80 +	5 (13.89)	5 (15.15)	10 (14.49)	8 (17.39)	9 (17.31)	17 (17.35)	2 (7.41)	7 (11.67)	9 (10.44)	15 (13.76)	21 (14.48)	36 (14.17)
Total	36	33	69	46	52	98	27	60	87	109	145	254

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.17: % Distribution of adult population who have severe vision problems



5.2.10 Child Health Status (Aggregate)

The health status of children of Western Dooars is in a sorry state. Based on the weight, age and height data of 795 children (< 5 Years), the anthropometric indicators reflect that

about half of the children in Western Dooars (53 percent) were stunted (i.e., low height for age).

Table-5.27: Child (below 5 years) health status in aggregate from among sample households of all blocks.

Age Groups	Sample Size		Weight (Mean Kg)		WHO Std 2006 (Kg)		Height (Mean Cm)		WHO Std 2006 (Cm)	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
0-1	62 (14.94)	59 (15.53)	3.97	3.87	8.9	9.6	69.2	68.8	74	75.7
1-2	86 (20.72)	67 (17.63)	8.34	7.77	11.5	12.2	74.3	71.6	86.4	87.8
2-3	93 (22.40)	77 (20.26)	11.3	11	13.9	14.3	83.8	81.6	95.1	96.1
3-4	106 (25.54)	84 (22.11)	12.8	12.3	16.1	16.3	93.4	88.7	103	103
4-5	68 (16.39)	93 (24.47)	13	12.9	18.2	18.3	95.6	92.5	109	110
Total	415	380								

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012,& WHO websites.

Figure-5.18A: Comparison of Sampled weight for Girls with WHO standard weight

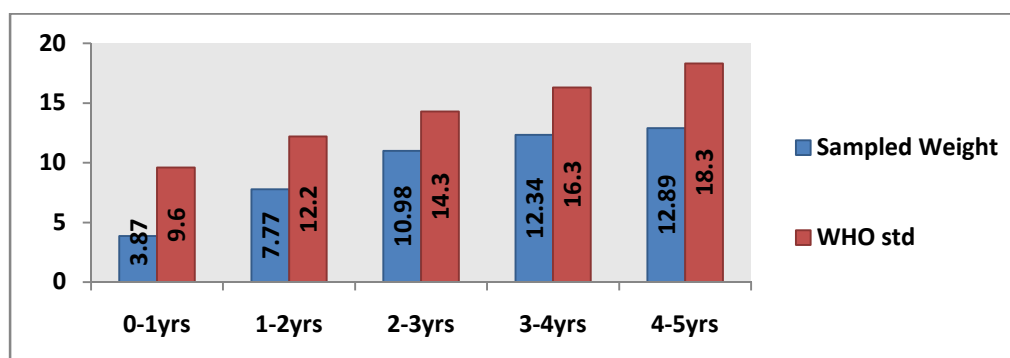
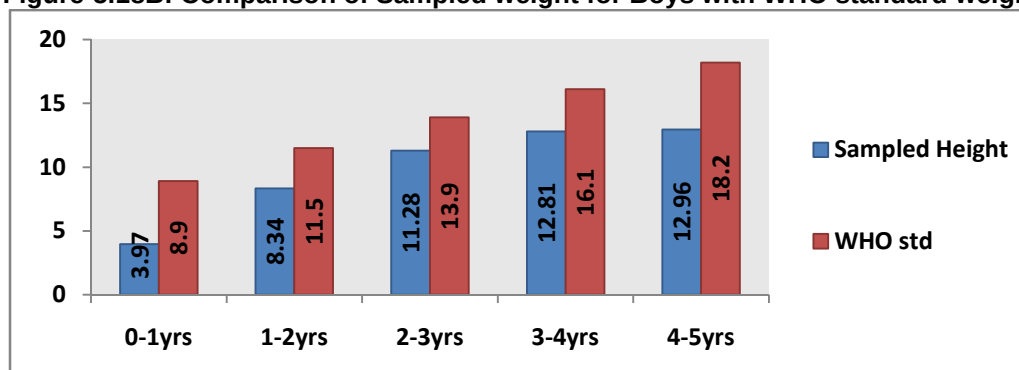


Figure-5.18B: Comparison of Sampled weight for Boys with WHO standard weight



Source: Sampled data of Household survey, 2012

Stunting, which is usually regarded as the best indicator of children's long run health status and well being is a biological adaptation to inadequate food, frequent episodes of disease, or

both during the first few years of life. In other words, a high stunting level among the children in the Western Dooars mirrors chronic poverty and food insecurity among a large part of the population. Regarding the weight and height, the study shows that like height, weight is also below the World Health Organisation standard (2006) for all age groups. In the study, we measure the supine length (lying face upward) for children of 2 years of age and which is a de-facto height for them. The study reveals that 48.4 percent children are very short and 23.8 percent are extremely stunted i.e. 0.3 SD below the reference. The height for age of boys and girls shows values for all children to be below the median reference at all ages. Under weight is also an important indicator of child malnutrition and in our study over sample households, we notice that 68.77 percent of the surveyed children of below 5 year is chronically malnourished and the respective percentage is higher than state (45 percent) and national average (48 percent).

5.2.11 Common ailments among Children (< 5 years) in last 15 days

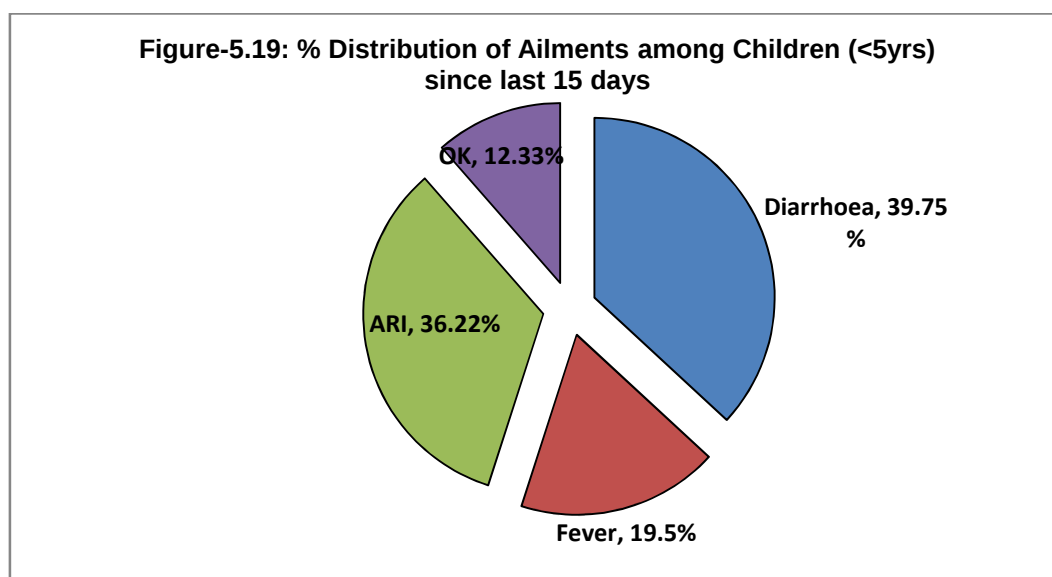
Table-5.28: Distribution of common ailments of children age below 5 years in last two weeks among sample Individuals

Ailments	Alipurduar-II	Madarihat	Falakata	Total
Diarrhoea	96 (39.18)	114 (40.43)	106 (39.55)	316 (39.75)
Fever	61 (24.90)	42 (14.89)	52 (19.40)	155 (19.50)
ARI	65 (26.53)	96 (34.04)	67 (25)	228 (36.22)
OK	25 (10.20)	30 (10.64)	43 (14.04)	98 (12.33)
Total	245	282	268	795

*Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012*

Chronic malnutrition usually has a spiralling effect on the vulnerability of the children to respiratory and gastro-intestinal ailments. Table 5.28 establishes this phenomenon in the present context and reveals a disproportionately higher burden of these ailments in the Western Dooars. The proportion of children under five years who had at least one spell of diarrhoea (39.75) during last two weeks is almost double in the Western Dooars compared to the state average (18.56 percent, NFHS-3). The prevalence of Acute Respiratory Infection (ARI) such as Pneumonia is also exorbitantly high in the sampled areas (28.68 percent). One in three children have suffered at least one episode of cough with difficulty in breathing (faster than usual, short and rapid breaths). The incidence of Diarrhoea is also slightly higher

in this region and there may be chance of over estimation of this rate, since the survey carried out at the end of monsoons season, which is a high-prevalent season. Diarrhoea is more frequent in Madarihat (40.42 percent) and Falakata block (39.55 percent) compared to Alipurduar-II block (39.18 Percent). The most interesting feature of such finding is that the sample area of Western Dooars implies that only 98 children out of 795 are found out of danger of any kind of ailments which means that the overall prevalence rate is near 88 percent.



5.2.12 Distribution of the ailments on the basis of age and sex in last 30 days

Table-5.29: Distribution of the ailments on the basis of age and sex in last 30 days

Age & Disease Prevalence rate	Alipurduar-II		Madarihat		Falakata		Total	
	Ailed Person		Ailed Person		Ailed Person		Ailed Person	
	M	F	M	F	M	F	M	F
0-14	256	227	252	210	291	241	799	678
Disease Prevalence rate	41.2	56.71	48.45	62.13	46.73	57.12	45.46	58.65
15-59	419	382	473	400	429	335	1321	1117
Disease Prevalence rate	21.42	34.28	27.51	35.51	22.77	33.29	23.9	34.36
60 +	107	121	116	136	126	137	349	394
Disease Prevalence rate	39.13	36.8	45.21	41.32	34.51	34.26	39.62	37.46
Total	782	730	841	746	846	713	2469	2189
Disease Prevalence rate	33.92	42.6	40.39	46.32	34.67	41.56	36.33	43.49

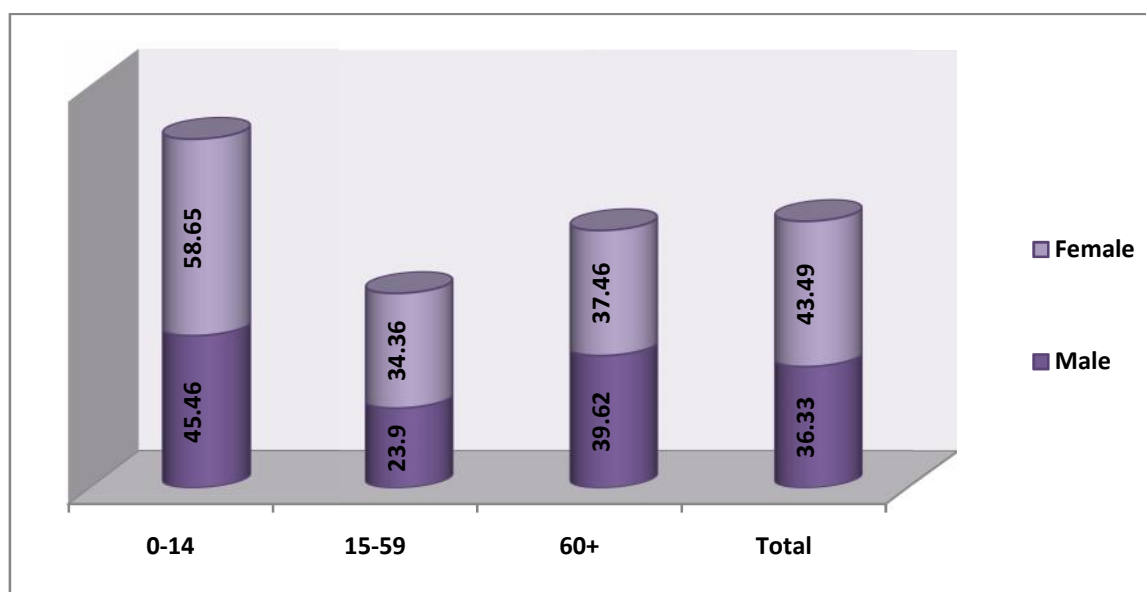
Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

The data collected through the survey do not reflect an impressive scenario about women health in the Western Dooars. The table 5.29 brings out the classification of the sample

households based on age and morbidity data collected during the reference of last 30 days of sample data collection. The disease prevalence rate is high among the women (43.49 percent) at the aggregate and individual level. In general, women (34.36 percent) have reported general ailments in larger proportion than their male (23.9) counterparts specially in the age-group 15-59 years without much difference in the ailments profile.

Figure-5.20: % Distribution of Age-Sex wise Disease Prevalence Rate



5.2.13 Age specific ailments among Female (Aggregate)

Table-5.30: Distribution of ailments among female on the basis of socio-economic status of all blocks

Age group	Vision Problem			Skin Problem			Body Mass Index					
							Weight			Height		
	Poor	Medium	Least Poor	Poor	Medium	Least Poor	Poor	Medium	Least Poor	Poor	Medium	Least Poor
0-15	9 (5.06)	11 (13.25)	4 (12.90)	10 (8.70)	4 (7.84)	3 (15)	38 (9.00)	14 (7.22)	6 (5.83)	41 (11.68)	8 (4.21)	2 (1.12)
16-59	59 (33.15)	28 (33.73)	10 (32.26)	73 (63.48)	27 (52.94)	11 (55)	397 (94.07)	174 (89.69)	94 (91.26)	307 (87.46)	180 (94.74)	174 (97.75)
60 +	110 (61.80)	44 (53.01)	17 (54.84)	32 (27.83)	20 (39.22)	6 (30.00)	7 (1.66)	6 (3.09)	3 (2.91)	3 (0.85)	2 (1.05)	2 (1.12)
Total	178	83	31	115	51	20	422	194	103	351	190	178

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.21A: % Distribution of Vision problem among Female on different Income Groups

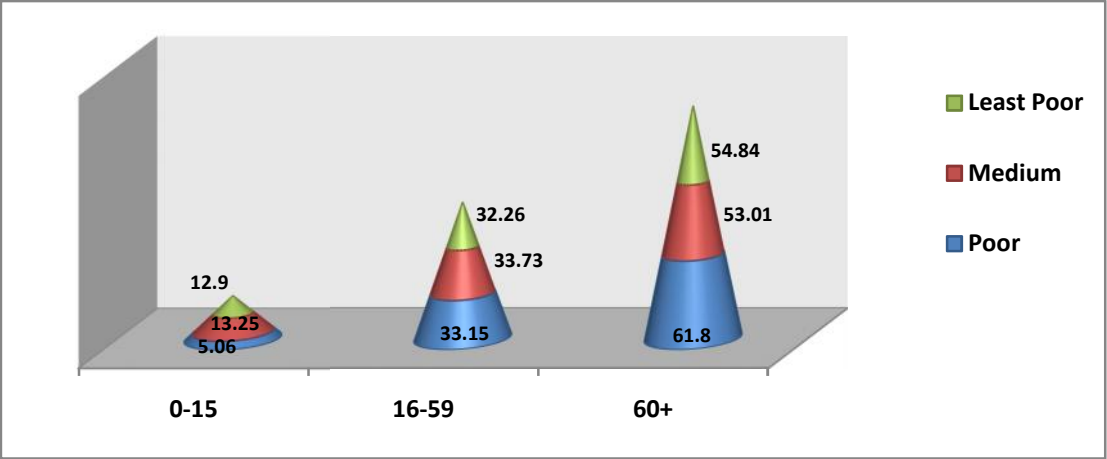


Figure-5.21B: % Distribution of Skin problem among Female on different Income Groups

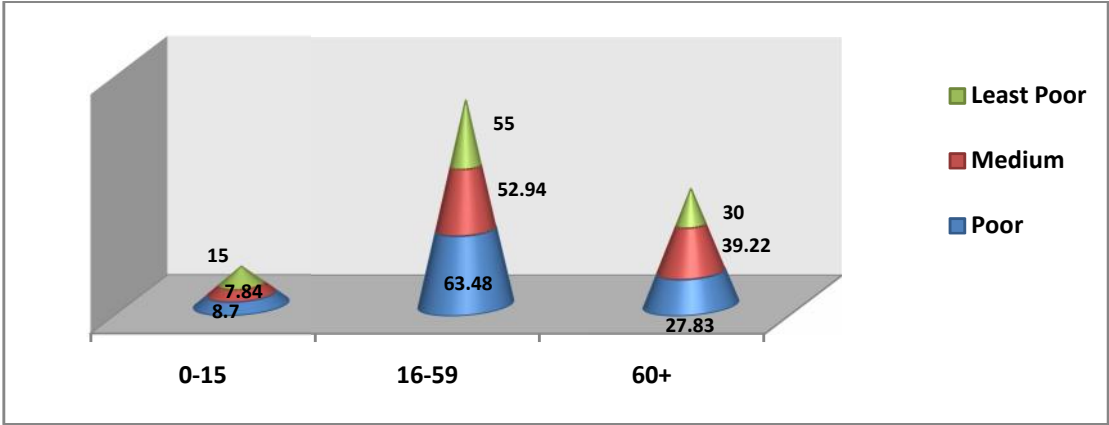
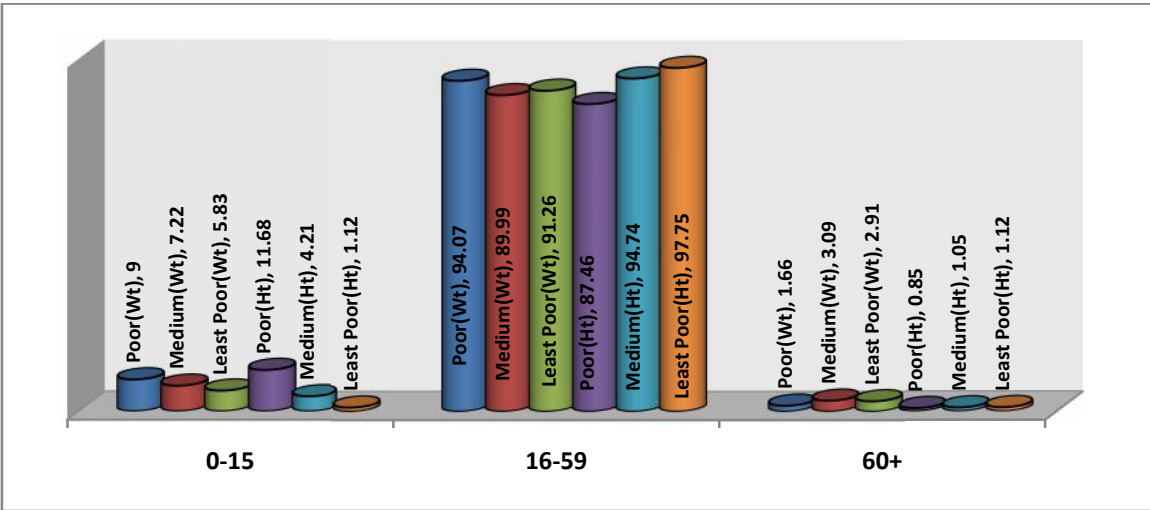


Figure-5.21C: % Distribution of BMI (Wt & Ht) problem among Female on different Income Groups according to Weight & Height



The gender inequality distribution of ailments manifests more prominently when data are disaggregated by socio-economic status. In table 5.30, in the poorest section, 292 women out of sampled 2189 (13.34 percent) women reported severe or extreme vision problem, while in the least poor category the number is 178, which is 61 percent of the total 292 sampled females. For the mothers who delivered at least one birth in the last five years, the study calculate the Body Mass Index (BMI) based on the weight, age and height data collected from 719 mothers indicate a little less than double of women (48.81 percent) were underweight (i.e., BMI< 18.5). The figures 5.21A, 5.21B and 5.21C are derived from the table 5.30 to show separately the conditions for the females of different age and income groups according to vision, skin, and low BMI problem. The study observed that among the different income groups the highest age group (Age 60+) suffer mostly from vision problems and between that age group the poorer have the largest share regarding the vision obstruction at the age greater than 60 years. Similarly for skin problems the middle age group, i.e., the ages between 15-59 are mostly affected by the skin problems and here the poorer have the largest share. For the same age group the BMI values are also below the standard level.

5.2.14 Gender wise distribution of the Malaria and General fever affected persons since last year

Figure-5.22: % Distribution of Malaria and General Fever in sampled persons

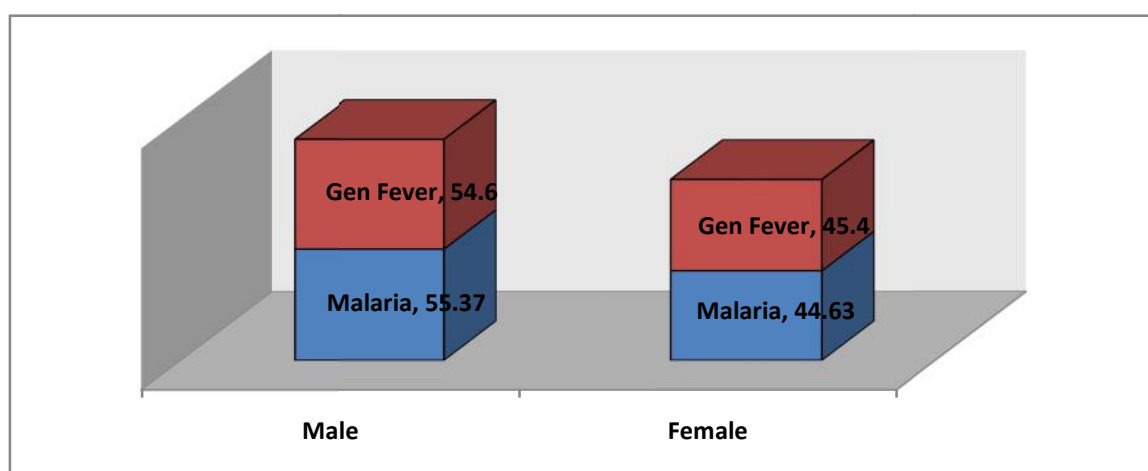


Table 5.31 brings out the classification of the sick persons based on their gender and suffered by malaria or any fever within last one year from the period of survey. There is a widespread of malaria attack and the others followed with lack of sufficient nutritional food and timely medical provisions, leading them to starve and wait for the outside help. In the surveyed area, out of 2761 ailed persons 1098 are suffering by malaria, and of which 490 are women. This means 39.77 percent people are suffering by malaria in the area which

implies malaria is frequent among the dwellers. So the government level initiatives were needed to check the spreading of malaria in post rainy season for better health outcome.

Table-5.31: Gender wise distribution of the Malaria and General fever affected persons since last year

Gender	Alipurduar-II		Madarihat		Falakata		Total	
	Malaria	Gen Fev	Malaria	Gen Fev	Malaria	Gen Fev	Malaria	Gen Fev
Male	184 (58.22)	276 (57.62)	232 (51.67)	341 (52.95)	192 (57.66)	291 (55.75)	608 (55.37)	908 (54.60)
Female	132 (41.77)	221 (42.38)	217 (48.33)	303 (47.05)	141 (42.34)	231 (44.25)	490 (44.63)	755 (45.40)
Total	316	479	449	644	333	522	1098	1663

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012, Gen Fev - General Fever*

5.2.15 Gender wise distribution of the patients on the basis consulting a doctor since last 30 days

Table-5.32: Gender wise distribution of the patients on the basis consulting a doctor since last 30 days

Gender	Alipurduar-II			Madarihat			Falakata			Total		
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Male	37 (63.79)	161 (50.47)	198 (50.52)	28 (62.22)	194 (44.39)	222 (46.06)	51 (68.92)	168 (46.03)	219 (49.89)	116 (65.54)	523 (46.65)	639 (49.23)
Female	21 (36.21)	158 (49.53)	179 (47.48)	17 (37.78)	243 (55.61)	260 (53.94)	23 (31.08)	197 (53.97)	220 (50.11)	61 (34.46)	598 (53.35)	659 (50.77)
Total	58	319	377	45	437	482	74	365	439	177	1121	1298

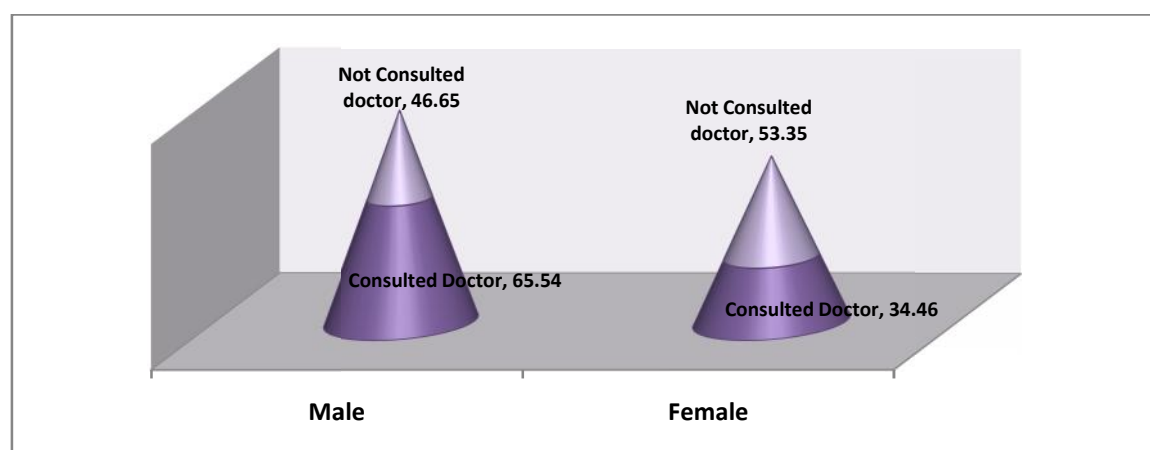
Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.32 brings out the gender differential classification of the disease prone persons in the sample households based on whether they have consulted with the doctor or not. In the Western Dooars, due to inaccessible terrain and the non-supporting atmosphere, many of the government doctors are not available in these areas. Owing to ignorance many a number of people believe in the traditional medicine, Rural Medical Practitioner (Unqualified), faith healers. The RMPs and faith healers take up this activity as for their employment and basically, faith healers create the beliefs that super natural elements are the causes for the disease among their patients. In Alipurduar block, out of 377 ailed persons, 84.61 percent of them did not consult the doctor. In that 50.47 percent are males and remaining 49.53 percent are females. In case of Madarihat and Falakata the corresponding percentages are 90.66 and 83.14 respectively. In this regard, it is observed that there exist the gender differences in consultation with a doctor. At this juncture, it is

imperative to understand that due to lack of sufficient money or due to ignorance, they are unable to obtain proper medical attention to get rid of the disease. Thus, this will be possibly the area to focus government initiatives by motivational programme.

Figure-5.23: % Distribution of patients on the basis of the Sex about Doctor Consultation in last one month



5.2.16 Conclusion

The health status of the study area helps us understand the disease profile as well as the disease prevalence rate. The mortality behaviour identifies that half of those who died have received some sort of medical attention before death and nearly one fourth of them are hospitalised before death which means that the cause of death has remained largely unknown. Almost all types of communicable diseases are primarily related to respiratory and gastro-intestinal systems - are highly prevalent in the Western Dooars in varying degrees. The study concluded that children (below 5 years) were three times more vulnerable to respiratory ailments than the rest. The situation like snake bite and poisoning were very common among the rural inhabitants of Western Dooars. The non communicable ailments like Arthritic Pain, Cardio-vascular Problems, Asthma, Diabetes, Skin related Problems, and Vision Problems among the people of more than 40 years' old are very much frequent. The study also shows that both tobacco and alcohol use is very common among the poorer of Western Dooars. The weight and height for age of boys and girls (below 5 years) showing values for all children to be below the median reference at all ages and causes stunting with severe malnutrition. In case of children Acute Respiratory Infection (ARI) and Diarrhoea are very much frequent specially during monsoons. The disease prevalence rate is high among the women in both aggregate and individual level. Nearly half of the sampled mothers, who delivered at least one birth in the last five years, are found low Body Mass Index (BMI) (i.e., BMI < 18.5). This kind of scenario in Western Dooars demanded much more government intervention regarding health and family welfare programme for better future outcome.

Section-III

Health Seeking Behaviour

- **Introduction**
- **Inpatient care**
 - Gender wise hospitalisation rate in last one year
 - Hospitalisation rate according to economic condition in last one year
 - Hospitalisation rate among different age groups in last one year
 - Hospitalisation rate in terms of source of care and reference in last one year
 - Out-of-Pocket expenditure for inpatient care
 - Out-of-Pocket Expenditure on different category
 - Out-of-Pocket expenditure of different economic class and choice of care
- **Outpatient care**
 - Gender and economic status wise distribution of ailed persons in last 30 days
 - Gender and economic status wise distribution of treatment seeking behaviour
 - Outpatient care of ailing persons seeking care in last 30 days
 - Ailments wise Outpatient care from different providers
 - Seeking Outpatient care in terms of location
 - Outpatient care according to socio-economic status to different providers
 - Average distance travel for Outpatient care among different providers
 - Average out-of pocket expenditure for Outpatient care
- **Maternal health care**
 - Place of delivery according to economic status since last 5 year
 - Place of delivery according to birth order in last 5 years
 - Institutional delivery in last 5 years
 - Maternal hazards related with delivery in last 5 years
 - Average distance travelled for institutional delivery
 - Ante-natal care
- **Child health care**
 - Children breastfeeding
 - Age wise vaccination of children below 2 years
 - Ailments among children of age below 5 years in last year
 - Child health care from different providers
- **Conclusion**

SECTION III

Health Seeking Behaviour

5.3 Introduction

The health seeking behaviour of the dwellers in the Western Dooars may be analysed by following four categories. These are inpatient care, outpatient care, maternal care and child health care. In each case, the study attempts to highlight the key issues related to utilisation of and accessibility to the existing health care system.

5.3.1 Inpatient care

Here we discuss the gender wise hospitalisation rate, economic status wise hospitalisation rate, age wise hospitalisation rate, choice of inpatient care, out-of-pocket expenditure among different income class, breakage of out-of-pocket expenditure, and distribution of out-of-pocket expenditure among different care units in aggregate and disaggregate forms.

5.3.1.1 Gender wise hospitalisation rate in last one year

Table-5.33: Gender wise distribution of hospitalisation rate in last one year among dwellers

Gender	Alipurduar-II	Madarihat	Falakata	Total
Male	33 (40.24)	48 (37.21)	31 (39.74)	112 (38.75)
Female	49 (59.76)	81 (62.79)	47 (60.26)	177 (61.25)
Total	82	129	78	289

*Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012*

Table 5.33 analyses the hospitalisation rate in the sample villages of three blocks in terms of sex in last one year for inpatient care. The study shows that out of 4658 sample persons 6.33 percent are hospitalised for inpatient care during a year, which is higher than the state average (2.57 percent, by NSSO in 2004). Among the total hospitalised persons, the study finds that a gender difference is noticeable in the Western Dooars region, because the male hospitalisation rate is 38.75 percent and for female it is 61.25 percent.

5.3.1.2 Hospitalisation rate according to economic condition in last one year

Table 5.34 discuss the hospitalisation rate in the sampled villages in terms of economic conditions between poor, medium and least poor section of the dwellers. The study focuses that poorest section used public hospitals at a higher rate than the least poor. This is evident by the fact that 73 percent are the poor are used publicly provided hospitals, whereas 16.3

percent are the least poor used these facilities. The situation is most crucial for Madarihat block where 72.65 percent are from poor economic conditions use publicly provided facilities.

Table-5.34: Distribution of hospitalisation rate according to economic condition in last one year among the dwellers

Economic Condition	Alipurduar-II	Madarihat	Falakata	Total
Poor	61 (74.39)	93 (72.09)	57 (73.08)	211 (73.01)
Medium	11 (13.41)	21 (16.28)	15 (19.23)	47 (16.26)
Least Poor	10 (12.20)	14 (10.85)	6 (7.69)	30 (10.38)
Total	82	129	78	289

*Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012*

5.3.1.3 Hospitalisation rate among different age groups in last one year

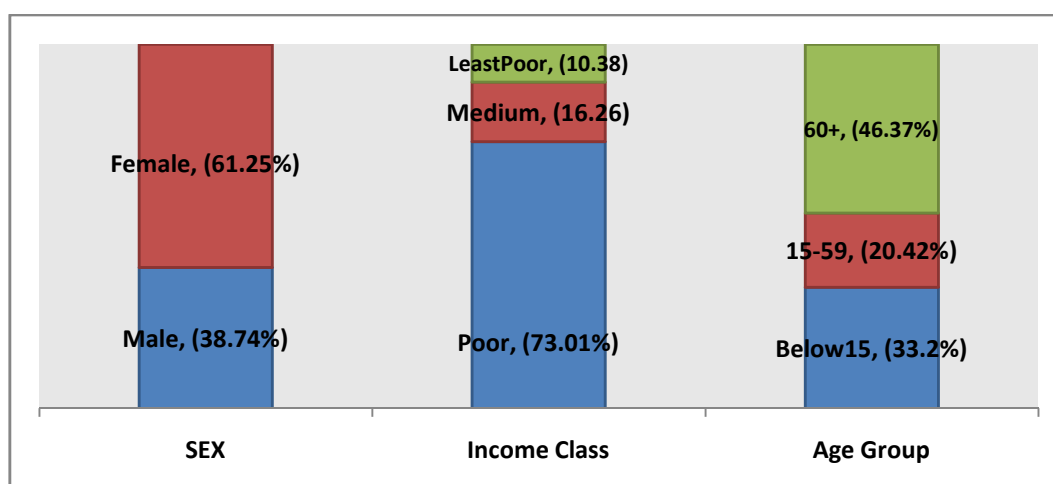
Table-5.35: Distribution of hospitalisation rate among different age groups in last one year

Age Group	Alipurduar-II	Madarihat	Falakata	Total
Below 15	27 (32.93)	43 (33.33)	26 (33.33)	96 (33.22)
15-59	17 (20.73)	27 (20.93)	15 (19.23)	59 (20.42)
60 +	38 (46.34)	59 (45.74)	37 (47.44)	134 (46.37)
Total	82	129	78	289

*Figures in the parentheses indicate their percentage with their respective totals.
Source: Household Survey of the study, 2012*

Table 5.35 explains the hospitalisation rate of the peoples of Western Dooars according to different age groups. The study reveals that hospitalisation rate is proportionately high for the age group above 60 years. Here, we observe the same trend like our national average (155 per thousand populations in those aged ≥ 60 years) in case of hospitalisation among age group over 60 years (46.37 percent). The figure 5.24 shows the hospitalisation rate in the study area according to sex, income class, and age groups discussed in table 5.33, 5.34, and 5.35 respectively.

Figure-5.24: % of Hospitalisation Rate in terms of Sex, Income Class, & Age Group



5.3.1.4 Hospitalisation rate in terms of source of care and reference in last one year

Table-5.36: Distribution of hospitalisation rate in terms of source of care and reference in last one year

Source of Care	Alipurduar-II		Madarihat		Falakata		Total	
	Doctor Ref	Self Ref	Doctor Ref	Self Ref	Doctor Ref	Self Ref	Doctor Ref	Self Ref
Public Hospital	46 (64.79)	4 (36.36)	79 (73.83)	12 (54.55)	42 (60.87)	5 (55.56)	167 (67.61)	21 (50)
Private Hospital	8 (11.27)	3 (27.27)	6 (5.61)	4 (18.18)	10 (14.49)	2 (22.22)	24 (9.72)	9 (21.43)
Outside	17 (23.94)	4 (36.36)	22 (20.56)	6 (27.27)	17 (24.64)	2 (22.22)	56 (22.47)	12 (28.57)
Total	71	11	107	22	69	9	247	42

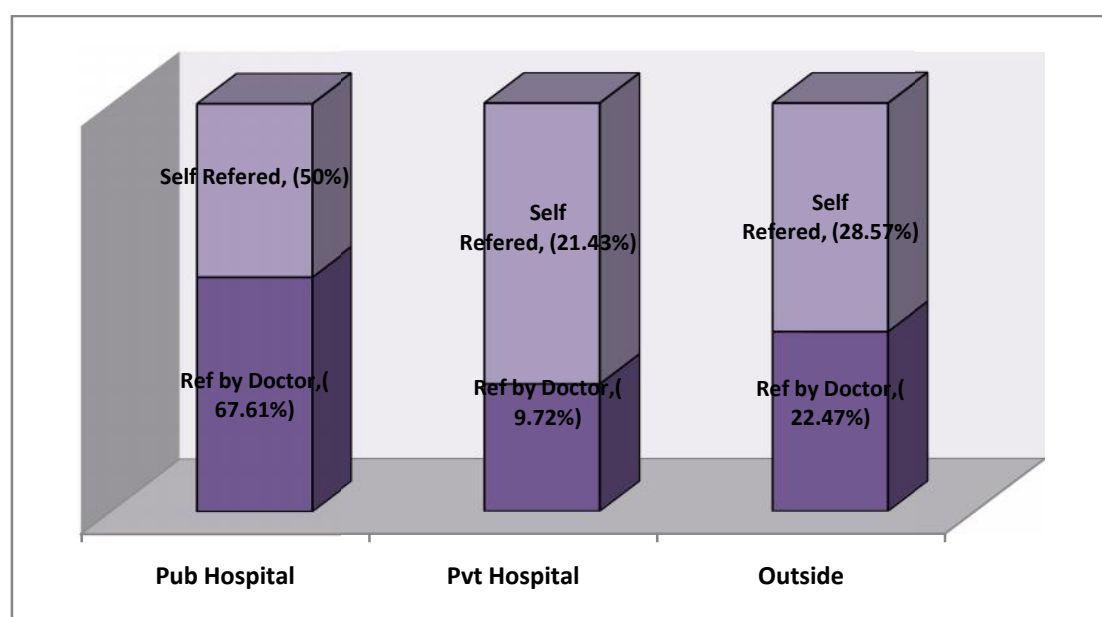
Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.36 brings out the difference classification of the hospitalisation rate in terms of sources of care between public hospital and private hospital. The relatively weaker role of the public sector at the Western Dooars in the backdrop of its overwhelming dominance in rural West Bengal is apparently perplexing but may be explained by the fact that a large number of small private hospitals/ nursing homes have grown up at different gateways of the Western Dooars as the alternative source of inpatient care. As the national highway (NH-31) passes through this region touching almost all trade centre and the north eastern frontier railway also connected this region with the other parts of the country, so improved road connection facilitate the process of health migration. Here, the study found 65.01 percent used publicly provided hospital and comparatively lower percentage (11.42 percent) used privately provided systems. The outside visits for health problems are not negligible in this

region. This type of visits covers the cases of health migration to South India or Kolkata for better treatment according to their beliefs. A little less than one-fourth (23.53 percent) of all inpatients had sought admission in outside. Clearly, there is a trend of health migration which, ironically, is likely to be triggered by improving communication system and deteriorating local public healthcare delivery system. Regarding referral pattern the study shows that most of the hospitalisation cases are referred by the doctors or rural unqualified medical providers.

Figure-5.25: % Distribution of Hospitalisation in terms of source of care



5.3.1.5 Out-of-Pocket expenditure for inpatient care

Table-5.37: Distribution of Out-of-Pocket expenditure for inpatient care on the basis of economic status in last one year

Expenditure	Alipurduar-II			Madarihat			Falakata			Total		
	Poor	Medium	Least Poor	Poor	Medium	Least Poor	Poor	Medium	Least Poor	Poor	Medium	Least Poor
Below Rs 1000	31 (50.82)	2 (18.18)	1 (10.00)	49 (52.69)	6 (28.57)	3 (21.43)	27 (47.37)	10 (66.67)	1 (16.67)	107 (50.71)	18 (38.30)	5 (16.67)
1000-5000	11 (18.03)	2 (18.18)	1 (10.00)	12 (12.90)	7 (33.33)	3 (21.43)	9 (15.79)	2 (13.33)	1 (16.67)	32 (15.17)	11 (23.40)	5 (16.67)
5000-10,000	8 (13.33)	3 (27.27)	2 (20.00)	14 (15.05)	3 (14.29)	3 (21.43)	7 (12.28)	1 (6.67)	1 (16.67)	29 (13.74)	7 (14.89)	6 (20)
Above 10,000	11 (18.03)	4 (36.36)	6 (60.00)	18 (19.35)	5 (23.81)	5 (35.71)	14 (24.56)	2 (13.33)	3 (50)	43 (20.38)	11 (23.40)	14 (46.67)
Total	61	11	10	93	21	14	57	15	6	211	47	30

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.26: % Distribution of Out-of-Pocket Expenditure for Inpatient care on the basis of Economic Status

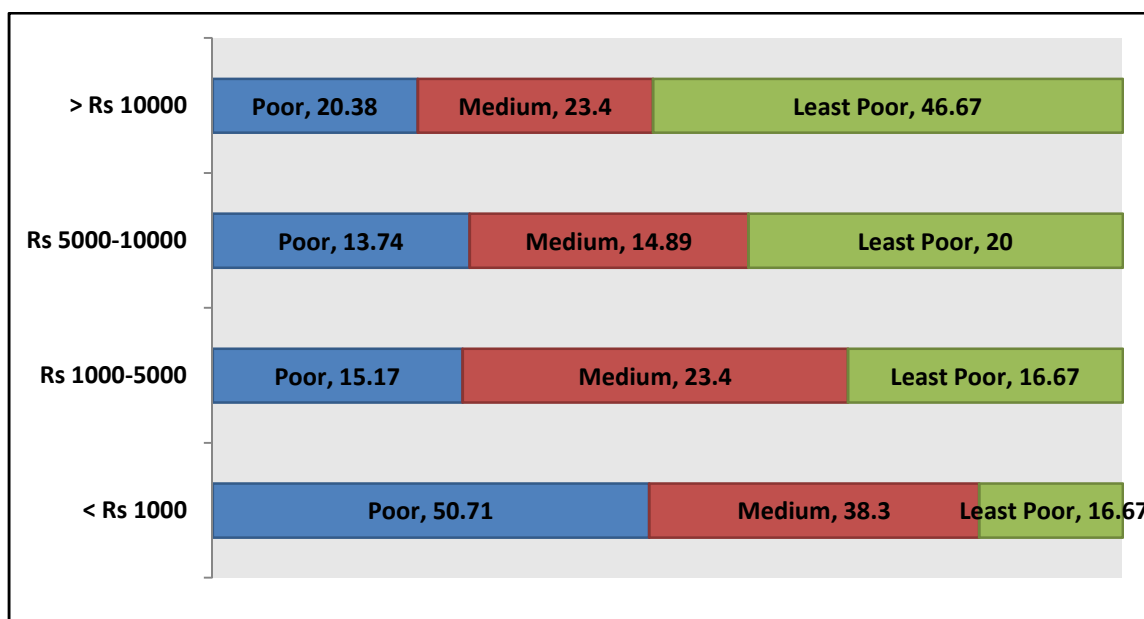


Table 5.37 brings out the classification of the out-of-pocket expenditure of the sample area since last one year for the inpatient care by different income class in hospitals. Increasing rate of hospitalisation indicates that a sizeable number of households are getting exposed to major health shocks which may result in their distribution due to high financial drain associated with it. In this area the study found on average (Median), a household spent about Rs 2166 on hospitalisation inpatient care on medicines, hospital charges, diagnostic tests, and travel when a member got admitted in a public hospital.

5.3.1.6 Out-of-Pocket Expenditure on different category

Table-5.38: Distribution of breakage of Out-of-Pocket Expenditure on different category

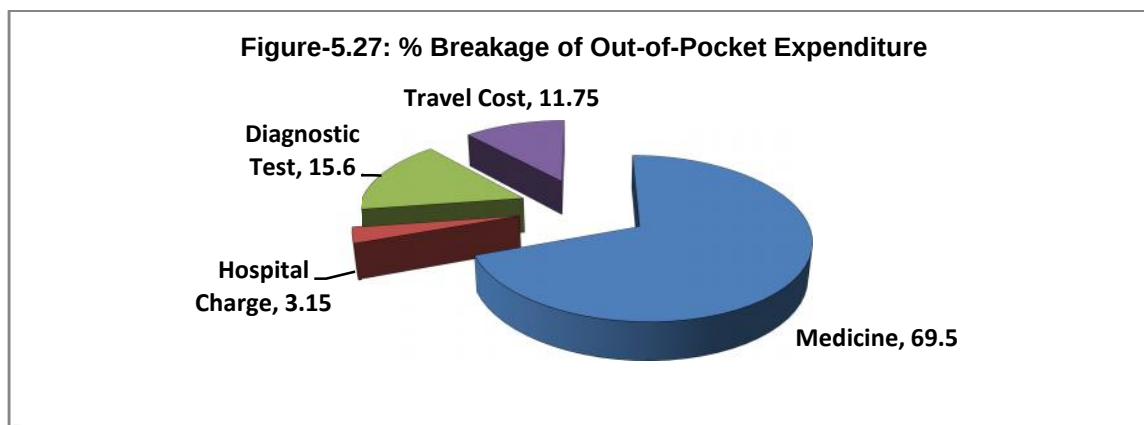
Category	Alipurduar-II	Madarihat	Falakata	Total
Medicine	2156 (70.71)	1933 (69.18)	2037 (68.54)	6126 (69.50)
Hospital Charges	104 (3.41)	65 (2.33)	109 (3.67)	278 (3.15)
Diagnostic Tests	448 (14.69)	469 (16.79)	458 (15.41)	1375 (15.60)
Travel Cost	341 (11.18)	327 (11.70)	368 (12.38)	1036 (11.75)
Total	3049	2794	2972	8815

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.38 shows the distribution of share of costs under different heads of out-of-pocket expenditure in the sampled area. About two-thirds (69.5 Percent) of the out-of-pocket expenses, the study reveals, may be attributed to drugs and medicines. The survey also

indicates that major part of these medicines have been purchased from the private pharmacies. The amount of travel cost is also not negligible (11.75 percent). This may highlight the shortage of inpatient care unit and also the bypass tendency of the local healthcare facilities and overcrowded situation at central level.



5.3.1.7 Out-of-Pocket expenditure of different economic class and choice of care

Table-5.39: Distribution of Out-of-Pocket expenditure of different economic class and choice of care in aggregate form

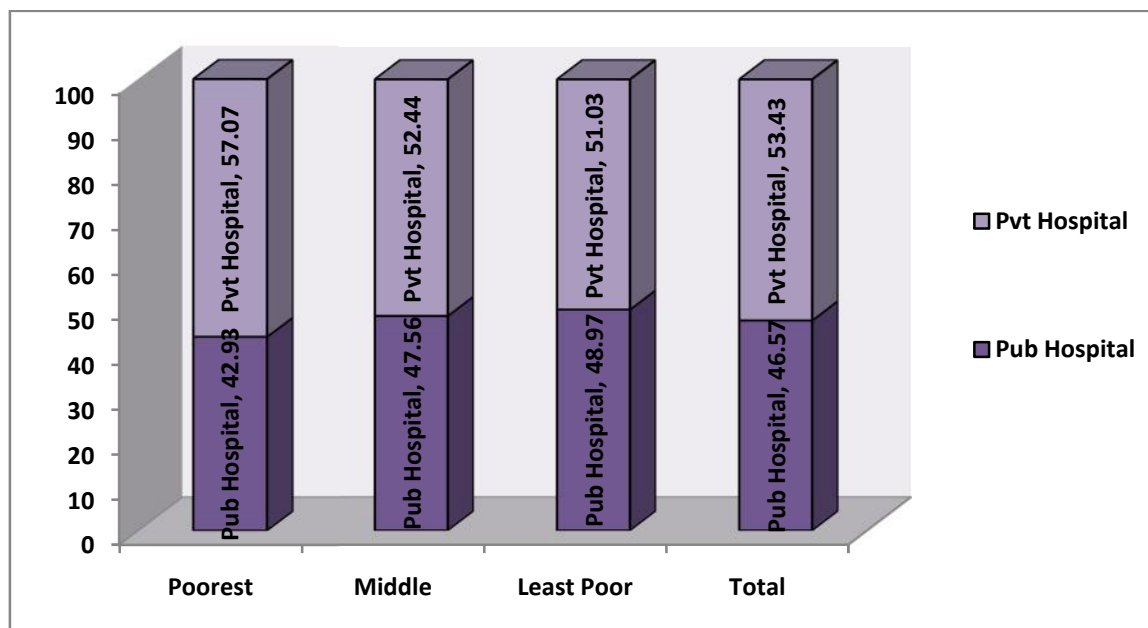
Care Sought	Poorest (Rs)	Middle (RS)	Least Poor (Rs)	Total (Rs)
Public Hospital	2416 (42.93)	2774 (47.56)	3017 (48.97)	8207 (46.57)
Private Hospital	3212 (57.07)	3059 (52.44)	3144 (51.03)	9415 (53.43)
Total	5628	5833	6161	17622

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.39 explains that the classification of out-of-pocket expenditure between different providers on the basis of different income class for inpatient care in aggregate form. The study focuses that in case of spending in public hospitals poorest spends Rs 2416 on average, where as spending by the middle income and least poor group is higher. But surprisingly, regarding distribution of expenditure on private hospitals, the poorest section spends highest compared to the other two. The average expenditure of the poorest income group on private hospitals is Rs 3012, which is very high in compare to the expenditure on public hospitals. This concludes that about the choice of care either the poorest group mislead or they have less faith on public hospitals for inpatient care. The consequence of such financial shock are often catastrophic and forces the household into a perennial poverty trap.

Figure-5.28: % Distribution of Out-of-Pocket Expenditure of different Economic class & Choice of care



5.3.2 Outpatient care

The outpatient visit is very much significant indicator of health seeking behaviour. It establishes the consciousness of the society on one hand and also reflects their conceptions about the health service provisions during ailments. Outpatient care occurs when the ailing person feels that he or she needs some kind of medical attention without admitting in any hospital or clinic and without a over-night stay. In general, most of the dwellers of Western Dooars seek some type of treatment when they are ill.

5.3.2.1 Gender and economic status wise distribution of ailed persons in last 30 days

Table-5.40: Gender and economic status wise distribution of ailed persons in sampled area in last 30 days

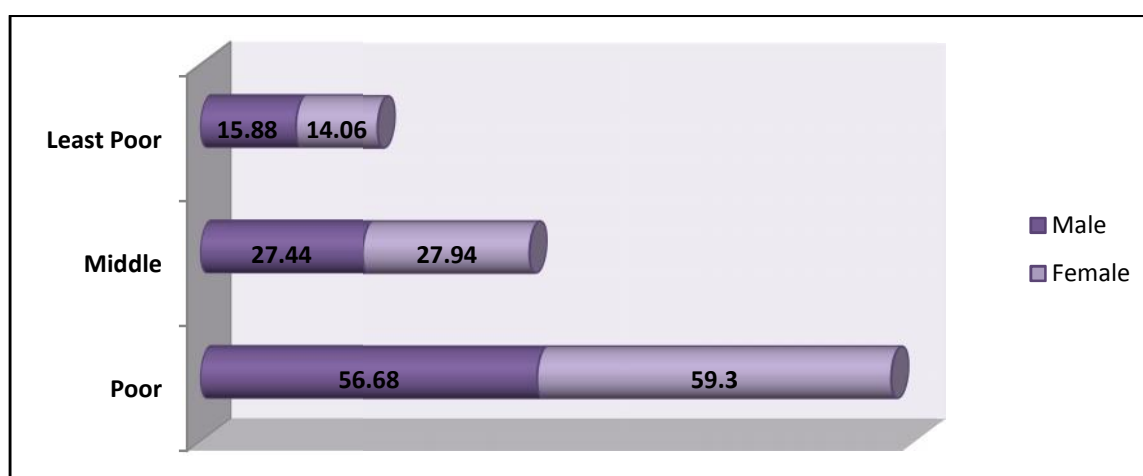
Economic Status	Alipurduar-II			Madarihat			Falakata			Total		
	M	F	T	M	F	T	M	F	T	M	F	T
Poor	37 (56.06)	42 (60.87)	79 (58.52)	64 (57.14)	69 (58.47)	133 (58.18)	56 (56.56)	58 (58.59)	114 (72.73)	157 (56.68)	169 (59.30)	326 (58.01)
Middle	17 (25.76)	19 (27.54)	36 (26.67)	31 (27.68)	33 (28.22)	64 (27.45)	28 (28.28)	29 (29.29)	57 (28.79)	76 (27.44)	81 (28.42)	157 (27.94)
Least Poor	12 (18.18)	8 (11.59)	20 (14.81)	17 (15.18)	15 (12.82)	32 (13.47)	15 (15.15)	12 (12.12)	27 (13.64)	44 (15.88)	35 (12.28)	79 (14.06)
Total	66	69	135	112	117	229	99	99	198	277	285	562

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.40 brings out the classification of ailing persons in the sample area in terms of gender and economic status. This is evident from the result that around 12.06 percent of the persons reported ailing anytime during the reference period (last 30 days). Among the poorest income class, the females have suffered by ailments are quite high compared the male counterparts (Male is 48.16 percent and female is 51.84 percent). The figure 5.29 depicts that both within the poor income group the distribution of ailments were much higher in compared to others under both the male and female category. The distribution of ailments among poor female is more than double than medium income group and more than four times that the least poor income group.

Figure-5.29: % Distribution Ailed Persons on the basis of Sex & Economic Status



5.3.2.2 Gender and economic status wise distribution of treatment seeking behaviour

Table-5.41: Gender and economic status wise distribution of treatment seeking of the ailed persons in last 30 days

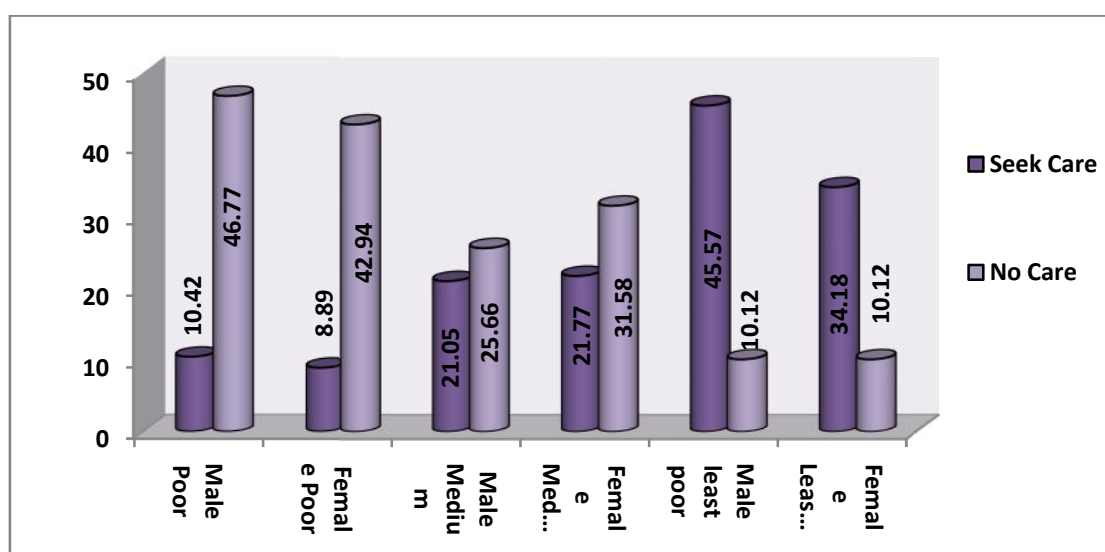
Gender		Alipurduar-II		Madarihat		Falakata		Total	
		Seek Care	No Care	Seek Care	No Care	Seek Care	No Care	Seek Care	No Care
Male	Poor	8 (10.12)	29 (36.71)	12 (9.02)	52 (39.05)	14 (12.28)	42 (36.84)	34 (10.42)	123 (46.77)
	Medium	8 (25.81)	4 (12.90)	13 (20.31)	18 (28.13)	11 (19.24)	17 (29.82)	32 (21.05)	39 (25.66)
	Least Poor	10 (50.00)	2 (10.00)	14 (43.75)	3 (9.38)	12 (44.44)	3 (11.11)	36 (45.57)	8 (10.12)
Female	Poor	6 (7.60)	36 (45.57)	11 (8.27)	58 (43.61)	12 (10.53)	46 (40.35)	29 (8.89)	140 (42.94)
	Medium	7 (22.58)	12 (38.71)	13 (20.31)	20 (31.25)	13 (22.81)	16 (28.07)	33 (21.71)	48 (31.58)
	Least Poor	7 (35.00)	1 (5.00)	11 (34.38)	4 (12.50)	9 (33.33)	3 (11.11)	27 (34.18)	8 (10.12)
Total	Poor	14 (17.72)	65 (82.28)	23 (17.29)	110 (82.71)	26 (22.81)	88 (77.19)	63 (19.33)	263 (80.67)
	Medium	15 (48.39)	16 (51.61)	26 (40.63)	38 (59.37)	24 (42.11)	33 (57.89)	65 (42.76)	87 (57.24)
	Least Poor	17 (85.00)	3 (15.00)	25 (78.13)	7 (21.87)	21 (77.78)	6 (22.22)	63 (79.75)	16 (20.25)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.41 shows that out of 562 ailed persons 34 percent are being treated by any qualified or unqualified providers. Thus 66 percent remains untreated due to lack of money, the most important barrier for healthcare seeking. As expected, the barrier is more prohibitive for females. The study reveals that 68.77 percent of the females from poorest income groups remain untreated due to economic reason or their low social status. The study also adds that around 80.67 percent of the persons belonging to the poorest group cannot access outpatient services for economic reasons the corresponding figure for the least poor group is 20.25 percent.

Figure-5.30: % Distribution of Treatment Seeking on Gender & Economic Status



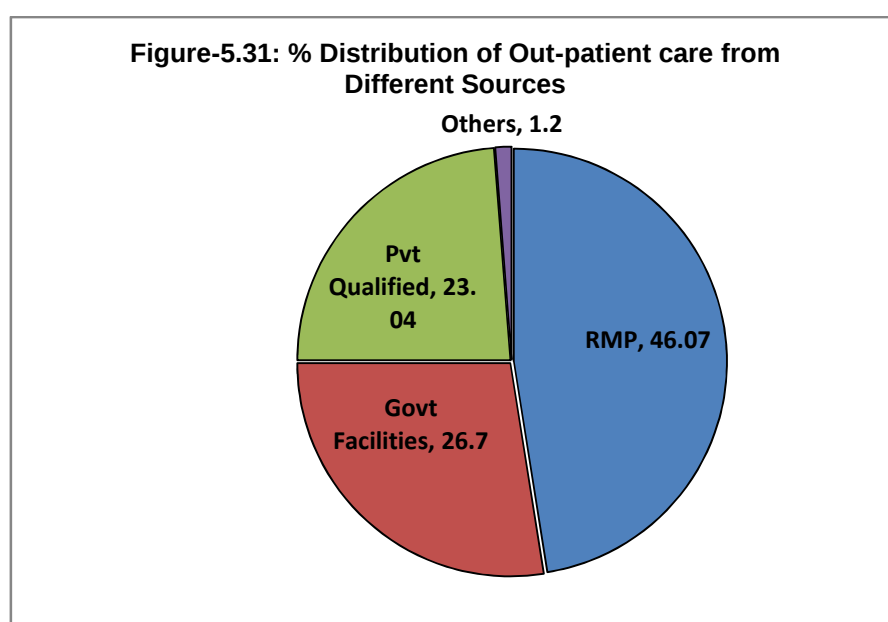
5.3.2.3 Outpatient care of ailing persons seeking care in last 30 days

Table-5.42: Distribution of Outpatient care of ailing persons seeking care, by source of care in last 30 days

Source	Alipuduar-II	Madarihat	Falakata	Total
RMP	20 (43.48)	38 (51.35)	30 (42.25)	88 (46.07)
Govt Facilities	12 (26.09)	20 (27.03)	19 (26.76)	51 (26.70)
Pvt Qualified	11 (23.91)	14 (18.92)	19 (26.76)	44 (23.04)
NGO/Charity	3 (6.52)	2 (2.70)	3 (4.23)	8 (4.19)
Total	46	74	71	191

*Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012*

Where from do ailing people seek treatment for minor ailments? The results unequivocally confirm absolute dominance of Rural Medical Practitioners (RMP), the private healthcare providers who practice modern medicines without any formal training and are identified as "Unqualified" / "Less than fully qualified" or simply "Quacks". Table 5.42 brings out the classification of ailing persons seeking care from different providers for outpatient care in last 30 days. The study shows that 46.07 percent of the outpatient clients sought treatment from RMPs while government-provided facilities are visited by only 26.7 percent. The study states that dependence on RMP is greater among the people from the block Madarihat and Falakata compared to Alipurduar-II. From this we can get an idea of huge market-share of RMPs in rural Western Dooars.



5.3.2.4 Ailments wise Outpatient care from different providers

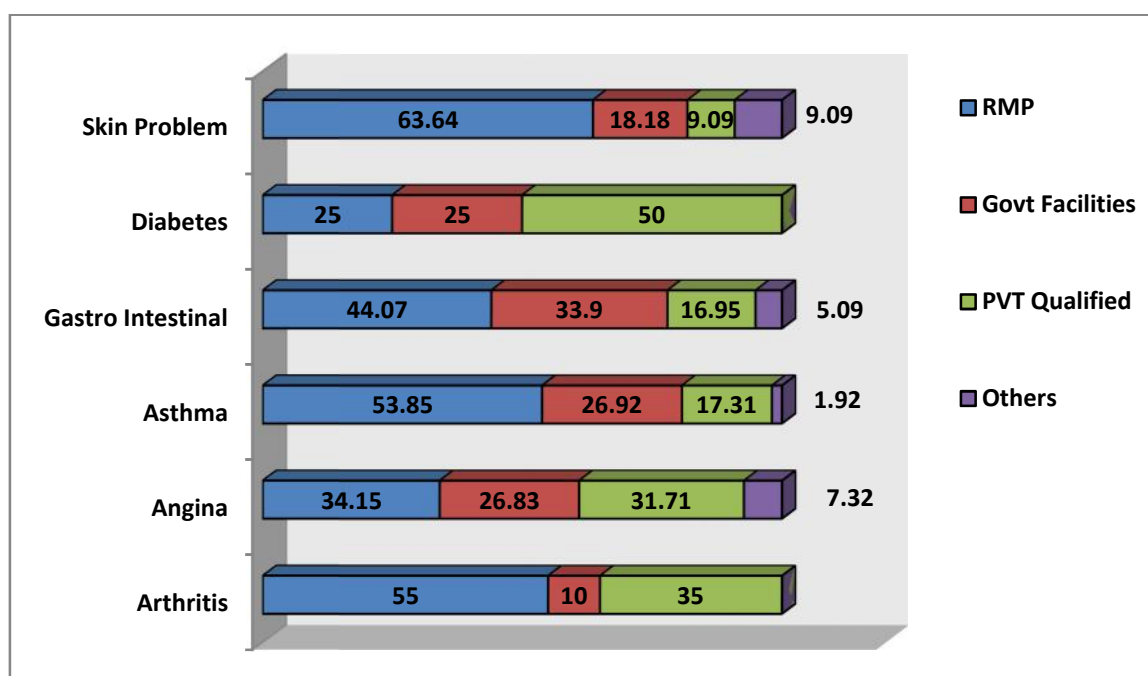
Table-5.43: Distribution of Ailments wise Outpatient care between different providers in last 30 days

Source	Arthritis	Angina	Asthma	Gastro-Intestinal	Diabetes	Skin Problem	Total
RMP	11 (55.00)	14 (34.15)	28 (53.85)	26 (44.07)	2 (25.00)	7 (63.64)	88 (46.07)
Govt	2 (10.00)	11 (26.83)	14 (26.92)	20 (33.90)	2 (25.00)	2 (18.18)	51 (26.70)
PVT	7 (35.00)	13 (31.71)	9 (17.31)	10 (16.95)	4 (50.00)	1 (9.09)	44 (23.04)
Other	0 (0.00)	3 (7.32)	1 (1.92)	3 (5.09)	0 (0.00)	1 (9.09)	8 (4.19)
Total	20	41	52	59	8	11	191

*Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012*

Table 5.43 depicts the distribution of different ailments and the seeking behaviour for care from different sources. The study shows that maximum number of RMP visit occurs in case of Arthritis (12.5 percent), Angina or symptom of CHD (15.91 percent), Asthma (31.82 percent), and Gastro-Intestinal Problem (29.55 percent). The care seeking from private qualified is also not negligible for the ailments like Angina (29.55 percent) and Gastro-Intestinal (22.73 percent). The total care seeking from government provided healthcare is 26.7 percent which is less than one eighth of the total care seeking during ailments. Almost half of the Asthma patients are treated by RMPs and relatively lower percentage for Skin problem and Diabetes patients due to the need for specialised tests involved in their detection.

Figure-5.32: % Distribution of Ailments wise Outpatient Care from different Source



5.3.2.5 Seeking Outpatient care in terms of location

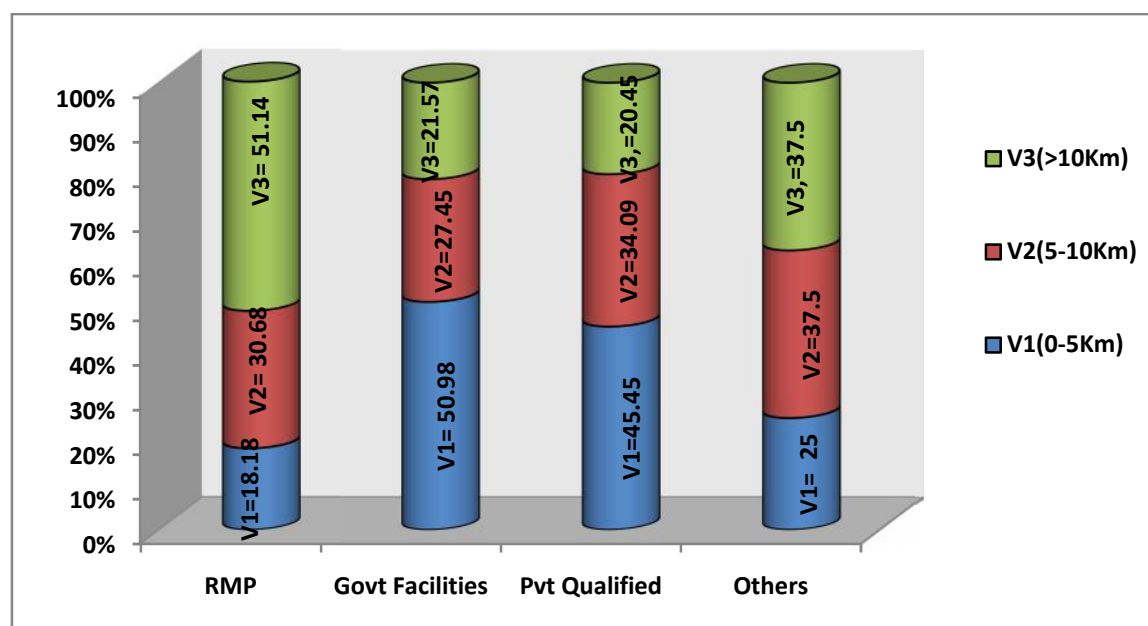
Table-5.44: Distribution of seeking Outpatient care in terms of location

Source	0-5 Km	5-10 Km	> 10 Km	Total
RMP	16	27	45	88
Govt Facilities	26	14	11	51
Pvt Facilities	20	15	9	44
NGO/Charity	2	3	3	8
Total	64	59	68	191

Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012

Table 5.44 brings out the classification about the choice of care between different providers for outpatient care according to their location. In the methodology part, our choices of sample villages can be done by three steps. First one is between the 0-5 Km radius, second one is between 5-10Km radius and third one is the remotest (more than 10 Km radius) from the block headquarter. In this table, the study discusses the pattern of choice of these village units for emergency outpatient care. The information focuses the general facts that RMP visit is very common for the farthest (remote) villages during outpatient care. Out of 88 persons who visited RMP for outpatient care shows that 16 persons from closest village, 45 persons for farthest villages. This establishes the answer of the question why do people prefer RMPs despite their questionable quality of service. The most obvious answer is physical proximity of RMP services. Figure 5.33 describes the distribution of seeking outpatient care from different sources on the basis of location of the villages. The villages in the figure 5.33 are identified as V1, V2, and V3 in terms of location 0-5 Km, 5-10 Km, and more than 10 Km from the block head quarter respectively.

Figure-5.33: % Distribution of seeking Outpatient care in terms of Location



5.3.2.6 Outpatient care according to socio-economic status to different providers

Table 5.45 depicts the classification of outpatient care seeking behaviour among different socio-economic classes between different providers. The results identify that 61.36 percent of the ailing persons from poorest income group visit RMP for outpatient care, whereas corresponding figure for the seeking care from government facilities is 41.18 percent. Conversely the affluent visit to the private qualified is the highest (47.73 percent). This identifies that market price of RMPs is significantly lower and affordable for the poorest

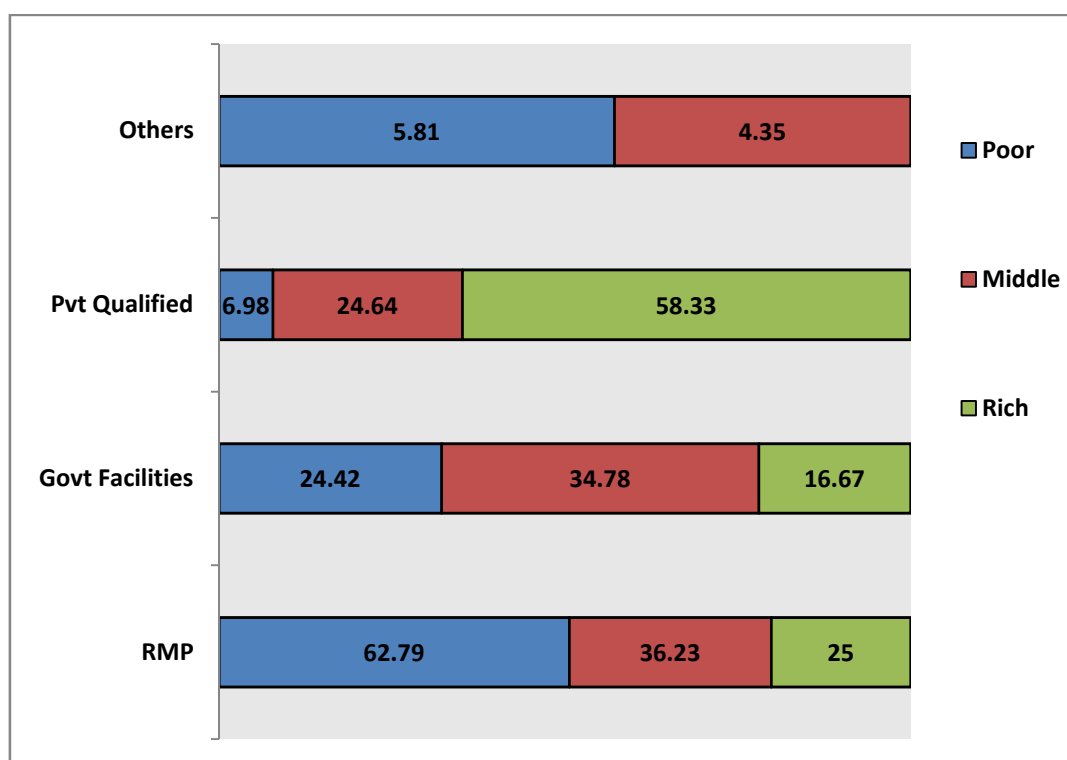
section. This is another cause to frequent visits to RMPs beside the physical proximity of their availability.

Table-5.45: % of Providers based Outpatient care in terms of socio-economic status

Source	Poor	Middle	Rich	Total
RMP	54 (62.79)	25 (36.23)	9 (25.00)	88 (46.07)
Govt Facilities	21 (24.42)	24 (34.78)	6 (16.67)	51 (26.70)
Pvt Qualified	6 (6.98)	17 (24.64)	21 (58.33)	44 (23.04)
NGO/Charity	5 (5.81)	3 (4.35)	0 (0.00)	8 (4.19)
Total	86	69	36	191

*Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012*

Figure-5.34: % Distribution of Outpatient care in terms of Economic Status



5.3.2.7 Average distance travel for Outpatient care among different providers

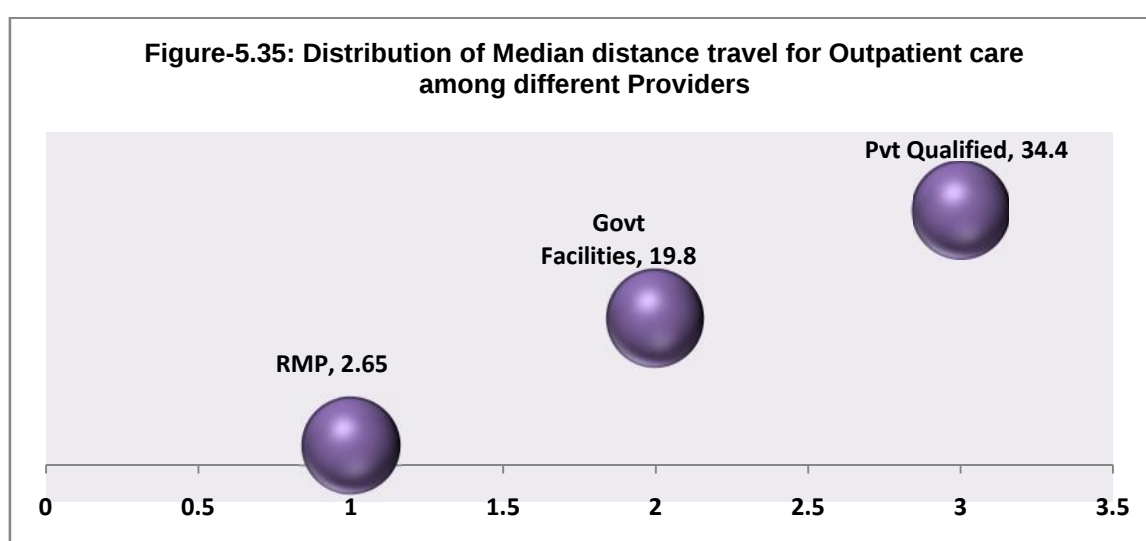
Table 5.46 and figure 5.35 shows the average (median) distance travelled for seeking outpatient care from different providers during the ailments. The study highlighted that on average (median) a RMP client has to travel less than 1 Km to reach the clinic, while those, who have availed services of public facility, have travelled about 6.6 Km.

Table-5.46: Distribution of average (Median) distance travel for Outpatient care among different providers

Source	Alipurduar-II (Km)	Madarihat (Km)	Falakata (Km)	Total (Km)
RMP	0.88	1.21	0.56	2.65
Govt Facilities	5.4	7.3	7.1	19.8
Pvt Qualified	10.4	14	10	34.4
NGO/Charity	NA	NA	NA	NA
Total	16.68	22.51	17.66	56.85

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012



5.3.2.8 Average out-of pocket expenditure (Rs) for Outpatient care

Table 5.47 identifies the average (median) out-of-pocket expenditure for seeking outpatient care from different providers during their ailments episode. The median out of pocket expenditure shows that it is minimum for the RMPs (Rs 35) and highest for the private qualified providers (Rs 145). The table signifies the fact that lower market price might be the important determinants of people's choice of RMPs. However, there are also several other crucial factors for the choices of RMPs. For example, a public facility, even if it is closely located to a village, may be bypassed due to non-availability of a regular doctor. Consequently, the patients have to remain prepared to pay upfront for the medicines they would purchase from private pharmacies. Moreover, the prescribed medicines, which are purchased from pharmacies, may not always be the cheapest brand. These deficiencies imply a high transaction cost associated with the provisions of services at the public health facilities. RMPs flourish by significantly reducing this transaction cost. They are usually always available, closely located, and sell medicines as a part of their service often on credit.

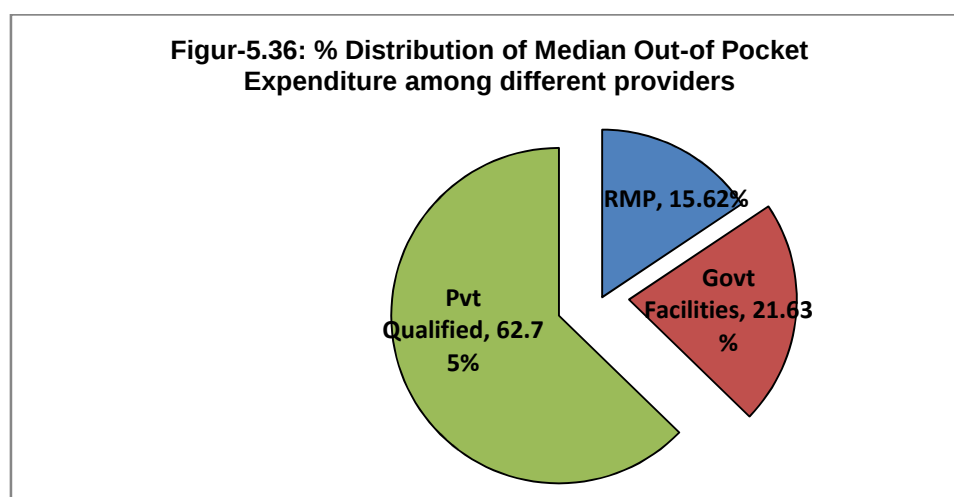
Clearly, their operation manifests the economic phenomenon that a market, when it fails to control transaction costs, begets a parallel but low-cost alternative. Beside low transaction costs, the other important factor behind the spread of RMPs is people's trust which often manifests in people's long memory of favourable results produced by RMPs (and short memory of undesired results).

Table-5.47: Distribution of average (Median) out-of pocket expenditure (Rs) for Outpatient care among different providers

Source	Alipurduar-II (Rs)	Madarihat (Rs)	Falakata (Rs)	Total (Rs)
RMP	32 (14.29)	42 (17.28)	35 (15.16)	109 (15.62)
Govt Facilities	54 (24.11)	46 (18.93)	51 (22.08)	151 (21.63)
Pvt Qualified	138 (61.61)	155 (63.79)	145 (62.77)	438 (62.75)
NGO/Charity	NA	NA	NA	NA
Total	224	243	231	698

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012



5.3.3 Maternal health care

Increasing institutional delivery is one of the top priorities to the policy makers of the state. If we consider the NFHS data from period 1995-96 (NFHS-2) to 2005-06 (NFHS-3), a little progress shows only 3 percent increase (from 40.1 during NFHS-2 to 43.1 percent at NFHS-3) in case of institutional delivery. The more recent evidence from DLHS (2007-08) however recorded a better progress of the state in this direction (49.2 percent overall, 43.2 percent in

rural areas). The evidence from Western Dooars, however, paints a gloomy picture in this respect.

5.3.3.1 Place of delivery according to economic status since last 5 years

Table-5.48: Distribution of Place of delivery according to economic status among the sampled mothers since last 5 years

Place	Alipurduar-II			Madarihat			Falakata			Total		
	Poor	Middle	Rich	Poor	Middle	Rich	Poor	Middle	Rich	Poor	Middle	Rich
Home	91 (69.47)	37 (37.37)	1 (9.09)	98 (71.02)	16 (24.62)	5 (17.86)	104 (66.67)	32 (40.51)	6 (19.35)	293 (68.94)	85 (34.98)	12 (17.14)
Pub Hospital	28 (21.37)	45 (45.46)	4 (36.36)	31 (22.46)	38 (58.46)	12 (42.86)	42 (26.92)	42 (53.17)	11 (35.49)	101 (23.77)	125 (51.44)	27 (38.57)
Pvt Hospital	12 (9.16)	17 (17.17)	6 (54.55)	9 (6.52)	11 (16.92)	11 (39.28)	10 (6.41)	5 (6.33)	14 (45.16)	31 (7.29)	33 (13.58)	31 (44.29)
Total	131	99	11	138	65	28	156	79	31	425	243	70

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.37: % Distribution of Place of Delivery in terms of Economic Status

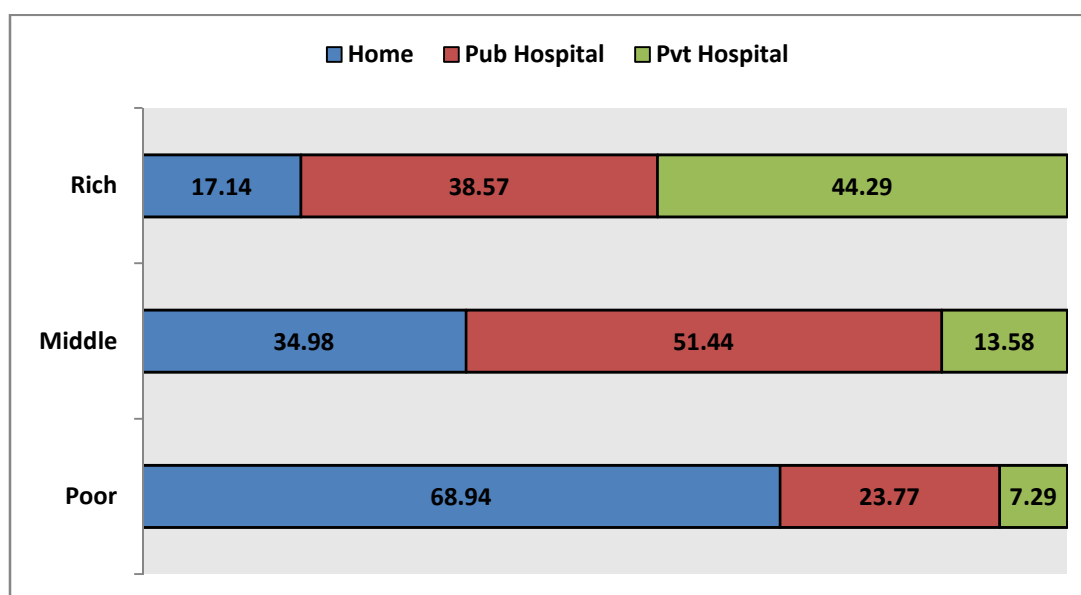


Table 5.48 shows the classification of place of delivery of the sample areas on the basis of economic status. Out of sample 738 eligible mothers, who delivered at least one child in last five years, only 34.28 percent have delivered their last child at public or private institutions. In case of households having more than one eligible mother, the respondent mother is selected following *Kish table* (A procedure adopted by the NFHS). This is comparable to the rural areas of the most backward districts in West Bengal such as Uttar Dinajpur (23.6 percent) or Malda (26.4 percent). The study focuses a link between poverty and institutional care. Here, one out of four women from poor families utilizes institutional care for birth

delivery, whereas from the rich families 82.86 percent uses institutional delivery for care. The number of home deliveries reduces as the income level increases and this is supported by the results of survey (poor 68.94 percent, middle income group 34.98 percent and rich 17.14 percent prefers home delivery). Quality of Care judged by the price occurs in case of affluent, as the number of institutional delivery for the rich is highest in private nursing homes (44.29 percent). In aggregate form, after home delivery most of the deliveries (about 34.28 percent of all institutional deliveries) is conducted at government provided hospitals.

5.3.3.2 Place of delivery according to birth order in last 5 years

Table-5.49: Distribution of Place of delivery according to birth order among the sampled mothers in last 5 years

Place	Alipirduar-II			Madarihat			Falakata			Total		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Home	11 (15.28)	36 (57.14)	82 (81.18)	13 (17.33)	29 (45.31)	77 (83.70)	21 (23.08)	47 (54.65)	74 (83.15)	45 (18.91)	112 (52.58)	233 (82.62)
Pub Hospital	38 (62.30)	19 (30.16)	15 (14.85)	43 (57.33)	26 (40.63)	12 (13.04)	52 (57.14)	31 (36.04)	12 (13.48)	133 (55.88)	76 (35.68)	39 (13.83)
Pvt Hospital	23 (37.71)	8 (12.70)	4 (3.96)	19 (25.33)	9 (14.06)	3 (3.26)	18 (19.78)	8 (9.30)	3 (3.37)	60 (25.21)	25 (11.74)	10 (3.55)
Total	61	63	101	75	64	92	91	86	89	238	213	282

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.38: % Distribution of Place of Delivery according to Birth Order

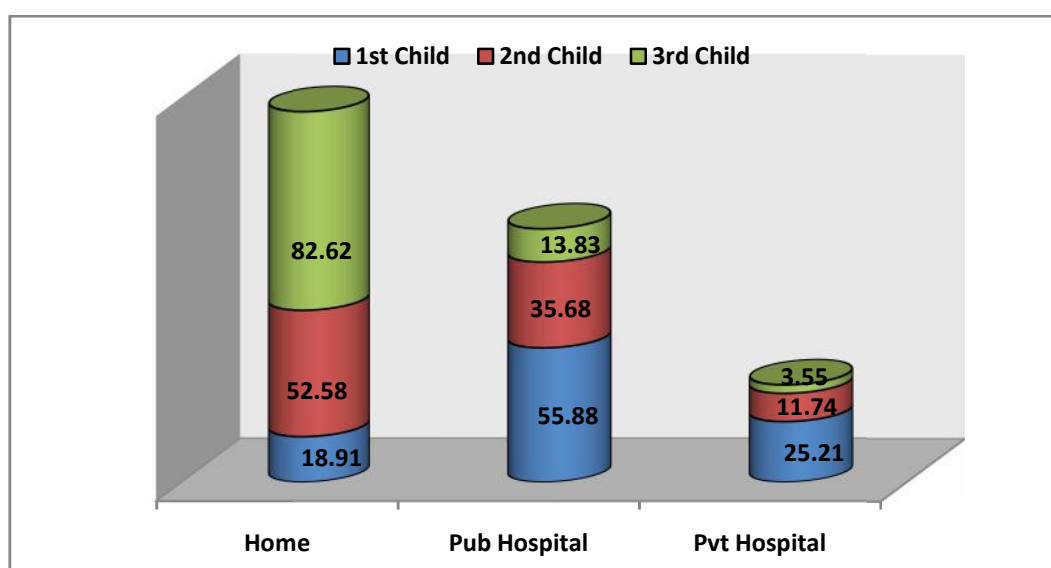


Table 5.49 focuses the relation between place of delivery and the birth order in last 5 years among the sample households. The study identifies that the first child of the mother is more

likely to be delivered at a hospital than is the second or third child. The study shows that number of home delivery for the first child is 11.54 percent, whereas for the third child it is highest (59.74 percent). In all the blocks the tendency for place of delivery according to birth order is the same.

5.3.3.3 Institutional delivery in last 5 years

Table-5.50: Distribution of Institutional delivery process (Normal or Caesarean) among the sampled mothers in last 5 years

Place	Alipurduar-II		Madarihat		Falakata		Total	
	Normal	Caesarean	Normal	Caesarean	Normal	Caesarean	Normal	Caesarean
Pub Hospital	61 (85.92)	11 (30.56)	74 (93.67)	7 (21.21)	86 (88.66)	9 (33.33)	221 (89.47)	27 (28.12)
Pvt Hospital	10 (14.08)	25 (69.44)	5 (6.33)	26 (78.79)	11 (11.34)	18 (66.67)	26 (10.53)	69 (71.88)
Total	71	36	79	33	97	27	247	96

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.50 highlights the distribution of Institutional delivery occurs at different providers in terms of delivery process i.e., either by normal delivery or by caesarean section process. The incidence of caesarean section is exorbitantly high among the users of private hospitals. In case of private hospitals 72.63 percent uses caesarean section, whereas the corresponding figure for public hospital it is quite low (27.37 percent). This may be either or both of the following possibilities: (1) the complicated pregnancy cases self-selected private hospitals pushing up the rate of caesarean section to a naturally high level, and (2) there may be high degree of supplier induced demand for caesarean section (i.e., the users were recommended for caesarean even if it is not necessary) due to excessive greed of the private providers. Due to data constraints it is however not possible to measure the contribution of these causes in the present case.

5.3.3.4 Maternal hazards related with delivery in last 5 years

Table 5.51 describes the classification of post delivery problems of eligible mothers into three categories like death (during or after delivery), any kind of disability initiated from the post delivery period, and lastly no problems at all. The study shows that in aggregate form death rate is high in case of home delivery (4.36 percent) either by infection or due to mishandling with no knowledge of maternity care. In case of deliveries in public hospitals, 59

mothers (out of 248) are suffered by some kind of disability due to negligence in post delivery care. The scenario of post delivery disability and death is not negligible in case of private nursing homes.

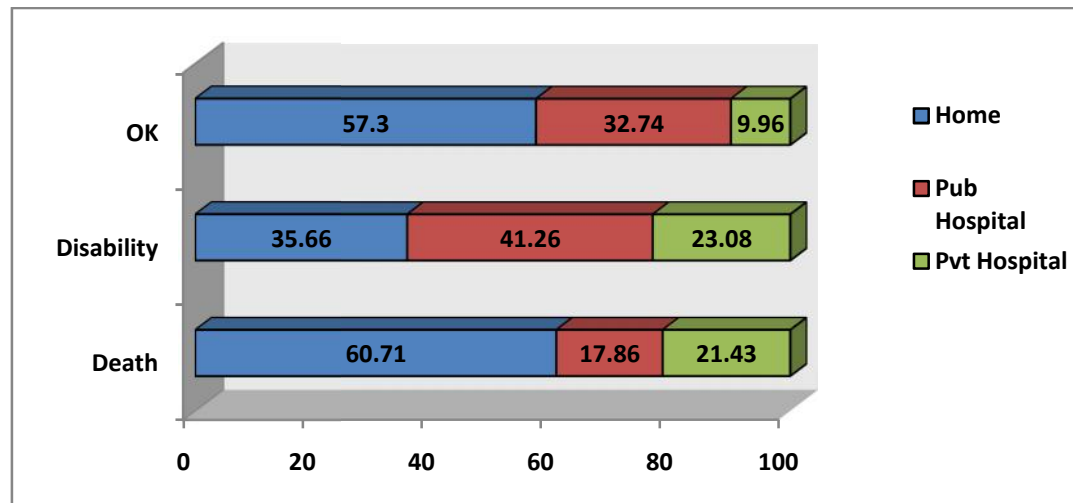
Table-5.51: Distribution of maternal hazards related with delivery among the sampled mothers in last 5 years

Place	Alipurduar-II			Madarihat			Falakata			Total		
	Death	Disability	O K	Death	Disability	O K	Death	Disability	O K	Death	Disability	O K
Home	4 (66.67)	13 (29.55)	112 (60.22)	7 (58.33)	22 (36.67)	90 (56.60)	6 (60.00)	16 (41.03)	120 (55.30)	17 (60.71)	51 (35.66)	322 (57.30)
Pub Hospital	0 (0.00)	18 (40.91)	54 (29.03)	2 (16.67)	27 (45.00)	52 (32.70)	3 (30.00)	14 (35.89)	78 (35.95)	5 (17.86)	59 (41.26)	184 (32.74)
Pvt Hospital	2 (33.33)	13 (29.55)	20 (10.75)	3 (25.00)	11 (18.33)	17 (10.69)	1 (10.00)	9 (23.08)	19 (8.76)	6 (21.43)	33 (23.08)	56 (9.96)
Total	6	44	186	12	60	159	10	39	217	28	143	562

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.39: % Distribution of Maternal Hazards during Delivery



5.3.3.5 Average distance travelled for institutional delivery

Table 5.52 explains the distribution of distance travel by the eligible mothers during their institutional delivery in the sampled area. Geographical adversities are an important constraint which is embedded within economic and social barriers and is often difficult to assess from quantitative data. The table shows that a woman, who delivered birth at home, would have to travel 6.6 Km on average, to deliver birth at the nearest public hospital. However, a short distance in some pockets may mean quite fails to reflect the degree of

inaccessibility as travelling a short distance in some pockets may mean quite a hardship due to broken transportation linkages or unavailable transportation when it most required. A virtual journey from a remote village to the nearest BPHC in Falakata block can be represented as follows. A woman living at Ethelbari Tea Estate village in Falakata block would require to visit Falakata Rural Hospital (RH) (Hospital at the block headquarter) or at Birpapara BPHC (located in Madarihat block) or at Dhupguri BPHC (located in Dhupguri block) if she wants to deliver birth at a hospital as well as if she is not working in the tea garden. All three are more or less same distance from the hospital. But the location of the village is in a pocket which takes 3-3.5 Km distance from the metal road named "Khagen Ghat Road". The shortest route to reach the RH/BPHC would require her to walk or travel by van rickshaw a distance of 3 Km, and then again ride a bus or auto to cross a distance 20 Km. In addition to hardship of cross-transportation, the whole journey would take about 1.5 to 2 hours. If she decides to avoid break-journeys and to travel by a single mode, she would take the private car (from Ethelbari Tea Estate village to crossing of Khagen Ghat road and from there to RH/BPHC) and reach the destination after a journey of 1 to 1.5 hours. During our study we found private car is more or less unavailable and during their general ailments they visit the health providers by feet which may be more serious during monsoons. A more viable alternative, in this case, would be to take a risk of delivering birth at home, or to helplessly wait for the morning if the problem starts at the night.

Table-5.52: Distribution of average distance travelled for institutional delivery by the sampled mothers

Place	Alipurduar-II (Km)	Madarihat (Km)	Falakata (Km)	Total (Km)
Pub Hospital	5.4	7.3	7.1	19.8
Pvt Hospital	10.4	14	10	34.4
Total	15.8	21.3	17.1	54.2

Source: Household Survey of the study, 2012

5.3.3.6 Ante-natal care

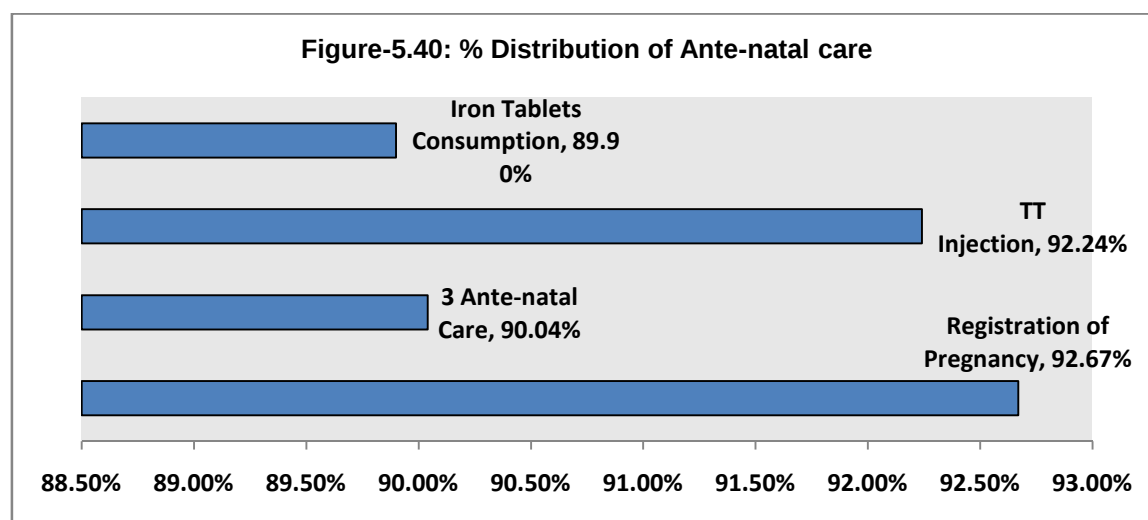
Table 5.53 describes the distribution pattern of ante-natal care in sample areas. The household data, however, shows a commendable achievement in pre-natal care. Almost all mothers interviewed during the survey, registered their pregnancies with a health worker (92.67 percent), received at least one ante-natal care (90.04 percent), received at least one TT injection (92.24 percent), and consumed iron tablets during pregnancies (89.9 percent). But in many earlier studies it is very common that this kind of information, regarding ante-natal care is biased by the interviewee and thus it will be checked by another round survey from providers (Done in the next chapter).

Table-5.53: Distribution of Ante-natal care in sampled mothers

Care Sought	Alipurduar-II	Madarihat	Falakata	Total
Registration of Pregnancy	222 (94.06)	210 (90.91)	248 (93.23)	680 (92.67)
Ante-natal care	218 (92.37)	203 (87.88)	239 (89.85)	660 (90.04)
TT injection	224 (94.91)	206 (89.18)	246 (92.48)	676 (92.24)
Iron Tablets Consumption	227 (96.19)	201 (87.01)	231 (86.84)	659 (89.9)
Total birth in last 5 year	236	231	266	733 (100)

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012



5.3.4 Child health care

Regarding child health care Western Dooars depicts a mixed progress compared to West Bengal. The picture of child health can be analysed in terms of breastfeeding behaviour, vaccination occurrence, and ailments behaviour.

5.3.4.1 Children breastfeeding

Table 5.54 describes the scenario of breastfeeding behaviour of children under 3 years. Mothers in the Western Dooars are a bit ahead of the state in following the correct timing of breastfeeding 47.61 percent of mothers started breastfeeding within one hour of child's birth compared to 41percent in rural West Bengal (DLHS-3, 2007/08). But the dwellers of Western Dooars are lagging behind in the desirable practice like children aged 0-5 months exclusively breastfed. The study shows 55.66 percent of mothers of the children aged 0-5 months exclusively breastfed their children compared to 45 percent in West Bengal (DLHS-3, 2007/08).

Table-5.54: Distribution of children breastfeeding in sampled households

No of Children	Alipurduar-II	Madarihat	Falakata	Total
Age < 3 Yrs brestfed within 1 HR of birth	106 (44.92)	117 (50.65)	126 (47.37)	349 (47.61)
Age 0-5 exclusively breastfed	124 (52.54)	136 (58.87)	148 (55.64)	408 (55.66)
Total	236	231	266	733

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

5.3.4.2 Age wise vaccination of children below 2 years

Table-5.55: Age wise distribution of Vaccination of children below 2 years in the sampled households

No of Child	Alipirduar-II	Madarihat	Falakata	Total
0-5 months	81 (30.80)	89 (33.84)	93 (35.36)	263
6-12 months	75 (32.89)	69 (30.26)	84 (36.84)	228
13-23 months	79 (32.65)	74 (30.58)	89 (36.78)	242
Total no of Child Covered	235	232	266	733

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Table 5.55 shows the classification of vaccination of children below 2 years in the study area. The data indicate that 11.45 percent of children below 5 months receive no vaccination. The sample data also indicate that as the children grow the percentage of vaccination reduces. In the age group of 6-12 months, out of 297 surveyed children 228 are found taking proper vaccination, which reduces for the age group 13-23 months (out of 297 surveyed children 165 are found take proper vaccination). In aggregate form 29.96 percent of children of 13-23 months in the Western Dooars have received no vaccination compared to 3 percent in West Bengal (DLHS-3, 2007/08).

5.3.4.3 Ailments among children of age below 5 years in last year

Table 5.56 depicts the distribution of ailments among the children below 5 years. It is found that 43.25 percent of the children seeking care for diarrhoea and 35.06 percent for ARI (Acute Respiratory Infections). In aggregate, the study shows that 84.58 percent of the total sample children are facing some kind of ailments episode in last one year. The occurrence of malaria is very much seasonal and in the last year 4.78 percent children are suffered by

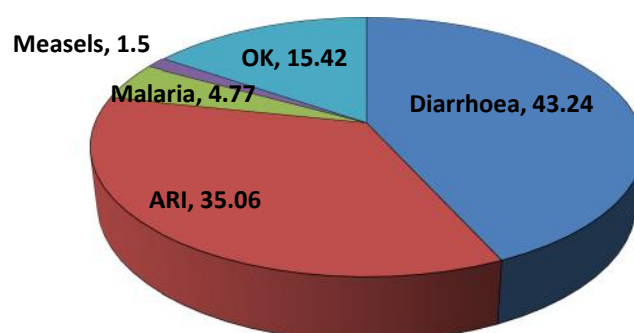
malaria. Another common ailment for the children is any kind of fever. It shows that rate of occurrence of fever is very much frequent in this area. The most possible causes will be the unhealthy living environment and the bad quality drinking water.

Table-5.56: Distribution of ailments among children of age below 5 years in last year

No of Child	Alipurduar-II	Madarihat	Falakata	Total
Diarrhoea	92 (38.98)	108 (46.75)	117 (43.99)	317 (43.24)
ARI	68 (28.81)	86 (37.23)	103 (38.72)	257 (35.06)
Malaria	11 (4.66)	15 (6.49)	9 (3.38)	35 (4.77)
Measels	4 (1.69)	2 (0.86)	5 (1.88)	11 (1.50)
OK	61 (25.84)	20 (8.66)	32 (12.03)	113 (15.42)
Total	236	231	266	733

Figures in the parentheses indicate their percentages with their respective totals.
Source: Household Survey of the study, 2012

Figure-5.41: % Distribution of Ailments among Children Below 5 Years



5.3.4.4 Child health care from different providers

Like general health problems RMPs provide prompt solutions to all common childhood diseases. Table 5.57 depicts the RMP dependence in the context of childhood diseases in the sample area. We see that 28.25 percent of the children are visiting to RMPs, whereas 14.76 percent are going to public hospital/health centre for primary care. The most significant factor is that the percentage of no-care (50.95 percent) is also very high. This reflects the reluctant behaviour of the inhabitants. The most possible back drop arises when the situation becomes more severe and out of control.

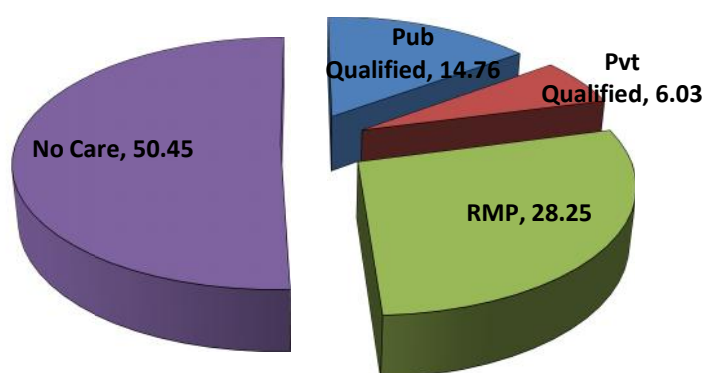
Table-5.57: Distribution of child health care from different providers

Source of Care	Alipurduar-II	Madarihat	Falakata	Total
Pub Qualified	23 (13.14)	38 (17.19)	32 (13.68)	93 (14.76)
Pvt Qualified	12 (6.86)	9 (4.07)	17 (7.27)	38 (6.03)
RMP	51 (29.14)	61 (27.6)	66 (28.21)	178 (28.25)
No Care	89 (50.86)	113 (51.13)	119 (50.85)	321 (50.45)
Total	175	221	234	630

Figures in the parentheses indicate their percentages with their respective totals.

Source: Household Survey of the study, 2012

Figure-5.42: % Distribution of Child Health care from different Providers



5.3.5 Conclusion

The health scenario of Western Dooars offers little to celebrate. A typical resident of the Western Dooars carries an extra load of ill-health and health risk compared to others living within the same district. Poverty coupled with sharp geo-climatic challenges, make him / her especially vulnerable to health shocks caused by environmental and the life style related agents. People's response to these challenges is often perplexing primarily due to complex interface of the social, economic, and geographical barriers to access health care and perceived severity of the problem. Utilisation of inpatient care in public institutions is remarkably high implying that the perceived severity and benefits of getting a seriously ill person admitted to a hospital is higher than the perceived costs and barriers of doing so. On the contrary, the family of a pregnant woman feels constrained to take her to a hospital for delivering a birth probably because the equation between benefits and costs is reversed. The village unqualified doctors dominate the outpatient market because people think it would

be too costly, or unnecessary, or hazardous to seek treatment for a minor ailment from a qualified provider. In other words, physical accessibility to a government health facility apparently becomes a prohibitive issue when people seek ambulatory or birth delivery care (due to low perceived severity and benefits) but becomes non-prohibitive when they need admission to a hospital (due to high perceived severity and benefit). The clear implication of this complete response behaviour is that adding more health facilities to the less accessible areas may not improve 'access' unless the social barriers are simultaneously addressed to influence the perception about severity of health needs and increased benefits of accessing these facilities.

CHAPTER-6

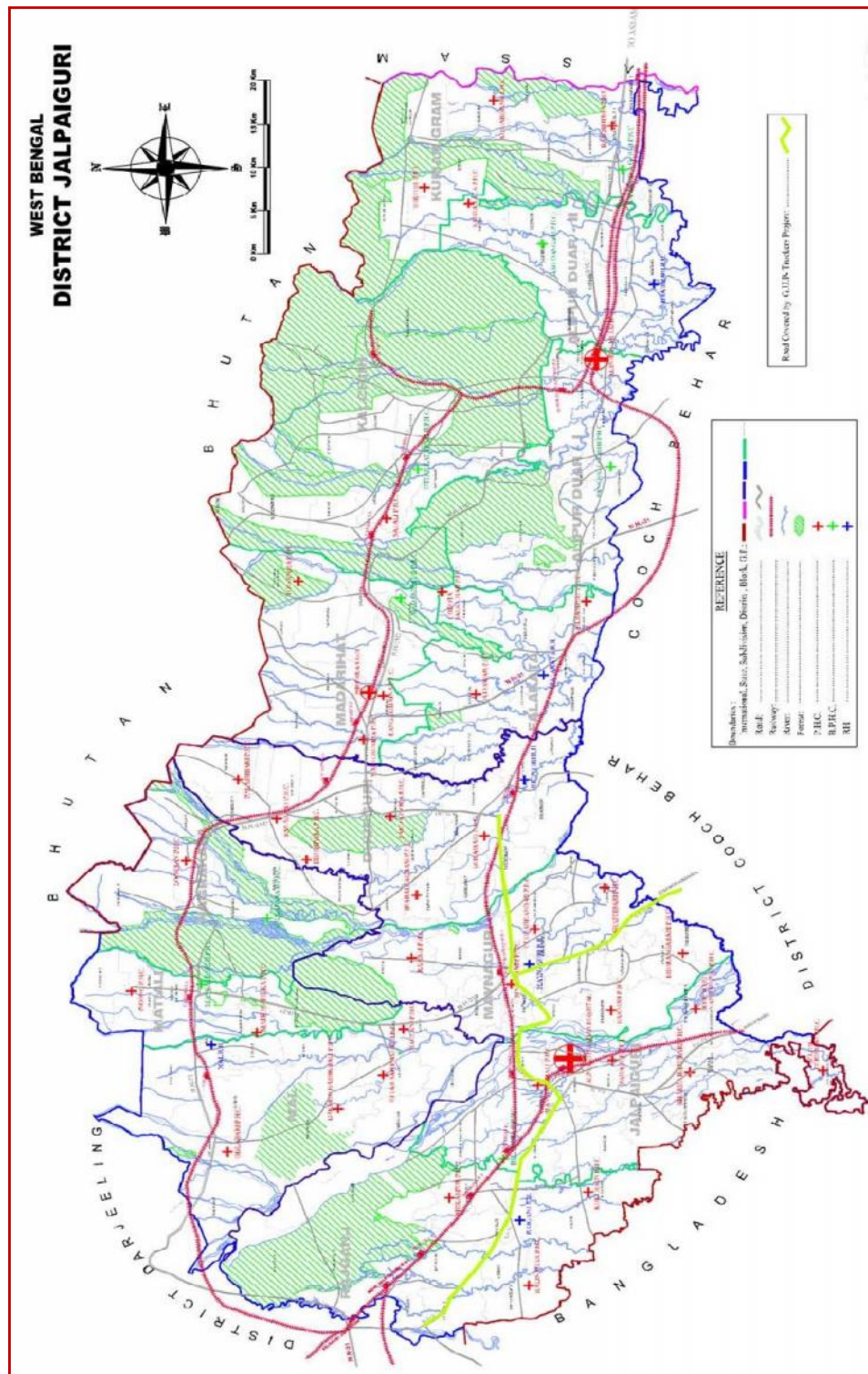
Healthcare System of Western Dooars

CHAPTER-6

Healthcare System of Western Dooars

6.1 Introduction

This chapter presents a brief overview of the supply side environment related to the health care delivery system of the Western Dooars. More specifically, it focuses on two major providers of health care: (1) public (or government) providers, especially the primary healthcare facilities (PHCs), and (2) the rural medical practitioners (RMPs). For each provider, the following three questions would be addressed: (a) what type and how much of the health needs of the Western Dooars are being met? (b) what are the constraints on the way to work more for the people of the Western Dooars? and (c) how the full potential of the provider could be utilised? All these questions would be addressed on the basis of a set of primary and secondary data collected through an extensive providers' survey conducted in all the blocks of the Western Dooars. The health care delivery system in the Western Dooars is built on an assortment of public and private providers. The public services, delivered through a multi-tier infrastructure, are primarily financed by public funds. The private providers may be classified in to several groups based on their economic motive and qualification: (1) the qualified private providers practicing solo or at private institutions, (2) unqualified private providers or RMPs, (3) private hospitals and nursing homes with capacity to provide inpatient care, and (4) not-for-profit organisations providing preventive and curative services through different programmes and facilities, especially through mobile health units under a unique public-private partnership programme and institutional birth delivery centres. Thus, this chapter is divided in two sections as for need of the explanations of the nature of supply side of the health system of Western Dooars. They are : SECTION-I: Here, the public primary health care system are analysed in terms of features, attitudes, and functioning for providing health support, and, SECTION-II: The roles of Rural Medical Practitioners are investigated. All sections are addressed largely on the basis of the primary and secondary data collected from the surveys in across the different blocks of Western Dooars. In our general demarcation of the periphery of Western Dooars, the Jalpaiguri block and Rajganj block are not considered. But during the time of analysing provider's behaviour, we include the Jalpaiguri Sadar and Rajganj block for two reasons. It is the district head quarter and different important health units (District Hospitals) are located in this block, and the other important one is that the peoples' of Western Dooars also collect different health support from the health units located in these two blocks during their complexity.



Section-I

Public Healthcare System

- **Introduction**
- **Health facilities with infrastructure in Western Dooars**
- **Block wise Lower Tier Public Health Facilities**
- **Primary Health centre (PHC)**
- **Service rendered by PHCs**
- **Bed density in PHCs**
- **Internal Classification of Districts in terms of Distribution of PHCs**
- **Bed density and Female Illiteracy relation for PHCs**
- **Equipment density at PHCs**
- **Manpower density at PHCs**
- **Comparison of Block PHCs Performance in terms of Infrastructure and Manpower**
- **Bed occupancy rate for ailments at various levels of facilities**
- **Bed occupancy rate at PHCs for delivering birth**
- **Outpatient per bed day at the lower and higher level hospital**
- **Preparedness of Western Dooars Health Facilities**
- **Conclusion**

SECTION I

Public Healthcare System

6.1.1 Introduction

The public health care system in Western Dooars, following the same pattern as in other parts of rural West Bengal, deliver preventive and curative services at multiple levels of institutions (or, facilities) and through outreach workers.

6.1.2 Health facilities with infrastructure in Western Dooars

Table-6.1: Block wise all Public Health facilities in terms of infrastructure in Western Dooars

Sub-Division	BLOCK	Population	PHC		RH/BPHC		SDH/SGH		OTHER	
			NO	BED	NO	BED	NO	BED	NO	BED
Jalpaiguri	Jalpaiguri	280927	5	32	1	30	4	728	2	102
	Maynaguri	281700	6	52	1	60				
	Dhupguri	418461	3	14	1	30				
	Rajganj	283967	3	22	1	30				
Total		1265055	17	120	4	150	4	728	2	102
Mal	Mal	265392	3	16	1	10	1	100		
	Meteli	105906	2	16	1	15				
	Nagrakata	115907	2	14	1	30				
Total		487205	7	46	3	55	1	100		
Alipurduar	Kumargram	178047	2	12	1	30	2	359	2	113
	Falakata	254273	2	10	1	30				
	Madarihat	185470	3	26	1	30				
	Kalchini	252571	2	4	1	30				
	Alipurduar-I	197231	2	14	1	30				
	Alipurduar-II	196984	3	24	2	50				
Total		1264576	14	90	7	200	2	359	2	113

Source: West Bengal ministry of health and family welfare web www.wbhf.gov.in, 2011
 [BPHC=Block Primary Health Center, RH= Rural Hospital, SDH= Sub-divisional Hospital, PHC= Primary Health Center, SC= Sub-center, DH= District Hospital]

Table 6.1 brings out the classification of distribution of health facilities in different blocks of Western Dooars. In this study, each and every health unit is characterised by five categories, namely, number of beds, number of available doctor, number of available trained multipurpose workers (including nurses, Auxiliary nurse midwives), availability of general services and availability of special services. The general services means mainly the general outpatient care services and the specialised services implied the more critical inpatient services. The health support from state level provided by 38 Primary Health Centers (PHCs)

with 246 beds, 14 Block Primary Health Centers (BPHCs) / Rural Hospitals (RHs) with 405 beds, 7 upper tier health facilities with 1187 beds and 4 other hospital with 215 bed for all subdivisions of the district. The study found concentration of beds of the PHCs highest at Jalpaiguri Sub-division (110 beds) which is also the district head quarter, whereas in Alipurduar sub-division PHCs (which have more or less same level of population like Jalpaiguri Sub-division) have less number of beds (90 beds). The quite opposite scenario depicted at second tier health facilities provided by BPHCs and RHs. Here Alipurduar Sub-division provided more beds compared to Jalpaiguri Sub-division. But Mal Sub-division which bears 16 percent population pressure of the district has only 9.79 percent of total available beds in the district. The table represents a general scenario of availability of health facilities like other parts of the country. Among the total bed 11.98 percent are in Primary Health Centers (PHCs), 19.73 percent exist in Block Primary Health Centers (BPHCs) and Rural Hospitals (RH) and 57.82 percent bed are under the head of upper tier level including State General Hospital (SGH), Sub-divisional Hospital (SDH) and District Hospital (DH). In the district Jalpaiguri total number of hospital beds including all levels of health facilities is 2053 for the total population 3016836, thus the total beds per lakh population is 4.11 and the total available doctors for serving those health facilities is 164 and the total family welfare centers are 527.

6.1.3 Block wise Lower Tier Public Health Facilities

Table 6.2 describe the picture of lower level health facilities in Western Dooars available for the unmet health needs. In the study area we consider all the blocks where the health supply units are scattered to supply the health facilities for the dwellers. The public facilities range from five sub-divisional hospitals (SDH) with specialised physicians and inpatient services to about 537 small sub-centres (SC) at the village level staffed by trained multipurpose workers. Within this range there exists 14 block level facilities (12 rural hospitals [RHs], and 2 block primary health centres [BPHCs]) and 38 primary health centers (PHCs) arranged in order of secondary to primary levels of care. In the area one district hospital (DH) located in Jalpaiguri block, which will be considered as the highest upper tier health units in the area. The block level facility (BPHC/RH), in addition to playing a role of a referral unit, acts as a hub of all primary health care activities within a block. The table 6.2 shows, the sub-centers are more or less adequate in number if one goes by usual standard i.e., 5000 population per sub-centre for the plain (in the hills it is 3000 population per sub-centers). The number of PHCs, on the other hand, is evidently inadequate by the same standard i.e., 30,000 population per PHC for the plain (in the hills it is 20000 population per PHCs). According to this standard, the blocks like Dhupguri, Falakata, Kalchini, Alipurduar-I are mostly suffered by the inadequacy by the number of PHCs and Maynaguri, Dhupguri, Rajganj, Falakata

blocks are of SCs. The inadequacy is mostly prominent for the PHCs rather than SCs. Mostly all PHCs are allotted for number of people out of national standard. Thus the interesting feature of the study whether the adequate number of SCs will fill the service gap of number of PHCs.

Table-6.2: Public health facilities at lower tier in the Western Dooars, by Blocks

Block	No of PHC	Population per PHC	No of SC	Population per Sc
Jalpaiguri	5	56185	48	5853
Maynaguri	6	46950	46	6124
Dhupguri	3	139478	64	6538
Rajganj	3	94655	48	5916
Mal	3	88464	51	5204
Meteli	2	52953	22	4814
Nagrakata	2	57953	22	5269
Kumargram	2	89023	35	5087
Falakata	2	127137	44	5779
Madarihat	3	61823	37	5013
Kalchini	2	126285	48	5262
Alipurduar-I	2	98615	36	5479
Alipurduar-II	3	65661	36	5472
Total	38		537	

Source: West Bengal ministry of health and family welfare web www.wbhf.gov.in

To observe this one can look after the length of patient queue both for inpatient and outpatient department of those PHCs and SCs. If some bypass tendencies are found, then that will be the darkest side of health delivery failure. According to our national standard norms for PHCs covering 30000 population, and on the basis of this calculation there like to exist 101 PHCs in the district, but there are only 38 actually performing PHCs. Thus huge shortages in terms of number of PHCs are exists in the Western Dooars area.

6.1.4 Primary Health centre (PHC)

Primary Health Centres (PHCs) are those which offer primary care services to the health seekers by the medical doctors (not specialist) for the first time and other health professionals who also have first contact with patients. PHCs offer services according to Indian Public Health Standard (IPHS) are: (1) Medical Care along 6 hours availability of doctors for Out Patient Department (OPD) and at least 40 patients per doctor per day should

served 24 hours medical support with proper referral services and at least 6 beds for IPD services. (2) Regarding maternal and child health care (MCH) PHCs have a huge allotted task. The areas basically deal with Antenatal care (early registration of pregnancies, provision of 3 antenatal checkups, minimum laboratory investigation like haemoglobin, urine, blood sugar etc, nutrition and health counselling, identification of high-risk pregnancies, distribution of Chemoprophylaxis for Malaria as per NVBDCP guidelines), Intra-natal care (Promotion of institutional deliveries, Conducting of normal deliveries, Assisted vaginal deliveries including forceps / vacuum delivery, Manual removal of placenta, Appropriate and prompt referral for cases needing specialist care, Management of Pregnancy Induced hypertension including referral, Pre-referral management), Post-natal care (initiation of breast feeding after half hour of birth, at least two postpartum home visits after delivery, provision of Janani Suraksha Yojana benefit), new born care, and family planning (Provision of contraceptives, Permanent methods like Tubal ligation and vasectomy, Counselling and appropriate referral for safe abortion services). (3) Management of sexually transmitted diseases (4) Nutrition services which coordinating the ICDS. (5) Disease Surveillance and Control of Epidemics services activated by disinfection of water sources, promotion of proper sanitation. (6) Organise training programme for health worker (HW), traditional birth attendance (TBA), ASHA worker, ANM etc.

Standing between sub-centres (SCs) and BPHCs, PHCs role is something critical. BPHCs were actually the PHCs initially but some facilities were extended with some extra manpower, EMOC, technical support for the growing health demand. In West Bengal 909 PHCs with 6612 bed strength and cater a bulk of patients. In 2011, the secondary data (Health on March Report of W.B. 2012) shows that 22,28,251 patients (which is near about 21.42 percent of total patients) were visited PHCs in West Bengal. In our study in Western Dooars we found 38 PHCs with 256 beds are serving for 3.01 million people with other upper level health facilities.

The PHCs of Jalpaiguri district are more or less evenly distributed over different blocks of the district. The distribution as follows from Kumargram PHC of Alipurduar sub-division in the extreme east, Belakoba PHC of Rajganj block in the extreme west and the farthest are Berubari PHC of Jalpaiguri Sadar, Matalhat PHC of Meteli block, Luksan Tea Garden PHC of Nagrakata block and Totopara PHC of Madarihat block. The size and facilities of the PHCs are also varied over the blocks. For example 11 PHCs of Jalpaiguri districts are functioning with provision of bed only in size 4, which are 29 percent of the total PHCs in the area. The total number of OPD (Out Patient Department) patient examined in the PHCs during January to December of 2012 were 258037 (that was 234421 in 2011), while total admissions in these facilities (IPD) during the same period were 31539 (that was 33417 in 2011). This identifies the importance of PHCs in Jalpaiguri health scenario. The demand for

primary care and Maternal & Child Health (MCH) care is soaring and under such situation if the existing primary level inpatient facilities are not encouraged to perform better, establishing of more and more PHCs will never full fill the aspiration of local people as well as the policy makers of the state. The distribution of beds of PHCs can be easily understood by the representation of radar diagrammatic representation of the all block level data along the series of the radar. Such technique is actually uses in statistics to explain the spread-out of different types of data which are significantly related by any logical relationships. The data of table 6.3 is shown in figure 6.2 the radar termination measures each blocks of the Jalpaiguri district. Here we plot the number of beds of PHCs, number of SCs, and the number of villages covered by the PHCs of a particular block in the series of the radar. In the figure the blue path identifies the bed number of PHCs in a particular block, the red line segments identified the numbers of the SCs under those PHCs in the particular block, and the green path shows the number of villages covered by those PHCs/SCs in that block.

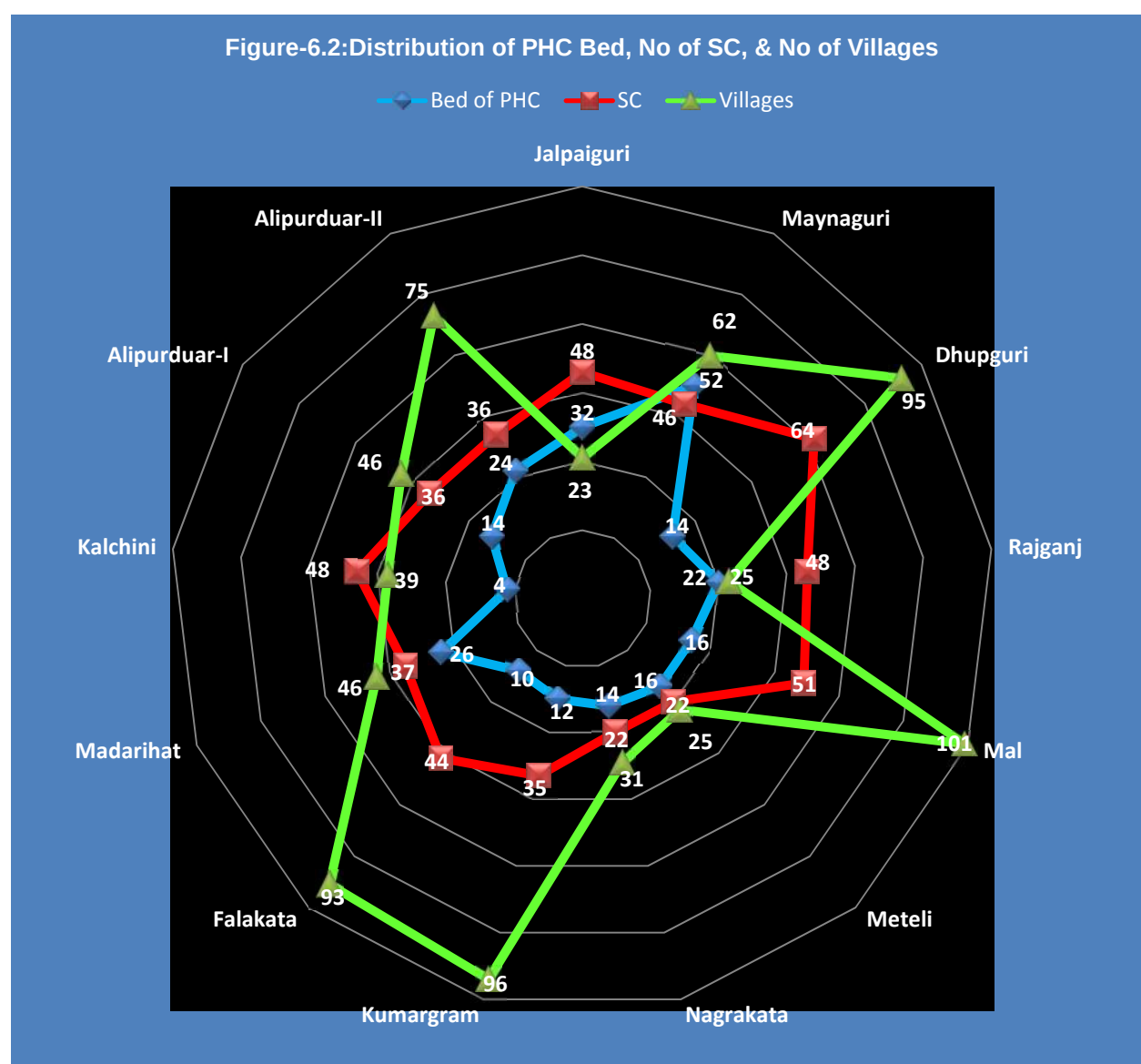


Table-6.3: PHCs catering in terms of Population, bed, number of Sub-centres and villages of Jalpaiguri District

BLOCK	POPULATION	PHCs	NO OF BED	NO OF SC	NO OF VILLAGE
Jalpaiguri	280927	5	32	48	23
Maynaguri	281700	6	52	46	62
Dhupguri	418461	3	14	64	95
Rajganj	283967	3	22	48	25
Mal	265392	3	16	51	101
Meteli	105906	2	16	22	25
Nagrakata	115907	2	14	22	31
Kumargram	178047	2	12	35	96
Falakata	254273	2	10	44	93
Madarihat	185470	3	26	37	46
Kalchini	252571	2	4	48	39
Alipurduar-I	197231	2	14	36	46
Alipurduar-II	196984	3	24	36	75
Total	3016836	38	256	537	757

Source: West Bengal ministry of health and family welfare, website: www.wbhf.gov.in

From the centre the major axis is measured in a scale of 0 to 102, because in case of our data the highest number is occupied by the village number 101 (under Mal Block). Where the respective colour path intersects the blocks axis, the corresponding size of the variable can be measured from that point. The degree of divergence between the respective points for three variables for a particular block identifies the degree of mal distribution. According to the diagram the crisis are clearly visible for the Blocks like Mal, Kumargram, Falakata, and Dhupguri.

6.1.5: Service rendered by PHCs

Now, the discrepancies between actual share patient loads weight what the PHCs are expected to bear and what they are actually presently bearing can bring some significant results. According to HMIS (2011) data, the number of people per lakh population visited the government hospital for inpatient services in West Bengal was 6637 and for the outdoor consultation were 61313 during 2011. Now if we hypothetically consider that PHCs are the only source for first time care during health needs, some important results and real positions of the PHCs can be drawn to face the situation. According to that standard, for Jalpaiguri district with population 3016836, thus $200227 [(6637 \times 3016836)/100000]$ number of patients per lakh are cater PHCs for inpatient services and $1849712 [(61313 \times 3016836)/100000]$ number per lakh for outpatient consultation. In West Bengal, total available beds in PHCs are 6612, out of which Jalpaiguri only have 256 beds i.e., PHCs beds share for the district is only 3.87 percent out of total available beds. Thus the expected number of inpatients to be served by the PHCs is only 7449 $[200227 \{ (6637 \times 3016836)/100000 \} \times 3.87\%]$ in 2011, but the capacity of the PHCs to serve is $200227 [(6637 \times 3016836)/100000]$. The difference between 200227 and 7449 identifies the service gap in inpatient care in PHCs in Jalpaiguri

district, which is 192778. Similarly for the outpatient department visits for doctors consultation in PHCs, the study found 21 doctors are performing in different PHCs of Jalpaiguri, where as the corresponding figure for West Bengal is 758. The study found 2.77 percent share of doctors actually performed in the PHCs of Jalpaiguri district. The burden of outpatient actually served by the PHCs is 51237 $[(61313 \times 3016836)/100000 \times 2.77\%]$ but what is their capacity is to serve 1849712 $[(61313 \times 3016836)/100000]$. Hence the gap can be easily calculated as 133737 (184974 - 51237). The descriptions are shown in table 6.4.

Table-6.4: Service rendered by PHCs in Jalpaiguri District

Service	Expected total patient as per 2001 census	Expected total patient in PHCs as per 2001 census	Actual Patient in PHCs 2011	2011 Gap % of Need
Inpatient Admission	20227	7449	3416	54.16
Out-door doctors Consultation	1849712	51237	37812	26.2

Source: Jalpaiguri CMOH office, 2011

6.1.6: Bed density in PHCs

The geographical locations of the PHCs are significant factor to produce health output. In this regard our national figure shows that 19 percent of per lakh population are served by the PHCs in India, the corresponding figure for the state West Bengal is 13.4 percent. The national standard norms identifies that one PHC cater 12 Sub-Centre (SC), where 30,000 populations are to be served (20,000 populations for hill areas). In case of Jalpaiguri district 38 PHCs for 2794291 rural populations and which cater 537 SCs. The disaggregate data in this regard shows that on average one PHC serve 73533 population and cater 14.13 SCs under itself, which establish quite significant figure in terms of our national norms. To identify the situation of bed density block wise, we can compare all levels of beds served by public hospitals like PHCs, BPHCs and RHs in each block and here we found the value of availability of beds sanctioned per 1000 population as a good indicator of bed density. In this respect of bed density Maynaguri, Nagrakata, Alipurduar-II, Madarihat block perform well. The bed densities of such blocks varied between 2 to 4. But if we drop the share of bed provided by BPHCs and RHs from the list and calculate the bed density in terms of PHCs only, the situation becomes seriously severe. Under such circumstances Kalchini is the worst performing blocks (where the bed density of PHCs is 63.142) followed by Dhupguri, Falakata, and Mal etc. The bed density of PHCs and the combined bed density of PHCs and BPHCs /RHs are shown in figure 6.1.3 for all the blocks of the district. The vertical differences of the two curves identify the discrepancies regarding bed distribution over the

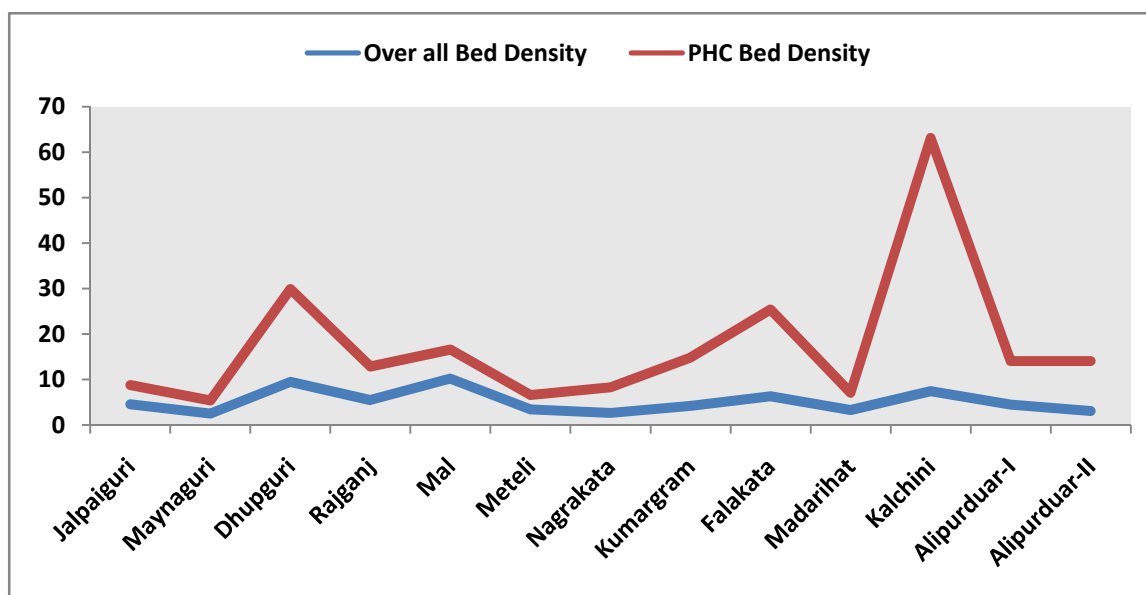
blocks in terms of beds of PHCs. The data are represented by table 6.5. The blocks like Dhupguri, Falakata, and Kalchini are situated in an extreme position in this regard.

Table-6.5: Block wise Bed density in PHCs

Block	Category of Health Units	Beds	Population	Bed Density	Bed density in PHCs
Jalpaiguri	SC	0	280927	4.531	8.779
	PHC	32			
	BPHC/RH	30			
Maynaguri	SC	0	281700	2.515	5.417
	PHC	52			
	BPHC/RH	60			
Dhupguri	SC	0	418461	9.511	29.89
	PHC	14			
	BPHC/RH	30			
Rajganj	SC	0	283967	5.461	12.908
	PHC	22			
	BPHC/RH	30			
Mal	SC	0	265392	10.208	16.587
	PHC	16			
	BPHC/RH	10			
Meteli	SC	0	105906	3.416	6.619
	PHC	16			
	BPHC/RH	15			
Nagrakata	SC	0	115907	2.634	8.297
	PHC	14			
	BPHC/RH	30			
Kumargram	SC	0	178047	4.239	14.837
	PHC	12			
	BPHC/RH	30			
Falakata	SC	0	254273	6.357	25.427
	PHC	10			
	BPHC/RH	30			
Madarihat	SC	0	185470	3.312	7.133
	PHC	26			
	BPHC/RH	30			
Kalchini	SC	0	252571	7.429	63.142
	PHC	4			
	BPHC/RH	30			
Alipurduar-I	SC	0	197231	4.483	14.088
	PHC	14			
	BPHC/RH	30			
Alipurduar-II	SC	0	196984	3.078	14.07
	PHC	14			
	BPHC/RH	50			

Source: Jalpaiguri CMOH office, 2011

Figure-6.3: Comparison of Bed Densities in PHCs and BPHCs/RHs in all Blocks of the district



6.1.7: Internal Classification of Districts in terms of Distribution of PHCs

To analyse further, it is rational to break up the district in terms of specific regions with similar geographical and social structure. From the stand point of Jalpaiguri district the regions are: Forest & Hilly area, Tea garden area and plain area. Out of 6245 sq km total area 1987 sq km are belongs to tea garden area. It is the second highest tea producing district in the country. The economy of this region is fully dependent on tea. The wages of the tea garden workers not only included the cash payment but also rations, fuel, housing, medical benefits, spot retirement benefits and different sundry benefits. Nearly 1, 20, 000 peoples directly and in terms of their dependence fully curve on tea garden in terms of food, cloth and housing. The tea garden areas are distributed unevenly over the district. But basically these tea gardens are located adjacent to forest. The forest and hilly area are considered jointly, due to more or less same kind of geographical adversities faces by the inhabitants. The district comprises 1790 sq Km forest and hilly areas distributed over different parts of the blocks like Mal, Meteli, Nagrakata, Madarihat, Kalchini, and Kumargram. The forest and hilly areas of the district are basically concentrated in the northern and in some middle part of the district. The plain area with tea garden covering 4635 sq Km which are basically the middle and southern part of the district consisting of Rajganj, Jalpaiguri Sadar, Maynaguri, Dhupguri, Falakata, Alipurduar-I, and Alipurduar-II block. To consider the distribution of PHCs over these two regions an approximation based consideration can gives us the inequality in the distribution of PHCs over the district.

Table-6.6: Approximate Classification of the District and distribution of PHCs

	Forest & Hilly Area	Plain Area with Tea Garden
Areas (Sq Km)	1790	4635
Block Coverage	Mal, Meteli, Nagrakata, Madarihat, Kalchini, Kumargarm	Rajganj, Jalpaiguri Sadar, Maynaguri, Dhupguri, Falakata, Alipurduar-I, Alipurduar-II
Approximate Population	1103293 (37%)	1913543(63%)
No of PHCs	14(36.8%)	24 (63.2%)
No of Beds of the PHCs	88(37.3%)	148 (62.7%)

Source: Jalpaiguri CMOH office, 2011

Surely like other parts of West Bengal, there appears a vast inequality within single district and usually the main sub-divisions, where bed density is highest and the proximate blocks which are located far from the sub-divisions always remain back benchers in terms of bed density. The table 6.6 shows that bed density is highest for the plain areas and severe for the forest and hilly areas. There are some PHCs in the forest area which are performing without inpatient provision or with some minimum bed. In this regard Meteli, Nagrakata, Kalchini and Kumargram blocks are performing at such a level that eight PHCs are performing with 46 beds for 917823 people. In aggregate, different blocks of the district are showing more or less even distribution of PHCs and their beds between forest-hilly areas and plain areas. Here, for forest and hilly areas 37 percent of total population are living and the health infrastructure in terms of PHCs availability both for inpatient and outpatient services shows out of total number 37 percent are available in this region. But according to our national norms, health service providing units of tough regions cover lower percentage of people in compare to plain area. So in that point of comparison a vast inequality exists in the distribution of health infrastructure in case of PHCs.

6.1.8: Bed density and Female Illiteracy relation for PHCs

The blocks like Kalchini, Falakata, Kumargram, Nagrakata, and Dhupguri have extremely low availability of beds in PHCs. For example in Kalchini four beds are found in the PHCs at functioning position. But simultaneously the second tier health support from BPHCs and RHs can also have significant role to cover the service gap created by the PHCs. In table 6.7 the study discusses the bed per lakh of population at PHCs, BPHCs and RHs jointly for the population of the different blocks. Considering all the PHCs and all second tier health facilities, the blocks like Mal, Dhupguri and Kalchini are have poor availability of beds and possibly these blocks are in severe condition in respect of bed availability. To understand the distribution of health facilities (lower or primary level) properly we have to understand the

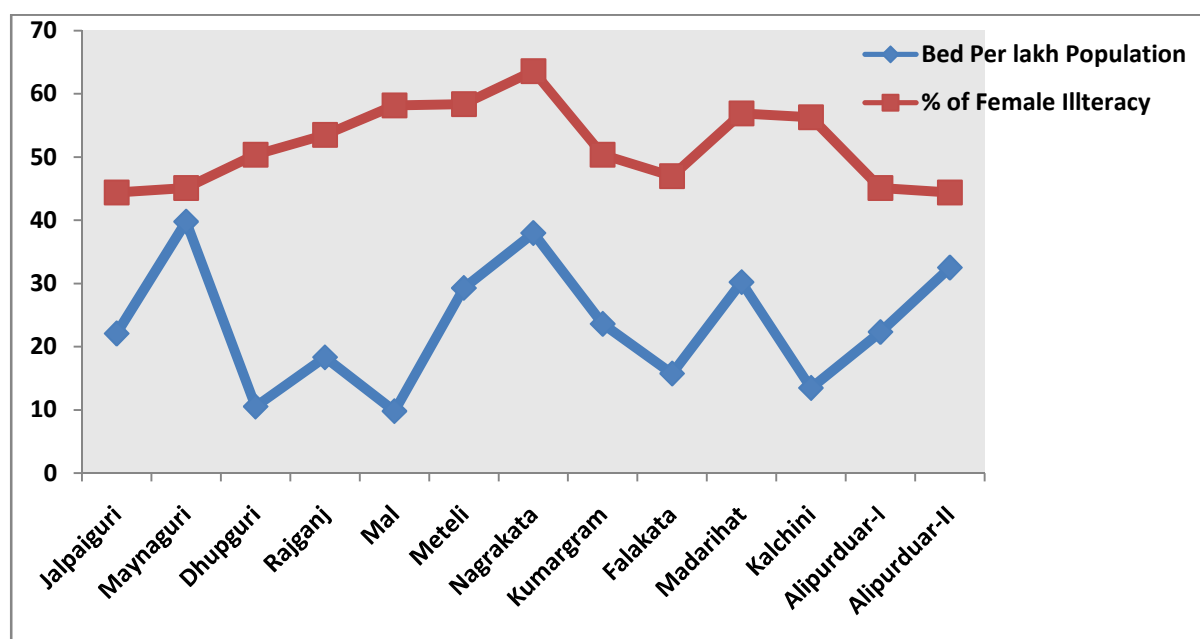
crux relation between health needs and health provisions. When provision of equal treatment to all those with equal needs is termed as 'horizontal equity' law, while 'vertical equity' refers to provision of unequal treatment for all with unequal needs (H Jerehiah, 2000). If we consider female illiteracy as a proxy of backwardness of any block, and try to correlate the block level beds per lakh of population with female illiteracy of that block, it will provide us significant result. The correlation coefficient between female illiteracy and beds per lakh population of the blocks shows -0.00062, which is significant at 5 percent level. The negative value of correlation coefficient shows that as the level of female illiteracy increases the bed availability also reduces in the block.

Table-6.7: Bed density and Female Illiteracy at PHCs, BPHCs and RHs across blocks

Block	Population	No of beds in BPHC/PHC/RH	Beds per Lakh Population	% of female Illiteracy(2001)
Jalpaiguri	280927	62	22.07	44.4
Maynaguri	281700	112	39.76	45.1
Dhupguri	418461	44	10.51	50.4
Raiganj	283967	52	18.31	53.5
Mal	265392	26	9.79	58.2
Meteli	105906	31	29.27	58.4
Nagrakata	115907	44	37.96	63.6
Kumargram	178047	42	23.59	50.4
Falakata	254273	40	15.73	47
Madarihat	185470	56	30.19	56.9
Kalchini	252571	34	13.46	56.3
Alipurduar-I	197231	44	22.31	45.1
Alipurduar-II	196984	64	32.49	44.4
Total	3016836	651	21.58	

Source: Jalpaiguri CMOH office 2011, and Census data 2001

Figure-6.4: Relation between Bed densities and Female Illiteracies of all Blocks



6.1.9: Equipment density at PHCs

The density of diagnostic and treatment technologies can be taken as a proxy of access of good treatment with technological complexities across PHCs. The national norms regarding the stock of equipments that generally PHCs are used given in table 6.8A.

Table-6.8A: List of Instruments used by PHCs

SL	Instrument used by PHCs
1	IUD insertion kit
2	Normal Delivery Kit
3	Equipment for assisted Vacuum delivery
4	Equipment for assisted Forceps delivery
5	Equipment for new born care & Neonatal care
6	Standard Surgical Set
7	Equipment for mannual Vacuum aspirations
8	Baby Warmer / Incubator
9	Ice-lined Refrigerator (Large)
10	Ice-lined Refrigerator (Small)
11	Deep Freezer (Large)
12	Deep Freezer (Small)
13	Cold Box
14	Vaccine Carrier
15	X-ray Machines
16	USG Machines

Source: Indian Public Health Standard (IPHS)

Table-6.8B: Equipment density in blocks of Jalpaiguri district

Block	Population	% of Female illiteracy	Agg No of Stock of Equipments	Agg No of in use equipments	Percentage of Equipments remain unused	Equipment density per 10,000 population (in Stock)	Equipment density per 10,000 population (in Use)	Gap between Equipment density (in stock-in use)
Jalpaiguri	280927	44.4	64	49	23.44	2.278	1.744	0.543
Maynaguri	281700	45.1	74	58	21.62	2.627	2.059	0.568
Dhupguri	418461	50.4	31	19	38.71	0.741	0.454	0.287
Rajganj	283967	53.5	34	28	17.65	1.197	0.986	0.211
Mal	265392	58.2	29	22	24.14	1.093	0.829	0.264
Meteli	105906	58.4	28	14	50.00	2.644	1.322	1.322
Nagrakata	115907	63.6	25	17	32.00	2.157	1.467	0.69
Kumargram	178047	50.4	28	22	25.00	1.573	1.236	0.337
Falakata	254273	47	29	19	34.48	1.141	0.747	0.394
Madarihat	185470	56.9	32	21	34.38	1.725	1.132	0.593
Kalchini	252571	56.3	27	16	40.74	1.069	0.633	0.436
Alipurduar-I	197231	45.1	30	23	23.33	1.521	1.166	0.355
Alipurduar-II	196984	44.4	37	27	27.03	1.878	1.371	0.507

Source: Sample data from PHCs Jalpaiguri District, 2012

The availability of these instruments for all PHCs in the district is investigated thoroughly and the data also collected from those units regarding their stock and in use position. Then

the aggregate of those equipments numbers available per block shows two things. One, the aggregate stock of equipments identified policy directions, and the other, the aggregate number of equipments in use position shows the effectiveness (ineffectiveness) of the blocks compare to their availability. Thus density of stock of equipments and density of use of equipments identify properly the distorted regional distribution. The table 6.8B shows the value of equipment density in stock and in use separately for 10,000 populations. The correlation coefficient between female illiteracy and equipment in stock and in use both the result produces negative value of correlation coefficient (in case of stock -0.0463 and for in use -0.269). This negative value of correlation coefficient also means as the female illiteracy increases the equipment density in the PHCs increases. Here also female illiteracy also considered as the indicator of backwardness of the respective block. On an average the study found 17.65 to 50.00 percent of the equipments lying unutilised due to various reasons. Such level of incomplete utilisation of equipments surely is the targets of policy makers for further developments in future. The value of equipment density per 10,000 populations (in stock) varies between 0.741 to 2.644, whereas equipment density per 10,000 populations (in use) varies between 0.454 to 2.059.

6.1.10: Manpower density at PHCs

Table-6.9A: Manpower distribution in blocks of Jalpaiguri district

Block	Doctors		Nurse		Health assistant		Gr-D	
	In Position	Sanctioned	In Position	Sanctioned	In Position	Sanctioned	In Position	Sanctioned
Jalpaiguri	4	5	3	5	5	7	5	5
Maynaguri	5	6	4	6	6	9	6	6
Dhupguri	2	3	1	3	2	3	2	2
Rajganj	2	4	2	5	3	4	3	3
Mal	2	3	2	3	3	5	2	2
Meteli	1	2	1	2	2	3	2	2
Nagrakata	1	3	1	3	2	2	2	2
Kumargram	1	4	1	2	2	3	2	2
Falakata	1	4	1	3	1	2	1	2
Madarihat	2	5	1	5	3	4	2	3
Kalchini	1	2	1	2	2	3	1	1
Alipurduar-I	2	4	1	5	2	3	2	2
Alipurduar-II	3	5	2	5	3	4	3	3
Total	27	50	21	49	36	52	33	35

Source: CMOH office Jalpaiguri District, 2012

Figure-6.5: Distribution of Manpower in Position and Vacant in PHCs over Blocks

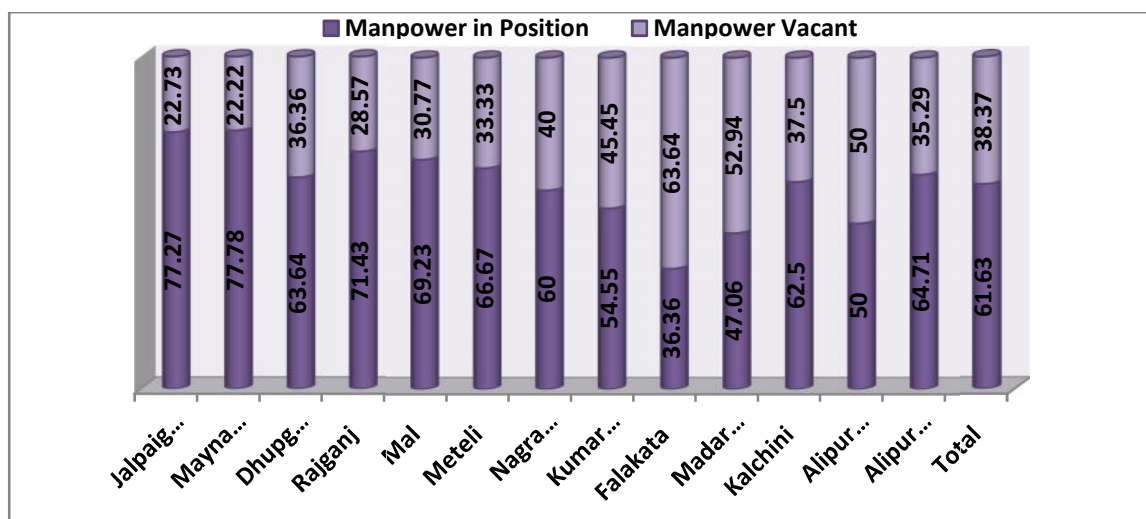


Table-6.9B: Density of Manpower across different blocks

Block	Doctors	Nurse	Health assistant	Gr D
Jalpaiguri	4	3	5	5
Maynaguri	5	4	6	6
Dhupguri	2	1	2	2
Raiganj	2	2	3	3
Mal	2	2	3	2
Meteli	1	1	2	2
Nagrakata	1	1	2	2
Kumargram	1	1	2	2
Falakata	1	1	1	1
Madarihat	2	1	3	2
Kalchini	1	1	2	1
Alipurduar-I	2	1	2	2
Alipurduar-II	3	2	3	3
Total	27	21	36	33
Max-Value	5	4	6	6
Min-Value	1	1	1	1
Average	2.07692308	1.61538462	2.76923077	2.53846154
S.D	1.25575598	0.96076892	1.3634421	1.4500221
C.V	60.46	59.48	49.23	57.12

Source: CMOH office Jalpaiguri District, 2012

Earlier we have considered the district in three geographical strata like tea garden belt, forest and hill area, and plain area to understand the physical infrastructure regarding beds and equipments of the PHCs in different blocks. Besides this the study considers manpower which includes doctors, nurses, health assistant (LHV, MHA, ANM), Group-D staff and also it calculates the densities of respective manpower staff in PHCs. Table 6.9A shows the blocks as per their geographical position in a particular block. The blocks like Meteli, Nagrakata, Kalchini, Falakata and Kumargram are showing a typical scarcity in terms of doctors. The situation like coverage by one doctor from BPHC or RH is very common for the blocks like Falakata, Dhupguri, Mal, Meteli and, Kumargram. Similarly scarcity of doctors can visible from the gap between sanctioned and in position difference. Only in case of Group-D the

PHCs are performing at satisfactory level. The statistical result in table 6.9B shows these discrepancies more properly. The inequality in all respect can be calculated by Coefficient of Variance (C.V.). The highest value of C.V. indicates the highest divergence. The figure 6.5 shows the distribution of manpower in position and the manpower shortage in terms of sanctioned strength. In terms of aggregate figure the study found that 38 percent of the total sanctioned manpower remains vacant in the PHCs of the district. The disaggregate picture of the blocks found that the position of blocks like Nagrakata, Kumargram, Falakata, Madarihat, and Alipurduar-I are in very much crucial, since there the vacant position is at least equal or more than 40 percent. The better results are shown for the blocks like Jalpaiguri, Maynaguri and Rajganj where the vacant positions are not more than 29 percent.

6.1.11: Comparison of Block PHCs Performance in terms of Infrastructure and Manpower

Now the sampled data collected from all PHCs can be summarised in the table 6.10A showing the different statistical values of the blocks distribution of manpower in terms of sanctioned and in position performing in PHCs over the district. The data regarding manpower collected from different PHCs and aggregated them Now the sampled data collected from all PHCs can be summarised in the table 6.10A showing in terms of different statistical values like mean, standard deviation (S.D.) and coefficient of variation (C.V.) of the blocks. Now in terms of PHCs list in the district as a whole we can calculate the C.V. for bed, equipments in use, doctors in position, nurses in position, health assistant in position and Group-D in position, which identify the blocks performing efficiently (inefficiently). The results are shown in the table 6.10B. The analysis with the help of Coefficient of variation has some limited application also. In case of bed availability for Kumargram block the value of C.V. is zero (0), since all the PHCs have same number of beds. Similar argument can be the reason behind the perfect functioning value of C.V for health assistant in positions and Group D in positions showing in table 6.10B. Some C.V values are extremely higher shows that high level of internal variation in case of respective health units within the block. In table 6.6 we have made a category between two regions i.e., forest and hilly regions and plain area of the district. Now the result of table 6.10B can be shown in terms of that categorisation made earlier in table 6.6 and the picture is shown in table 6.10C. In the table 6.10C we categorise the blocks in terms of performance of PHCs in three point scale, like A, B, and C. Where A means the most efficient and for which C.V. lays between 0 - 40 percent, B means the moderate efficient or inefficient and the C.V. of the followings are lie between 41 - 75 percent and C is the highly inefficient, for which C.V. is over 75 percent. In this issue it is very common that the areas with better endowment of infrastructure of PHCs to get more manpower in position and vice versa.

Table-6.10A: Mean, S.D, and C.V. values of different types of infrastructural and manpower density in PHCs in Blocks of Jalpaiguri District

Items	Statistic al Values	Jalpaiguri	Maynaguri	Dhupguri	Rajganj	Mal	Meteli	Nagrakata	Kumargram	Falakata	Madarihat	Kalchini	Alipurduar-I	Alipurduar-II
Bed	Mean	6.4	8.666667	4.666667	7.333333	5.333333	8	7	6	5	8.666667	2	8	8
	S.D	3.286335	2.065559	1.154701	2.309401	1.154701	2.828427	4.242641	0	1.414214	2.309401	2.828427	3.464102	3.464102
	C.V	51.35	23.83	24.74	31.49	21.65	35.56	60.61	0	28.28	26.65	141.42	43.3	43.3
Equipment	Mean	9	9.666667	6.333333	9.333333	7.333333	7	5.666667	7.333333	6.333333	7	7	7.333333	7.333333
	S.D	2.236068	1.75119	5.333333	2.309401	2.886751	2	2.886751	2.081666	3.21455	3	7.071068	2.081666	2.886751
	C.V	24.84	18.12	84.21	24.74	39.36	28.57	39.36	27.15	50.76	42.85	101.02	27.15	37.65
Doctors	Mean	0.8	0.833333	0.666667	0.666667	0.666667	0.5	0.5	0.5	0.5	0.666667	0.5	0.666667	1
	S.D	0.447214	0.408248	0.57735	0.57735	0.57735	0.707107	0.707107	0.707107	0.707107	0.57735	0.707107	0.57735	0
	C.V	55.9	48.99	86.6	86.6	86.6	141.42	141.42	141.42	141.42	86.6	141.42	86.6	0
Nurse	Mean	0.6	0.666667	0.333333	0.333333	0.666667	0.5	0.5	0.5	0.5	0.333333	0.5	0.333333	0.666667
	S.D	0.547723	0.516398	0.57735	0.57735	0.57735	0.7071.7	0.7071.7	0.7071.7	0.7071.7	0.57735	0.7071.7	0.57735	0.57735
	C.V	91.28	77.46	173.2	173.2	86.6	141.42	141.42	141.42	141.42	173.2	141.42	173.2	86.6
Health Assistant	Mean	1	1	0.666667	1	1	1	1	1	0.5	1	1	0.666667	1
	S.D	0	0	0.57735	0	0	0	0	0	0.707107	0	0	0.57735	0
	C.V	0	0	86.6	0	0	0	0	0	141.42	0	0	86.6	0
Group-D	Mean	1	1	0.666667	1	0.666667	1	1	1	0.5	0.666667	0.5	0.666667	1
	S.D	0	0	0.57735	0	0.57735	0	0	0	0.707107	0.57735	0.707107	0.57735	0
	C.V	0	0	86.6	0	86.6	0	0	0	141.42	86.6	141.42	86.6	0

Source: Sampled data collected from PHCs, 2012

In table 6.10C we have found that in the forest and hilly areas Kumargram, Meteli, and Mal blocks are performing better in terms of service provision initiatives either by using potential health assistant or by using existing beds and equipments. But all the blocks in forest and hilly areas face severe inefficiency in case of using potential manpower like doctor and nurses. Such type of inefficiencies are basically shown by the high value of C.V. and which are generated by the low uneven supply value of potential manpower (doctor and nurses) in the respective PHC units. Similarly when the supply of these kind of potential manpower increases and evenly distributed over all PHCs in these regions, automatically C.V. values

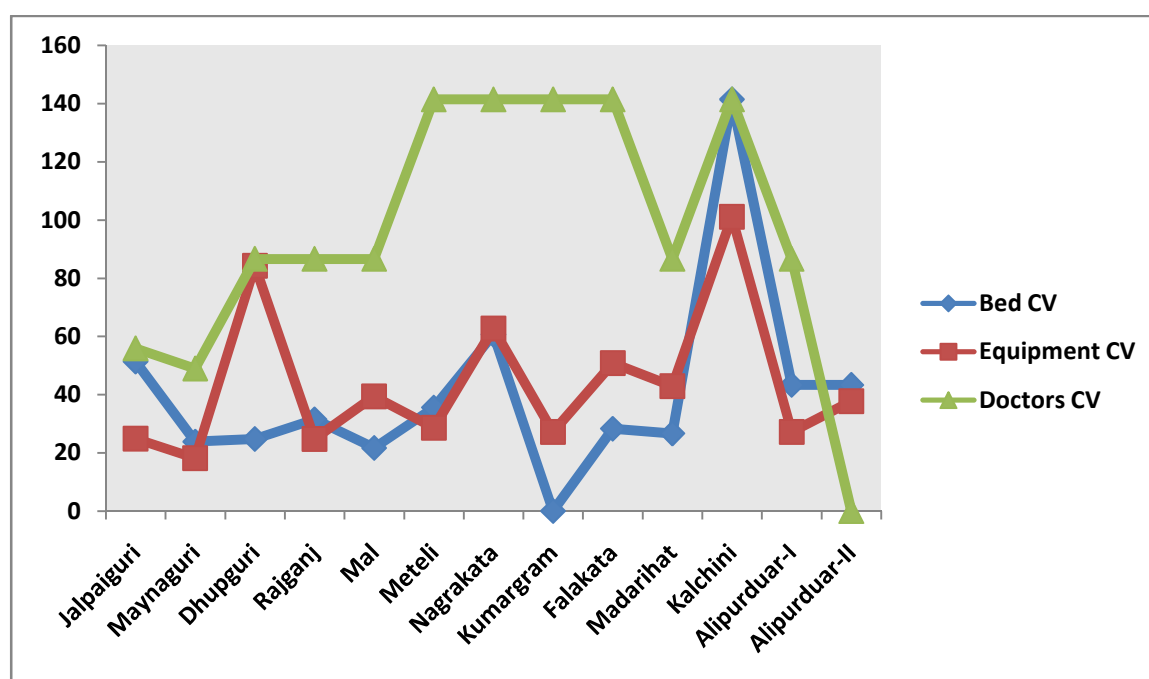
reduce and the respective inefficiencies turned to efficient values. The results from such table identify that

Table-6.10B: Blocks with of different types of infrastructural and manpower density in terms of Coefficient of Variations of PHCs

Blocks	Bed	Equipment	Doctors	Nurse	Health Assistant	Gr-D
Jalpaiguri	51.35	24.84	55.9	91.28	0	0
Maynaguri	23.83	18.12	48.99	77.46	0	0
Dhupguri	24.74	84.21	86.6	173.2	86.6	86.6
Rajganj	31.49	24.74	86.6	173.2	0	0
Mal	21.65	39.36	86.6	86.6	0	86.6
Meteli	35.56	28.57	141.42	141.42	0	0
Nagrakata	60.61	62.66	141.42	141.42	0	0
Kumargram	0	27.15	141.42	141.42	0	0
Falakata	28.28	50.76	141.42	141.42	141.42	141.42
Madarihath	26.65	42.85	86.6	173.2	0	86.6
Kalchini	141.42	101.02	141.42	141.42	0	
Alipurduar-I	43.3	27.15	86.6	173.2	86.6	86.6
Alipurduar-II	43.3	37.65	0*	86.6	0	0

Source: Sampled Data collected from PHCs, 2012

Figure-6.6: CV values of Bed, Equipment & Doctor densities over the Blocks



plains are top in terms of doctor's density and the forest and hilly region shows lowest density in terms of bed. Now other important aspects of providers of health are to consider the funds allotted and funds spend by them within a stipulated period. In the plain blocks like Rajganj, Maynaguri, and Alipurduar-II are functioning efficiently in terms of potential use of beds, equipments, doctors, health assistant and group-D staff. But all are facing a severe problem like functioning inefficiently due to uneven distribution of nurses within the blocks. Dhupguri is the most significant block where more or less all variables are functioning inefficiently and health administrator can look after the matter of this block.

Table-6.10C: Two regions with of different types of infrastructural and manpower density

Regions	Blocks	Bed	Equipment	Doctors	Nurse	Health Assistant	Gr-D
Forest and Hilly Areas	Mal	A	A	C	C	A	C
	Meteli	A	A	C	C	A	A
	Nagrakata	B	B	C	C	A	A
	Madarihat	A	B	C	C	A	C
	Kalchini	C	C	C	C	A	A
	Kumargram	A	A	C	C	A	A
Plain areas	Jalpaiguri	B	A	B	C	A	A
	Rajganj	A	A	C	C	A	A
	Maynaguri	A	A	B	C	A	A
	Dhupguri	A	C	C	C	C	C
	Falakata	A	B	C	C	C	C
	Alipurduar-I	B	A	C	C	C	C
	Alipurduar-II	B	A	A	C	A	A

Source: CV values of Table 6.10B, A=CV value between 0-40%, B=41-75%, C=Over 75%

6.1.12: Bed occupancy rate for ailments at various levels of facilities

Table-6.11: Distribution of Bed occupancy rate (%) for ailments at various levels of facilities in Western Dooars, 2011-2012

Block	PHC	BPHC	RH	SDH	DH
Jalpaiguri	12.4	96.7	NA	NA	83.3
Rajganj	10.2	NA	79.8	NA	NA
Mal	11.4	NA	NA	84.9	NA
Meteli	7.9	NA	NA	NA	NA
Maynaguri	12.8	NA	69.9	NA	NA
Nagrakata	6.6	NA	NA	NA	NA
Dhupguri	5.3	NA	101	NA	NA
Madarihat	9.8	NA	NA	139	NA
Kalchini	3.3	NA	NA	NA	NA
Falakata	4.7	NA	153	NA	NA
Alipurduar-I	9.3	NA	66.7	86.7	NA
Alipurduar-II	11.6	90.7	NA	NA	NA
Kumargram	10.5	94.6	NA	NA	NA

Source: HMIS data for Jalpaiguri district, 2011, NA=Not Applicable

A few other clues regarding utilisation of inpatient care emerge when the official data are disaggregated further by block wise. Table 6.11 describes the total number of admission in different level of health facilities for inpatient care during 2011-12 at Western Dooars. Considering the data collected from different health facilities shows that only 8.907692 percent of the total patients are admitted in the PHCs, whereas 83.3 percent in upper tier hospitals like District Hospital. Clearly there is a tendency of bypassing the lower tier health facilities in the area and overcrowded the upper tier hospitals. A possible implication from the above results is that a large number of inpatients bypass the block level PHCs leaving their Bed Occupancy Rate (BOR) much less than the desired level especially where the access to higher level facility is better. The official data on hospital admission (HMIS data 2011), as

shown in the table support the hypothesis. The blocks like Jalpaiguri Sadar, Maynaguri shows that BOR is high because of better-accessibility to urban areas. From this data, we can calculate hospitalisation rate in Western Dooars by following way. The total estimated population (2001) in the Western Dooars is 3016836 million, and the total admissions (2011) in PHCs are 3416. Hence the hospitalisation rate in PHCs in aggregate is $[\text{total admissions (2011)}] / [\text{total estimated population (2001)}]$ 0.11 percent. In case of hospitals like BPHC, RH, and SDH it is 72.8 percent and in case of upper tier (SGH/DH) the corresponding rate is 83.3 percent. However, the inequality in utilisation would be quite evident from the fact that 5 blocks (Falakata, Kalchini, Dhupguri, Nagrakata and Meteli) recorded extremely low rates (less than 0.041 percent) clearly imply that inpatients from the first group of blocks have a higher propensity to bypass local facilities compared to those from the other group. This inference could be further strengthened by the fact that the bed occupancy rate in the first group was extremely low in 2011 i.e., 4.7 percent, 3.3 percent, 5.3 percent, 6.6 percent and 7.9 percent respectively in Falakata, Kalchini, Dhupguri, Nagrakata and Meteli blocks.

6.1.13 Bed occupancy rate at PHCs for delivering birth

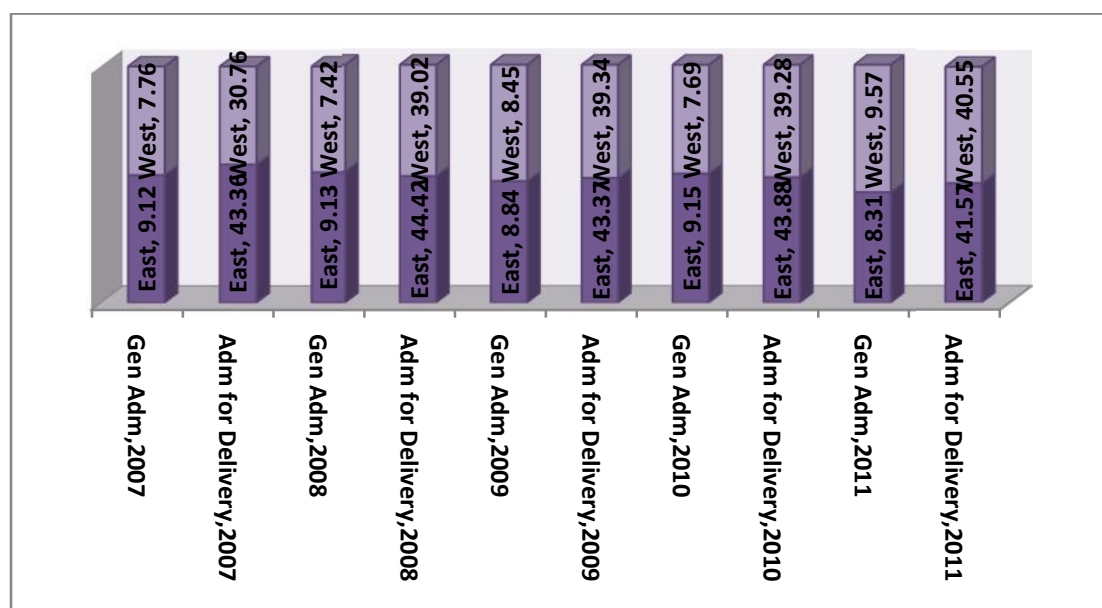
Table 6.12 describes the proportion of admission in local facilities for institutional delivery during 2007-2011 in the study area. In this table 6.12 we have analysed the Western Dooars in two parts, one consist of the blocks of western side like Jalpaiguri, Mal, Meteli, Nagrakata, Maynaguri, Rajganj and Dhupguri, the other side, the eastern part consist of Madarihat, Falakata, Kalchini, Alipurduar-I, Alipurduar-II and Kumargram block. The data show that bed occupancy rate for diseases other than institutional delivery, however, would be lower in the PHCs since a little less than one-fifth of total admissions were due to delivering births. The proportion (of birth delivery cases) significantly increased in the eastern side since 2005 with a downward trend in the most recent year. The implications from the overall picture are that the local facilities (especially the PHCs) are not utilised to their optimum level even though there is a high demand for inpatient care. A corollary to this observation is that the secondary and tertiary hospitals are over utilised exposing the weakness in the referral system. Another important point of concern is that the potential role of the lowest level facilities (such as PHCs) to share the load of inpatient care with the block and higher level facilities (such as BPHC/RH and SDH). The PHCs currently share a negligible part of inpatients primarily due to their low capacity to handle inpatient services, a common trait of Indian health care system. However, the exceptions for example, some PHCs in different blocks are notable which stand alone and manifests their potential not only in sharing the burden but also in providing low-cost solutions for common inpatient and birth delivery services.

Table-6.12: BOR at local facilities for delivering birth in Western Dooars from 2007-2011

	2007		2008		2009		2010		2011	
	East	West	East	West	East	West	East	West	East	West
Gen Adm	208	177	235	191	252	241	245	206	284	327
Adm for Delivery	989	907	1143	1004	1237	1122	1175	1052	1420	1385
	2281		2573		2852		2678		3416	

Source: HMIS data for Jalpaiguri district, 2011, ADM =Admissions

Figure-6.7: BOR at local facilities between Gen Adm & Adm for Delivery over 2007-2011



6.1.14 Outpatient per bed day at the lower and higher level hospital

Table 6.13 demonstrates the utilisation of outpatient care in the Western Dooars area during 2011. The evidences support that the utilisation of outpatient care is at sub-optimal level. In chapter 5, we find that majority of outpatient services is covered by the unqualified rural medical practitioners (RMPs), the same evidence also supported by the data collected from the providers end at a lesser degree. The situation of outpatient care can be analysed with the creation of a demarcation between lower tier health facilities (includes PHCs, BPHCs, RH and SDH) and upper tier facilities (includes SGH and DH). The subject like outpatient per bed day is an output measure of the OPD services of a hospital and is calculated as total outpatients in a year/[sanctioned beds X 365 days]. The corresponding value for PHCs is 40.5 percent. Increasing value of this indicator at a constant input level indicates increasing hospital efficiency. Data on outpatient visits at lower level facilities (PHCs) corroborate the phenomenon that the number of outpatients per bed day at the PHCs of the Western Dooars varied between 17.8 to 117.9 percent which is less than the state average. In other words, despite high demand for treatment of minor and chronic ailments, the outpatient services at

the primary healthcare facilities in Western Dooars meet only a small fraction of the demand, which is similar with our state picture. Overall, the utilisation pattern reflects the existence of crucial barriers which often remain invisible under the myriad of complex, and potentially confusing, health care choices available to people. The most prominent barriers include time and physical stress to reach a facility, or non-availability of required services. Clearly and logically people choose to access the nearest facility even if it is a low profile PHC if and when the barriers are reduced to minimum.

Table-6.13: Outpatient per bed day at the PHCs and higher level hospital in Western Dooars, 2011

Block	Jalpaiguri	Mal	Rajganj	Meteli	Maynaguri	Nagrakata	Dhupguri	Madarihat	Kalchini	Falakata	Alipurduar-I	Alipurduar-II	Kumargram
PHC	2886	3369	2026	2114	3389	2990	2489	3277	2364	2405	3380	3517	3606
BPHC/RH/SDH	48865	34587	33562	28417	32457	18945	25746	33775	20641	34569	48792	41688	46367
Outpatient per bed day(PHC)	0.247	0.577	0.252	0.362	0.178	0.585	0.487	0.345	1.619	0.659	0.661	0.401	0.823

Source: HMIS data for Jalpaiguri district, 2011

6.1.15 Preparedness of Western Dooars Health Facilities

Table 6.14 describes that how prepared or constrained are the local public health facilities to address the barriers of health attention. Data collected from 15 block level facilities (including 9 BPHC, 5RH and 2SDH) reveal that almost all facilities were functioning with basic services such as general OPD, IPD, and labour room. Ambulances were available and functional. All of them had required capacity to provide basic maternal and child health care such as normal birth deliveries, or treatment of diarrhoea-affected children. Basic pathological test services were also available in only 35.14% and management of animal attack or snake bite which constitutes an important part of emergency care in the Western Dooars is present in 4.15 PHCs of the total functioning PHCs in the district. Notwithstanding a visibly enabled environment in the block level facilities, it is hard to overlook several caveats in the system. First, the translation of capacity into effective utilisation in case of some services is seriously constrained by inadequacy of some critical and complementary inputs. For example, equipment for provisioning of critical services like resuscitation and thermal protection (baby warmer) is available in almost all the blocks but in absence of steady power supply its utilisation is highly restrained. In many cases equipments are non-functional implying sheer negligence on maintenance. Almost 97 percent of the PHCs did not have facility to conduct

caesarean section and / or basic emergency obstetric care (EMOC) services. Even the three first referral units (FRUs), facilities designated to provide 24X7 comprehensive EMOC services, were found lacking in several critical inputs. For example, the SDH situated in Alipurduar-I block reported shortage of equipment for resuscitation and baby warmer. The rural hospital in Falakata block, another designated FRU, is running without any blood storage unit. About half of the facilities were found deficient in providing basic neo-natal services. The radiology and imaging services were conspicuously weak; for example, only three district level facilities were found to have an USG machine and only eight could provide X-ray facilities to the users.

Table-6.14: Preparedness of Western Dooars Health Facilities in percentage

Services	Lower Tier				Upper Tier	
	PHC	BPHC	RH	SDH	SGH	DH
OPD	100%	100%	100%	100%	100%	100%
IPD	94.20%	100%	100%	100%	100%	100%
Labor Room	83.70%	96.24%	100%	100%	100%	100%
Pathological Test	35.14%	79.41%	82.15	94.28%	100%	100%
Animal/Snake bite Management	4.15%	44.28%	69.84%	78.55%	100%	100%
Blood Bank	0	0	50.00%	60.22%	100%	100%
Thermal Protection	12.11%	68%	100%	100%	100%	100%
Steady Power Supply	0.00%	20%	60%	100%	100%	100%
Caesarian Section	2.14%	77.35%	100%	100%	100%	100%
EMOC	4%	94%	100%	100%	100%	100%
EMOC services	2%	81%	100%	100%	100%	100%
Radiology	0.00%	27%	100%	100%	100%	100%
Imaging Servuces	0.00%	47%	100%	100%	100%	100%
USG Machine	0.00%	0.00%	0.00%	20%	100%	100%
X-Ray	0.00%	25%	100%	100%	100%	100%

Source: HMIS data for Jalpaiguri district, 2011 and Sampled data from PHCs, 2012

6.1.12 Conclusion

The public health care network in the Western Dooars symbolises a system with serious constraints, yet deemed to deal with extraordinary challenges of meeting the health care need of the Western Dooars. The constraints manifests lower level facilities the PHCs and sub-centres- operating far below the potential, and the block level facilities able to meet only a small part of the need. Hence, the necessary steps will be taken to strengthening the block level facilities being able to meet only a small part of the need. Strengthening the block level facilities is extremely crucial since they not only act as the first point of inpatient care, but also operate as a hub for all public health programmes carried out by their lower level counterparts including those located in hard-to-reach locations.

Section-II

Rural Medical Practitioners (Unqualified)

- **Introduction**
- **Rural outpatient care market in Western Dooars**
- **Existence of RMPs and per day patients visits**
- **Medical background of RMPs**
- **Drug collection & distribution behaviour of RMPs**
- **General treatment behaviour of RMPs**
- **RMPs behaviour in mother and child health care (MCH)**
- **RMPs behaviour related to surgical intervention**
- **RMPs referral behaviour**
- **Conclusion**

SECTION II

Rural Medical Practitioners (Unqualified)

6.2 Introduction

The dominance of unqualified rural medical practitioners (RMPs) are already stated in the last chapter. They are village doctor practicing modern medicine without any formal training. Based primarily on the survey of a sample set of RMPs, the present section explores further to assess the supply side issues associated with this group of informal providers.

The RMPs were selected through 3 blocks (Alipurduar-II, Madarihat, and Falakata) from study area by a two stage sampling procedure. They were purposively selected based on their distance from the block head quarter. From each block 30 RMPs are surveyed, 15RMP from the block headquarter and another 15 from remote villages of block. In total 90 RMP were interviewed through this process. The focus of the interview is on the background of the RMPs, background of their patients, knowledge about various diseases and treatment procedures, and treatment and referral behaviour.

The overwhelming dominance of the RMPs in the Western Dooars' health care market it imperative to direct the policy focus towards their role as an institution. The first step towards this direction would be to develop a framework for analysing the market structure in which the key actors especially the RMPs - play their roles.

6.2.1 Rural outpatient care market in Western Dooars

Figure-6.8: Rural outpatient care market in Western Dooars

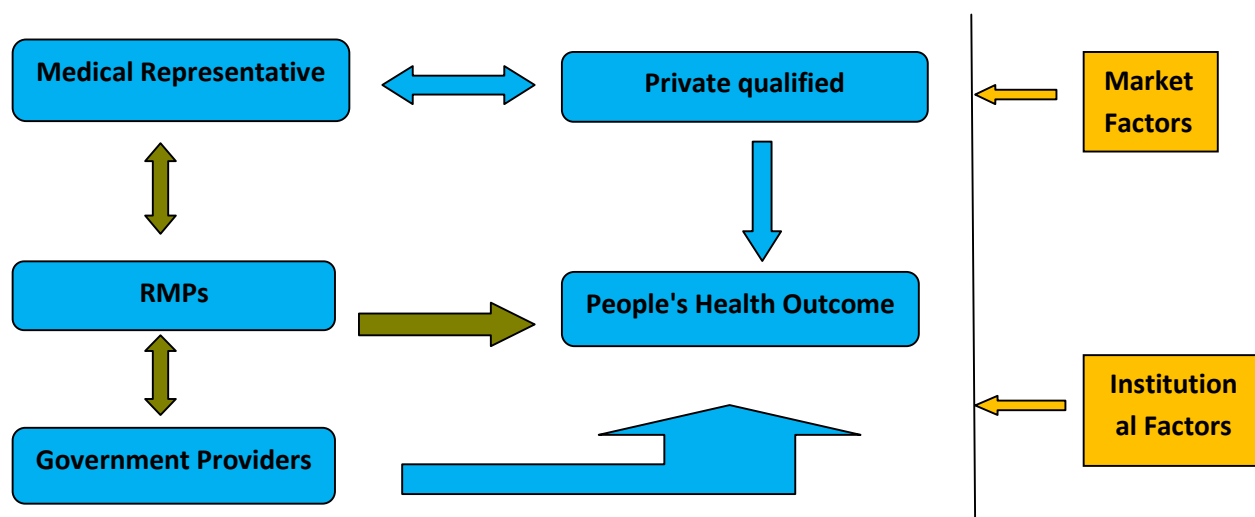


Figure 6.8 presents such a simple framework based on the elements of New Institutional Economics. The key market actors are (1) the RMPs, (2) government providers, (3) private qualified providers (including NGOs), and (4) medical representatives (or, the drug detailers)

who canvass medicines to anybody who practice modern medicines. The informal (or unofficial links, indicated by moss green arrows, are well establish between the RMPs and medical representatives (MR) and government providers. The link with MRs is particularly interesting since the RMPs also act as medicine vendors and, hence, absorb the larger share of pharmaceutical products as the dominant actor. Their interface with MR, however, remains indiscernible to a larger extent since the RMPs are not officially or legally recognised as medical practitioners. Similar is the case with their links with government doctors, who, admittedly, often 'refer' cases to RMPs and 'receive' cases referred by RMPs at their work stations or at private clinics.

The blue arrows show the formal link, which, as the width of the arrows indicates, is easily dwarfed by sheer strength of the parallel and informal link. The strength is derived from two forces: (1) market or price factors, and (2) institutional factors. The price factors, are more visible; evidently, people save money and time when they visit a RMP (instead of visiting a public health centre) because RMPs are available anywhere anytime. However, no less important are the 'institutional' factors, mostly arising out of the informal structure of the RMP-people connection which help reduce the transaction cost on both sides and wrap it with a strong bondage. The informality in the parallel market has its roots in the background characteristics of the providers (RMPs) and their treatment behaviour. Some of the key characteristics, as collected by the study of 90 RMPs are as discussed in the following tables.

6.2.2 Existence of RMPs and per day patients visits

Table 6.15 describe the spread of RMPs over the block in terms of rural and urban area. The studies found that out of 90 RMP 52 percent are located in the rural area and 48 percent in the urban area. According to the study estimates, on an average a village in the Western Dooars had 3.14 RMPs are practicing. In the rural side average number of patient's visits is 65.34 percent. Corresponding to total population, the average population covered by one RMP is around 6306.

Table-6.15: Existence of RMPs and per day patients visits in the study area

Obsevation	Alipurduar-II		Madarihat		Falakata		Total	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
RMP Originally from	22	8	9	21	12	18	43	47
Av No of Patients visits per day	14	21	11	27	10	18	35	66
Total Population	197231		185470		254273		636974	

Source: Sampled study on RMP, 2012

6.2.3 Medical background of RMPs

Table-6.16: Medical background of RMPs in the study area

Medical background		Alipurduar-II	Madarihat	Falakata
Educational Qualification	Have a college degree	7	6	10
	Have not	23	24	20
Availability	Only Day	9	3	4
	Day & Night	21	27	26
Basic Skills	Pushing Injections	30	30	30
	Checking blood pressure	24	30	27
	Reading X-ray plates	17	21	15
Training	No	5	7	3
	Under any Doctor	16	18	22
	Working in Pharmacies	9	4	4
Profession	Full time	24	27	22
	Part time	6	3	8

Source: Sampled study on RMP, 2012

Figure-6.9: Medical back ground of the surveyed RMP

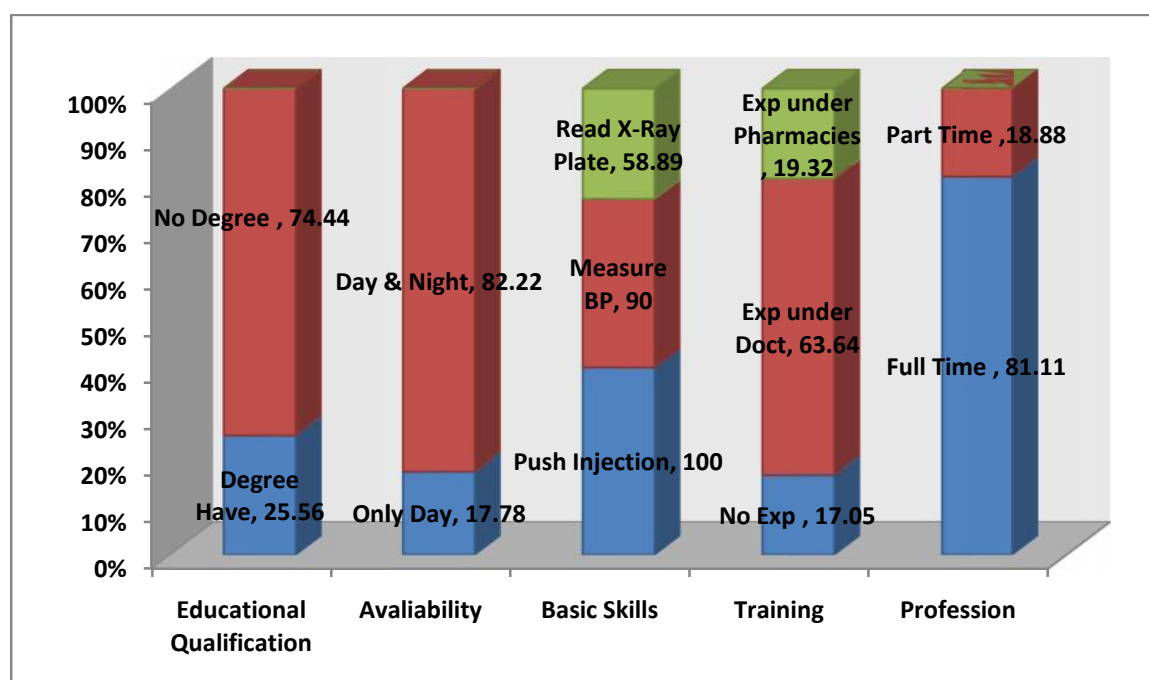


Table 6.16 brings out the classification of medical background of RMPs in the Western Dooars area. About three fourths of all RMPs did not have a college degree (74 percent) and almost all (81 percent) had taken it as a full time profession. The study found 82 percent of the RMPs are available in day and night. Almost all of them (96 percent) were available on-call even at mid-night although they also had been operating clinics on a normal routine. The study found that 62 percent of the RMPs (two third) had past experience of working with some qualified private practitioners. This experience helps them 'learn' the treatment path

and medicines for common diseases and develop some basic skills (such as, pushing injections, checking blood pressure, and even reading X-ray plates).

6.2.4 Drug collection & distribution behaviour of RMPs

Table-6.17: Drug collection & distribution behaviour of RMPs in the study area

Treatment & Drug Behaviour			Alipurduar-II	Madarihat	Falakata	Total
Treatment	Allopathic		25	20	24	69
	Homeopathic		4	6	3	13
	AYUSH		1	4	3	8
Provide Drugs	Yes	Without Credit	9	11	8	28
		With Credit	14	15	13	42
	No		7	4	9	20
Drug Collection	Pharmacies		18	16	17	51
	Medical Representative		7	6	7	20
	Whole saler		5	8	6	19

Source: Sampled study on RMP, 2012

Figure-6.10: % of Practice method, Drug distribution & Drug Collection behaviour of RMPs

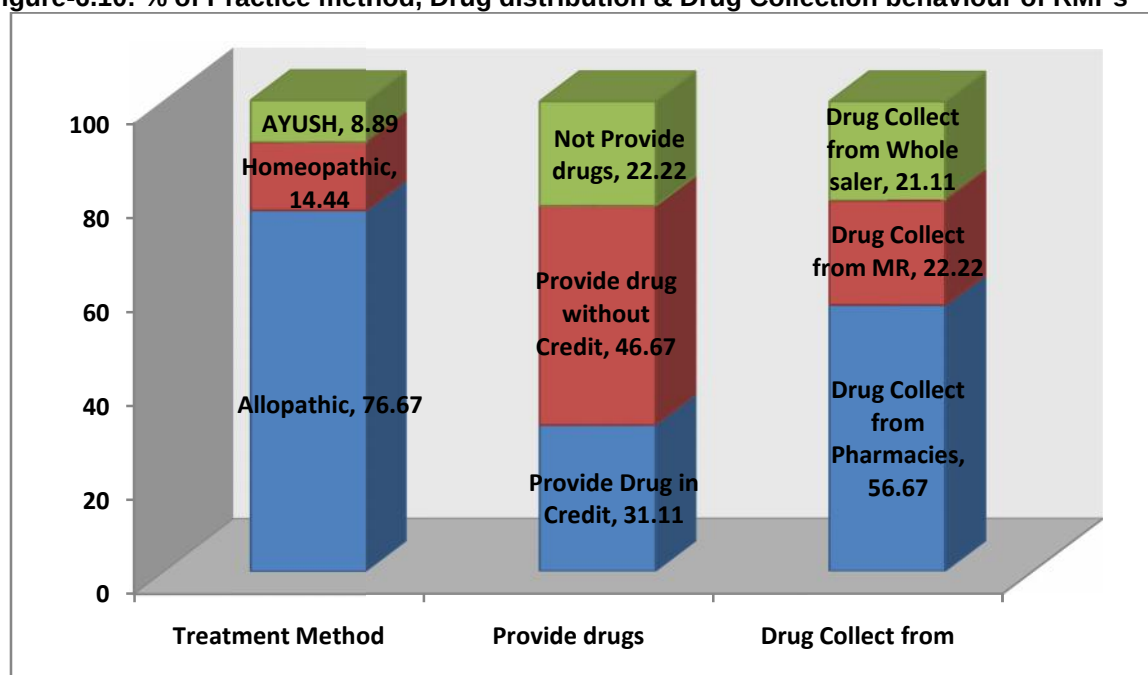


Table 6.2.4 describes the treatment and drug distribution behaviour of RMPs in the study area. The study found 76.6 percent of the existing RMPs are practicing allopathic treatment, which is more than three times of the practicing homeopathic and AYUSH treatment process. Almost 77.7 percent of the RMPs clearly provide drugs with treatment and among them most of the RMPs (60 percent) would sell drugs on credit or at subsidised prices if the client does not have enough cash at the point of service delivery. Half of the existing RMPs

procure these drugs from local pharmacies (the rest from the wholesalers and medical representatives). The operational procedures of RMPs clearly reflect a mutually beneficial agency relationship. For example, during ailments rural people tend to depend on those health care providers who would be easily accessible, understand their socio-economic constraints, respond quickly, and offer a quick medicine for their ailments at an affordable cost. The benefit of deferred payment (i.e., payments for drugs on credit basis) generates huge incentives to the buyers of services. On the other hand, the providers or the agents (RMPs) find significant market incentives in terms of clients who have no or very poor information about their own health problems or treatment procedures but always look for some packaged medicines or injections whenever they fall sick. In addition, easy access to knowledge on modern medicines (through medical representatives), good understanding of people's social behaviour and economic constraints, and a very weak public health care system make them a formidable player in the outpatient market.

6.2.5 General treatment behaviour of RMPs

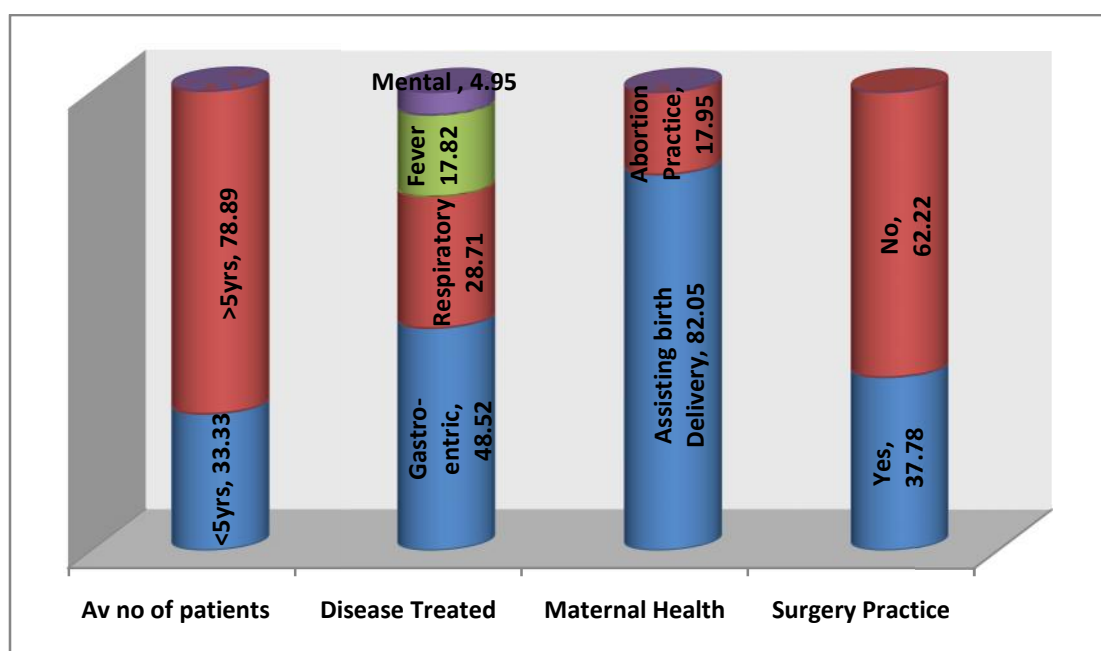
Table-6.18: General treatment behaviour of RMPs in the study area

General Treatment behaviour		Alipurduar-II	Madarihat	Falakata	Total
Av number of patients per day	< 5 yr	10	12	8	30
	> 5 yr	25	26	20	71
Disease treated commonly	Gastro-enteric	15	21	13	49
	Respiratory	12	8	9	29
	Fever	6	8	4	18
	Mental health problems	2	1	2	5
Maternal Health	Assisting birth delivery	18	24	22	64
	Abortion	3	6	5	14
Surgery practicing	Yes	12	13	9	34
	No	18	17	21	56

Source: Sampled study on RMP, 2012

Table 6.18 brings out the distribution of treatment behaviour of RMPs in the study area. On average, one RMP treats 15-20 patients every day, about one-third of them being children below 5 years. As reported by the selected RMPs, the most common diseases treated by them are related to gastro-enteric (e.g. diarrhoea) and respiratory ailments like common cough, cold, fever and asthma. However, people seek care also for relatively less common ailments; for example, about 5.56 percent of RMPs reported to have treated patients with mental health problems in the last one year. Assisting in birth delivery seems to be a common and regular part of their profession for more than half of the RMPs (71 percent). It is also a matter of concern that, even with high probability of underreporting, 15.56 percent of RMPs admitted that they provided frequent abortion services.

Figure-6.11: General Treatment Behaviour of RMP



6.2.6 RMPs behaviour in mother and child health care (MCH)

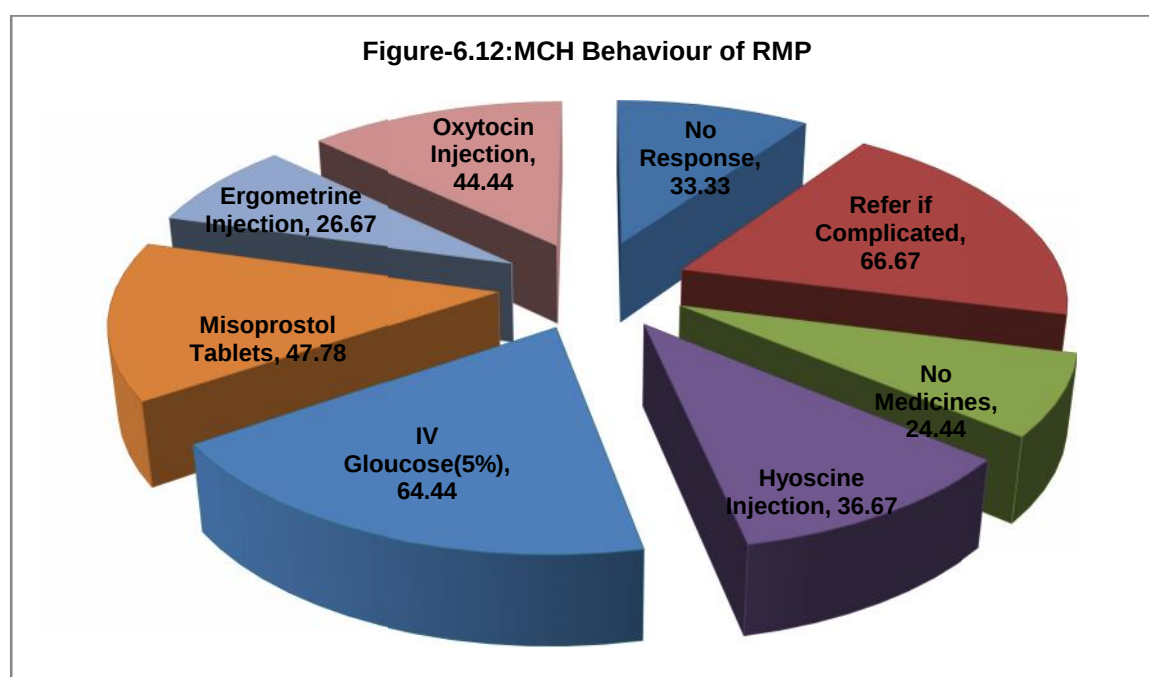
Table-6.19: RMPs behaviour in mother and child health care (MCH) in the study area

MCH	Alipurduar-II	Madarihat	Falakata	Total
No Response	12	8	10	30
Refer if complicated	18	22	20	60
No Medicine	9	6	7	22
Hyoscine injection	9	13	11	33
IV Glucose (5%)	18	21	19	58
Misoprostol Tablets	13	16	14	43
Ergometrine injection	7	11	6	24
Oxytocin injection	13	15	12	40

Source: Sampled study on RMP, 2012

Table 6.19 describes the mother and child health care (MCH) behaviour treated by the RMPs in Western Dooars. In this regard, a pertinent question is: how safe is MCH at the hands of RMPs? Do they have adequate knowledge on how to diagnose and how to treat in a particular situation? Do they practice the proven safe methods in birth deliveries or in treating a child with diarrhoea? In the study on the RMP, the process of knowledge, attitude and practice (KAP) is implemented on selected RMPs, which reveals a mixed picture. The study found, many of them have basic knowledge about the diagnosis and primary purpose of modern medicines related to common diseases; on the other, the practices (or treatment) often reflect lack of judgement regarding rational use of drugs. For example, pushing

Oxytocin during labor pain (for induction of labor) is found to be a popular part of assisting in birth deliveries by a large section of RMPs even though unmonitored intrapartum use of Oxytocin has been found to have several adverse outcomes (*Jeffery P et al, 2007*). Similarly, despite having knowledge about importance of ORS in diarrhoea treatment, 64.4 percent of RMPs indicated use of IV fluids as the first line treatment of children's diarrhoea. Data on the RMPs preferred line of treatment also indicate rampant use of antibacterial / antibiotic drugs (e.g., Ciprofloxacin and Metronidazole for normal diarrhoea, Cefalexin for common respiratory troubles). Given no data on the degree of irrationality in the use of these drugs it is, however, difficult to assess the harmful impact of these practices.



6.2.7 RMPs behaviour related to surgical intervention

Table 6.20 shows the behaviour of surgical intervention of RMPs in the study area. Despite uncertainties about health impact in case of non-surgical treatments, the potential harm can be captured in a more concrete way in three other related RMP practices: (1) the increasing engagement of RMPs in surgical intervention, (2) their gradual penetration in the inpatient market (i.e., clinics with beds), and (3) their pool referral practices. Available data indicate that an alarming trend of surgical interventions including major surgeries - by RMPs. About three-fourth of the RMPs interviewed during survey indicated that occasional or frequent tryst with surgical equipment. The surgical cases ranged from female sterilisation to operating on 'liver abscesses'. There is virtually no barrier to be a surgeon which also induces an established RMP to venture in to hospital 'business', i.e., running a clinic with

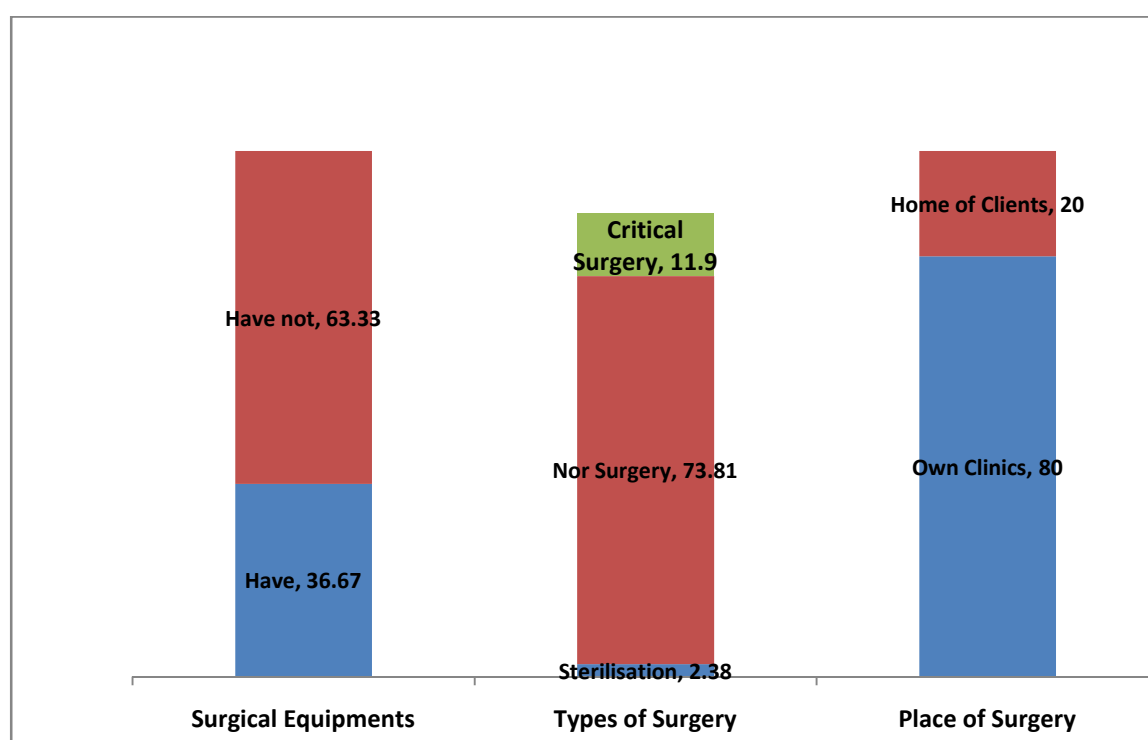
inpatient facilities. Clearly, in a poorly unregulated environment, RMPs penetration into inpatient market implies a sizeable risk to their clients.

Table-6.20: RMPs behaviour related to surgical intervention in the study area

Surgical Intervention		Alipurduar-II	Madarihat	Falakata	Total
Surgical Equipments	Have	9	13	11	33
	Have not	21	17	19	57
Types of surgery	Female sterilisation	1	0	1	2
	Normal surgery	20	23	19	62
	Critical surgery	4	2	4	10
Place of Surgery	Own clinics	24	27	21	72
	Home of clients	6	3	9	18

Source: Sampled study on RMP, 2012

Figure-6.13: % Distribution of RMPs Surgical intervention



6.2.8 RMPs referral behaviour

Table 6.2.8 describes the referral behaviour of RMPs in the study area. The referral behaviour of RMPs also manifests the risk. The basic question regarding the referral behaviour of RMPs asked that whether they refer potentially or actual complicated cases to public facilities or qualified private doctors. The study suggested that, on average 1251 patients were referred by the RMPs in last months, which is actually 40.75 percent of the

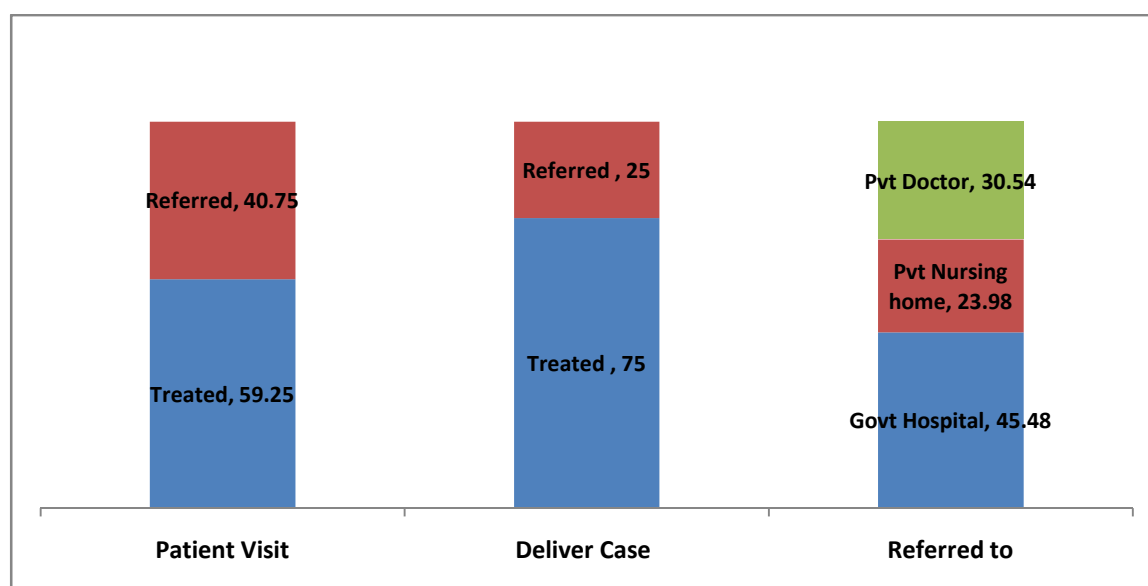
patients who visited his clinic. The calculation made on the basis of under qualified data regarding the number of patient visits per day at the chamber of RMP. Low referral rate reconfirms the common perception is that they refer only when cases go completely out of their control. The scenario is , however less discouraging in the complicated birth delivery cases; for example most of the RMPs, according to their responses, would refer to the government hospitals (45.48 percent) or private nursing homes (30.54 percent) in case a woman comes with obstructed labor, or bleeding before delivery, or eclampsia.

Table-6.21: RMPs referral behaviour in the study area

Referral Behaviour		Alipurduar-II	Madarihat	Falakata	Total
No of patients visits in last months		1023 (33.32)	1180 (38.44)	867 (28.24)	3070 (100)
No of patients referred in last months		421 (33.65)	475 (37.97)	355 (28.38)	1251 (100)
No of birth delivery cases received last months		17 (32.69)	22 (42.31)	13 (25)	52 (100)
No of birth delivery cases referred last months		4 (30.77)	7 (53.85)	2 (15.38)	13 (100)
Referred to	Govt Facilities	153 (26.89)	242 (42.53)	174 (30.58)	569 (100)
	Pvt Nursing Home	81 (27.00)	125 (41.67)	94 (31.33)	300 (100)
	Pvt Doctor	187 (48.95)	108 (28.27)	87 (22.77)	382 (100)

Source: Sampled study on RMP, 2012, Figure in the parentheses shows the percentages figure of the corresponding totals

Figure-6.14: % Distribution of Referral Behaviour of RMP



Discussion with the villagers reveals that most of the RMPs have good working relation with private nursing homes which popped up over the years at the periphery of the Western

Dooars. Few of them work as a linkman to particular private nursing homes and refer cases whenever they have to. This finding is corroborated with the household survey estimates that two-third of all RMP-referred cases were advised to visits particular private clinics or institutions.

6.2.9 Conclusion

To summarise, RMPs are an integral and vital part of the Western Dooars' health care structure. They have a strong grip over the health care market, much stronger than the public health care system. From the policy perspective, there is an inherent dilemma is acknowledging this fact and taking a clear stand on this issue. On one hand, RMPs dominance is too obvious to ignore, while on the other, the legal and technical barriers are too strong to formally acknowledge RMPs and redirect their market power in a controlled and guided manner.

CHAPTER-7

Patient survey in PHCs of Western Dooars

- Introduction
- Determination of sample size
 - Sample size for IPD and OPD
- Patient Choosing Methodology
- Socio-economic character of patients
 - Economic status
 - Socio-economic Status
 - Educational Status
- Access to Healthcare
 - Proportion of Ailing Persons (PAP)
 - Access in IPD facilities of PHCs
 - ✓ Access to beds
 - ✓ Distance travelled to access the IPD services of PHCs
 - ✓ Preference reasons for IPD in PHCs
 - ✓ Choice between PHCs and Private Nursing homes
 - Access to OPD Services
 - ✓ Distance travelled by OPD patients
 - ✓ Preferences for private doctors of OPD Patients
 - Access to free Medicines
 - ✓ Drugs of PHCs
 - ✓ Block-wise receiving pattern of medicines
- Perception Index derived from Patients
 - Manpower Index
 - Cleanliness Perception Index
 - Infrastructure Perception Index
 - Calculation and Results of Overall Perception Index
- Conclusion

CHAPTER-7

Patient survey in PHCs of Western Dooars

7.1 Introduction

To make a complete picture of the providers behaviour and efficiency, it is very much important to consider the demand side scenario which mainly deals with the patient expectations and experience about the services what they going to receive or what they received in past. The study think this will focus some light in the context of realistic health provision what the recipients obtained from the process. Also, the performance of the health units can be evaluated more thoroughly with the help of such enlightenment. Since the purpose of the study is to estimate the efficiency of the lower tier facilities, so here we are concerned about the Primary Health Centres (PHCs). Thus study interrogates 1082 patients from 38 Primary Health Centres (PHCs) in Jalpaiguri district of Western Dooars. Here, the study covers both inpatient and out-patient department under a structure. The socio-economic background of the patients are collected and analysed, the study also tries to evaluate about the quality of services and its nature also. The causes behind the reasons when they remain absent to achieve such services were also attempted. This possibly identifies the barriers which obstructed to get such health services.

7.2 Determination of sample size

The fund allotted for health units according to the number of beds allotted to that health units. In case of several PHCs are running without beds one average processes are followed for distribution of funds. The upper tier facilities like Block Primary Health Centre (BPHC) or Rural Hospital (RH) which are developed from PHCs with both Inpatient department (IPD) and Out-patient department (OPD) communicated with some allotted PHCs under it. Now whether through district level or directly from state funds are allotted to the PHCs either in terms of bed (for which have IPD facilities) or on the basis of average i.e., how many PHCs are performing under one BPHC. Significantly the bed size also varied among PHCs who have IPD facilities. The bed size of the PHCs are varies from 2 to 10. Thus bed number wise survey can generate some kind of biasness. To solve this problem we consider some kind of floor to the sample size. Thus we consider a minimum of 15 patients per PHCs, in order to balance of maximum 30 patients. Thus, in this way we have 1090 patients altogether.

7.2.1 Sample size for IPD and OPD

It is also an important task of this kind of survey is that how many patients among a sample size will be selected from IPD and how many from OPD. To determine the corresponding

sample size for IPD and OPD, the study took some help from the state level provided secondary data. For West Bengal the study found 909 PHCs with 6612 bed strength and cater a bulk of patients. In Jalpaiguri district, there are 38 PHCs with 256 beds. We collect the data from district health office that how many patient visited each PHCs in IPD and OPD facilities in 2010 and calculate the ratio for each PHCs. We divide the sample size in terms of that ratio (approximately 1: 5, and actually it was 19 : 100 for each PHC) for each PHC and get the allotted sample size for each PHCs. Table 7.1 shows the allotted sample size for each PHCs according to its IPD and OPD facilities. Thus the sample selection shows that in total 171 people are surveyed for IPD and 919 people are surveyed for OPD facilities and in total 1090 patients are surveyed to get the information regarding their ailments pattern and also regarding their conception of services what they receive from different PHCs.

Table-7.1: Sample size allocation to each PHCs

Block	No of PHC	No of Bed	Sample size for OPD	Sample size for IPD
Jalpaiguri	5	32	142	21
Maynaguri	6	52	147	38
Dhupguri	3	14	86	9
Rajganj	3	22	81	14
Mal	3	16	87	10
Meteli	2	16	33	10
Nagrakata	2	14	33	10
Kumargram	2	12	35	8
Falakata	2	10	38	7
Madarihat	3	26	77	18
Kalchini	2	4	43	2
Alipurduar-I	2	14	36	9
Alipurduar-II	3	24	81	15
Total	38	256	919	171

Source: Sample size calculation on the basis of patient visits in 2012 at different PHCs

7.3 Methodology of Patient Choosing

A significant determinant of this kind of study is to adopt a methodology which one is more appropriate to make choice of a patient during the survey. To cover the morbidity pattern, disease profile the choice pattern must have some randomness. So in case of OPD patients we have to marked same weight to some basic type of illness. The study categorised illness for OPD patients in three basic types. The first category cover general illness, which includes fever, diarrhoea etc., the second category covers maternity and gynaecological problems and needs, and the third category includes eye problems, ear-nose-throat problems (ENT), orthopaedic problems, paediatric problems, skin problems, surgery etc. A particular patient or patient party is chosen by the following manner. In OPD every patient are asked about

their nature of ailments first. Then according to the nature of ailments and on the basis of sample size they are asked about the socio-economic conditions if they agreed. If he refuses we go to the next patients. In case of IPD same weightage is given to male and female wards. In IPD a specific patients with sex were visited two out of three randomly selected and interviewed for his/her personal experience so far with PHC.

7.4 Socio-economic character of patients

We consider in this section the economic issues and socio-economic issues related with the patients or patient parties.

7.4.1 Economic status

Table-7.2: Share of MPCE1 and MPCE2 patients under different blocks of Jalpaiguri

Block	Share of MPCE1		Share of MPCE2	
	OPD	IPD	OPD	IPD
Jalpaiguri	30 (21.13)	3 (14.29)	112 (78.87)	18 (85.71)
Maynaguri	26 (17.69)	7 (18.42)	121 (82.31)	31 (81.58)
Dhupguri	17 (19.77)	2 (22.22)	69 (80.23)	7 (77.78)
Rajganj	16 (19.75)	3 (30.00)	65 (80.25)	7 (70.00)
Mal	18 (20.69)	2 (14.29)	69 (79.31)	12 (85.71)
Meteli	7 (21.21)	2 (20.00)	26 (78.79)	8 (80.00)
Nagrakata	4 (12.12)	0 (0.00)	29 (87.88)	10 (100.00)
Kumargram	6 (17.14)	1 (12.50)	29 (82.86)	7 (87.50)
Falakata	8 (21.05)	0 (0.00)	30 (78.95)	7 (100.00)
Madarihat	9 (11.69)	2 (11.11)	68 (88.31)	16 (88.89)
Kalchini	2 (4.65)	0 (0.00)	41 (95.35)	2 (100.00)
Alipurduar-I	10 (27.78)	3 (33.33)	26 (72.22)	6 (66.67)
Alipurduar-II	9 (11.12)	3 (20.00)	72 (88.88)	12 (80.00)
Total	162 (17.43)	28 (16.37)	757 (82.37)	143 (83.63)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of the totals

To judge the economic status the study consider whether the family situated above or below the below poverty level (BPL). In such identification the study consider the criterion as whether the family have BPL card or not, assuming that the card distribution process is mostly perfect. The study found 78 percent visited PHCs have BPL card. But BPL card holding is not actually representing the proper economic status. This is due to the fact that

holding BPL card depends upon political connection, power of ability to manipulate etc. As a result another factor like monthly per capita expenditure (MPCE) for each family can be considered as indicator of measuring the economic status of the patients of that family. According to planning commission (2010) the estimate for rural poverty is Rs 643.2 for an individual in rural areas. Thus according to MPCE we divide the patients in two categories, MPCE1, and MPCE2. Under MPCE1, the patients whose MPCE >Rs 643.2 and the patients under category MPCE2, whose MPCE <Rs 643.2 (source www.planning commission.nic.in). Since more than 80 percent of the PHCs are located in rural or semi-urban area, so we consider the rural poverty bench mark as an proxy to estimate the economic status of the patients. Table 7.2 shows this categorisation in the sampled patients under different blocks of Jalpaiguri district. From the table 7.2 the study found that 82.37 percent of the patients from MPCE2 background visited the OPD of PHCs and 83.63 from MPCE2 background visited for IPD care in PHCs of Jalpaiguri district. The picture becomes significant that more than four out of five persons visited PHCs either for OPD or for IPD services are belonging in some lower economic status. To understand the economic status properly we can compare the BPL status with MPCE criterion in aggregate form.

Figure-7.1: Distribution of MPCE1 & MPCE2 Patients for IPD & OPD Section

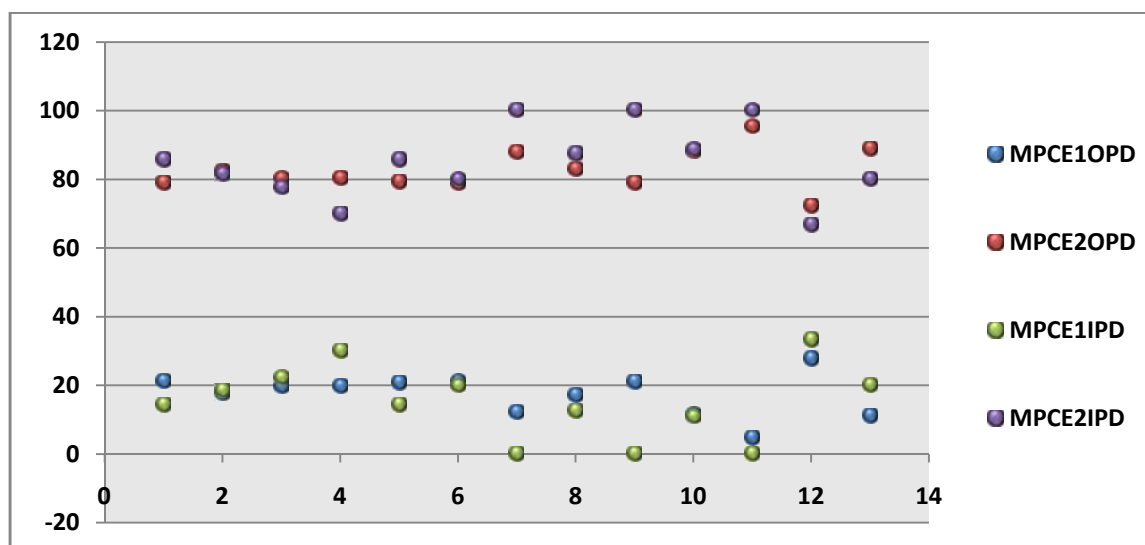


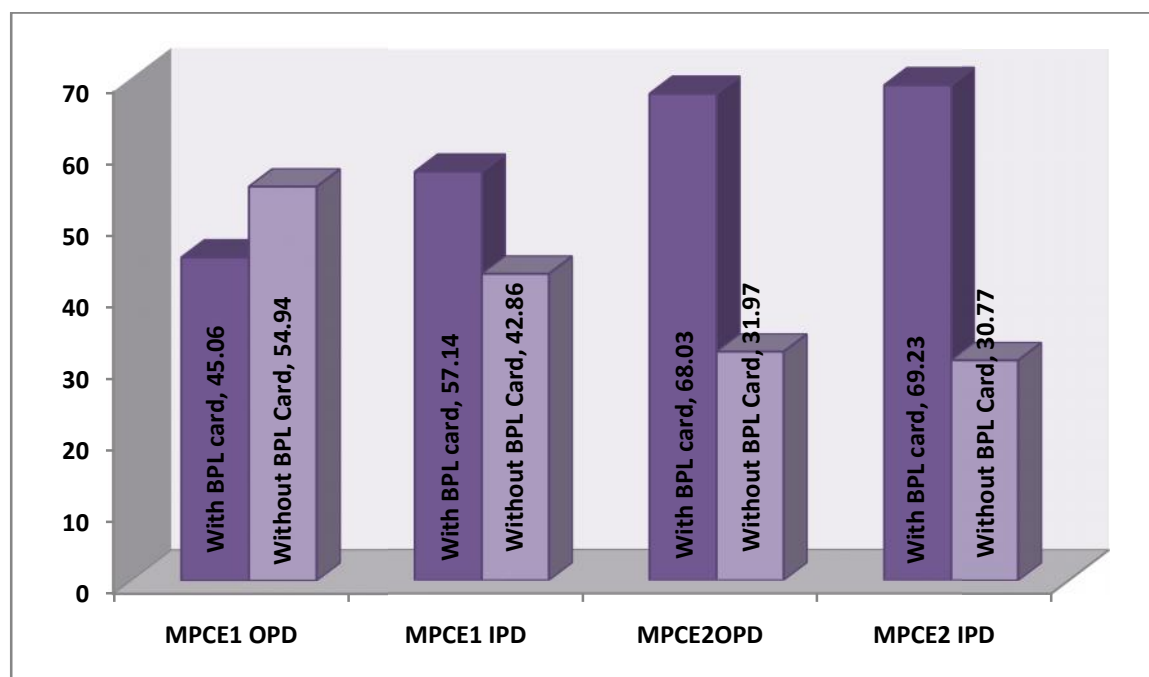
Table-7.3: MPCE status with BPL card among sampled patients

Category	OPD Patients		IPD patients	
	With BPL Card	Without BPL Card	With BPL Card	Without BPL Card
MPCE1	73 (45.06)	89 (54.94)	16 (57.14)	12 (42.86)
MPCE2	515 (68.03)	242 (31.97)	99 (69.23)	44 (30.77)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentages

Table 7.3 describe the relation between MPCE status and BPL status of the sampled patients in PHCs both for IPD and OPD care. The study found that among MPCE2 category for OPD patients 68.03 percent hold the BPL card, which indirectly signify that near about 32 percent from MPCE2 category do not posses BPL card though they are also belonging in lower income status. Since they do not have BPL card, they are ruled out to get free service access from PHCs. Similar things also happen for IPD patients belonging to MPCE2 group.

Figure-7.2: % Distribution of MPCE with BPL Status among Sampled Patients



7.4.2 Socio-economic Status

Under this section we are dealing with four main parameters. These are types of houses, drinking water facility, type of drainage system, and type of sanitation. Here, we use the Principal Component Analysis (PCA) to transform the information to one component which will represent the overall background of the patients. PCA is a non-dependent mathematical tool which uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of uncorrelated variables called principal components. In this transformation process the first principal component has as high a variance as possible and the next succeeding component in turn has the highest variance as possible under the constraint that it would be orthogonal (uncorrelated) with the preceding components. By this way here the four dimension background characteristics are converted to single valued index with one dimension scalar. Table 7.4 identifies this index for OPD and IPD patients. After calculating the index for each patient, we create two groups. One is above average mean index and the other is below the mean average. The first group is termed as 'good background index' which are staying above average and the second group

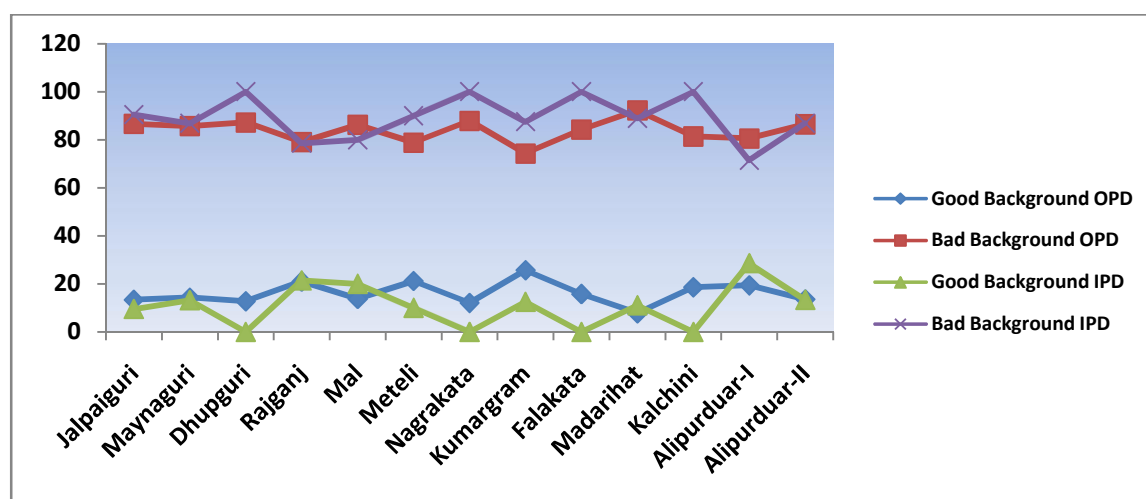
is termed as 'bad background index'. In our study majority of the patients are belonging to the 'bad background index' group. The possible explanation behind such behaviour is that those who have 'good background index' are representing the affluent people, and they visited the private healthcare facilities during their ailing periods. From table 7.4 it is clear to us that

Table-7.4: Socio-economic status index of sampled IPD & OPD patients

Block	% of OPD patients		% of IPD Patients	
	Good background Index	Bad background Index	Good background Index	Bad background Index
Jalpaiguri	13.38	86.62	9.52	90.48
Maynaguri	14.29	85.71	13.16	86.84
Dhupguri	12.79	87.21	0	100
Raigani	20.98	79.02	21.43	78.57
Mal	13.79	86.21	20	80
Meteli	21.21	78.79	10	90
Nagrakata	12.12	87.88	0	100
Kumargram	25.71	74.29	12.5	87.5
Falakata	15.79	84.21	0	100
Madarihat	7.79	92.21	11.11	88.89
Kalchini	18.6	81.4	0	100
Alipurduar-I	19.44	80.56	28.57	71.43
Alipurduar-II	13.58	86.42	13.33	86.87
Average	16.11	83.89	10.74	89.26

Source: Sampled patients of PHCs, 2012

Figure-7.3: Socio-economic Index of OPD & IPD Patients



both the index for IPD and OPD patients majority belongs to bad background index. Here, for OPD patients on an average 16 percent are belonging to good background category and the remaining 84 percent are belongs to the bad background category. Similarly for IPD patients the study found only 11 percent on an average are in good background category

and the remaining 89 percent are in the other. The data describe that for bad background patients limited options remain other than IPD care from PHCs for the majority of the people.

7.4.3 Educational Status

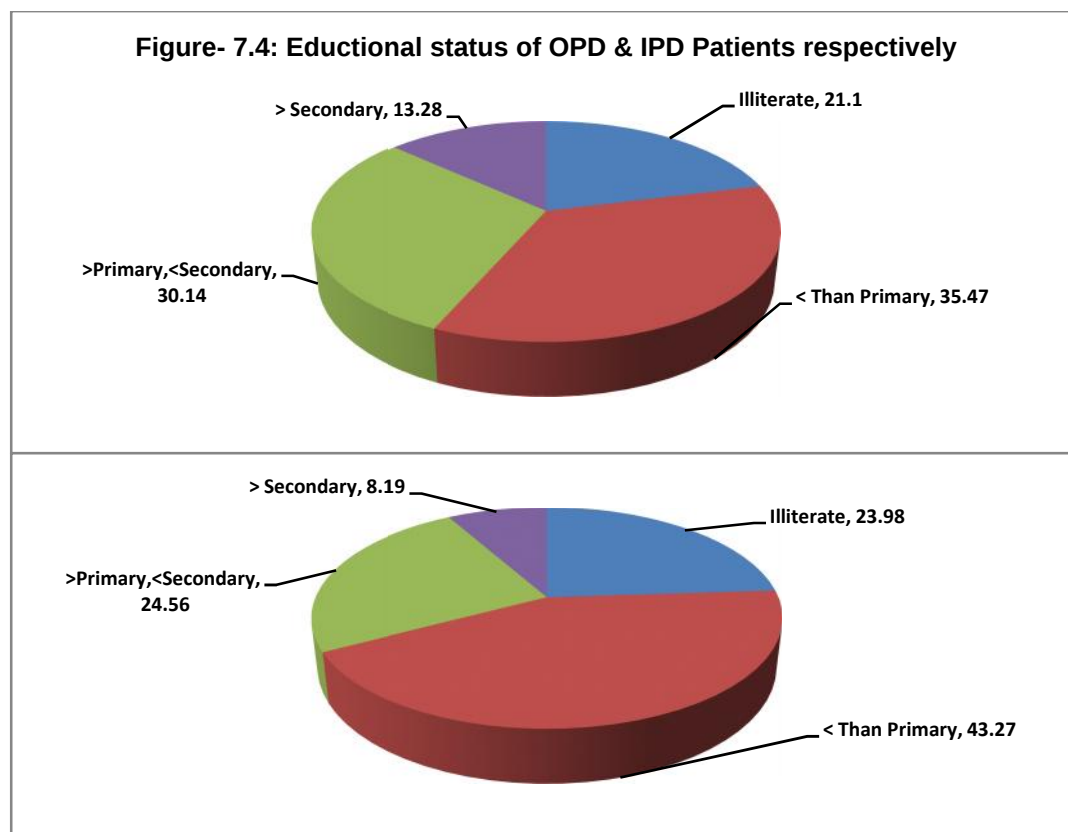
Table-7.5: Educational Status of Sampled IPD & OPD patients

Block	OPD Patients				IPD Patients			
	Illiterate	Less than Primary	Above Primary but less Secondary	Above Secondary	Illiterate	Less than Primary	Above Primary but less Secondary	Above Secondary
Jalpaiguri	10 (7.04)	47 (33.10)	64 (45.07)	21 (14.79)	4 (19.05)	11 (52.38)	4 (19.05)	2 (9.52)
Maynaguri	17 (11.57)	55 (37.41)	58 (39.46)	17 (11.56)	11 (28.95)	14 (36.84)	9 (23.68)	4 (10.53)
Dhupguri	22 (25.58)	31 (36.05)	21 (24.42)	12 (13.95)	3 (33.33)	5 (55.56)	1 (11.11)	0 (0.00)
Rajganj	13 (16.05)	32 (39.51)	27 (33.33)	9 (11.11)	2 (14.29)	5 (35.71)	5 (35.71)	2 (14.29)
Mal	23 (26.44)	27 (31.03)	22 (25.29)	15 (17.24)	1 (10.00)	4 (40.00)	4 (40.00)	1 (10.00)
Meteli	10 (30.30)	11 (33.33)	6 (18.18)	6 (18.18)	2 (20.00)	2 (20.00)	5 (50.00)	1 (10.00)
Nagrakata	15 (45.46)	9 (27.27)	7 (21.21)	2 (6.06)	4 (40.00)	3 (30.00)	2 (20.00)	1 (10.00)
Kumargram	13 (37.14)	11 (31.43)	8 (22.86)	3 (8.57)	2 (25.00)	4 (50.00)	1 (12.50)	1 (12.50)
Falakata	14 (36.84)	18 (47.37)	4 (10.53)	2 (5.26)	3 (42.86)	3 (42.86)	1 (14.29)	0 (0.00)
Madarihat	17 (22.08)	32 (41.59)	17 (22.08)	11 (14.29)	5 (27.78)	9 (50.00)	4 (22.22)	0 (0.00)
Kalchini	18 (41.86)	15 (34.88)	6 (13.95)	4 (9.30)	1 (50.00)	1 (50.00)	0 (0.00)	0 (0.00)
Alipurduar-I	10 (27.78)	7 (19.44)	15 (41.67)	4 (11.11)	1 (11.11)	5 (55.56)	2 (22.22)	1 (11.11)
Alipurduar-II	12 (14.81)	31 (38.27)	22 (27.16)	16 (19.75)	2 (13.33)	8 (53.33)	4 (26.67)	1 (6.67)
Total	194 (21.10)	326 (35.47)	277 (30.14)	122 (13.28)	41 (23.98)	74 (43.27)	42 (24.56)	14 (8.19)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of totals

It is important to collect the educational background data of the patients or the person helping the patient because to get the information that whether they come to those PHCs for treatment guided by their educational background or not. To search such investigation the study collect the educational background data for both in-patient and out-patient department. Table 7.5 describe the educational status of both OPD and IPD patients in terms of four categories. These are illiterate, less than primary education, above primary but less than secondary, and above secondary education. The study found that on an average from patients of different block 35 percent of OPD patients have some sort of education which is less than primary education base, and 30 percent of them are have education level between primary and secondary level. In case of IPD patients the study found one fourth (24.56%) of them have some better kind of education status, which establish the fact that patients with

some education only come for treatment here. At least one fifth of OPD and IPD patients show that they have no education background.



7.5 Access to Healthcare

To define the access to healthcare there are a group of literatures which are defined from the different domain of definition. *Aday and Anderson* (1981) defined access as the potential and actual entry of a given individual or population group into the healthcare delivery system. *Guliford et.al.* (2001) describe the term access by two ways. Firstly, having access means the potential to utilise a service if required. Access to healthcare means required service is available and the system is also present which allowed for utilisation of service by a contact with healthcare. Secondly, gaining access means procedure of admissions into the process of utilising the services. Thus gain in access automatically implies utilisation of services. *Guliford et. al.* definition covers both the entry and utilisation aspects of access of healthcare. Hence both demand and supply side barriers might truncate the access in various degree and normally degree of access measured by the actual degree of utilisation of service. *Blackstone* (2000) narrate that poor are more likely to use primary care services than secondary and more likely to use secondary than tertiary. However analysis on facility based data for India show that a poor use proportionately more of secondary hospitals particularly in rural area. *Ajay Mahal* (2001) identified that in India a strong pro-rich bias

exist in overall utilisation of public financed health services. This overall utilisation of health services is skewed to richer section in case of OPD and IPD services. *Yaqub* (1999) also pointed out that share of health benefits captured by the poor decreases with the complexities of services. Thus access to healthcare has been defined not just by availability of healthcare services at affordable cost, but also the revealed demand for those services by utilising them. Access to healthcare concerned the relationship between need provision and utilisation of health services. Thus the purpose of the study is to identify the access influencing factors for the poor rural people in Western Dooars.

7.5.1 Proportion of Ailing Persons (PAP)

Table-7.6: Social Caste distribution of Patients from OPD and IPD of PHCs

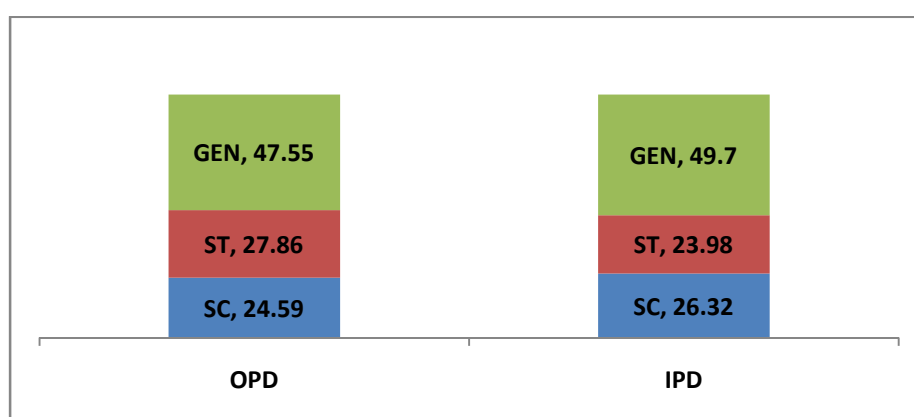
Block	OPD			IPD		
	ST	SC	GEN	ST	SC	GEN
Jalpaiguri	17 (11.97)	47 (33.10)	78 (54.93)	2 (9.52)	8 (38.10)	11 (52.38)
Maynaguri	21 (14.29)	32 (21.77)	94 (63.95)	7 (18.42)	9 (23.68)	22 (57.89)
Dhupguri	16 (18.61)	29 (33.72)	41 (47.67)	0 (0.00)	4 (44.44)	5 (55.56)
Rajganj	10 (12.35)	29 (35.80)	42 (51.85)	1 (7.14)	4 (28.57)	9 (64.29)
Mal	34 (39.08)	8 (9.19)	45 (51.72)	7 (70.00)	0 (0.00)	3 (30.00)
Meteli	13 (39.39)	5 (15.15)	15 (45.46)	6 (60.00)	1 (10.00)	3 (30.00)
Nagrakata	18 (54.55)	7 (21.21)	8 (24.24)	6 (60.00)	0 (0.00)	4 (40.00)
Kumargram	11 (31.43)	11 (31.43)	13 (37.14)	2 (25.00)	2 (25.00)	4 (50.00)
Falakata	7 (18.42)	22 (57.89)	9 (23.68)	0 (0.00)	5 (71.43)	2 (28.57)
Madarihat	36 (46.75)	12 (15.58)	29 (37.66)	11 (61.11)	1 (5.56)	6 (33.33)
Kalchini	21 (48.84)	7 (16.28)	15 (34.88)	2 (100.00)	0 (0.00)	0 (0.00)
Alipurduar-I	7 (19.44)	18 (50.00)	11 (30.56)	0 (0.00)	3 (33.33)	6 (66.67)
Alipurduar-II	15 (18.52)	29 (35.80)	37 (45.68)	1 (6.67)	4 (26.67)	10 (66.66)
Total	226 (24.59)	256 (27.86)	437 (47.55)	45 (26.32)	41 (23.98)	85 (49.70)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of totals

It is a significant factor that how many persons represented from different social class have access to health services. To consider this an important indicator is proportion of ailing persons (PAP) reporting illness in last fifteen days prior to survey out of every 1000

population. From National Sample Survey Organisation (NSSO, 60th round) provided data shows that in India a steady increasing trend with monthly per-capita expenditure in rural and urban areas. In this patient survey we consider the social caste of the patients and observe the fact that PAP of different caste in the PHCs both for IPD and OPD visits. Table 7.6 describe the situation of caste distribution among the surveyed patients and found that a general bias exist to access the health facility in favour of general affluent caste in both IPD and OPD visits. Under OPD patients the study found only one fourth (24.59) of the total patients are from Schedule Tribes (ST), only 27.86 percent from Schedule Caste (SC), and nearly half of the patients are from general caste background. More or less same scenario are observes under IPD patients also. It is also important to recall that in Jalpaiguri district a large section of people belongs to ST category, but their representation regarding

Figure-7.5: % of Caste distribution among OPD & IPD Patients



access to healthcare is only one fourth of the total. Apparently this will portrays that both socially and economically vulnerable people report lower morbidity and hence they possess better health. But due to bad living conditions, malnutrition, and low educational status they have expected a worse health status. This apparent inconsistency can be analysed by the fact that weaker sections of the population have lower access to health facilities and hence they can report their illness far less frequently.

7.5.2 Access in IPD facilities of PHCs

The access to IPD services provided by PHCs can be viewed from different corners. Here, the study discusses about the IPD facilities of the PHCs from the point of access to beds, access to proximities, cheapness. The reasons behind such choices also analysed by a choice comparison between private nursing homes and IPD services provided by the PHCs.

7.5.2.1 Access to beds

The access to IPD facilities in PHCs are determined by the availability of beds. Every bed available in PHCs are free beds. But we have to look whether the patient or patient parties required some personal or technical reference to receive the IPD services. Now we calculate the corresponding factor for two groups mentioned in section 7.4.1 of this chapter, i.e., on the basis of monthly per-capita expenditure. The first group MPCE1 (for whom MPCE $\geq$ Rs 643.2) and the second group MPCE2 (for whom MPCE $<$ Rs 643.2) One can refer the first group as APL group and the second group as BPL group. In table 7.7 we can explain

Table-7.7: Access to beds in PHCs

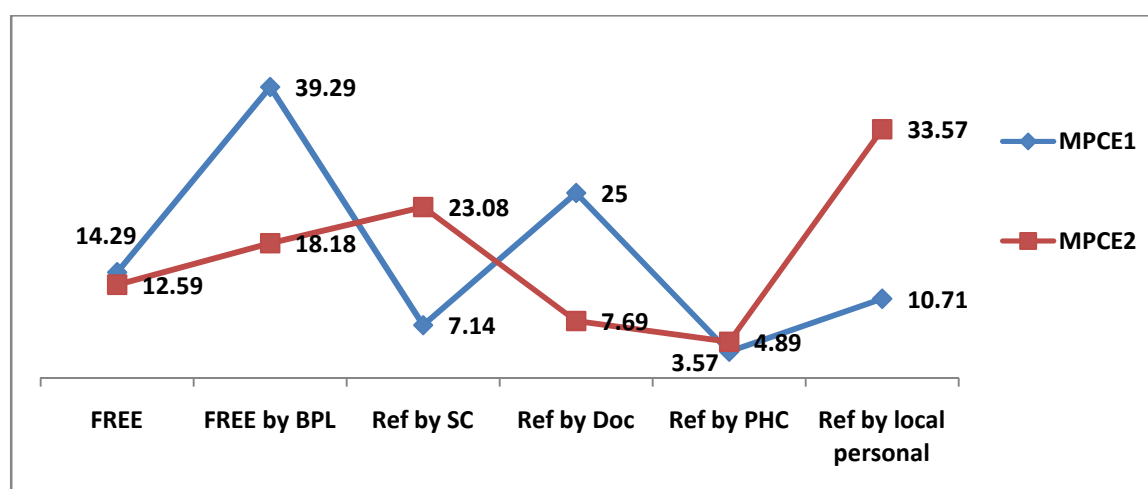
Access to beds	MPCE1	MPCE2
Free	4 (14.29)	18 (12.59)
Free by BPL Status	11 (39.29)	26 (18.18)
Ref by SC	2 (7.14)	33 (23.08)
Ref by Pvt Doctor/RMP	7 (25.00)	11 (7.69)
Ref by PHC staff	1 (3.57)	7 (4.89)
Ref by Local personal	3 (10.71)	48 (33.57)
Total	28 (100.00)	143 (100.00)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of totals

the access to bed in aggregate form under different consideration. The category of query regarding access over beds can be divided in terms mutually exclusive and exhaustive like freely available, free due to BPL status, referred from Sub-center, referred by private doctor or by rural medical practionner (unqualified) (RMP), referred by PHC staff, and referred by local personal. The descriptive statistics shows that from MPCE1 category maximum access to beds occurs who gather BPL status (39.29%) and second highest are that referred by private doctor or by rural unqualified medical practionner (RMP) (25%). An interesting observation emanates from this analysis is that patients who belonging to MPCE1 category i.e., actually above the poverty line, but hold the BPL card. Patient under this category enjoy access to free beds for 39.29 percent cases. MPCE2 categories narrate the picture which is quite different from MPCE1. Here the maximum access in beds occurs for them who have some kind of connection with local personal (33.57%). The next highest categories (23.08) are referred by BPL status. Thus a patient entrance for access in bed is highly influenced by

such a factor like reference from local personal surely arise a question regarding the poor people access in IPD. Side by side it is important to observe that only 18 percent of the total sample access IPD services from MPCE2 category who have some BPL status. This kind of social as well as political factor may be the obstruction to free access for beds in PHCs for the poor patients. One important factor can be observed that among the IPD patients 23 percent are referred by Sub-centres, that implies at any stage the patients under MPCE2 category prefer to visits the lower the tier health facilities. For further research scope one can investigate whether the poor from MPCE2 category are prefer the lower tier than the upper tier health center. As *Blackstone* (2000) and *Yakub* (1999) pointed out that due to technical complexities poorer section preferred to go to lower tier health facilities than upper tier.

Figure-7.6: % Distribution of Access to Beds on the basis Income among IPD Patients



7.5.2.2 Distance travelled to access the IPD services of PHCs

This one of the vital area of health seeking behaviour and from this factor one can get the reasons behind the quality of services provided by the PHCs for IPD category. People can move to that health units by considering a long as well as tough journey if in past he had some memorable experience or he heard about its service quality from any other relatives or local villagers. Sometimes local doctors, unqualified medical practionner guided them regarding their choices for receiving care from particular health units. According to Arrow (1969) the medical care is totally one sided information based (providers) so this all aspects of choosing a particular health units may not hold at current period. Thus uncertainty factor have some important role behind choosing a particular health units services. Whatever may be the fact distance travelled is a crucial determinant of access. In this study we recorded the distance travelled in Kilo-Meter (KM) and also in time travelled in minutes. The time travelled parameter is also used because some patients or patient parties unable to report about the approximate distance in KM. But this kind of measurement creates another type of problem. As a result some standardisation can be required to solve the problem. For

example 10 minutes walking by feet is not similar to 10 minutes bus journey. Thus for well comparison the standardisation can be done by creating three categories. We choose the value as 1= for walking, 2 = Non-motorised conveyance like Van-Rickshaw, Rickshaw, Boat, and 3 = Motorised conveyance like bus, taxi, private car, ambulatory service etc. Now, 10 minutes walking = $\frac{10}{1} = 10$ adjusted value (in minutes), 10 minutes by rickshaw = $\frac{10}{2} = 5$ adjusted value (in minutes), and 10 minutes by car = $\frac{10}{3} = 3.33$ adjusted value (in minutes). In this way we categorise the patients into two categories, those who travelled more than adjusted value 20 minutes and those who travelled less than adjusted value 20 minutes. Table 7.8 describe the distance travelled feature among MPCE1 and MPCE2 patients of PHCs and also with it we consider the availability of any private health units (Nursing homes) in less than 20 KM distance from the origin of patients. The data from this respect

Table-7.8: Distance travelled to reach the PHCs for admission

Category of patients	<20 minutes adjusted Value	>20 minutes adjusted Value	Total
MPCE1	21 (75.00)	7 (25.00)	28 (100.00)
MPCE2	86 (60.14)	57 (39.86)	143 (100.00)
Availability of Nursing homes < 20KM distance	52 (30.41)	119 (69.59)	171 (100.00)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage

shows that majority of the patients in all types are coming with an adjusted travel time less than 20 minutes adjusted value. This 20 minutes adjusted value can be calculated for each patient of each PHC and categorised them in the table-7.8 on the basis of his MPCE. Most of the Indian works related with distance travelled in case of access of healthcare revealed that every where better endowed MPCE1 patients travel less to reach the health units. Thus the MPCE1 patients have some localised effects of access, which is very much true for PHCs in urban area. In this study also same type of conclusion remain valid for MPCE1 patients in IPD category of PHCs of Jalpaiguri district. In this study out of 171 IPD patients it was found that 30.41 percent answer positive against the question of availability of private nursing home situated less than 20 KM distance from their place of origin, but they do not move there due to either low quality of service or the afraid of huge cost.

7.5.2.3 Preference reasons for IPD in PHCs

In the above distance travelled section the study tries to generate some idea regarding the MPCE factor wise movement towards IPD of PHCs at Jalpaiguri district. But this does not clearly reveal any preferences for PHCs or for private nursing home. Thus the basic question

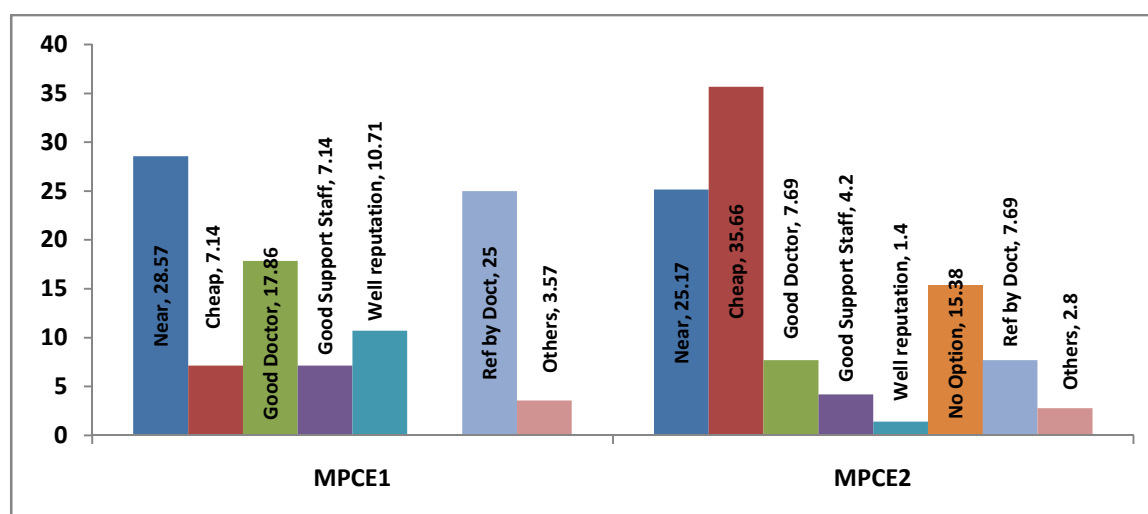
may arise if true for what reason the people visits PHCs. For IPD patients several possibilities are there. These are proximity, cheapness, good doctor, good health supporting staff, well reputation, and no other option, referred by doctor / RMP, and other. All these options are asked to the IPD patients in the form of mutually exclusiveness, so the respondent can identify the best reason to come into this health unit. Before going to this discussion we have to make a common assumption that poorer people are more concerned with cheap treatment while the better off always more eager with the better quality of treatment in terms of good doctor, good facility etc. Table 7.9 describe the reasons for coming to the PHCs for admission under both MPCE1 and MPCE2 category. The study found that under MPCE1 category maximum patients chooses the respective PHCs due to its proximities (28.57%), followed by factor like good doctor (21.43%) and well reputation of the respective PHCs. A very negligible percent of this category patient admitted PHCs either due its cheapness or the PHCs have good reputed staff (7.14%). Under MPCE2 category 35.66 percent patients are admitted in the PHCs due to its cheapness and 25.17 percent patients are choosing the PHCs due to its proximities. A minimum number of patients from MPCE2 category admitted in PHCs guided by the fact that the PHCs are reputed (1.40%). The figure at least reveals that poorer sections are not eager about the reputation of IPD services provided by the PHCs.

Table-7.9: Reasons for admission in PHCs

Reasons of Visits	MPCE1	MPCE2
Near	8 (28.57)	36 (25.17)
Cheap	2 (7.14)	51 (35.66)
Good Doctor	5 (17.86)	11 (7.69)
Good Support Staff	2 (7.14)	6 (4.20)
Well Reputation	3 (10.71)	2 (1.40)
No Option	0 (0.00)	22 (15.38)
Referred by Doctor/RMP	7 (25.00)	11 (7.69)
Others	1 (3.57)	4 (2.80)
Total	28 (100.00)	143 (100.00)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of totals

Figure-7.7: % Distribution of IPD Patients Reasons of Visits to PHC



7.5.2.4 Choice between PHCs and Private Nursing homes

Table-7.10: Preference of IPD patients for Private Nursing homes under ailments

Causes of visit Nursing Homes	MPCE1	MPCE2
General illness	4 (14.29)	7 (4.89)
Delivery	16 (57.14)	22 (15.38)
Emergency	18 (64.29)	62 (43.36)
Paediatric	6 (21.43)	21 (14.68)
CHD	13 (46.43)	24 (16.78)
ARI	8 (28.57)	16 (11.19)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of total

One important aspects of choice between public and private clinic depend upon the factor like emergencies during ailments. On the basis of this patients or patient parties chooses private clinics some times. The study asked the patients or patient parties where do they prefer to go for different type of diseases though they actually come to publicly provided PHCs. Table 7.10 shows that the choice for private nursing homes of two category (MPCE) of IPD patients of PHCs under different ailments. The ailments are categorised in the form as general illness, birth delivery, emergency visits, paediatric problems, chronic heart disease (CHD), and acute respiratory infections (ARI). They asked about their choices for such ailments in non-mutually exclusive forms, as a result one patient replied with more than one options for choosing private nursing homes during their ailing periods. For MPCE1 category the study found maximum number of patients are preferred private nursing homes during their emergency (64.29%) followed by birth delivery (57.14%). 46.43 percent patients

of this category preferred private nursing homes for CHD problems. From this information the view of relatively affluent section of peoples can be described as, they think during emergencies, birth deliveries or chronic heart problems publicly provided PHCs admission is pretty troublesome due to various uncertainties like absence of health staff. Under MPCE2 no such preference were observed except emergencies. Here 43.36 percent patients admit that they prefer private nursing homes during their emergencies. Thus considering both views the study became more or less sure that patients from both economic categories are always suffering about the uncertainties of availability of proper health support during emergencies from publicly provided PHCs services. It may be their general perception and the actual fact may be the different.

7.5.3 Access to OPD Services

The people visit OPD services of PHCs for mainly three reasons. These are consultation with doctors, receive medicines and for some simple pathological and diagnostic tests. Depending on their nature of severity of ailing condition, sometimes they are referred to upper tier health facilities like Block Primary Health Centres (BPHCs), Rural Hospitals (RH), Sub-divisional Hospitals (SDH) and District Hospitals (DH) for the limited provision of PHCs. The study considers the access to OPD services in terms of two criteria. One is distance travelled by the OPD service seeking patients and other is preference for private doctors and rural unqualified medical practionner (RMP) available in their locality.

7.5.3.1 Distance travelled by OPD patients

Table-7.11: Distance Travelled to reach the OPD

Block	MPCE1			MPCE2		
	<20	>20	Total	<20	>20	Total
Jalpaiguri	23	7	30	87	25	112
Maynaguri	22	4	26	93	28	121
Dhupguri	13	4	17	48	21	69
Rajganj	12	4	16	47	18	65
Mal	10	8	18	37	32	69
Meteli	2	5	7	12	14	26
Nagrakata	2	2	4	12	17	29
Kumargram	4	2	6	19	10	29
Falakata	5	3	8	21	9	30
Madarihat	6	3	9	41	27	68
Kalchini	1	1	2	12	29	41
Alipurduar-I	6	4	10	18	8	26
Alipurduar-II	5	4	9	47	25	72
Total	111 (68.52)	51 (31.48)	162 (100.00)	494 (62.26)	263 (34.74)	757 (100.00)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of total

In our earlier discussion regarding distance travelled by IPD patients at section 7.4.4.2.2 of this chapter, here also we adjusted the distance travelled by same way and the study consider the distance travelled aspects for both economic category (MPCE1 & MPCE2). Here two economic categories can be divided in two groups, those who travelled less than 20 minutes adjusted value distance and the other, who travelled more than 20 minutes adjusted value distance. The study found that near about 69 percent of MPCE1 and 62 percent of MPCE2 economic category patients visited the PHCs for OPD services are from less than 20 minutes adjusted value of distance. If we compare these results with distance travelled for visiting IPD facilities (section 7.4.4.2.2, chapter 7), the study found the patients of MPCE1 category have higher tendency to move to PHCs for IPD services (75.00%) in compare to OPD services (68.52%). Similarly for the patients of MPCE2 category the study found 34.74 percent patients visited PHCs for OPD services whereas 39.86 percent visited IPD facilities of the corresponding PHCs. This probably indicates that in the remote villages and sub-urban areas, there is availability of private doctors as well as rural unqualified medical practitioners. During our village survey process the study observes a huge presence of these unqualified practitioners over all the sampled areas. Thus the visits in OPD facilities for both economic categories of patients is less in compared to IPD facilities due to the presence of such kind of providers in rural Jalpaiguri district. Thus both categories of patients consult the neighbourhood providers for their outdoor consultation but visits PHCs for inpatients services.

7.5.3.2 Preferences for private doctors of OPD Patients

From the above discussion the study found that patients of OPD section have some biasness in favour of neighbourhood availability of private doctors and RMPs. In this regard the study also asked the OPD patients to get some idea regarding preferences for private doctors and RMPs. The categories of ailments are general illness, fever, Diarrhoea, pre-natal problems, accidents, and others, which are not mutually exclusive and also not exhaustive. Thus one respondent may answer more than one category. This kind of categorisation are done due to the fact that the study investigate that where the patients visits during their chronic ailments. Table 7.12 portrays the behaviour of OPD visitor's preference for private doctors/RMP and with this the survey asking another question that whether they already visits to any private doctor or RMP before coming those institution or not. The study found that from MPCE1 category 96 percent patients showing some faith on private doctors or RMP during pre-natal problems and of them 41 percent is already visited to private doctors or RMP before coming here. There is a strong bias in favour of private doctors or RMP under situations like general illness, fever and diarrhoea under MPCE1 economic category patients. More or less similar observations are found for the MPCE2

category patients also. But under this category the study found that before coming the PHCs, they already visited to either private doctors or RMP by some greater percentage in compare to MPCE1 category OPD patients. For example OPD patients who prefer private doctors or RMP during pre-natal problems out of them 90.58 percent respond positive to visit private doctors or RMP before coming here.

Table-7.12: Preference for Private Doctors of OPD patients

Preference for Private doctors/RMP	MPCE1	Already visited Pvt Doctor/RMP	MPCE2	Already visited Pvt Doctor/RMP
General Illness	129 (79.63)	44 (34.11)	684 (90.36)	523 (76.46)
Fever	111 (68.52)	28 (25.23)	629 (83.09)	564 (89.67)
Diarrhoea	148 (91.36)	31 (20.95)	655 (86.53)	601 (91.76)
Pre-natal problems	156 (96.30)	64 (41.03)	711 (93.92)	644 (90.58)
Accidents	58 (35.80)	18 (12.77)	214 (28.27)	87 (40.65)
Others	27 (16.67)	9 (33.33)	264 (34.87)	138 (52.27)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of total

7.5.4 Access to free Medicines

Before discussing the access of medicines we have some idea regarding essential drugs. According to international definition essential drugs means which satisfy healthcare needs of a majority of population and which are available by adequate quantity at some fair price that community can afford it. World Health Organisation (WHO) prepared a list of 224 essential drugs during 1946 and 198 countries adopt this prescribed list in modified form during 2000. Like food, housing, and clothing medicine is an essential commodities. Thus what percentage of people can access to free medicine is a significant factor. Hence, universal accessibility of free medicine can be achieved by equitable as well as efficient distribution system. Accessibility of medicine is a function of availability and affordability of medicine. Now the availability of medicine depends on domestic production and imports net of exports. Whereas affordability of medicine can be determine by the total cost of procuring and using the medicines, given the disposable income of the patients. *Dukes and Paula* (2004) identified that one third of the world population are not have access to basic essential drugs and the corresponding figure for Asia and Africa is half of the poorer population. Countries with lower industrial capabilities regarding pharmaceutical products have lower capabilities in healthcare system. But if people do not have adequate access to essential drugs, "Health for all" slogan cannot be materialised. India is self sufficient in production of medicines and also

export substantial amount to developed and developing worlds. Here, the supply of pharmaceutical drugs to private retail market is high but affordability is seriously low (*Health Action International Report*, 2005). *Kanjilal et.al.* (2007) pointed out that in India 2/3rd of the out of pocket expenditures on health is spent to purchase drugs and as a result a noticeable amount drains from family's resources for this purpose. *Kanjilal et.al.* describe that sometimes the situations become so critical that the families are fallen in 'medical poverty trap'. Such kind of studies concluded that availability of right kind of drugs is in short supply in the government funded healthcare facilities. According to National Sample Survey Organisation (NSSO) data of 60th round (2004-05) the urban government hospitals of West Bengal offer free of cost medicines only for 29 percent of inpatients, and 55.8 percent have to buy all medicines prescribed with full payment from outside. Tamil Nadu is the best performer in this regard, where 81.6 percent of inpatients admitted in urban government provided hospitals receives free medicines. In this term West Bengal rank is 9th among 19th major states in India.

7.5.4.1 Drugs of PHCs

Government of West Bengal has its own state drug policy since 2004. The main objectives of the 'State Drug Policy of West Bengal, 2004' are: (1) to maximise access to essential medicines to people, (2) to promote rational use of medicines, (3) to facilitate rational pharmaceutical management in government health facilities, (4) to foster and sustainability of state level pharmaceutical industries, and (5) to ensure compliance of drugs legislation/regulation and quality assurance. According to our 'Indian Public Health Standards' (IPHS) there are some separate drug norms and drug availability list exists for PHCs. In those norms it is mentioned there that all the scheduled drugs of Sub-centres should be available in the PHCs perhaps by greater quantity. All the drugs required for the National health programmes and emergency management should be available in adequate quantities at PHCs, so as to ensure completion of treatment by all patients. It is also mentioned that for the PHCs adequate quantities of all drugs should be maintained through periodic stock-checking, appropriate record maintenance and inventory methods. Facilities for local purchase of drugs in times of epidemics / outbreaks / emergencies should be permitted to PHCs also. Under the drugs schedule available in PHCs can be divided in two categories. One is for essential use and the other is for the use of reproductive and child care. The scheduled drugs which should be available according to IPHS are (1) Oxygen, (2) Local Anaesthetics, (3) Preoperative Medication and Sedation for Short Term Procedures, (4) Analgesics, antipyretics and Non-Steroidal Anti-inflammatory Medicines, (5) Antiallergics and Medicines used in Anaphylaxis, (6) Antidotes and Other Substances used in Poisonings, (7) Cardiovascular Medicines and antianginal medicines, (8) Dermatological Medicines, (9)

Antileprosy Medicines and Anti-tubercular medicines as per national programmes, (10) Blood Products and Plasma Substitutes, (11) Disinfectants and Antiseptics, (12) Gastrointestinal Medicines, (13) Contraceptives, (14) Anti-diabetics and Hyperglycaemics medicines, (15) Ophthalmological Preparations, (16) Solutions correcting Water, Electrolyte and Acid-Base Disturbances, and (17) Vitamins and Minerals. Under each of this category there are various kind of drugs which uses for different types of care.

7.5.4.2 Block-wise receiving pattern of medicines

The significant part of the study is that to calculate the block scenario under the situation of receiving free medicines by the patients prescribed to him/her from the PHCs. The medicines are procured by the Chief Medical Officer of Health (CMOH) offices at some lower price and distributed to PHCs on the basis of specific norms like number of beds. Among our surveyed patients we calculate that what percentage of patients both from IPD and OPD receives free medicines. These are illustrated in table 7.13. 17.54 percent of IPD patients can access the free medicines from PHCs. The disaggregate picture of different blocks shows that Alipurduar-I, Mal, Kumargram and Jalpaiguri block are performing better in compare to others. But these better performing blocks cannot ensure that at least 72 percent (on the basis of average for above stated four blocks) IPD patients receive all the medicines at some free of cost. It is important to remind that in as many as thirteen

Table-7.13: Block-wise free medicine access pattern in PHCs

Block	Total IPD Patients Surveyed	Total IPD patients access free Medicines	Total OPD Patients Surveyed	Total OPD patients access free Medicines
Jalpaiguri	21	5 (23.81)	142	14 (9.86)
Maynaguri	38	4 (10.53)	147	18 (12.24)
Dhupguri	9	1 (11.11)	86	3 (3.49)
Rajganj	14	2 (14.29)	81	10 (12.35)
Mal	10	3 (30.00)	87	8 (9.19)
Meteli	10	2 (20.00)	33	2 (6.06)
Nagrakata	10	2 (20.00)	33	5 (15.15)
Kumargram	8	2 (25.00)	35	2 (5.71)
Falakata	7	1 (14.29)	38	3 (7.89)
Madarihat	18	2 (11.11)	77	8 (10.39)
Kalchini	2	0 (0.00)	43	4 (9.30)
Alipurduar-I	9	3 (33.33)	36	8 (22.22)
Alipurduar-II	15	3 (20.00)	81	11 (13.58)
Total	171	30 (17.54)	919	96 (10.45)

Source: Sampled patients of PHCs, 2012; Figure in the parentheses indicate the percentage of total

blocks none of the inpatients interviewed reports to have all medicines. There is also variation within blocks between drug access from OPD and IPD services in PHCs. Under OPD section the study found only 10.45 percent of surveyed patients received free medicines from PHCs. Here the best performing blocks in terms of free access of OPD medicines are Alipurduar-I, Nagrakata, Alipurduar-II, and Rajganj. Among these blocks Alipurduar-I provide highest access of free medicines for the OPD patients, but still here 78 percent OPD patients remain untouched from the free access of medicines provided by PHCs. Whatever may be the reasons, the fact found that in the Western Dooars region OPD patients have less access over free medicines than IPD patients delivered by the PHCs.

7.6 Perception Index derived from Patients

In this study we use patients' perceptions about the services as a proxy for quality. In this regard we incorporate both the interpersonal and hospitality aspects of quality. The studies calculate the perception index for both IPD and OPD patients for the areas like manpower index, cleanliness index, and infrastructure index. Here the manpower index reflects the interpersonal aspects of the quality, and the other two indices consider the quality perception about the hospitality services and comfort in the hospital. Now we can discuss about this index as follows.

7.6.1 Manpower Index

This index is constructed to get some idea regarding the services provided by the doctors, nurses, health assistant, and group D staff like sweeper, ambulance driver etc. Five questions were asked to measure this index. These are (1) whether they were available during needs, (2) whether they had given enough time, (3) whether their behaviour were courteous, (4) whether they were efficient, and (5) what the patients overall impression was about the person. Respondents answered these question in five points scale like excellent, good, average, poor, and very poor. For each patients we calculate the each scales arithmetic mean (AM) and to calculate the manpower perception index the study took help from UNDP provided Human Development Index (1990) formula.

$$\text{Manpower Index} = \frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}} \times 100$$

For IPD services this index can be calculated easily but for OPD patients we calculate this index only for doctors.

7.6.2 Cleanliness Perception Index

By the same way like manpower perception index the index for cleanliness was constructed. The prime questions were (1) whether the bed sheet and water tap were clean, (2) the number of time sweeper cleans the ward, (3) whether these were available in the ward regularly like dogs, cats, ants, bugs in bed, mosquitoes, outsiders, (4) whether the patients can use bathroom properly or they has to use other place as bathroom, (5) whether enough water supply were provided in the bathroom. The cleanliness index calculated on the basis of data provided by the IPD patients only. Again the answers from patients were collected in five point scale and the AM of each patients scale value calculated. The same formula stated above used to calculate cleanliness perception index.

7.6.3 Infrastructure Perception Index

Again the same method used and the question asked were (1) whether the patients were used single or shared bed or had to lie on floor, (2) whether the water tap was working, (3) whether the water supply was enough and clean, (4) whether there was a proper waiting shed, benches for patients waiting, (5) whether drinking water available in the PHCs, (6) whether fan, security guards, information board, complain box was there or not. The infrastructure perception index can be calculated for each single patient following the same procedure like manpower and cleanliness perception index.

7.6.4 Calculation and Results of Overall Perception Index

The study use Principal Component Analysis (PCA) to construct the overall perception index for each individual patient. The range of the PCA score varies from 0 to 1, and this PCA score used as a proxy for quality of service provided by the PHCs. It is important to note that patients coming to these PHCs are of not homogeneous background; their perception about the service quality must vary depending on their background. Thus we needed to analyse patients background to get more detailed picture of patient's perception about service quality. Here in this study we consider the economic, social and educational background of the patients. For proxy of economic background monthly per-capita expenditure (MPCE) like section 7.4.1 of this chapter were used and divided between MPCE1 and MPCE2 category. For proxy of social background we categorise patients as mentioned in section 7.4.2 of this chapter between good background index and bad back ground index. For proxy of educational background we took class up to which the respondent studied. The average perception scores for different sub-groups across economic and educational background are shown in table 7.14. The study found perception about the services rendered by the manpower of the PHCs staff is quite good and no significant differences were found across

sub-groups. The study took the perception index for doctors separately from manpower perception index, and no such variations across sub-groups were observed. This is an interesting outcome of the study is that doctors or other manpower staffs of PHCs do not show any social bias while attending the IPD and OPD patients from different backgrounds in Western Dooars.

Table-7.14: Perceptions of Different Groups

Perception Index	MPCE1	MPCE2	High Social Background	Low Social Background	Education High	Education Low
Manpower	62.8	63.01	62.34	62.41	62.67	62.05
Doctors	68.55	68.14	68.31	68.29	68.11	68.03
Cleanliness	52.74	55.41	61.23	54.28	56.37	54.21
Infrastructure	47.59	54.16	59.66	52.32	59.07	54.13

Source: Sampled patients of PHCs, 2012

In case of cleanliness perception index the study found that patients coming from higher social background have much better perception about cleanliness and infrastructure in compare to low social background. Now the percentage of bed days occupied in a given period in relation with above mentioned index shows some important result. The percentage of bed days in a given year is termed as Bed Occupancy Rate (BOR). A PHCs rendered low quality service may be for two reasons, one is due to the fact that they manage a large number of patients which is beyond its capacity, and the other is managing a quite small number of patients due to its in efficiency. The second one should be the really bad performers regarding rendering quality services. The correlation coefficient between BOR and perception index shows that in table 7.15 negative correlation between doctor's perception, cleanliness and infrastructure perception index.

Table-7.15: Correlations of Perceptions with BOR

	Manpower	Doctors	Cleanliness	Infrastructure
BOR	0.016	-0.084	-0.221	-0.179

Source: Sampled patients of PHCs, 2012

7.7 Conclusion

The study about the patient behaviour in the PHCs of Western Dooars reveals that maximum number of patients visited PHCs for IPD or OPD services are from low economic status with lower monthly per-capita expenditure. The study also found that among that poorer section a large amount of people don't have any BPL identification and that may be

the major weakness of the government identification system. The study also added that the social background of the IPD and OPD patients are not so well. Specially in case of IPD the study found that maximum patients are from bad background. Regarding education status the study found that one fourth of the IPD patients have some educational background, and at least half of the OPD patients have no education or less than primary educational status. Regarding access to health services in PHCs the study found that access by schedule caste and schedule tribes are lower in compare to general caste, thus the low social status people cannot access the service rendered by PHCs properly. In case of access to beds of PHCs the study found that poorer category access is maximum, which is a good sign but the other side of the story shows that a significant contribution for such access are generated by some kind of connection with local personal. The IPD patients are found not to travel a great distance to get the services from PHCs. The study found that majority of IPD patient from better income category chooses the PHCs services due to their proximities and from poor income categories responses shows that they come due to its cheapness. But, both the categories respond that they prefer private nursing home or the service rendered by the rural unqualified medical practitioner during their emergencies. Among OPD patients the study found both income category people agreed to move to private doctors or the rural unqualified medical practitioner during their pre-natal problems. The study also found a large section of IPD and OPD patients remain untouched from the access of free medicines. Regarding perceptions the study found that the patients of IPD and OPD both have some good perceptions about the service quality provided by the PHCs of Western Dooars.

CHAPTER-8

Efficiency Estimation of Existing Primary Providers

- **Introduction**
- **Methods to measure efficiency**
 - **Data Envelopment Analysis**
 - **DEA Model**
- **Empirical findings of DEA Model**
- **Conclusion**

CHAPTER-8

Efficiency Estimation of Existing Primary Providers

8.1 Introduction

Health depends upon several factors like nutrition, shelter, clothing and sanitation. It is a complex group of services which supported by physicians, private and group practice, hospitals and public health that can be termed as 'medical care'. Arrow (1963) firstly identified the distinguishing features of medical care. He pointed out firstly, it's demand is very much irregular in nature, which leads to death or permanent disability to the individual due to lack of appropriate care. Secondly, It is such a commodity that we cannot take test of it before consumption. Thus, a trust element exists in the relation between the providers and healthcare seekers. Thirdly, quality of medical care is uncertain, because providers have more information than consumers. Fourthly, supply of such care is artificially controlled by the licensing policy. The basic aim behind such artificial control is to maintain the quality of the product. Fifthly, extensive price discrimination is practiced under such care. Sixthly, private cost is much lower than the social cost, thus the product is non-marketable. Lastly, a public health unit shows increasing return upto a certain points in the developing countries. The health status in the country can be improved by two possible ways. One is by increasing the resources level in the health sector, and the other is by improving the efficiency of the existing health sector with existing level of resources. In a country like India where resource scarcity is a serious problems, so to increase the resource level for health sector is more or less impossible in the short run. Thus measurement of efficiency and to evaluate their performance for different health units is an important task for health researcher.

From the above mentioned character it is clear that the healthcare is a multi-input, multi-output framework. Considering the demand side and availability of health providers, it is the main area of discussion of this chapter is to estimate the efficiency of providers in Western Dooars. Farrell (1957) first utilised the concept efficiency in case of medical care. In case of production firms uses specific combinations of inputs to produce certain level of outputs.

The efficiency analyses are used by the different branches of social science for the capacity assessment. In case of production behaviour it is used under static framework, where the technologies and other conditions of production process are assumed as constant. Under such production behaviour, firms are generally optimise their objectives like profit, cost, revenue, sales or other economic variables. If the optimality conditions are satisfied the firms are considered as behaving efficiently. Thus, inefficiency arises when we departed from optimality conditions. Farrel (1957) defined two types of inefficiencies: technical and

allocative. A firm is called as technically inefficient or output inefficient if it can increase its total output without changing its current level of input combinations. But the allocative inefficiency is defined as a price taker firm incur higher total input cost due to wrong choice of proportion of inputs for a given level of output. Here, in this study allocative efficiency is not meaningful for the healthcare units. However, most of the studies on efficiency measurement are concentrated on industrial sector. In India few studies are observed on the health sector. These studies are basically deals with efficiency of the health units of a state or about the total country. The district level studies to measure efficiency is a new attempt though there is a chances of data limitations. In case of a district most common fact is existence of largest number of Sub-centres (SCs) and then the Public Health Centers (PHC). The number of Block Primary health centers (BPHCs), Rural Hospitals (RHs), Sub-divisional Hospitals (SDHs), State General Hospitals (SGHs) and District Hospitals (DHs) are very much limited. One important specifications for measuring efficiency either by non-parametric approach like Data Envelopment Analysis (DEA) or by parametric approach like Stochastic Frontier Analysis (SFA) requires that health output generating units must be homogeneous in nature. Thus for such specifications, purposively the study categorised the public health output producing units into three categories. First one is lower local level health units where the SCs and PHCs are exist, second one is upper local level health facilities where the BPHCs, RHs, SDHs are situated and in the upper district level health facilities where SGHs and DHs are producing health output. This study is concentrating on the efficiency measurement first categories i.e., on PHCs. These public health units are more or less using same level of inputs to produce a particular health output. The objective of the present study is an attempt to measure the relative "efficiency" of the Primary Health Centres (PHCs) to improve health outcomes and to identify the PHCs that appear to be most as well as least efficient. The result of the analysis evolved empirical indicators of efficiency, which may be useful for the health managers for future planning.

There are several types of difficulties arises to measure the efficiencies of health units. The quality of service is variable in nature, so it is difficult to capture the variable quality of health output generating units. In case of use of panel data, which involves comparison over time, quality may changes here by some unobservable way. To reduce such problems efficiency analysis assumes that all unmeasured heterogeneity across data is due to inefficiency.

8.2 Methods to measure efficiency

There are two appropriate methods used by the different researchers for analysing the efficiency of the health providers. One is non-parametric approach, which is basically done by the Data Envelopment Analysis (DEA) and other is parametric form of approach, which is

the Stochastic Frontier Estimation (SFA) techniques. In this study DEA approach is followed to measure the efficiency of the primary health centres of Western Dooars.

8.2.1 Data Envelopment Analysis

DEA is developed by Farrell (1957), and then further generalised by Charnes, Cooper and Rhodes (1978, 1979, 1981) by using mathematical programming for multiple input and multiple output frame, Which is also referred as Charnes, Cooper and Rhodes (CCR) model and applied for not-to-profit organisations. The main idea of CCR model is related with minimisation of weighted input-output ratio, where the subjective conditions are certain restrictions on production technology. The subjective restrictions are imposed on three axes of production; these are constant return to scale (CRS), strong disposability and convexity. Here, convexity and CRS are quite obvious, but disposability means "ability to stockpile or disposed off unwanted commodities" (Fare et al. 1994). The CCR model assumes that there is no cost for disposing of unwanted commodities. Before the application of the DEA methodology we consider a framework how DEA is working for the health sector. In general health production process a vector of labour inputs (L), a vector of non-labour inputs (X) is used to produce a desirable output (Y) and a vector of undesirable output (Z). Here the desirable output is the curability from the ailments contributed by the health providing units and the undesirable outputs are like infant mortality, permanent or partial disability after treatment etc. Following Banker et al (1984) the health output set can be formed (S) which is a convex hull:

$$S = \{(L, X, Y, Z): L \text{ \& \& } X \text{ produced } Y \text{ \& } Z\}$$

The output set has some important properties:

(1) Here the production process in the health system is of such type that a positive amount of desirable output must be accompanied by some amount of undesirable output also. These are also termed as 'null-jointness'.

$$(L, X, Y, Z) \in S; Z = 0 \Rightarrow Y = 0$$

This can be explained with the help of one example. Suppose in some health facilities there was no operation theatre for inpatient service, thus there was no such case of operational death, but when an operation theatre started functioning the cases of operational death occurs. Otherwise due to opening of operation theatre the biomedical disposal also increases.

(2) The reduction in undesirable output is not possible without reducing desirable output. Thus the desirable and undesirable outputs are jointly weakly disposable.

If $(L, X, Y, Z) \in S$ and $0 \leq \theta \leq 1$ then $(L, X, \theta Y, \theta Z) \in S$

Where θ is the rate factor.

According to DEA formulation health units transform inputs (factors of production) into health outputs (health services). Health inputs are divided into three categories labour, material and capital. Under DEA each health output producing units are considered as Decision Making Units (DMUs) in producing health outcomes by utilising multiple healthcare resources as inputs. So it is an attempt to measure the 'relative efficiency' of PHCs to improve health outcomes. The produced efficiency score is estimated by taking into consideration the data of inputs and outputs. The important research questions in these sections are (1) Which PHCs enjoys the most efficient health system? (2) Which PHCs are performing below the average health efficiency level? and (3) Among various inputs used under such production process which inputs are used efficiently or in other words there exist input slacks. Then the possibility of reduction of inputs for the identified DMU can be possible and transfer of such input to other in Pareto efficient manner.

It is a rather fact that all of the DMUs may not have access to the same technology due to variety of geographical, institutional, or other factors. Thus different units may face different production technologies. Thus, the study tries not to construct a single production frontier based on all the data points, but a separate way to measure the impact of technological heterogeneity across blocks is to construct a block frontier for each individual block. When any firm 'm' in block 'n' the block efficiency and grand efficiency measures are close, we can argue that evaluation proximity of the block frontier to the grand frontier at individual point, it is useful to get an overall measure of proximity for the group as a whole. This idea is captured by creating the measure of Technology Closeness Ratio (TCR).

DEA is a linear programming methodology for evaluating relative efficiency of each production unit among a set of fairly homogeneous decision making units (DMUs). Here the decision making units may be Sub-center (SC), Primary Health Center (PHC), Block Primary Health Center (BPHC), Rural hospital (RH), Sub-divisional Hospital (SDH), State General Hospitals (SGH) and District Hospitals (DH). But from the sufficient number of availability one particular decision making units in such geographical arena Western Dooars, this study concentrated on the efficiency measurement of PHCs. One important assumption about the application of DEA is that each and every DMU are homogeneous, here in India according to

character PHCs are mostly producing same kind of output using more or less same categorical inputs. For employing DEA tools the study needs the following steps:

Step-I: For each and every specific health unit the study will identify combinations of inputs and outputs, which determine the production possibility frontier from best performing health facilities. Thus linear programming methods will be used to identify such production possibility frontier. Each decision making unit creating efficiency boundaries (so why Data Envelopment) and compare their relative boundaries with other.

Step-II: Identify the best performing health units in terms of usage of inputs and outputs. The efficiency score allotted them will be 100 percent, so they are known as technically efficient compared to the others.

Step-III: The efficiency of the other who lies below the efficiency frontier is measured in terms of their distance from the frontier. The inefficient health facilities are assigned a score between zero and one. The higher the score the more efficient a health facilities is. Those health units with an efficiency ratio equals to 1, while not necessarily efficient in absolute sense, represent the 'best practice' units when compared with other programmes in their subset (Yueh-Guey Laura Huang et al, 1989).

Step-IV: Technical efficiency score is defined as the ratio between weighted sum of outputs and weighted sum of inputs.

Step-V: Technically inefficient health unit employed more weighted inputs per weighted output. Differently speaking, as producing less weighted output per weighted input than the best practicing health units.

One important advantage of DEA is that each input and each output are measured independently without being transformed into single metric, provided that each decision making unit is employing the same inputs (Charnes & Cooper, 1980).

8.2.2 DEA Model

Before going to a detail explanation of DEA linear programming approach, it is better to discuss some of the term related with DEA model. The efficiency of a firm have two components generally, one is technical efficiency and other is allocative efficiency. The technical efficiency measures the ability of a firm to obtain maximum output from a given set of inputs and technology, whereas allocative efficiency reflects the ability of a firm to use the inputs in optimal proportions, given their respective prices. Combination of these two efficiencies produces the total economic efficiency. In this study we deal with the measurement of technical efficiency. The measurement of technical efficiency can be done by two ways; one is output oriented technical efficiency and other is input oriented technical efficiency. In case of input oriented technical efficiency deals with the maximum amount of input quantities, which can be proportionately reduced without changing quantities produced

as output. Under output oriented technical efficiency the maximum output quantities can be proportionately increased without altering input quantities. We can take one example to make the distinction between these two technical efficiencies. Let 'X' is the input used to produce output 'y'. Here, we measure x input in the horizontal axis and y output in the vertical axis. Point A (X_0 , y_0) represents the actual input-output bundle of a firm A. Now $y^* = f(X_0)$, where y^* is the maximum output producible from

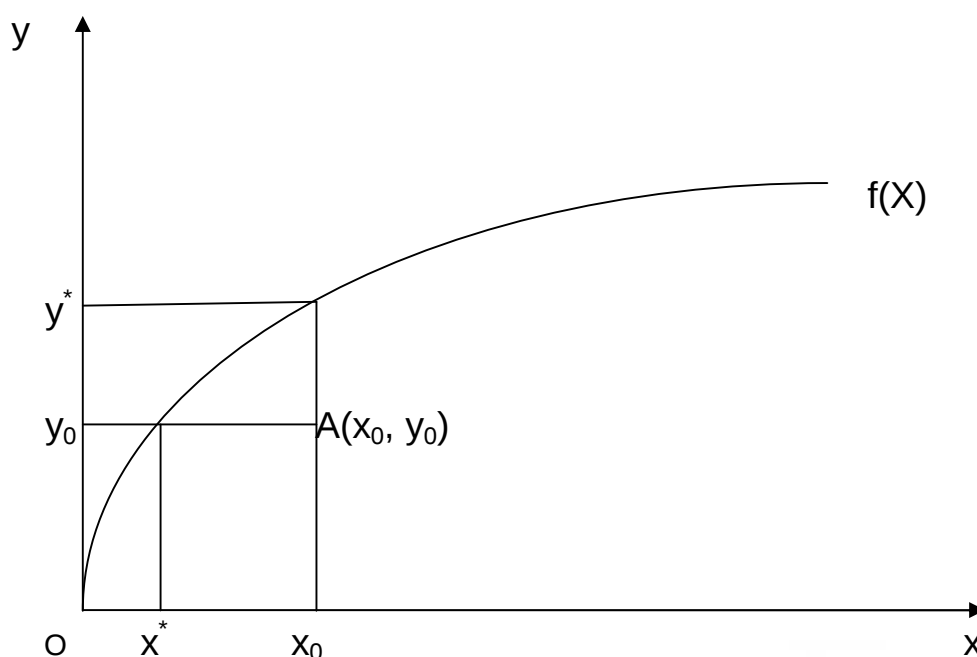


Figure-8.1: Input and output measures of technical efficiency

input X_0 . Here, the output oriented technical efficiency of firm A = $\frac{y_0}{y^*}$, which is the ratio of actual output and maximum producible quantity from the observed input. Now the same output y_0 can be produced by reducing the input quantity till the frontier is reached. Hence, y_0 can be produced from input x^* . Thus the input oriented technical efficiency measures for firm A is = $\frac{x^*}{x_0}$. The measure of technical efficiency depends upon the assumption of return to scale. Here we consider about constant return to scale (CRS) and variable return to scale (VRS). Under CRS the output changes in the same proportion as inputs are changed, and under VRS reflects that production function (technology) may exhibits increasing, constant and decreasing return to scale. A methodology developed by Fare et al. (1994) that given the input resources on healthcare and performance of the health system of a particular health producing system (DMUs), the best achievable configuration of population health outcomes can be constructed, which can be termed as 'best practice' frontier. The 'best practice' frontier is a piece-wise linear envelopment of the health input and health output

(outcome) data for the DMUs under consideration. This frontier creates a standard for comparison as it describes the most efficient performance condition within the group of health producing units under judgement. For each health unit, efficiency in the production of primary healthcare is measured relative to such a frontier. The healthcare system of the health producing units, which are operating on the frontier, are termed as efficient, while the other health producing units producing off the frontier are considered to be relatively inefficient. A health producing unit operating below the frontier is considered as technically inefficient, because its output falls short of what could have been produced given the input usage.

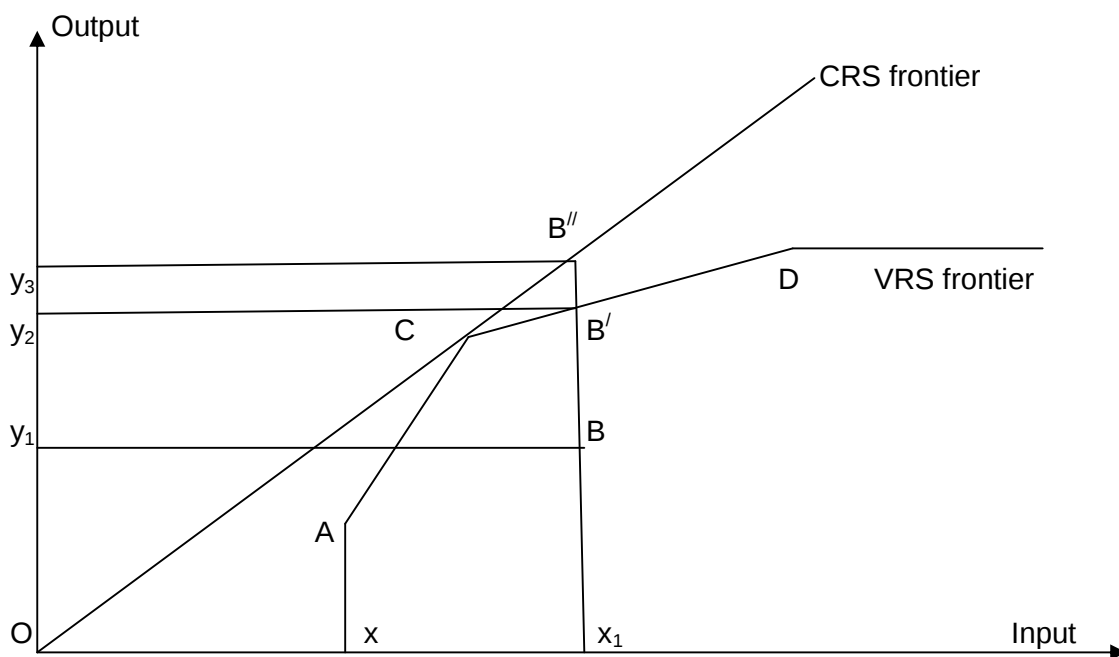


Figure-8.2: The production frontier and return to scale

The basic idea behind DEA and return to scale can be illustrated with the help of figure 8.2. Four data points A, B, C, and D are used here to describe the efficient frontier and level of capacity utilisation under VRS and CRS assumptions. In a simple one output and one input DEA problem decision making units (DMUs) like A, C, and D are found to be efficient, while B is an inefficient DMU. So unit B can produce more output at point B' on the frontier (which is theoretical maximum) utilising same level of input at x_1 . With CRS, the frontier is defined by point C for all points along the frontier, with all other points falling below the frontier i.e., indicating capacity underutilisation. With VRS, the frontier is defined by points A, C, and D, and only B lies below the frontier, i.e., shows capacity underutilisation. From figure 8.2.2 it is clear to us that capacity output corresponding to VRS is smaller than the capacity output corresponding to CRS.

Now the study tries to explain how DEA solves a problem considering some hypothetical linear programming (LP) problem, where the production function produces a convex frontier. The word 'envelopment' means the production frontier envelops the set of observations.

Suppose there are N firms, and each is producing 'g' outputs using 'h' inputs. The input bundle used by firm t is $x^t = (x_{1t}, x_{2t}, \dots, x_{ht})$ and the output bundle produced is $y^t = (y_{1t}, y_{2t}, \dots, y_{gt})$. To consider the average productivity of the firm, we consider the input price, and output price data together. In health sector availability of price data is a rare situation, thus we can use shadow prices of inputs & outputs in such situation. Thus shadow price vector of inputs can be defined as $a' = (a_{1t}, a_{2t}, \dots, a_{ht})$ and the shadow price vector of output is $b' = (b_{1t}, b_{2t}, \dots, b_{gt})$. The shadow prices have some restrictions, firstly, non-negativity, however individual input and output prices can be zero and secondly, the shadow prices are such that when they used for aggregation, no firm's input-output bundle results in average productivity greater than unity.

Now under CRS, if (x, y) is feasible then for any $\alpha \geq 0$, $(\alpha x, \alpha y)$ is also feasible. The production possibility set corresponding to CRS can be defined as

$$T^{CRS} = \{(x, y): x \geq \sum_{j=1}^N \lambda_j x_j; y \leq \sum_{j=1}^N \lambda_j y_j; \lambda_j \geq 0; (j=1, 2, \dots, N)\} \dots (8.1)$$

Under VRS the production frontier becomes

$$T^{VRS} = \{(x, y): x \geq \sum_{j=1}^N \lambda_j x_j; y \leq \sum_{j=1}^N \lambda_j y_j; \sum_{j=1}^N \lambda_j = 1; (j=1, 2, \dots, N)\} \dots (8.2)$$

The output oriented measure of technical efficiency (TE) of any firm t under VRS technology requires the solution of the following LP problem.

Max $\emptyset$

$$\left. \begin{aligned} \text{Subject to } \sum_{j=1}^N (\lambda_j y_{rj}) &\geq \emptyset y_{rt} & (r = 1, 2, \dots, g) \\ \sum_{j=1}^N (\lambda_j x_{ij}) &\leq x_{it} & (i = 1, 2, \dots, h) \\ \sum_{j=1}^N \lambda_j &= 1 \quad \lambda_j \geq 0 & (j = 1, 2, \dots, N) \end{aligned} \right\} \dots (8.3)$$

Here $\emptyset$ is a scalar satisfying $\emptyset_i \leq 1$, which is the efficiency score that measures technical efficiency of the i th unit in terms of distance to the efficiency frontier. When $\emptyset_i < 1$ means output of the DMU is inside the frontier and inefficient. But $\emptyset_i = 1$ means output of the i th DMU is on the frontier and efficient and these are considered as peers. The restriction like $\sum_{j=1}^N \lambda_j = 1$ measures the convexity of the frontier with VRS. If the restrictions are dropped and then CRS will operates.

Now if $\emptyset^*$ is the maximum value of $\emptyset$, by solving equation (3), output oriented TE of firm t can be determined by using equation (4).

$$TE_0^{ct} = TE_0^{ct}(x^t, y^t) = \frac{1}{\emptyset^*} \dots (8.4)$$

where $y^* = \theta^* y^t$ and y^* is the maximum output bundle producible from input bundle x^t . In CRS, $\max \theta$, θ^* can be determined by solving equation (8.3) alone without the constraint $\sum_{j=1}^N \lambda_j = 1$, taking into account the CRS frontier (equation 1). Knowing θ^* technical efficiency of the firm can be determined.

There are some potential strength and weakness of DEA to measure efficiency using non-parametric approach. The advantages are: (i) it can handle multiple input and multiple output, (ii) no functional forms are required between the relation of inputs and outputs, (iii) each DMU can be directly compared with its peers, and (iv) units of input and output may be of different. The limitations of DEA are (i) the measurement error can cause significant problems, i.e., unlike regression technique it has no way to minimise the stochastic error, (ii) the DEA technique can tell us the only the relative position in terms of peers, but not its absolute efficiency, (iii) it is not possible to test the statistical hypothesis since DEA is non-parametric technique, and (iv) a standard DEA creates a separate linear programme for each DMU which may create large computational problem.

Banker, Charnes and Cooper (BCC) in 1984 showed that whether the data supports CRS or VRS technique for each firm on the basis of a dual approach. Like BCC (1984) model, the input-oriented efficiency measure corresponding to VRS technology for firm t can be specified as

$$\begin{aligned} \min \theta \\ \text{Subject to } \sum_{j=1}^N \lambda_j y_{rj} &\geq y_{rt} \quad (r = 1, 2, \dots, g) \\ \sum_{j=1}^N \lambda_j x_{ij} &\leq \theta x_{it} \quad (i = 1, 2, \dots, h) \\ \sum_{j=1}^N \lambda_j &= 1, \quad (j = 1, 2, \dots, N) \end{aligned} \quad \left. \vphantom{\sum_{j=1}^N \lambda_j} \right\} \dots\dots\dots (8.5)$$

The corresponding dual LP programme is given by

$$\begin{aligned} \max \sum_{r=1}^g a_r y_{rt} - a_0 \\ \text{Subject to } \sum_{r=1}^g a_r y_{rj} - \sum_{i=1}^h b_i x_{ij} - a_0 &\leq 0 \quad (j = 1, 2, \dots, N) \\ \sum_{i=1}^h b_i x_{it} &= 1 \\ \text{where } a_r, b_i &\geq 0 \quad (r = 1, 2, \dots, g; i = 1, 2, \dots, h) \\ a_0 &\text{ is free.} \end{aligned} \quad \left. \vphantom{\sum_{r=1}^g a_r} \right\} \dots\dots\dots (8.6)$$

- BCC (1984) shown that
- a) locally CRS holds if $a_0^* = 0$
 - b) locally DRS holds is $a_0^* > 0$
 - c) locally IRS holds if $a_0^* < 0$

Under LP model radial measures to efficiency can be find out. Under radial projections method efficiencies are measured along a ray from origin to the observed production point. Among the output produced by firm t, the largest output bundle with the same output mix as (y_1^t, y_2^t) that can be produced from the input bundle (x_1^*, x_2^*) is $(\theta^* y_1^*, \theta^* y_2^*)$. It is sometimes

possible to expand individual outputs by a factor larger than θ^* . It is also possible that the firm t may not entirely use up all the individual components of the input bundle to produce the expanded output bundle. Hence we can define output slack variable as

$$s_r^+ = y_{rt}^* - \theta^* y_{rt} \quad (r = 1, 2, \dots, g) \quad (8.7)$$

The input slack variable can be defined as

$$s_t^- = x_{it} - x_{it}^* \quad (r = 1, 2, \dots, h) \quad (8.8)$$

We can illustrate the concept of output and input slack with the help of diagram.

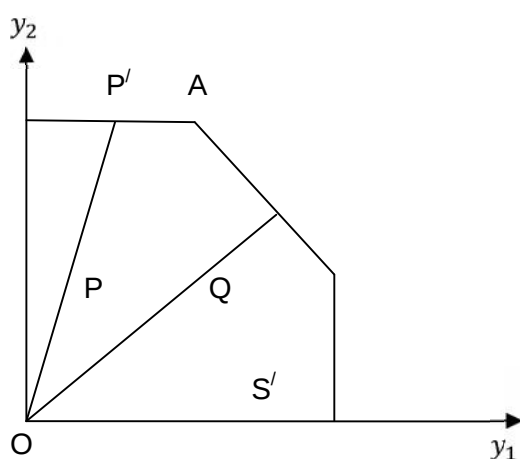


Fig-8.3: Slack of output

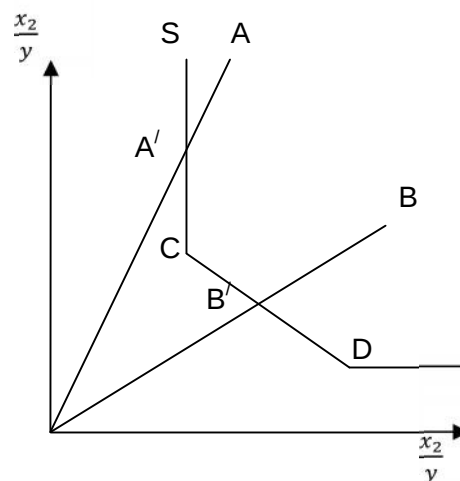


Fig-8.4: Input slack

First consider the case of output slack in figure 8.3, let two output as example under an output oriented DEA which could be represented by a piecewise linear production possibility curve, which also discussed in figure 8.2. Let us consider the actual observation corresponds to point P. The point P is projected to the frontier P' which is on the frontier but not on the efficient frontier, because the production y_1 could be increased by the amount AP' without using any more inputs. Thus the output slack is AP' and the radial movement in output is PP' and the slack movement is AP' . Thus when any output slack is strictly positive, it is possible to expand particular output by the amount of output slack even after the radial expansion has been taken into account. The case of input slack is illustrated in figure 8.4. Here, the DMUs using input combinations C and D are two efficient DMUs which are on the frontier, and the DMUs A and B are inefficient. According to Farrell (1957) defined measure of technical efficiency the respective efficiency of DMUs A and B are OA' / OA and OB' / OB respectively. Here if the use of input X_2 reduce by amount CA' , still the same output can be produced. Thus the CA' represents the slack in input X_2 .

In case of healthcare efficiency estimation different types of health units are not producing the output using same technology. Rather different firms or categories of firms may face different production technologies. The factors responsible for these differences may be of geographical and institutional types. Thus under such situation construction of a single

frontier based on all data points is an impossible task. Under such situation a separate group frontier for each individual group can be constructed, and from that a single grand or meta frontier can be identified which applies to firms from all the groups. As for example the function of Rural Hospital (RH) is quite different from PHCs, or the PHCs of Dhupguri block (Plain area) faces easier challenges in comparison to PHCs at Meteli or Mal Block (Hilly region). Thus in order to set different production possibility sets for different groups; firstly we group the observed input-output bundles by locations of the corresponding firms. Thus suppose there are N firms which are classified according to some criterion in H number of distinct and exhaustive groups. By this way g th group containing N_g number of firms and we can write

$$N = \sum_{g=1}^H N_g$$

Now we can define the index set of observations $J = \{1, 2, \dots, N\}$ and partition it into non-overlapping subsets like $J_g = \{j : \text{firm } j \text{ belongs to group } g; (g = 1, 2, \dots, H)\}$

In this case the production possibility set for group g will be

$$T^g = \{(x, y) : x \geq \sum_{j \in J_g} \lambda_{gj} x^j; y \leq \sum_{j \in J_g} \lambda_{gj} y^j; \sum_{j \in J_g} \lambda_{gj} = 1; \lambda_{gj} \geq 0\} (g = 1, 2, \dots, H)$$

Here T^g is the free disposal convex hull of the observed input-output bundles of firms from group g . Consider that the observed input-output bundle of firm k in group g is (x_g^k, y_g^k) . A measure of output oriented within group technical efficiency of the firm k , is

$$TE_g^k = \frac{1}{\emptyset_g^k}$$

Where $\emptyset_g^k$ can be find out from solving following linear programming problem:

$$(P_g^k) \quad \emptyset_g^k = \max \emptyset$$

$$\text{Subject to: } \sum_{j \in J_g} \lambda_{gj} y^j \geq \emptyset y_g^k;$$

$$\sum_{j \in J_g} \lambda_{gj} x^j \leq x_g^k; \quad \sum_{j \in J_g} \lambda_{gj} = 1;$$

$$\lambda_{gj} \geq 0 (j = 1, 2, \dots, N_g); \quad \emptyset \text{ Unrestricted}$$

The above LP problem can be solved for each firm k in the g th group. This is the technical efficiency of a particular firm in a particular group. Now we consider the technical efficiency of the same firm relative to the grand or meta technological frontier. The meta frontier is the outer envelope of all group frontiers. Meta frontier covers the boundary points of the free disposal convex hull of the input-output vector of all firms in the sample. This meta technical efficiency of the firm k in the g th group can be measured as

$$TE_G^k = \frac{1}{\emptyset_G^k}$$

$$\text{Where, } \emptyset_G^k = \max \emptyset$$

$$\text{Subject to } \sum_{g=1}^H \sum_{j \in J_g} \lambda_{gj} y^j \geq \emptyset y_g^k;$$

$$\sum_{g=1}^H \sum_{j \in J_g} \lambda_{gj} y^j \leq \emptyset x_g^k ; \quad \sum_{g=1}^H \sum_{j \in J_g} \lambda_{gj} = 1 ;$$

$$\lambda_{gj} \geq 0 \quad (j = 1, 2, \dots, N ; g = 1, 2, \dots, H); \quad \emptyset \text{ Unrestricted}$$

In fact the meta production possibility set contains every group production possibility set, and it is obvious that $\emptyset_g^k \leq \emptyset_G^k$, and hence, $TE_g^k \geq TE_G^k$, for every k and g . Thus in other words, a firm cannot be more technically efficient when assessed against the meta- frontier than when evaluated against a group frontier. When for any firm k in the group g , the group efficiency and grand efficiency measures are close, we can say that evaluated at the input bundle x_g^k , the relevant group frontier is close to the meta frontier. Thus calculation of proximity of the group frontier to the meta frontier is an important task of the researcher who deals with technical efficiency. But such proximity is not very meaningful at individual points. Hence it is useful to get an overall measure of proximity for the group as a whole. Thus we define the average technical efficiency of the firms in the group (i.e., relative to the group frontier) by taking a geometric average of such individual technical efficiencies. For the group g this can be shown as

$$TE_g(g) = \left[\prod_{k=1}^{N_g} TE_g^k \right]^{1/N_g}$$

Similarly, the average technical efficiency of group g , measured from the meta-frontier, will be

$$TE_G(g) = \left[\prod_{k=1}^{N_g} TE_G^k \right]^{1/N_g}$$

For group , the overall measure of proximity of the group frontier to the meta frontier is its Technology Closeness Ratio (TCR) and the TCR can be measured as

$$TCR (g) = \frac{TE_G}{TE_g}$$

TCR increases, if the group frontier shifts towards the meta frontier, ceteris paribus, and is bounded above by unity which would be realized, if and only if, group frontier with the meta frontier.

Now we can apply the above theoretical DEA model in the efficiency estimation of PHCs in the study area. DEA (a non-parametric method) defines efficiency as the ratio of the weighted sum of outputs of a health centre to its weighted sum of inputs. It is particularly useful in public sector organizations (e.g. health facilities) that lack the profit maximization motive and employ a multiple input, multiple output production process. The technical efficiency (TE) of PHCs was found by solving the following linear programming problem for each health unit in the sample:

$$\begin{aligned}
\text{Max} \quad & h_0 = \sum_{r=1}^s U_r Y_{rj}^0 \\
\text{Subject to:} \quad & 1 = \sum_{i=1}^m V_i X_{ij}^0 \\
& \sum_{r=1}^s U_r Y_{rj} - \sum_{i=1}^m V_i X_{ij} \leq 0, \quad j = 1, \dots, n \\
& U_r, V_i \geq 0
\end{aligned}$$

Where:

Y_{rj} = Amount of output r from health centre j

X_{ij} = Amount of input i to health centre j

U_r = Weight given to output r

V_i = Weight given to input i

n = Number of PHCs

s = Number of Outputs

m = Number of Inputs

This mathematical programming technique establishes a production possibilities frontier based on relatively efficient health centres and measures how far the inefficient health centres are from this 'best' practice frontier. The efficient health centres lie on the frontier and are assigned a score of 1 or 100%. Inefficient health centres are allocated a score that is less than 1 (or 100%). The higher the score, the greater the efficiency, and vice versa. The variable returns to scale (VRS) model was estimated to facilitate the estimation of scale efficiency. It assumed that changes in inputs would lead to disproportionate changes in outputs. In other words, a percentage increase in input can yield less than a percentage change in output signifying diseconomies of scale, or more than a percentage increase of output implying existence of economies of scale. The scale efficiency (SE) is the ratio of constant returns to scale technical efficiency (TE_{CRS}) to variable returns to scale technical efficiency (TE_{VRS}), i.e. $SE = (TE_{CRS})/(TE_{VRS})$. All the analysis is undertaken using DEA.

The output-oriented DEA model is used for the analysis because the management of PHCs has no control over inputs, especially the deployment of human resources. However, given their public health orientation, PHC staff have a duty to induce demand (through health promotion strategies) for preventive health care services such as general medical care, child birth, antenatal care, family planning services, immunizations, etc. Through their outreach

public health work among communities, PHC staff are also supposed to mobilise community efforts and other resources to provide clean water and hygienic human waste disposal facilities, e.g. vented improved pit latrines, especially in rural areas. From our study we observe that output maximization is the most appropriate orientation for health centres which are given a fixed input to produce as much output as possible. Thus, an output-oriented approach focuses on the amount by which health unit outputs can be expanded with the same level of inputs. Furthermore, the output- and input-oriented models will estimate exactly the same frontier, and therefore, by definition identify the same set of DMUs (firms) as being efficient. It is only the efficiency measures associated with the inefficient firms that may differ between the two methods. In fact under the assumption of constant returns to scale, even the efficiency scores will not change. We, therefore, feel that the choice of model is not going to affect the results significantly. In this analysis the study uses 7 inputs and 4 outputs in the DEA model.

Table-8.1: Input and Output list of the DEA analysis

List of Inputs	List of Outputs
Bed	Quality Adjusted Out-patient Per day(QAOPD)
Equipment	Quality adjusted In-patient Per day(QAIPD)
Doctor	
Nursing staff	Number of Child Deliveries(NCD)
Health Support Staff	
Group D Staff	No of Health Education Sessions(HES)
Medicine	

Source: Model formulated in the study, 2012

The inputs and outputs are shown in table 8.1. Before going to the analysis the study tries to illustrate the output specifications of this analysis. The true fact is that state has not supplied the full component of staff including doctors, required to all the PHCs of our country. Health managers know that more or less homogeneous inputs need not always lead to same outputs. Thus it is an important task from their end also to mark the critical performers regarding production of health outputs. This will help them to identify the areas which need to be strengthened and the investment that need to be carried out for removing the weakness of those health units. Thus, priority-wise effective investments create pace on effective utilisation of resource which quantifies the skill improvement. So, evaluation of performance becomes a crucial factor, because with the same kind of resource some performs much better compared to all others. The DEA helps us to identify the efficient PHCs and the others' positions. Not only this, it helps us to identify the factors responsible for such discrepancies in proper functioning.

Table-8.2: Doctors involvement index in PHCs of different blocks

Block	PHC	Manpower	DII	PI
Jalpaiguri	5	17	0.75	1.33
Maynaguri	6	21	0.67	1.83
Dhupguri	3	7	0.72	0.25
Rajganj	3	10	0.61	0.92
Mal	3	9	0.597	0.66
Meteli	2	6	0.59	0.83
Nagrakata	2	6	0.46	0.49
Kumargram	2	6	0.67	0.75
Falakata	2	4	0.41	0.17
Madarihat	3	8	0.45	0.75
Kalchini	2	5	0.495	0.155
Alipurduar-I	2	7	0.895	1.215
Alipurduar-II	3	11	0.796	1.32
Average DII & PI			0.6241	0.821
Max Value			0.895	1.83
Min Value			0.41	0.155
Correlation coefficient between DII & PI			0.614999076	

Source: Patient survey during PHC visits, 2012

In our 7 input and 4 output DEA model the inputs are classified as BED, Equipment, Doctors, Nursing Staff, Medical Support Staff, Group D Staff and Medicines, whereas the outputs are Quality adjusted out-patient per day (QAOPD), Quality adjusted in-patient admitted less-referred per-day (QAIPD), number of child deliveries and total number of health education sessions conducted through home visits, public meetings, lectures at different platforms. The first output significantly determines the care of quality of doctors and nursing staff for outdoor patients per day. To determine the study we construct an index known as Doctors Involvement Index (DII). This can be calculated as

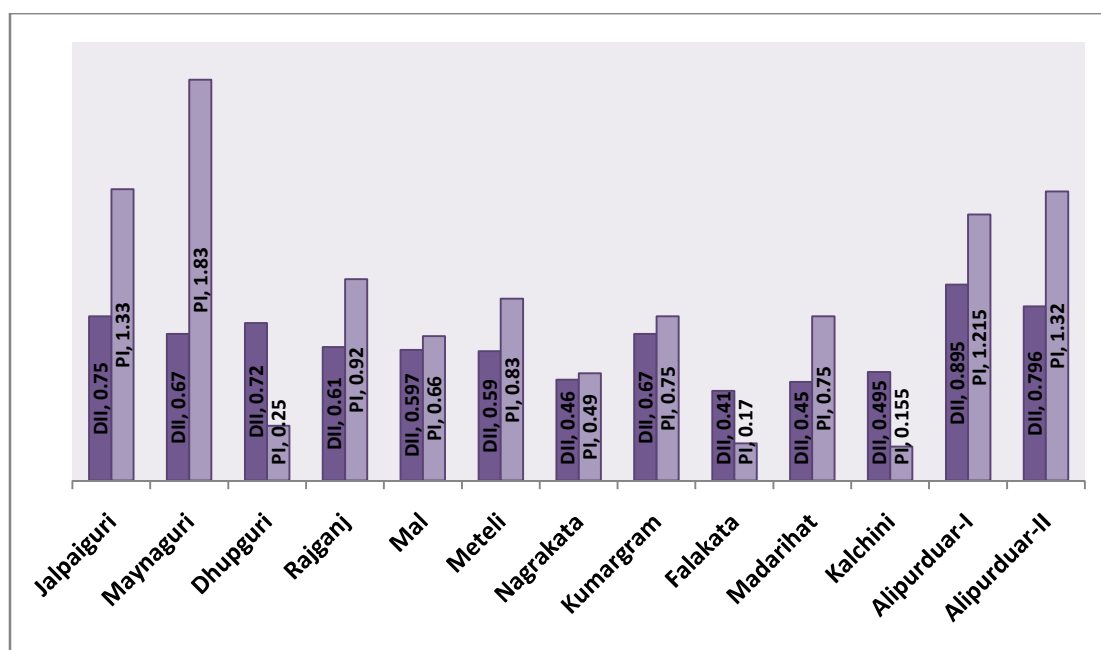
$$DII = \frac{\text{Actual OPD hours Per-week day}}{\text{Normal OPD hours Per-week day}}$$

Since data on numbers of doctors in position in PHCs are already collected, from that we calculate the total number of OPD doctors' hours for each PHCs according to actual norms (a total 28 hours OPD hours per week, i.e. 5 hour norms from Monday to Friday and 3 hour for Saturday).

The rationale of using the specified output like Quality adjusted outpatient per day (QAOPD) is to take care of the quality of doctor's service for the outdoor patients. The QAOPD can be calculated by the multiplication of number of outpatients per day by DII of the specific PHC. This index takes care of how many patients can be served with time and quality if the doctors have given full norm hour in the hospital OPD, whereas they have devoted only a small fraction of their full norm hour in the hospital OPD. This can be explained with the help of an example. Consider there are 'N' patients visiting OPD per day in the PHC. It is expected that they will serve with full norm of 'x' hours from the doctors, but actually they are

offering only 'y' hours in OPD. Thus, the doctors can examine only $n = \{ N * (y/x) \}$ patients with same expected quality. As $y/x \leq 1$, the PHCs in effect handle a fraction of patients with the same expected quality. Table 8.2 shows the average value of DII in each block which is calculated on the basis of collected data from the PHC administration visits and PHC patient visits. Here, during this survey on PHCs, each and every PHCs were visited three days of a week to collect the information related to IPD and OPD patients and to understand the uses of equipments and manpower. On each day the presence of the doctor for that day was observed and by this way considering for three days, the study prepare the DII value for that PHC by averaging the doctor attendance of those days. The calculated value of DII shows that for the district the average doctors involvement is near about 62 percent. This means that doctors are contributing about two third of their involvement what is actually due from their end. The disaggregated data (Figure-8.5) from the districts show that in some blocks like Falakata, Madarihat, Nagrakata and Kalchini the value of DII is low though there is high demand for health staff. This is important to note that when the poor villagers have not found proper healthcare in the PHCs then they have two options, either they visit the upper tier facilities or they remain absent from taking any type of care.

Figure-8.5: The DII & PI value for the blocks PHCs in Study Area



Source: Patient Survey data, 2012

The second output i.e., the quality adjusted inpatient admitted less referred (QAIPD) can be calculated on the basis of perception of the inpatient about the PHC services. In this regard, the quality index can be constructed in terms of perception index (PI) of the inpatient department (IPD) patients about the PHC services. The PI generated from the perception of quality from the inpatients only because they have only a perception about the services of

the PHC in case of cleanliness, manpower efficiency, behaviour, diet etc. The PI is calculated on the same pattern like DII. Here, we consider the factors like cleanliness, manpower efficiency, behaviour, and diet offered in PHC in terms of four point scale like *A*, *B*, *C*, and *D*, where *A* means 'excellent', *B* means 'fair', *C* means 'moderate', and *D* means 'not satisfactory'. The weight on the basis of such grading can be marked as $A = 1.0$, $B = 0.5$, $C = 0.25$, and $D = 0$. During inpatient survey another question is also asked: whether they come back to that PHC in future if they will have some ailments. This is also an influencing factor of PI. If the answer is yes, it takes value '1' and if the answer is no, the value obtains '0'. Whatever may be the fact the PI can be calculated for each PHC and aggregated for each block. The PI can be calculated from the following formula:

$$PI = \frac{[Actual\ Perception\ value]}{1} + \frac{[Value\ fixed\ for\ future\ come\ back]}{1}$$

Here, the highest value of PI for any PHC can be '2', and that can be judged as the best functioning PHC according to inpatient perception, and the minimum value of PI can be '0', which can be identified as worst performing PHC in the view of inpatient services. Now, in each block we take the average value of PI for PHCs are shown in the table 8.2. The significant factor from table 8.2 shows that the value of PI can be higher for those block where the bed number is more frequent than the PHCs where it is low, and also for blocks like Nagrakata and Kalchini the values of PI are the lowest like DII. It is very much rational for the patients that if they are well informed regarding availability of doctors or nurses in particular PHCs, then it becomes easier for them to decide to go or bypass that health unit during their ailing periods. This may be the reason behind the positive correlation between DII and PI. The value of correlation coefficient between DII and PI is 0.615. This means that doctors involvement index is quite highly correlated with the patient perception index which is also quite expected in such health staff arid region.

8.3: Empirical findings of DEA Model

The output-oriented DEA model is used for the analysis because the management of PHCs has no control over inputs, especially the deployment of human resources. It is difficult as well as unethical up to some point to reduce inputs, which are already in short supply position. Therefore we have made an attempt to look at the possibility of maximising the output with the given level of inputs. However, given their public health orientation, PHC staff have a duty to induce demand (through health promotion strategies) for preventive health care services such as antenatal care, family planning services, immunizations, etc through Sub-centres. Through their outreach public health work among communities, PHC staff are also supposed to mobilise community efforts and other resources to provide clean water and hygienic human waste disposal facilities, e.g. vented improved pit latrines, especially in rural

areas and slums. Like other parts of the country there is a large unmet need for primary health care among communities. The severe budgetary constraints make it difficult to increase inputs, even assuming that PHCs have control over inputs (which they do not have). Even where inputs (e.g. labour) might be underutilized, it is not within their power to dispose of excess inputs. In this study we thus observe that output maximization is the most appropriate orientation for health centres which are given a fixed input and requested to produce as much output as possible. An output-oriented approach focuses on the amount by which health unit outputs can be expanded with the same level of inputs. Furthermore, the output and input-oriented models will estimate exactly the same frontier, and therefore, by definition, identify the same set of PHCs (firms) as being efficient. It is only the efficiency measures associated with the inefficient firms that may differ between the two methods. In fact, under the assumption of constant returns to scale, even the efficiency scores will not change. We, therefore, feel that the choice of model is not going to affect the results significantly.

Table-8.3: Mean and SD for PHCs inputs and outputs

Variables	Total	Mean	SD	Maximum	Minimum	CV
Outputs						
QAOPD	121.268	3.191	2.315	9.156	0.301	72.547
QAIPD	10.243	0.27	0.189	0.629	0	69.97
Number of Deliveries Covered (NCD)	4353	114.553	51.384	227	0	44.856
Health Education Sessions (HES)	301	7.921	3.802	18	3	47.999
Inputs						
Bed	256	6.737	2.767	10	0	41.072
Equipment	335	8.816	2.779	16	5	31.522
Doctors	27	0.711	0.46	1	0	64.697
Nursing staff	21	0.553	0.504	1	0	91.139
Health Support Staff	36	0.947	0.226	1	0	23.865
Group D Staff	33	0.868	0.343	1	0	39.516
Medicine	462	12.158	4.051	21	6	33.32

Source: DEA analysis results of selected Inputs & Outputs, 2012

Table 8.3 presents the descriptive statistics for outputs and inputs of 38 PHCs in Western Dooars. The general findings of the DEA analysis presented in table 8.4 indicate high inefficiency among the PHCs and wide dispersions of efficiency score across PHCs. The measurement of QAOPD and QAIPD output shows the per day basis value according to the definition of these outputs constructed as per our purpose.

The technical efficiency (TE) and scale efficiency (SE) scores for individual PHCs are given in table 8.4. Out of the 38 PHCs, 39.5 percent (15) are found to be relatively technically efficient score with a TE score of 100 percent and they should be considered as the peer group among the lot. The remaining 60.5 percent (23) are technically inefficient since they had a TE score of less than 100 percent.

Table-8.4: Technical and Scale Efficiency Scores for PHCs

SI No	Block	PHC (DMUs)	TE Score	SE Score	The minimum extent to which all the output can expanded (in%)	The extent to which scale of operation needed to be changed (in%)
1	Alipurduar-I	Munshipara	100	100	0	0
2	Alipurduar-I	Silbari Hat	81	75	19	25
3	Alipurduar-II	Samuktola	100	100	0	0
4	Alipurduar-II	Jasodanga	83	58	17	42
5	Alipurduar-II	Turturi	52	66	48	34
6	Dhupguri	Duramari (Salbari)	59	57	41	43
7	Dhupguri	Shakarjhora	44	53	56	47
8	Dhupguri	Jhar Altagram	37	71	63	29
9	Falakata	Jateswar	75	100	25	0
10	Falakata	Choto Salkumar	41	100	59	0
11	Jalpaiguri	Rangdhamali	100	100	0	0
12	Jalpaiguri	Kharija Berubari	100	88	0	12
13	Jalpaiguri	South Berubari	82	93	18	7
14	Jalpaiguri	Bahadur PHC	77	84	23	16
15	Jalpaiguri	Nandanpur Boalmari	63	100	37	0
16	Kalchini	Joygaon	73	96	27	4
17	Kalchini	Satali	36	42	64	58
18	Kumargram	Kumargram	100	100	0	0
19	Kumargram	Barabisa	100	100	0	0
20	Madarihat	Totapara	100	86	0	14
21	Madarihat	Madhyarangali Bazna	100	68	0	32
22	Madarihat	Sishujhura (Sishubarihat)	78	39	22	61
23	Mal	Chalk Moulani (Lataguri)	100	100	0	0
24	Mal	Dakshin Hanskhali	100	48	0	52
25	Mal	Uttar Saripukhari	54	91	46	9
26	Maynaguri	Barnies	100	100	0	0
27	Maynaguri	Singimari (Domohini)	100	73	0	27
28	Maynaguri	Bhurangabari	72	62	28	38
29	Maynaguri	Churabhandar	69	64	31	36
30	Maynaguri	Ramsi	62	81	38	19
31	Maynaguri	Saptibari	53	100	47	0
32	Metali	Indong	100	97	0	3
33	Metali	Mathachulka	66	46	34	54
34	Nagrakata	Looksan	100	85	0	15
35	Nagrakata	Dhumpara	68	55	32	45
36	Raiganj	Kalinagar	100	100	0	0
37	Raiganj	Sikarpur	93	87	7	13
38	Raiganj	Kakurjan (Sukbari)	88	49	12	51

Source: Calculation from the DEA Results, 2012

These 23 PHCs are placed below the efficiency frontier with an average score of 65.48 percent on a scale of 0 to 100. 10.53 percent (4) of the inefficient PHUs have a TE score of less than 50 percent. The overall sample average TE score is 79.11 percent [standard deviation (SD) = 21.23 percent]. This implies that if the inefficient PHCs are to operate as efficiently as their 15 peers on the efficient frontier, outputs can be increased by about 20.89 percent without changing the level of inputs used. The average TE score among the inefficient (23) PHCs is 65.48 percent (SD = 16.31 percent). This means that their output can be expanded by 34.52 percent without altering their input combinations. The study shows a high degree of variation across different PHCs. In the study 15 PHCs are found efficient. This means that further increase in output is not feasible in the current structure. Some PHCs are found with so low score of efficiency that their expansion of output can be possible

by more than 60 percent by the efficient utilisation of resources. The maximum extent of such increase can be possible for Satali PHC of Kalchini block and Jhar Altagram PHC of Dhupguri block.

In case of scale efficiency scores the study identifies that 31.58 percent (12) PHCs have a scale efficiency (SE) score of 100 percent. This means that these PHCs would significantly improve their efficiency and reduce their unit cost by increasing scale of operation and they have the most productive size for the particular input-output combinations. Thus the other 68.42 percent (26) PHCs are performing as scale inefficient with a scale efficiency scores less than 100 percent. The average scale efficiency score of all the PHCs is 79.32 percent with SD equals to 20.48. This implies that on average the scale inefficient PHCs can reduce their size by 20.68 percent without affecting their current output status. The average scale efficiency score for all 26 scale inefficient PHCs is 73.8 percent with SD equals to 19.64. Thus for these 26 scale inefficient PHCs, scope of size reduction is 26.2 on an average basis. In case of scale efficiency (SE) we observe that among 38 PHCs 31.58 percent (12) show constant return to scale, which means that these PHCs are operating at their most productive scale sizes. The number of PHCs operating under decreasing returns to scale is 55.26 percent (21), implying that scale of operation of these PHCs should be contracted for achieving efficiency and reduction of unit costs, and 5 (13.15percent) PHCs are operating at increasing returns to scale position. The most of the PHCs are operating under decreasing returns to scale implying that they are going beyond their capacity and hence need reduction of their scale operation. Highest reduction in scale is required for the Sishujhora PHC of Madarihat block (61percent).

The findings of this study reveal that more than half of the PHCs are operating at less than optimal levels of pure technical and scale efficiency. The performance of some of the PHCs in the sample is actually observed to be very low, and raises much concern for planners and policymakers. With the existing levels of inefficiency, the achievement of the health policy objectives and health related global and regional targets such as the Millennium Development Goals (MDGs) target will be compromised. Hence, greater focus should be placed on efficient use of the existing resources. Using technical efficiency scores of different PHCs it is possible to find out the extent to which outputs of out-patient department and in-patient department can be expanded. By the same way, scale efficiency scores combinations and the information on the technology, i.e., whether the hospitals are operating at increasing or decreasing returns to scale, one can arrive at the decision that at which extent change in scale proportion is needed. The table 8.5 gives us the concrete result derived from table 8.4.

Table-8.5: Summary results of DEA for 38 PHCs

Item	TE Score	SE Score
Number of Efficient PHCs	15	12
Number of Inefficient PHCs	23	26
Mean Score of Efficient PHCs	100	100
Mean Score of all PHCs	79.11	79.32
Mean Score of Inefficient PHCs	74.74	73.8
Median Score of all PHCs	81.5	60.66
Standard Deviation	21.23	20.48
Minimum Score	36	39

Source: Calculation from the DEA Results, 2012

Table-8.6: Efficiency status of PHCs in different Blocks

Block	Number of Efficient PHCs	% of no of efficient PHCs	Av TE Score	Av SE Score
Jalpaiguri	2	40	84.4	93
Maynaguri	2	33.33	76	80
Dhupguri	0	0	46.67	60.33
Rajganj	1	33.33	93.67	78.67
Mal	2	66.67	84.67	79.67
Meteli	1	50	83	71.5
Nagrakata	1	50	84	70
Kumargram	2	100	100	100
Falakata	2	0	58	100
Madarihat	2	66.67	92.67	64.33
Kalchini	0	0	54.5	69
Alipurduar-I	1	50	90.5	87.5
Alipurduar-II	1	66.67	78.33	74.67

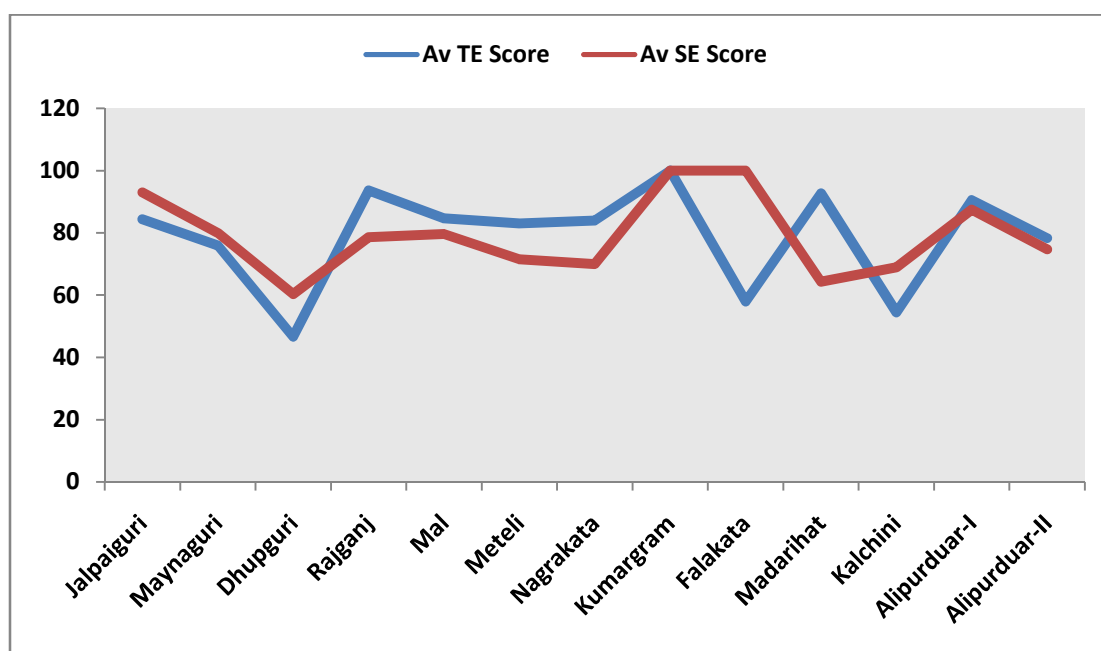
Source: Calculation from the DEA Results, 2012

Now from table 8.4 we can derive the efficiency status of the PHCs in all blocks of the district, and that is described in table 8.6. The block wise efficiency character of the PHCs is shown in the table 8.6 in terms of number of efficient PHCs, percentage of efficient PHCs out of total number of PHCs in the block, average technical efficiency scores, and scale efficiency scores. The block wise picture paints that Kumargram, one of the extreme east side block of the Western Dooars, has performed as the best performer in the area followed by Alipurduar-II, Madarihat and Mal blocks of Jalpaiguri district. In terms of average technical efficiency score the block Kumargram again is the peer and situated on the extreme boundary of the health production possibility frontier. The figure 8.6 shows the average technical and scale efficiency scores of the blocks. Considering both the scores the Kumargram block is the most superior compared to other blocks. The figure 8.6 shows that

the efficient blocks (both with TE and SE scores) in terms of functioning of PHCs are Jalpaiguri sadar, Mal, Kumargram and Alipurduar-I blocks of the district.

Now in table 8.4 we have already measured the minimum extent to which all the output can be expanded by TE score deficiency from the frontier and also the extent to which the scale of operation needed to be changed by scale efficiency deficiency. If we rank the PHCs in terms of these two and compare the result in table 8.7 an idea regarding the output expansion and scale changes can be incorporated by the study.

Figure-8.6: Block wise average technical & scale efficiency scores of PHCs



Source: Calculation from the DEA Results, 2012

Here, the study can easily identify the best performer and worst performer PHCs in terms of both output expansion and scale expansion possibility. The PHCs which have minimum possibility of expanding output according to its technical efficiency scores as well as the least value of the scale expansion possibilities should be identified as the best performer and vice versa for the worst performer. The PHCs in table 8.7 filled rows with blue colour are identified as the worst performers and filled rows with blue colour are identified as the best performers. Now the scopes of expansion of outputs have two possibilities, one is 'radial expansion' and the other is 'slack movement'. By radial expansion we mean that all the outputs can be expanded by minimum percentage, and by slack movement we mean amount by which further expansion of at least one output is possible in addition to the radial expansion. In this study the positive slack movement means that, in addition to radial expansion which is measured by technical efficiency scores, further expansion in output is possible. Among all the technically inefficient PHCs have scope of radial expansion i.e., expansion of all of the outputs. The detailed descriptions of radial expansions as well as output slacks are shown in table 8.8.

Table-8.7: Rank of PHCs in terms of output & Scale expansion

SI No	Block	PHC (DMUs)	Rank in terms of the minimum extent to which all the output can expanded (in%)	Rank in terms of the extent to which scale of operation needed to be changed (in%)
1	Kalchini	Satali	38	37
2	Dhupguri	Jhar Altagram	37	25
3	Falakata	Choto Salkumar	36	12
4	Dhupguri	Shakarjhora	35	33
5	Alipurduar-II	Turturi	34	27
6	Maynaguri	Saptibari	33	11
7	Mal	Uttar Saripukhari	32	16
8	Dhupguri	Duramari (Salbari)	31	31
9	Maynaguri	Ramsi	30	22
10	Jalpaiguri	Nadanpur Boalmari	29	10
11	Metali	Mathachulka	28	36
12	Nagrakata	Dhumpara	27	32
13	Maynaguri	Churabhandar	26	28
14	Maynaguri	Bhurangabari	25	29
15	Kalchini	Joygaon	24	14
16	Falakata	Jateswar	23	9
17	Jalpaiguri	Bahadur PHC	22	21
18	Madarihat	Sishuihura (Sishubarihat)	21	38
19	Alipurduar-I	Silbari Hat	20	23
20	Jalpaiguri	South Berubari	19	15
21	Alipurduar-II	Jasodanga	18	30
22	Rajganj	Kakurjan (Sukbari)	17	34
23	Rajganj	Sikarpur	16	18
24	Alipurduar-I	Munshipara	15	8
25	Alipurduar-II	Samuktola	14	7
26	Jalpaiguri	Rangdhamali	13	6
27	Jalpaiguri	Kharija Berubari	12	17
28	Kumargram	Kumargram	11	5
29	Kumargram	Barabisa	10	4
30	Madarihat	Totapara	9	19
31	Madarihat	Madhyarangali Bazna	8	26
32	Mal	Chalk Moulani (Lataguri)	7	3
33	Mal	Dakshin Hanskhali	6	35
34	Maynaguri	Barnies	5	2
35	Maynaguri	Singimari (Domohini)	4	24
36	Metali	Indong	3	13
37	Nagrakata	Looksan	2	20
38	Rajganj	Kalinagar	1	1

Source: Calculation from the DEA Results, 2012

The explanation of table 8.8 can be described in terms of original output, scope of radial expansion, slack introduction, and target output. Consider the case of 'Silbari Hat' PHC under Alipurduar-I block. Here, the original output produced by the OPD i.e. visits of 5.083 persons per day basis. Now to define the scope of radial expansion we see in table 8.4 that this PHC has the scope of increase its output by 19 percent from its present technical efficiency. Thus the scope of radial expansion becomes 0.966 ($= 5.083 \times 19\%$) for output in OPD units.

Table-8.8: Scope of Radial Expansion and Output Slacks in PHCs

PHCs	Original Output				Scope of Radial Expansion					Slack				Target Output				
	OPD in units	IPD in units	NDC in units	HES in units	In%	OPD in units	IPD in units	NDC in units	HES in units	In %	OPD in units	IPD in units	NDC in units	HES in units	OPD in units	IPD in units	NDC in units	HES in units
Silbari Hat	5.083	0.358	138	12	19	0.966	0.068	26.22	2.28	25	1.271	0.09	34.5	3	7.32	0.516	198.7	17.28
Turturi	3.062	0.304	92	4	17	0.521	0.052	15.64	0.68	42	1.286	0.128	38.64	1.68	4.869	0.484	146.3	6.36
Jasodanga	7.259	0.283	149	12	48	3.484	0.136	71.52	5.76	34	2.468	0.096	50.66	4.08	13.211	0.515	271.2	21.84
Jhar Altagram	0.643	0.009	71	4	41	0.264	0.004	29.11	1.64	43	0.277	0.004	30.53	1.72	1.184	0.017	130.6	7.36
Shakarjhora	2.338	0.033	138	3	56	1.309	0.019	77.28	1.68	47	1.099	0.016	64.86	1.41	4.746	0.068	280.1	6.09
Duramari (Salbari)	4.693	0.191	227	5	63	2.957	0.12	143	3.15	29	1.361	0.055	65.83	1.45	9.011	0.366	435.8	9.6
Choto Salkumar	1.428	0.03	97	4	25	0.357	0.008	24.25	1	0	0	0	0	0	1.785	0.038	121.3	5
Jateswar	1.616	0.057	134	8	59	0.953	0.034	79.06	4.72	0	0	0	0	0	2.569	0.091	213.1	12.72
Kharija Berubari	6.463	0.558	148	18	0	0	0	0	0	12	0.776	0.067	17.76	2.16	7.239	0.625	165.8	20.16
Nadanpur Boalmari	2.482	0.263	44	12	18	0.447	0.047	7.92	2.16	7	0.174	0.018	3.08	0.84	3.103	0.328	55	15
Rangdhamali	8.657	0.595	173	15	23	1.991	0.137	39.79	3.45	16	1.385	0.095	27.68	2.4	12.033	0.827	240.5	20.85
South Berubari	4.821	0.426	85	10	37	1.784	0.158	31.45	3.7	0	0	0	0	0	6.605	0.584	116.5	13.7
Satali	0.301	0	0	4	27	0.081	0	0	1.08	4	0.012	0	0	0.16	0.394	0	0	5.24
Joygaon	3.934	0.1	131	4	64	2.518	0.064	83.84	2.56	58	2.281	0.058	75.98	2.32	8.733	0.222	290.8	8.88
Madhyarangali Bazna	1.483	0.249	131	10	0	0	0	0	0	14	0.208	0.035	18.34	1.4	1.691	0.284	149.3	11.4
Sishujhura (Sishubarihat)	0.571	0.061	58	6	0	0	0	0	0	32	0.183	0.02	18.56	1.92	0.754	0.081	76.56	7.92
Totapara	2.852	0.359	155	8	22	0.627	0.079	34.1	1.76	61	1.74	0.219	94.55	4.88	5.219	0.657	283.7	14.64
Uttar Saripukhari	0.698	0.049	71	4	0	0	0	0	0	52	0.363	0.026	36.92	2.08	1.061	0.075	107.9	6.08
Dakshin Hanskhali	2.743	0.236	149	10	46	1.262	0.109	68.54	4.6	9	0.247	0.021	13.41	0.9	4.252	0.366	231	15.5
Bhurangabari	5.85	0.622	144	8	0	0	0	0	0	27	1.58	0.168	38.88	2.16	7.43	0.79	182.9	10.16
Churabhandar	4.573	0.63	181	8	28	1.28	0.176	50.68	2.24	38	1.738	0.239	68.78	3.04	7.591	1.045	300.5	13.28
Singimari (Domohini)	2.382	0.432	80	4	31	0.738	0.134	24.8	1.24	36	0.858	0.156	28.8	1.44	3.978	0.722	133.6	6.68
Saptibari	6.878	0.559	201	11	38	2.614	0.212	76.38	4.18	19	1.307	0.106	38.19	2.09	10.799	0.877	315.6	17.27
Ramsi	0.439	0.223	43	4	47	0.206	0.105	20.21	1.88	0	0	0	0	0	0.645	0.328	63.21	5.88
Indong	0.719	0.162	98	9	0	0	0	0	0	3	0.022	0.005	2.94	0.27	0.741	0.167	100.9	9.27
Mathachulka	3.233	0.365	143	15	34	1.099	0.124	48.62	5.1	54	1.746	0.197	77.22	8.1	6.078	0.686	268.8	28.2
Looksan	0.816	0.061	87	6	0	0	0	0	0	15	0.122	0.009	13.05	0.9	0.938	0.07	100.1	6.9
Dhumpara	3.056	0.249	148	11	32	0.978	0.08	47.36	3.52	45	1.375	0.112	66.6	4.95	5.409	0.441	262	19.47
Sikarpur	1.217	0.107	32	3	7	0.085	0.008	2.24	0.21	13	0.158	0.014	4.16	0.39	1.46	0.129	38.4	3.6
Kakurjan (Sukbari)	2.387	0.424	55	5	12	0.286	0.051	6.6	0.6	51	1.217	0.216	28.05	2.55	3.89	0.691	89.65	8.15

Source: Calculation from the DEA Results, 2012

In a similar fashion the scope of introducing slack in OPD output can be increased by 25 percent (from table 8.4) according to its present scale efficiency score. Hence the slack in OPD output is 1.271 ($=5.083 \times 25\%$), and finally the scope of radial expansion and scope of introducing slack can be added with the original output, and we get the value of target OPD output as 7.32 ($=5.083+0.966+1.271$). Thus, finally the study can conclude that Silbari Hat PHC is serving 5.083 persons per day in OPD services where as it can serve 7.32 persons without changing its current input combinations and by using its full efficiency. We see that 26 PHCs show positive slacks in OPD in output (QAOPD), and among them amount of slack happens to be highest for Banerhat PHC (2.468) of Alipurduar-II block. Similarly, 25 PHCs show positive slack in IPD output (QAIPD) and among them output is highest for Churabhandar PHC (0.239) of Maynaguri block. In case of output like number of deliveries of

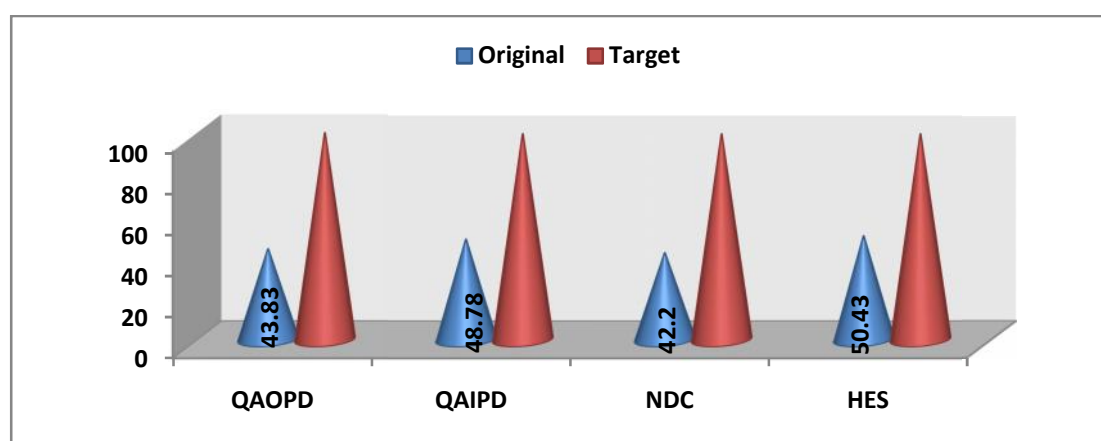
child (NDC) 22 PHCs show positive slack and Totapara PHC (94.55) of Madarihat block is in the top position. For the fourth output i.e., health education sessions (HDS), 26 PHCs are showing positive slack and Mathachulka PHC (8.1) of Meteli block is the topper.

Table-8.9: Comparison of Original & Target output of inefficient PHCs

Outputs	Original Output		Target Output		% Increase in Output Possible
	Total	Average	Total	Average	
QAOPD	92.68	3.089	144.738	4.825	56.17
QAIPD	7.995	0.267	12.09	0.403	51.22
NDC	3403	113.433	5370	178.986	57.8
HES	237	7.9	354.48	11.816	49.57

Source: Calculation from the DEA Results, 2012

Figure-8.7: The comparison between Target & Original output of inefficient PHCs



Now we can compare the aggregate picture of inefficient PHCs in terms of their original output and target output. Table 8.9 shows the results if all the inefficient PHCs become efficient (i.e., using their full capacity). It then becomes possible to increase all output by at least 50 percent level. The diagram 8.7 derived from table 8.9 can illustrate the comparison between all four types of output under original and target situations. In the figure the target level output are considered as 100 percent and the corresponding original output is shown by less than corresponding percentage increase in output from 100 percent. Table 8.9 shows the total output increases needed to make inefficient public PHCs more efficient. In order to become efficient, the 30 inefficient PHCs combined would need to increase their current output levels by 56.17 percent more QAOPD, 51.22 percent more QAIPD, 57.8 percent more deliveries, and 49.57 percent more health education sessions. This potential of providing more preventive health services to those currently without access, at no extra cost, would be of great public health importance in a poor area like Western Dooars where large number of people do not have access to healthcare, proper medical attention during ailments and trained attendants during childbirth.

Table-8.10: Inputs Slacks at different PHCs and their corresponding Rank

Block	PHC	Slack in Input 1 (Bed)	Rank in terms of Bed	Slack in Input 2 (Equipment)	Rank in terms of Equipment	Slack in Input 3 (Doctor)	Rank in terms of Doctor	Slack in Input 4 (Nurse)	Rank in terms of Nurse	Slack in Input 5 (HSS)	Rank in terms of HSS	Slack in Input 6 (Gr-D)	Rank in terms of Gr-D	Slack in Input 7 (Medicine)	Rank in terms of Medicine
Jalpaiguri	Bahadur PHC	0	1	0	1	0	1	0	1	0	1	0	1	0	1
Alipurduar-II	Jasodanga	5.1	38	5.1	33	0.51	34	0.51	37	0.51	34	0.51	35	8.16	37
Kumargram	Barabisa	0	10	0	10	0	13	0	17	0	11	0	12	0	10
Maynaguri	Barnies	4.3	35	4.3	31	0.43	31	0.43	34	0.43	31	0.43	32	6.45	35
Maynaguri	Bhurangabari	4.7	37	5.64	35	0.47	33	0.47	36	0.47	33	0.47	34	9.87	38
Mal	Chalk Moulani (Lataguri)	3.66	33	6.1	36	0.61	38	0	14	0.61	38	0	10	6.1	33
Falakata	Choto Salkumar	1.08	22	2.16	23	0	14	0.27	31	0.27	25	0	13	2.7	25
Maynaguri	Churabhandar	2.9	28	2.9	26	0.29	25	0.29	32	0.29	26	0.29	26	5.22	29
Mal	Dakshin Hanskhali	3.12	29	3.64	29	0.52	35	0.52	38	0.52	35	0.52	36	5.2	28
Nagrakata	Dhumpara	3.2	30	3.52	28	0.32	26	0	13	0.32	27	0.32	27	2.56	23
Dhupguri	Duramari (Salbari)	0.96	21	1.28	21	0.16	23	0.16	29	0.16	22	0.16	24	1.28	17
Metali	Indong	0	7	0	7	0	9	0	11	0	8	0	8	0	7
Falakata	Jateswar	2.28	26	4.18	30	0.38	29	0	18	0	12	0.38	30	2.66	24
Dhupguri	Jhar Altagram	0.48	16	0.72	16	0	6	0	7	0.12	18	0.12	20	1.44	20
Kalchini	Joygaon	2.16	25	5.4	34	0.54	36	0	22	0.54	36	0.54	37	5.94	32
Rajganj	Kakurjan (Sukbari)	3.48	31	4.64	32	0.58	37	0	10	0.58	37	0.58	38	5.8	31
Rajganj	Kalinagar	0	6	0	6	0	7	0	9	0	7	0	7	0	6
Jalpaiguri	Kharija Berubari	2.5	27	3.5	27	0.25	24	0.25	30	0.25	24	0.25	25	4.5	27
Kumargram	Kumargram	0.54	18	1.08	20	0.09	20	0	16	0.09	17	0.09	19	0.72	16
Nagrakata	Looksan	0.56	19	0.84	18	0	11	0.14	28	0.14	20	0.14	22	1.4	18
Madarihat	Madhyarangali Bazna	3.6	32	2.88	25	0.36	28	0	19	0.36	29	0.36	29	3.96	26
Metali	Mathachulka	0	8	0	8	0	10	0	12	0	9	0	9	0	8
Alipurduar-I	Munshipara	0.6	20	1.35	22	0.15	22	0	23	0.15	21	0.15	23	2.4	22
Jalpaiguri	Nadanpur Boalmari	0	2	0	2	0	2	0	2	0	2	0	2	0	2
Maynaguri	Ramsi	0	5	0	5	0	5	0	6	0	5	0	5	0	5
Jalpaiguri	Rangdhamali	4.2	34	6.72	38	0.42	30	0.42	33	0.42	30	0.42	31	6.72	36
Alipurduar-II	Samuktola	0	13	0	12	0	18	0	24	0	14	0	17	0	12
Maynaguri	Saptibari	0	4	0	4	0	4	0	5	0	4	0	4	0	4
Kalchini	Satali	0	12	0.18	13	0	17	0.03	26	0.03	15	0	16	0.27	13
Dhupguri	Shakarjhora	0.28	15	0.35	15	0.07	19	0	8	0	6	0	6	0.7	15
Rajganj	Sikarpur	0.24	14	0.32	14	0	8	0.04	27	0.04	16	0.04	18	0.6	14
Alipurduar-I	Silbari Hat	4.5	36	6.3	37	0.45	32	0.45	35	0.45	32	0.45	33	5.4	30
Maynaguri	Singimari (Domohini)	0	3	0	3	0	3	0	4	0	3	0	3	0	3
Madarihat	Sishujhura	1.14	23	0.95	19	0	15	0	20	0.19	23	0	14	1.71	21
Jalpaiguri	South Berubari	1.36	24	2.38	24	0.34	27	0	3	0.34	28	0.34	28	6.12	34
Madarihat	Totapara	0	11	0	11	0	16	0	21	0	13	0	15	0	11
Alipurduar-II	Turturi	0.52	17	0.78	17	0.13	21	0	25	0.13	19	0.13	21	1.43	19
Mal	Uttar Saripukhari	0	9	0	9	0	12	0	15	0	10	0	11	0	9

Source: Calculation from the DEA Results, 2012

Now we consider the case of input slacks for different inputs. The table 8.10 shows the level of inputs slacks in all PHCs and the corresponding ranks for them. The inputs in table 8.10 are written as bed as input 1, equipment as input 2, doctors as input 3, nursing staff as input

4, health support staff as input 5, group D staff as input 6, and medicine as input 7. The corresponding ranks of the inputs are written in the next cell of the table. Now the total and mean level of slacks for each input can be calculated for all 38 PHCs. Table 8.11 depicts the situation of all input slacks in the study area. It is found that highest average slack is in medicine, and then it is followed by equipment, Bed, health support staff, Doctor, Group-D and Nurses. Conceptually it is very much correct that we cannot reduce the inputs like doctors, nursing staff etc but what can we do is that with the help of such level of inputs PHCs can able to produce more level of outputs easily. Technically we can say that if these inputs can be reduced the respective PHCs output production remains the same. But such resource crunch is not recommended under any situation. Hence only way out is to give pressure to those inefficient units to increase their productivity.

Table-8.11: Summary of all Input Slacks

Input Type	Total of Slacks	Average of Slacks
Bed	57.46	1.512
Equipment	77.21	2.032
Doctor	7.07	0.186
Nurse	3.98	0.105
HSS	7.41	0.195
Gr-D	6.69	0.176
Medicine	99.31	2.613

Source: Calculation from the DEA Results, 2012

Also, over 40 percent of the population in the Western Dooars do not have access to safe water, sanitation facilities and health care services. Thus, it is irrational, immoral and unethical to deny needy people access to essential health services through inefficiencies. The predominant form of scale inefficiency is decreasing returns to scale, which is also known as diseconomies of scale. A PHC operating at decreasing returns to scale has an inefficiently large size. As percentage increase in all inputs is followed by less than a percentage change in output. To improve the efficiency of the inefficiently large PHCs, there is a need to have more health units of a relatively smaller size. Which is cheerful in such situation is that our national health policy and plan understand the situation and recommend for more number of PHCs in our health structure reform. While the scope for staff reduction in Western Dooars of Jalpaiguri district is almost non-existent as revealed by this study, there is certainly scope for providing essential public PHUs to a significantly larger number of people than the health units are actually providing. This can be achieved through a conscious pursuit of health promotion strategies to create or induce demand for essential preventive public health services that are being under-utilized. Examples and details of such demand-inducing strategies are discussed in the next chapter (chapter-9).

8.4 Conclusion

In earlier portion of the study discusses the individual values of efficiency for all the 38 PHCs of Jalpaiguri district. Hence, a significant part of the study is to locate the differences of efficiency among the PHCs depending on their locations and size. Thus it becomes important to search for the fact that whether the efficiency of the respective PHCs are influenced by the factors like locations and size. Such comparison can be made by the construction of group frontier and meta frontier of the PHCs. In this study we divide the PHCs into different sub-groups according to location variant and bed size variant. By calculating the Technology Closeness Ratio (TCR) further study can easily examine the proximity of any group frontier to the meta frontier. After construction of different groups we can take the geometric average of such individual technical efficiencies of the group, and we get the average technical efficiency of the PHCs in that group.

CHAPTER-9

Potential Service Delivery Space of Primary Health Centres

- **Introduction**
- **Service Delivery Space by Service Categories**
 - **Maternal and Child Healthcare (MCH)**
 - **General curative care**
- **Service Delivery Space by Geographical Divisions**
 - **Physical accessibility Index**
 - **Service Delivery Space Index**
- **Operating Efficiency**
- **Conclusion**

CHAPTER-9

Potential Service Delivery Space of Primary Health Centres

9.1 Introduction

The purpose of the present chapter is to present an estimate of gaps in healthcare delivery system of Primary Health Centres (PHCs) of the Western Dooars. In other words, it attempts to assess the potential 'service delivery space' of the PHCs. Now the meaning of 'service delivery space' is very important and needed some short elaboration. It means the availability of room that would allow the government and its development partners to provide additional resources or to undertake new initiatives for improving service delivery of the PHCs and to reach specific targets of health outcomes in the Western Dooars. In other words, based on a simple supply-demand framework it will assess how much of healthcare needs of the people of the Western Dooars is currently met by the present delivery system of the PHCs, or alternatively, how much remains unmet. The analysis and results may be used to answer two important policy questions in the context of the healthcare delivery system of the PHCs in Western Dooars. These are: (1) Service delivery space of PHCs by service categories: how much additional capacities need to be added to the present system of the existing PHCs to meet the desired health outcomes for various service categories. Here, the various service categories can be classified as general inpatient care, general outpatient care, maternal and child health care, public health programmes etc. (2) Service delivery space of PHCs by geographical areas: which areas (blocks / villages) are more vulnerable in terms of inefficiencies of PHCs. These areas require more intensive investment or allocation of resources, and here the maximum gap between supply and demand for services of the PHCs.

9.2 Service Delivery Space by Service Categories

The service delivery space of PHCs is not, however, constant across different components of healthcare such as inpatient care, outpatient care, institutional deliveries, immunisations, and so on. For example, the need for outpatient care is being met at a much higher rate by the PHCs compared to the same for inpatient care. It is, therefore, important to prioritise the allocation of resources according to magnitudes of the space. In the present analysis, two scenarios are created, one is base scenario and the other is desirable scenario. The base scenario is estimated from the household survey, patients' survey and administrative facility survey of the PHCs. The desirable scenario can be derived on the basis of certain set of assumptions. Then we can assess the service delivery space by comparing these two scenarios. As in the earlier chapter (chapter 8) the inputs of the specified health system used by the PHCs are defined as bed, equipment, doctor, nurse, health assistant, group-D

staff, and medicines. All these inputs are used to produce four qualified output like Quality adjusted in-patient output (QAIPD), Quality adjusted out-patient output (QAOPD), Number of child birth, and Number of health education sessions. Here, the base scenario conditions are already known to us for the following inputs and what level of output produced by them is also in our knowledge. Among these outputs one major output is number of child birth taking place in the institution like PHCs. One may consider this as a proxy for the very significant health indicator like institutional delivery. Table 9.1 can explain such space of service delivery situation for institutional birth. The estimation of table 9.1 indicates that about 1037

Table-9.1: Estimation of gap in Institutional Delivery of PHCs, Western Dooars, 2011

	Estimated birth in 2011	Estimated Institution Delivery in 2011	Estimated Deliveries in PHCs, 2011	Total birth Delivered at PHCs	Additional load on PHCs
Assumptions	Population 3.5 million, birth rate 2.2% p.a	60% of Population as per district health information	10% of the estimated Institutional delivery	From HMIS data, 2011	If institutional Delivery increases by 10%
Western Dooars	77000	46200	4620	4353	1037

Source: Assumptions and data of Jalpaiguri district health Office, 2011

births would be delivered at PHCs in the Western Dooars in a year if, all other things remaining same, institutional delivery increases by 10 percent. Assuming 3 days as average length of stay for a birth delivery, this number could be translated roughly 3100 inpatient days. Now in the study area there are 256 bed performing for the year i.e. there will be 93440 bed days. If the average length of stay is 3 days, then this will generate 31147 bed days per patient. Now due to 10 percent increase in institutional delivery 3100 inpatient days further generated which is 9.95 percent of the present capacity. The PHC survey study shows that present capacity for providing birth delivery services at this level are already close to the saturation level except some gap due to lack of manpower and infrastructural facilities. Hence the additional 9.95 percent burden inpatient capacity has to be created in PHCs if overall institutional delivery rate increases by 10 percent. Clearly, the additional requirement will proportionately increase if the bypass and referral rate is simultaneously reduced.

The service delivery space under each category of health seeking behaviour are discussed on the basis of four categories like basic scenario, desirable scenario, prospects for service delivery space at local level and who could fill the space. The following service delivery spaces are discussed below under the category of mother and child's health care, and general curative care.

9.2.1 Maternal and Child Healthcare (MCH)

In case of maternal and child healthcare (MCH) the service delivery space in the Western Dooars are observed by the study under six major components. The *first* one is *institutional delivery*, where the base scenario is that only 46 percent (according to study) births are institutionally delivered. About 72 percent of such births are in local public health units. The study finds that local PHCs are underutilised but BPHCs and RHs are optimally utilised. The desirable scenario with some feasible target would be achieving 60 percent institutional delivery rate for which the local capacity has to increase by more than 10 percent. The prospects of service delivery space under institutional delivery are very good and NRHM provides an excellent opportunity to increase the rate. Government through strengthening PHCs could fill the gaps of service delivery space and some non-governmental organisations through scaling up partnerships can also be an effective way to complete such gaps. The *second* one is *ante-natal care*, where 70-80 percent coverage is the base scenario found by the study and the desirable scenario will be 90-100 percent coverage. At the local level the prospects of service delivery space in this regard can be achieved through strengthening routine process, and the government through existing NRHM network can fill the space of service delivery. *Third* components is the *neo natal care* where the base scenario finds no local intensive care unit for sick neo-nate and poor infrastructure were functioning for providing quality neo-natal care. Expectedly the desirable scenario would be the basic neo-natal facilities at all local PHCs. Like institutional delivery prospects for service delivery under neo-natal care is very good and also NRHM provides here also a very good opportunity to develop the care. *Fourth* component is the *treatment of common child diseases* where the basic scenario is preference for the unqualified providers for treatment and the desirable scenario is treatment by trained professionals. The prospects for service delivery space describe that the excellent opportunity to involve RMP services through training and integration and the gap of space would be filled by the RMP with adequate training. The fifth component is child nutrition where the basic scenario is more than half of the children are chronically malnourished and the desirable scenario is to bring down the level of malnourished children by less than 25 percent. Prospects for service delivery space at local level is very good and community level intensive intervention for addressing malnutrition.

9.2.2 General curative care

The service delivery space for general curative care has two major components, one is general inpatient care and the other is general outpatient care. The basic scenario for *general inpatient care* shows that use of inpatient care is already high. However, use of local facilities is about half and bed occupancy rate is also lower in PHCs compared to state

average. A huge tendency is observed to bypass the lower local level facilities and also these lower local level facilities have a very weak referral mechanism system. The desirable scenario means utilisation of local facilities for inpatient care would increase to 80 percent and a strong referral mechanism for local hospital is required to gain the confidence of the local people. The prospects of service delivery space at local level indicates a very positive attitude with the establishment of guided referral system, partnerships with local private hospitals, ensuring supply of critical inputs to all PHCs, at least one PHC at each block with 24 x 7 services and with functional inpatient care facilities. This space could be filled by the government through strengthening PHC inpatient services and making local nursing homes in partnership with PHCs. In case of *general outpatient care* the study shows that the basic scenario as more than 60 percent of the total outpatients are treated by unqualified providers (RMPs), whereas public facilities treat only 13 percent. A desirable state is to bring 50 percent of RMPs into formal health system, simultaneously mobile health clinics should be scaled up. Here, the prospects for service delivery space have some excellent opportunity to involve RMPs service through training and integration and the space should be filled by a government-RMP-NGO partnership.

9.3 Service Delivery Space by Geographical Divisions

The important questions is which areas (blocks / villages) are more vulnerable, that means with maximum gap between supply and demand for services and require more intensive investment of resources? It is also worth investing whether and to what extent the space is correlated with physical inaccessibility. To address this question, two indices were computed and used to rank the Western Dooars block according to physical accessibility and service delivery space: (1) physical inaccessibility index, reflecting the degree of hardship regarding the mobility to and from most areas of the block, and (2) service delivery space index of PHCs which reflects the adequacy or room for significantly improving the service coverage by new initiatives.

9.3.1 Physical accessibility Index

Accessibility in a block is classified in three categories- good, poor, and moderate. The good, poor, and moderate physical accessibility indexes blocks are identified by following criterion as shown in table 9.2. On the basis of criterion fitted in table 9.2, the study categorises the accessibility of all 13 blocks of the district Jalpaiguri which is shown in the table 9.3. The table 9.3 shows that out of 13 blocks, 4 blocks have good physical accessibility, 4 have poor accessibility, and 5 have moderate accessibility. All the blocks with poor accessibility shows that they have some larger part under the national protected forest area. The geographical distribution of the blocks over the district represents the physical accessibility criteria

according to this study. Here, the study keyed out the blocks in terms of number of existing villages with (i) available bus services within or more than 5 Km, (ii) available railway station within or more than 5 Km, (iii) existence or non-existence of river bodies on the approach roads, (iv) existence or non-existence of 10 percent area under forest, and (v) distance from farthest sub-centres to Block Primary Health Centers is over or under 20 Km. All the 13 blocks of the district are analysed in terms of secondary data collected from district administration and district forest office. On the basis of such data level a rough categorisation has been made and the results in this respect indicate that blocks like Kalchini, Nagrakata, Alipurduar-II, and Kumargram have poor physical accessibility compared to others.

Table-9.2: Physical Accessibility Index

Indicators	Block Category		
	Good	Poor	Moderate
1st	More than 50% of the villages have bus services within 5 Km	Less than 50% of the villages have bus services within 5 Km	Otherwise
2nd	More than 10% of the villages have railway line within 5 Km	Less than 35% of the villages have railway line within 5 Km	Otherwise
3rd	Less than 10% of villages have river bodies on their approach roads	More than 50% of villages have river bodies on their approach roads	Otherwise
4th	Less than 10% of the villages have 10 % area under forest area	More than 10% of the villages have 10 % area under forest area	Otherwise
5th	Distance of furthest sub-centre to BPHC is less than 20 Km or less than 2 hours Journey	Distance of furthest sub-centre to BPHC is more than 20 Km or more than 2 hours Journey	Otherwise

Source: Methodology of the research

Table-9.3: Category of Blocks of Jalpaiguri in terms of Physical accessibility

Category of Block	Name of Block
Good	Jalpaiguri, Maynaguri, Rajganj, Alipurduar-I
Poor	Kalchini, Nagrakata, Alipurduar-II, Kumargram
Moderate	Mal, Metali, Dhupguri, Falakata, Madarihat

Source: Methodology of table 9.2

As there are no option regarding the opportunity to take advantage of the technology based on Geographic Information System (GIS) to map out the physical accessibility to health care, it is always better to estimate the geographic coverage in terms of accessibility and availability of the existing PHCs network in each block of the Western Dooars. Anyone can able to use "AccessMode" software developed by World Health Organisation (WHO) for modelling physical accessibility to healthcare. But in this study such type of application is not possible due to data unavailability and time.

9.3.2 Service Delivery Space Index

The service delivery spaces of PHCs are already ranked by block level given in chapter 6. The service delivery space index is measured by the study in terms of both the technical

efficiency and scale efficiency scores. If the PHC is performing with scores equal or very close to 100, it means it is the efficient one. The table 8.6 of chapter 8 shows the technical and scale efficiency scores of the PHCs for each block. On the basis of such demarcation table 9.4 shows the category of blocks in terms of service delivery space.

Table-9.4: Category of Blocks of Jalpaiguri in terms of service delivery spaces

Category of Block	Name of Block
Good	Kumargram, Alipurduar-I, Jalpaiguri, Rajganj, Mal
Poor	Dhupguri, Kalchini
Moderate	Falakata, Madarihat, Maynaguri, Metali, Nagrakata, Alipurduar-II

Source: Methodology of table 8.6

Table-9.5: Category of blocks in terms of both service delivery spaces & physical accessibility

		Physical Accessibility		
		Good	Moderate	Poor
Spaces for Service Delivery	Good	Jalpaiguri, Alipurduar-I, Rajganj	Mal	Kumargram
	Moderate	Maynaguri	Falakata, Madarihat, Meteli,	Nagrakata, Alipurduar-II
	Poor		Dhupguri	Kalchini

Source: Methodology of table 9.3 & 9.4

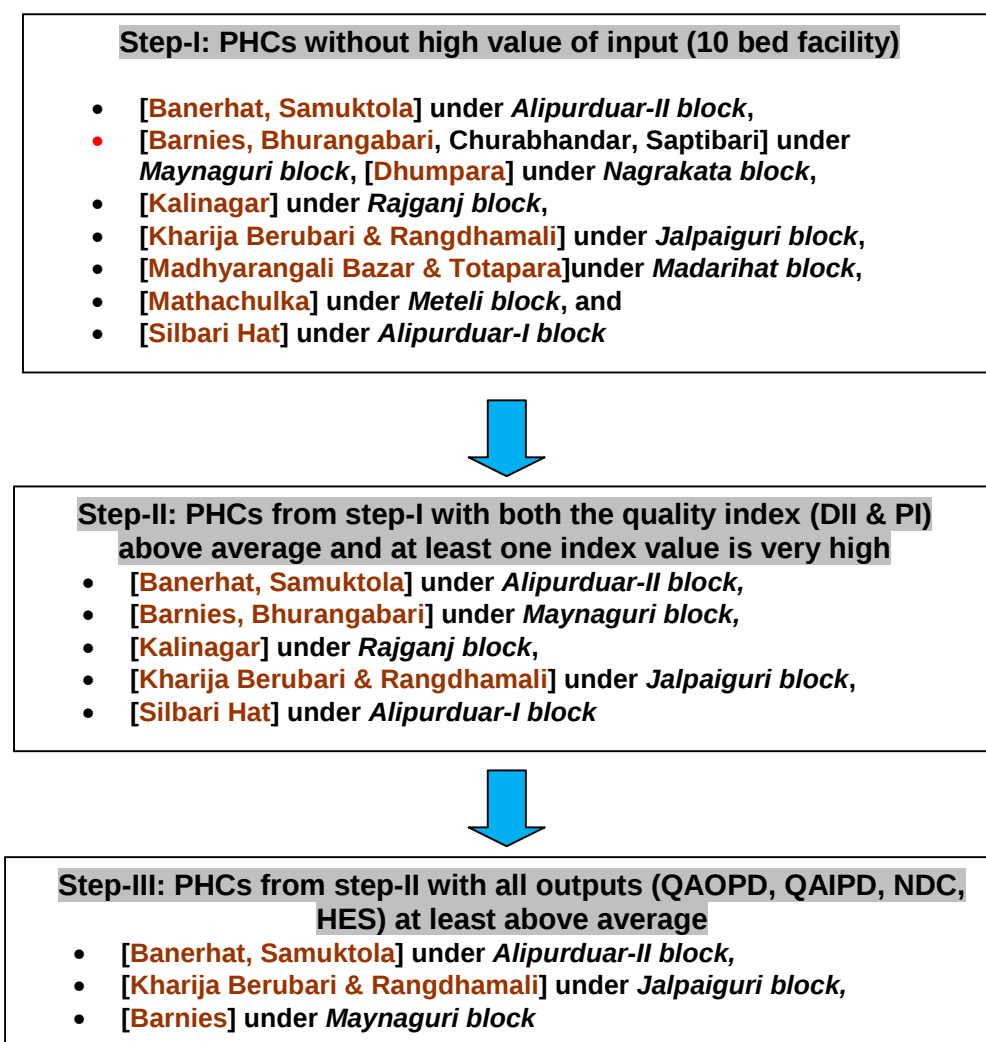
Table 9.5 agglomerates the cases of table 9.3 and 9.4 in a single table both in terms of physical accessibility and service delivery spaces. Practically table 9.5 shows a matrix where the physical accessibility and service delivery spaces are described in terms of good, moderate, and poor categories. The study shows that Jalpaiguri, Alipurduar-I and Rajganj blocks are in better position with the identification that all of these blocks have better accessibility and better service delivery spaces. These blocks are in much better position and need less resource since they are more accessible and have got their service delivery space more utilised. The significant identification shows that Mal and Kumargram blocks have good service delivery spaces but they are in the position with poor physical accessibilities. The worst conditions in terms of both the physical accessibility and service delivery spaces are found specially in case Kalchini block and for Dhupguri block where the

service delivery spaces are poor but the physical accessibility is moderate. One significant indication for the satisfaction of the health managers are found none with good in terms of physical accessibility and poor in terms of service delivery spaces.

9.4 Operating Efficiency

The input output analysis followed by Data Envelopment Analysis (DEA) is used in chapter 8 as output oriented form to calculate the efficiencies of the PHCs in Western Dooars area. In this method the study basically measures the efficiency in terms of how much output(s) is (are) produced given the quantities of inputs compared to maximum possible output(s) producible by a PHC. Now the study identifies

Figure-9.1: The best Practising PHCs

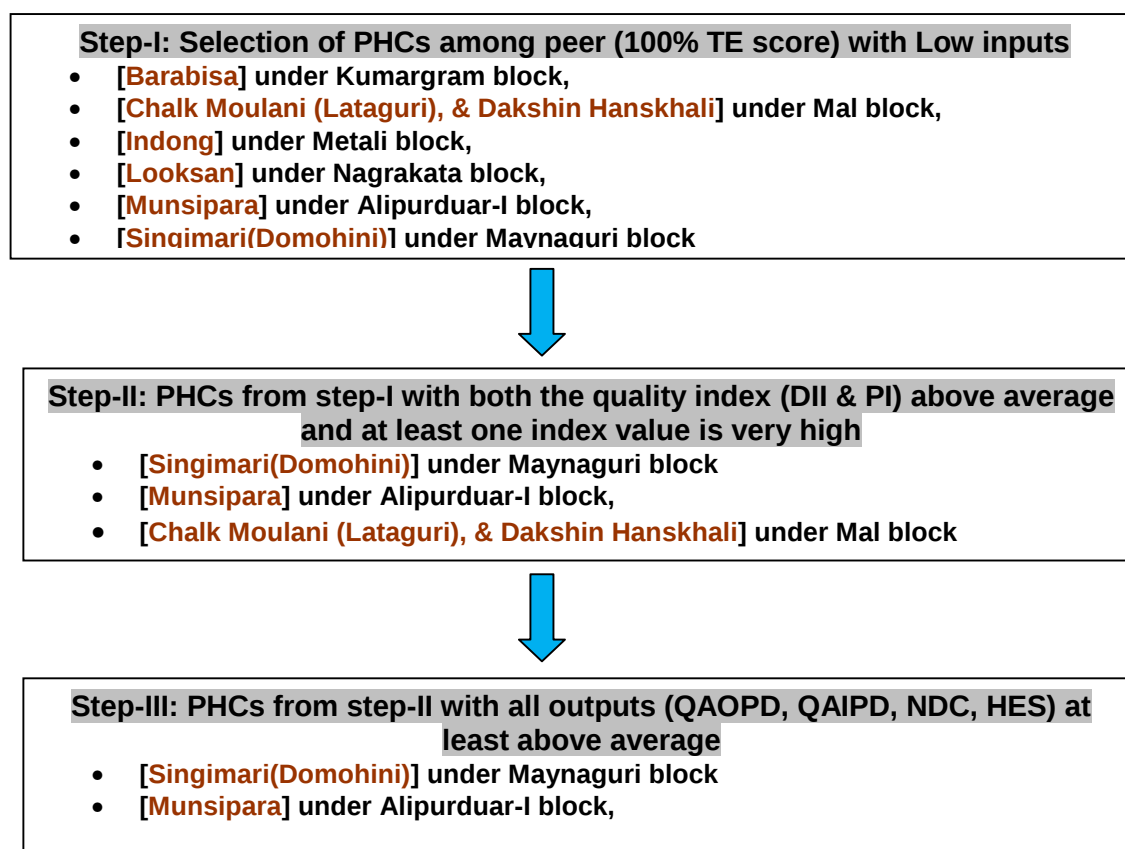


two responsible factors for such efficiency score. One is internal factors, i.e., factors which are under control of PHCs, and these are surely related with quality indices of the services rendered by the PHCs. The other is the external factors, i.e., factors which are beyond the control of PHCs, and these are input quantities supplied to the PHCs from higher tier health

facilities and demand for service from the PHCs. Since this is a simple input output analysis, a PHC can produce efficiency if it produces average output with the help of very low level of input(s). But such type of input crisis is not a desirable situation and also does not imply overall efficiency of the health system as a whole. Thus categorisation of PHCs in terms of input use criteria is the first step to understand the real efficiency scenario. In our study firstly we consider about those PHCs which are not suffering from any kind of crisis from low inputs. In Jalpaiguri district PHCs functioning with 10 beds provide highest bed input compared to all 38 PHCs. Thus there are 14 PHCs which provide 10 beds for the IPD services in the Jalpaiguri district. Now among them, we have selected the PHCs having two quality indices (Doctors Involvement Index and Perception index of patients) at least one index above average (Very high or high). The study focuses 8 PHCs under this category whose DII or PI values are above average (at least one). Now from these 8 PHCs, we select the PHCs with both two quality adjusted outputs at least average and at least one above average. By such selection we get 5 PHCs, which gained efficiency for providing high quality services to the patients. The details of such selection are shown in figure 9.1.

Another important factor may work under such condition. The demand for OPD and IPD services is beyond the control of PHCs, as it is generated by the demand side story. So a PHC can provide high quality service if it happens to cater a small number of patients. A PHC may remain clean if nobody goes there. But if a PHC can maintain high quality of service even after catering a large number of patients that PHC can be said to be really good performing one. Before choosing 14 PHCs we are selecting those PHCs which cater a large number of patients at the initial step. Here the large number of patients choosing is reflected by the production of all four outputs above the average level. Thus the study finds that 5 PHCs from Alipurduar-II, Jalpaiguri and Maynaguri block are the best performing PHCs within the lot. They are the best performing one among this lot only relative to the other PHCs in the set. Now the study has another important task. There are some PHCs among the peer group (i.e., technical efficiency above 100%) that are suffering from the crisis regarding low inputs and they have attained high efficiency scores because of achieving moderate or high outputs or qualities using some very low inputs. The figure 9.2 describes the situation. Here, we see 7 PHCs are with 100 percent technical efficiency scores but using low inputs. Among these 7 selected PHCs, the study considers the PHCs which have both quality indices above average, and here we find 4 such PHCs of Maynaguri, Alipurduar-I and Mal block of the district. All these 4 PHCs are identified as PHCs needed special attention because they are producing efficient output with the help of low input. Under this category, the difference with the first set is that here we consider the assumption that these PHCs are suffering from input crunch.

Figure-9.2: PHCs needed special attention



Three PHCs show extremely good performance even after fighting such input crunch. We thus recommended strongly some special care for them. The findings of the study related with the efficiency estimation of PHCs (chapter-8) indicate that the amount of inputs can be increased tremendously without increasing the input amounts which are already allotted. In chapter-8, table 8.2.9 shows that each of the outputs exhibits tremendous increase and in some cases it is more than 50 percent. This includes both the radial and slack movement. Thus with the potential increase in outputs from the PHCs of Jalpaiguri district, it is possible for the health system to significantly increase coverage by the different health interventions and contribute to the achievement of the various national and global health strategies.

9.5 Conclusion

The study observes that service delivery spaces for the existing PHCs are limited by various factors. The physical accessibility of the blocks is derived on the basis of the infrastructure available within the blocks. The secondary level data were collected from the district administration to construct such index in terms of approach bus road distance from the existing villages, approach rail road distance from the same villages, numbers of river bodies on these approach roads, percentage of villages where more than 10 percent areas are

covered by forest areas, and the distance factor from the farthest Sub-centre to performing BPHC of that particular block. The service delivery spaces are defined in terms of technical efficiencies and scale efficiencies derived in chapter 8 for all 38 PHCs of the Jalpaiguri district. By considering both the physical accessibility and service delivery spaces for all the blocks in macro terms, the study can identify the strongest and weakest blocks performing in terms of both service delivery spaces and physical accessibility index. Next, considering the technical and scale efficiency scores of each PHCs the study tries to identify the PHCs at micro or individual level which offers health support at primary level. Here, the study tries to identify the best practicing PHCs and the PHCs need special attention. Regarding the best practicing PHCs the study tries to identify the PHCs with full capacities of inputs like 10 beds and then from that level of selection the study tries to identify the PHCs with doctors involvement index (DII) and Perception index (PI) above the average and from that then the study filters the PHCs with all values of output above the average level. Then for the PHCs needed special attention shows that selected PHCs among the peer group performing with low inputs, and from those select those PHCs whose quality indexes are above average level.

CHAPTER-10

Summary, Policy Recommendations and Conclusion

- **Introduction**
- **Summary**
- **Policy Directions**
- **Plans for a Better Future**
 - **Goal and Objectives of the Proposed Initiatives**
 - **Structural Components of the Planned Initiatives**
 - ✓ **Strengthening Public Health Facilities**
 - ✓ **Providing basic health services at village level**
 - ✓ **Establishing a Referral Transport Network**
 - ✓ **Innovations in use of Information and Communication Technology**
- **10.5 Conclusion**

CHAPTER-10

Summary, Policy Recommendations and Conclusion

10.1 Introduction

Built on the findings in the previous chapters, now this chapter proposes a broad summary with a broad policy plan for initiatives to improve the healthcare delivery system of the Western Dooars. Such plan purposes to build a sustainable and affordable healthcare delivery system in the Western Dooars which would address the major healthcare needs of the inhabitants by improving availability, accessibility, equity, and efficiency of the system. In brief, it will help the people take the quickest and right choice to address their health problems and reach a secured health status. The evidences presented in the previous chapters unequivocally justify the proposition that the healthcare delivery system in the Western Dooars need special attention and unique approach. Against the backdrop of man-nature conflicts and livelihood insecurity, people in this region have to depend on a fragile health service delivery mechanism which fails to reach most of them with a low-cost but good quality service package. The study divides the analysis in some special areas reflecting both the demand and supply side of the health status of Western Dooars.

10.2 Summary

The Western Dooars is predominantly rural with a large share of scheduled tribe people. Most of the people have primary occupation in agriculture and in larger number of blocks forest, tea garden and rivers are associated with their life. Administrative set up of Western Dooars connect it with Jalpaiguri district of state West Bengal. Primarily, the name Dooars is identified as gateways (doors) to Bhutan hills.

The sample survey study on household health seeking behaviour describes the socio-economic as well as health status of the people of these localities. The study finds that average family size of the sample area is larger than national average. The child sex ratio is in alarming position and the working age group population in the sample population is higher than the national average. Illiteracy among the head of the households and among females are at significant level. Most of the surveyed people use unsafe drinking water and every year during monsoon spread out of diarrhoea is very common in this vicinity. Most of the females are married before the attainment of government sanctioned age bar, and even their age of first conception is below the government sanctioned level. The dwelling condition identifies that most are in kutcha houses and the BPL poor and APL poor dominantly subsist

in this area. Most of the approach roads (even national highways) of this area suffer during rainy season and flood is a very common feature for some parts of the district in every year. Study regarding health status from the sample households describes the situations for mortality, communicable and non-communicable diseases. The hospitalisation rate for the dead person is very low, which identifies that causes of death are largely unknown. The study shows that all types of communicable diseases primarily related to respiratory and gastro-intestinal systems - are highly prevalent in the Western Dooars in varying degrees. Non-communicable ailments like Arthritic Pain, Cardio-vascular Problems, Asthma, Diabetes, Skin related Problems, and Vision Problems among the elders are very frequent. Most of the people are using tobacco and alcohol which increase the possibilities like chronic heart diseases and low body mass index is very frequent among the mothers who have delivered at least one birth in last one year. In case of inpatient care scenario of the dwellers of Western Dooars the study exhibits that hospitalisation rate is higher among the females compared with males. Hospitalisation rate is sizeable for age group less than 15 years and for the age group more than 60 years, and for poor income groups. In terms of source of care the study focuses that people choose public hospital at the time of hospitalisation. The out-of-pocket expenditure for inpatient care indicates that expenditure level is high for the poor income group compared with others. The highest cost among out-of-pocket expenditure is generated from cost of medicines and followed by diagnostic tests. In case of outpatient care most of the cares are searched from rural unqualified medical practitioner, which is the most proximate and cheapest one. Regarding maternal health, most of the deliveries occur at home in last five years, and it is a common phenomenon for the higher birth order. Normal deliveries are very coarse compared to caesarean section. The study observes that broken linkages of transportation sometimes force them to deliver birth at home or at unqualified quacks chamber. The ante-natal care scenario of the research area shows that most of the pregnancies are registered though home delivery is very common. In this regard government level planners may try to find out the root cause of such missing link. The child health scenario shows that age wise vaccination rate reduces with the increase of age. Occurrence of malaria among children is very much seasonal, and the study observes that during the general children ailments period they prefer to get no care or first care from unqualified practitioners.

The healthcare infrastructure is found scarce in the Western Dooars region. A sizable discrepancy performs within the blocks in terms of distribution of number of PHCs according to Indian Public Health Standards (IPHS). The main aim of such research is to deal with the services rendered by the PHCs. The PHCs mainly offer outpatient support with some kind of inpatient services. The study finds that block wise distribution of PHC beds, number of Sub-centers catered by the PHC, and also the number of villages covered by the PHC are

distributed unevenly and mainly concentrated in the urban part of the blocks. The services rendered by the PHCs for IPD and OPD section are found a reliable gap between the need and actual services provided. The block-wise bed densities in PHCs identified that for some forest concentrated and hilly region the bed densities are typically low compared to other blocks. Generally, the female illiteracy is treated as the index of backwardness of any particular area, and the correlation coefficient between bed density and female illiteracy is found negative. Hence, as the female illiteracy increases the corresponding bed density reduces in the particular blocks of Jalpaiguri. This implies that backwardness is an important factor. The equipment densities of the PHCs shows an accountable gap between the equipment in position and equipment in use performing in all blocks of the region. Even the developed (urbanised) blocks are not out of such practices. This implies that some sort of unused equipments always remains vacant in PHCs. The study observes huge discrepancies regarding the health man power distribution in each block of the district. The bed occupancy rate (BOR) in PHCs shows that an admirable section is admitted here to deliver birth. Despite huge demand for treatment of minor and chronic ailments, the outpatient services at the PHCs in the Western Dooars meet only a small fraction of the demand. The unqualified rural medical practitioners (RMP) of this area are practising modern medicine without any formal training. The study focuses that out of total outpatients over sixty five percent are visited to RMPs during their ailing periods in this region. Most of these RMPs adopt this as full time profession and majority of them have past experience of working with some qualified private practitioners. A remarkable portion of these RMPs have followed allopathic treatment and majority of them provide drugs sometimes in credit. They collect drugs from the wholesale pharmacies and medical representatives. Studies show that some general and critical cases are also handled by those RMPs. A large section of these RMPs (three fourth) are found practising surgery and their referral behaviour suggest that they normally refer patients to the private doctors and private nursing home when the cases are out of control.

For better understanding of functioning of PHCs patient survey behaviour have some important indication for such level of study. Hence, like before the socio-economic behaviour of patients are analysed and also the quality of service offered by the PHCs are evaluated. To determine the economic category of the patients the study shows some sort of difficulties to identify the poor in terms of holding of BPL cards. So the study defines monthly per-capita expenditure as a proxy to determine the economic category of the patients. On the basis of created MPCE index the study finds that in each block the patient for outpatient department and inpatient department of PHCs are dominated by the poorer section of people. The study also identifies that a sizable portion of the real poor (low MPCE) do not have any BPL cards. On the basis of type of houses, availability of drinking water, type of drainage system, and

type of sanitation the study uses principal component analysis to make background index for both the OPD and IPD patients. In case of healthcare services received by the OPD and IPD patients of PHCs the study shows that proportion of ailing persons among different caste of this area. In case of access to beds it is found that some political and social factors are responsible to generate free access of beds in the PHCs of Western Dooars.

To access the IPD/OPD services of PHCs it is very significant to know how much travel a patient or patient family can allow to seek healthcares. Eventually under such circumstances quality of services offered by the PHCs is the most significant factor for such health movement. It is observed that for IPD patients the distance travelled data are collected in the form of distance (Km) and also in terms of time taken (hour) to reach the PHCs. Some standardisation is also introduced here to explain the influence of distance factor in case of access services from PHCs. It is seen that majority of the patients visited PHCs are from closer distance. For what reason the IPD patients prefer the PHCs and the study collect largely in favour of its cheapness followed by the proximities of the PHCs. In this regard a reliable percent of people response that they have no option other than to visit PHCs during their ailing periods. But most of the admitted IPD patients have answered that they prefer private nursing home during their emergencies since PHCs remain open only for some limited periods. The OPD patients particularly are asked to identify their preferences for private doctors, and three fourth of them have answered that they already have visited private doctors or RMPs before entering to this particular PHCs. Regarding access to free medicines delivered by the PHCs, Jalpaiguri district is in a dark situation. The study shows that only 18 percent of the IPD patients and 11 percent of the OPD patients report that they have received free medicines from the PHCs.

Finally the estimation of efficiencies of the existing 38 PHCs of the Jalpaiguri district. The basic input output frame uses data envelopment analysis (DEA) model controlling seven inputs like bed, equipment, doctor, nurse, health assistant, group D and medicines to produce four outputs like quality adjusted output for OPD patients, quality adjusted output for IPD patients, number of child deliveries, and number of health education sessions. The information regarding the inputs and outputs are collected during 2011-12. Two important indexes are introduced to define the first two output levels. The first index is doctors involvement index (DII), which is measured by the ratio of actual performing hours and the allotted weekly hours for a doctor in a particular PHCs. The second index is perception index (PI) which is created by the study from the IPD patients perception of service quality offered by the PHCs. The yearly data for the number of OPD and IPD visits are collected. Then from OPD data set average per-day patient visits are calculated and multiplying this data level with DII the study defines the first output QAOPD. Similarly, dividing the IPD yearly admissions by the bed number of the particular PHCs and also defined it in per day basis,

the study get per-day and per-bed wise inpatients admissions and hence, multiplying this by PI the study obtained QAIPD output. The other two outputs are expressed in terms of yearly value.

The study uses *KonSi DEA Solver* software for the following input output model for all 38 PHCs, and the technical and scale efficiency scores for each PHCs are defined by the software. The technical efficiency scores show that 15 PHCs are performing with 100 percent efficiencies and they should be considered as peer groups. and the corresponding scale efficiency scores of 12 PHCs are found at efficient level. The block wise efficiency of PHCs are also described by the study in terms of average technical efficiency scores and average scale efficiency scores. Here, the Kumargram block is the most efficient one with both technical and scale efficiency scores at 100 percent level.

At the next level the study ranks the PHCs in terms of the minimum extent to which all output can be expanded and also on the basis of scale of operation needed to be changed. From that particular point the study focuses on the scope of radial expansion and output slacks in all the PHCs. The aggregate results can compare the original output and target output for all output levels. And the study focuses that with the existing level of inputs bundles it becomes possible for each PHC to increase all four outputs by more or less fifty percent.

10.3 Policy Directions

PHCs provide affordable promotive, preventive and basic curative care in localities inhabited mainly by the poor. Their locations make them critically important in the ongoing efforts to scale up pro-poor cost effective public health interventions geared at achieving the health related goals fixed by National Rural Health Mission (NRHM). Thus the importance of these close-to-client health facilities in all efforts to reduce the burden of disease and improve health conditions, especially in rural areas, cannot be over emphasised.

Our findings reveal that 23 PHCs are operating at less than average level of technical efficiency and scale efficiency. The performance of 7 PHCs is actually observed to be very low and raises much concern for planners and policy makers. With the existing level of efficiencies / inefficiencies the achievements of health policy objectives and health related global and regional targets set by NRHM will be compromised. In chapter 8 the radial movement (table-) and slack movement (table-) can identify the output level which the PHCs can able to produce (termed as target output) compared to what presently they are producing. The target level of output is the potential to provide more preventive health services to those currently without access, at no extra cost, would be of great public health importance in a poor tribal concentrated region like Western Dooars, where the health seeking behaviour identifies that (chapter-5) large number of women do not have access to

primary health services at the point of need, huge concentration of home delivery, large number of children are underweight, and a large section of people have visited rural unqualified medical practitioners (RMP) for the first health visit. Thus it is immoral, irrational and unethical to deny people access to essential health services through inefficiencies.

The scope of input reduction in Western Dooars area of West Bengal is almost non-existent as revealed from this study, but there remains scope for providing essential public PHCs to a significantly larger number of people than the health units are actually providing. The achievement of such goals through a conscious pursuit of health promotion strategies to control or manage the induced demand for essential preventive public health services that are being underutilised. Such demand induced strategies can be applicable by three different ways. (1) Information: The target should be filled by such a way that increases people's capacity to get information and arrange their choices according to that information during their health needs. Such improvement will increase people's ability to access health information. For example, if the information regarding benefits of antenatal care, family planning, use of condoms to prevent sexually transmitted disease (STD), proper immunisation, safe drinking water, proper drainage facilities, proper sanitation, physical activity and healthy diets surely have some impact on induced demand for healthcare services. Hence, in our country like India where provision of one extra health facility is not only costly but it takes tremendous administrative hazards to initiate, thus such information based policies will be much more effective compared to any substitute ways. (2) Knowledge: The social, economic and environmental conditions have some impact on individual health by the imposition of risk factors. Arsenic poisoning can be controlled by increasing the usage of safe water and hence water testing at least once in a year can prevent the spread of such type of poisoning. Not only arsenic poisoning, by the boiling process or use of proper percolation / straining process of the drinking water many can avoid the general chronic gastro-intestinal disorders. The health knowledge can foster motivation, skills and confidence among communities to take action to improve their health. (3) Marketing: New attempts will be made to influence the people living in the vicinity of health units regarding how to think and behave with respect to utilisation of preventive health services by using marketing techniques (Egger et al, 2002). Such kind of social marketing will bring the attitudes towards values, behaviours in the participation in disease prevention services.

The health planners of this region can be benefited to get information regarding the present efficiency status of the PHCs. Their future strategies for the proper and optimum functioning of the PHCs can be guided by the policy direction of this study. So the important directions are as follows.

Firstly, the geographical inequalities in coverage of the PHCs in Jalpaiguri district should be addressed properly. The blocks where the number of PHCs are very much limited (for

example Meteli, Nagrakata, Kumargram, Kalchini), immediate initiatives should start to build such PHCs in those blocks. Similarly blocks where bed density is extremely low (for example Kalchini, Falakata, Dhupguri, Mal) should also be given priority to increase bed strength. Side by side some focus should be given to the actual "need" of the area depending upon the status of its human development. For example, Nagrakata block, where the female illiteracy rate is the highest and the bed density is only 37.96 per lakh population while average bed densities across different blocks are high. Thus health services should follow the principle of "vertical equity" rather than "horizontal equity", and special attention must be paid for these vulnerable areas.

Secondly, the size of PHC beds is a crucial determinant of the total PHC services in gamut. The range of PHC beds in Jalpaiguri is from 0 to 10. According to Indian Public health Standards (IPHS, www.mohfw.nic.in) PHCs should have 4 to 6 beds size, while our findings show that the average number of bed in this area is 6.737 with a coefficient of variation 41.072 percent. The technical efficiency scores identify that average number of slacks in bed is 1.512. Therefore some reallocation of hospital beds might make it optimal.

Thirdly, regarding manpower again special policies are needed to fix the transfer policy as well as to improve the workers' involvement in the PHCs. The policy of hiring more and more doctors should be followed with caution given the fact that doctors' involvement ratio (DII) is highly correlated (0.82) with total doctors in the PHCs. Our DEA shows that 18.6 percent of the doctors remain unutilised in this area as the input slack for the doctors is 0.186. For doctors particularly, downstream policies in medical education should be fixed to offer some incentives for the junior doctors coming out to the publicly subsidised medical institutions like PHCs to serve remote blocks for 2-3 years at least. Yet on all types of staff, medical and non-medical, some monitoring is needed and the higher authority must adopt some special plans to penalise for bad performance, as well as incentives for the good performances. In this process involvement of technology and specially IT services should be maximised to avoid human supervision as far as possible.

Fourthly, more care should be taken for maintenance, rather than just creation of equipments at these PHCs. Annual maintenance contracts (AMC) can be formulated by generating fund from NRHM sources and the gap between equipment stock and equipment in use should be minimised.

Fifthly, the study shows that IPD facilities are more or less underutilised in PHCs of this region compared to OPD facilities. Thus, a general tendency is observed to bypass the lower tier health facilities for inpatient services and the higher tier facilities become over-crowded from every aspect. Such situations are not expected. The basic cause behind such behaviour generated due to lack of health inputs at the point of need. So a 24 X 7 service with plentiful health inputs can reduce such tendencies. In a PHC like Munsipara of

Alipurduar-I block some contrary is found during our survey. The doctor who has received the all odds as a part of his mission and within these odds he has tried his best to provide the service. The study focuses that this PHC is functioning very smoothly under patient crowded situation also. There is the arrangement of battery based inverter for the time of power cut, and the anti-venom injections are also available. The patients have reported us that they changed the transfer order of the doctor three times by showing protest and by some communications with higher health authorities.

Sixthly, in the Jalpaiguri district the study shows that number of PHCs in Jalpaiguri block and Maynaguri block stay ahead compared to other blocks of the district. The bed number and the average bed occupancy rate were better in compared to other blocks. But the health seeking behaviour of the district identifies that all the blocks are in vulnerable position in terms of fever and digestive ailments. Hence, a growing demand is always steady in origin and due to cost limitation it is not possible for the government to open new PHCs in the arid region. Thus to open new dispensaries with full time / part time doctors only for OPD section may help the dwellers of Western Dooars. This will surely reduce the pressure on upper tier health facilities and also increases the qualitative value of the health outputs.

Seventhly, the survey on the essential drug list is enquired and found crucial in the study area. Some exceptions are there but the study shows that in those cases the total initiatives are generated by the doctors. We have also studies that whether the doctors prescribe according to guidelines and also to available drugs. The study suggests that for better results in this regard a proper monitoring and prescription audit by the higher authorities needs to be initiated.

Eighthly, at the PHC specific levels we have pointed out the slacks in each input and if those are followed, coverage of services would expand in a significant way without spending one extra unit of money. A re-allocation of resources can increase the total efficiency of the system.

Ninthly, the DEA results suggest some policy options specifically. From this analysis we can identify the PHCs with their efficiency scores and the difference of the efficiency scores from the optimal level of outputs can identify the level of minimum outputs that can be increased with the given set of inputs. The individual input slack is also identified where actually the intervention is needed. The study does not propagate for any substantial enhancement of inputs right now. Slack in each level of inputs can identify that monitoring and supervision can increase the optimal use of inputs within the current framework.

10.4 Plans for a Better Future

The plan presented here is intended to reflect the broad strategic options for improvement in service delivery at the Western Dooars. A logical step forward would be to discuss and debate the options with all key stakeholders and finalise a road map with necessary

modifications. The plan is guided by the propositions that, given their complex landscape and barriers, the Western Dooars requires a multi-prolonged strategy to meet the healthcare need of people. A single intervention (such as mobile health clinics), even at a large scale, is less likely to bring about the desired changes in health outcome if other things (public healthcare delivery system) remain the same. In other words, it requires a series of initiatives engaging in PHC services and innovatively putting pieces of interventions together to create a big push and reach sustainable and high level of delivery system.

10.4.1 Goal and Objectives of the Proposed Initiatives

The goal of the proposed initiatives is to provide a comprehensive, low-cost, and accessible platform for healthcare for the inhabitants of Western Dooars so as to reduce mortality and morbidity among them. The specific objectives are: (a) Improve availability of and access to affordable and quality healthcare in the Western Dooars specially in least (physically) accessible areas. (b) Improve efficiency of the existing delivery system through reorganisation of key institutions and applications of innovative technologies. (c) Strengthen the primary healthcare and the referral system through linking the broken chain of transportation. (d) Broaden the delivery base of primary healthcare by including highly relevant but neglected local health problems, such as maternal health problems and chronic diseases.

10.4.2 Structural Components of the Planned Initiatives

The initiative proposed in this plan has following four components like, (i) strengthening public health facilities, (ii) providing basic health services at village level, (iii) establishing a referral transport network, and (v) innovations in use of information and communication technology.

10.4.2.1 Strengthening Public Health Facilities

The success of the plan depends crucially on a significantly improved and reorganised public healthcare system. For this purpose primary focus will be on the PHCs which are currently operating at less than the desirable level. The number of PHCs is conspicuously low in the Western Dooars (only 38 covering 3016836 population, i.e. 79390 population per PHC) and it is estimated that the area will need at least 62 additional PHCs to meet the universal standard (30,000 per PHC). However, more serious concern is how to activate and enable the existing PHCs most of which are functioning at much lower than their potential. It is also noted that the initiatives in strengthening the public healthcare system in Western Dooars the State Health System Development Project in late 1990s and early 2000s - focused

entirely on the BPHCs and RHs. Hence, the PHCs, the backbone of the rural public healthcare, remained chronically weak and partially disabled. The centres are further trapped by chronic manpower shortages (specially the doctors who are usually reluctant to get posted in a remote PHC of the Western Dooars).

The proposed initiative will strongly emphasise the process of strengthening the PHCs to utilise their full potential and even add to that. This is extremely important also because NRHM initiatives are expected to generate additional demand for local institutional care and the supply environment needs to be geared up to meet this demand. The desired outcome is that these centres absorb a large part of local burden of healthcare services and become the first point of institutional contact. The present plan proposes to designate at least one PHC in each block provide 24 x 7 services, and make necessary supply arrangements within a year. A vigorous attempt would be made to meet the shortages of doctors and allied manpower at the PHC, specially those which are deemed to serve people living in the least accessible region. All the PHCs will be renovated and equipped according to their need. Each PHC in the most vulnerable blocks will be linked to the respective Gram Panchyat (GP) units through a referral link.

10.4.2.2 Providing basic health services at village level

In response to huge need for ambulatory care and accessible and safe birth delivery system, the plan proposes establishment and operationalisation of at least one Basic Health Guard Unit (BHGU) at each head quarter of GP to complement, but not to substitute, the existing public service delivery system [It is the modified version of the " village health unit" concept proposed by the National Commission on Macroeconomics and Health commissioned by Government of India, MoHFW, GOI, Aug, 2005]. The unit will provide the population of 5-6 GPs (i.e. about 10000-15000 population) with some following services. (i) Basic curative services which include treatment and medicines for most common and minor ailments. Daily clinics will be operated at the same place (i.e. at GH head quarter) where the weekly mobile clinics are held. The special focus will be on diarrheal diseases, respiratory infections, malaria, kala-azar treatments. The unit will provide standard treatment guidelines to ensure scientific and cost effective interventions for such common minor ailments. (ii) Referral services for those who would need care from institutional OPD. A standard referral manual will be prepared which would distinctly guide the provider about the referral cases based on the degree of complications and potentially danger signals. (iii) Safe delivery services for normal delivery cases with a basically equipped labor room (in the GP head quarter or the nearest Sub-center) and trained community workers. (iv) Post calamity care services will be provided to people who are affected by natural calamities (flood & storm) and consequent

health hazards. The unit will have adequate stocks of medicines and other supplies to prevent and to deal with health emergencies, specially gastro intestinal diseases.

The facility will have one consultation room and a set-up for normal birth delivery and basic neo-natal care. Each BHGU will have three trained personnel. A diploma holding critical practitioner who will act as a team leader and provide basic curative and referral services on a daily basis. He / she may be recruited from the local pool of RMPs and will be put through a rigorous short-term training before joining. Two community health workers selected from the already available pool of health workers (e.g., ASHA and the second ANM) who will receive special training in safe delivery and basic child and neo-natal care. The unit will manage by a voluntary agency or a community-based organisation (e.g., Self-help group or Panchayet) depending on the availability and stronger presence. The management process will be guided by a PPP contract with the block PHC (or the district health office) with a set of clearly defined indicators of health activities and outcome.

10.4.2.3 Establishing a Referral Transport Network

The primary objectives of this component is to link the broken transport chain which makes the journey to health facility a nightmare for a sick person or a pregnant woman specially at night. The basic features of this network are: (i) A set of local transport will be leased and attached to each BHGU exclusively for transporting referred patients to the nearest PHC or BPHC. This may include specially designed (motorised) van rickshaw and a mechanised boat (in the river based area). (ii) Once a patient is referred by BHGU, the leased transport will be alerted and aligned. For an emergency referral case (specially for woman requiring emergency obstetric and maternal care), the destination (PHC or BPHC) will be alerted by the source of referral to minimise the delay in receiving treatment after the patient reaches the destination. (iii) The referral network may be financed by the providers of transport services will be contracted by the agency managing BHGU. The service providers will be paid through a voucher scheme by which the poor user will receive vouchers and the service providers will be reimbursed by the agency on vouchers. The agency, in turn, will be reimbursed by the block or district health society or Rogi Kalyan Samiti. (iv) The whole process needs to be monitored by any watch mechanism process.

10.4.2.4 Innovations in use of Information and Communication Technology

The plan is uniquely characterised by its emphasis on extensive use of low cost and appropriate technology in healthcare service delivery. Technology will, however, be used as a complementary input to system reorganisation. Any GIS-based software (such as *AccessMode*) will be used at every BPHC by which the block will be mapped by different

accessibility indicators. The authority can introduce of new and low-cost self diagnostic technology for communicable disuses which can be used at the BHGU level. For example, initiatives will strongly emphasise on collaborating with global innovators for using self-test kit for diagnosis of malaria and cholera at this level which may be tested if and when the research products are available.

10.5 Overall Conclusion

It could be argued that the objective function of the health facilities is to maximise health gains from the available resources. The ideal output indicator would be the one that captures in a sensitive, valid, reliable and culturally acceptable manner changes in both the quantity and quality of lives of those who interact with PHCs. However due to unavailability of data on quality adjusted life years (QALY) and disability adjusted life years (DALY) gained due to care in PHCs in the data set, the study uses proxies like quality adjusted OPD or IPD outputs. It may be argued that this quality of care can be varied by different PHCs, for example the study also tries to identify the PHCs which are performing better with low level of inputs. Thus for those PHCs some addition in inputs level can able to remarkable increase in outputs. Given the fact that all the PHCs studied are district level PHCs, designed and resourced to provide a fairly similar level and mix of care, it is unlikely that there would be any significant variance in the quality of care across these facilities. The PHCs studied are also fairly homogeneous in size and mix of services provided. The study assumes that the case group of a specific PHCs and their meta frontier reference set PHCs is similar. The study does not verify whether the assumptions were plausible or not. The inputs and outputs data are collected for only one time periods; thus, it is not possible to determine whether the health sector reforms have any impact on the efficiency of the PHCs. The study does not manage to collect information on input prices, and thus, we are unable estimate the allocative efficiency of the PHCs. Since the study is conducted for one district only, it will not be justified to generalise the findings for the whole state, and for such analysis the study can be applied for other districts also. Lastly the DEA cannot able to capture the randomness of white noises, for example epidemics, natural disasters effects are not reflected by such type of analysis.

To increase the relevance of the study for helping the health managers, it would have been useful to undertake a second stage analysis of the factors influencing inefficiency using a Tobit model analysis, which censored as dependent variable model based regression analysis. However due to absence of good quality data on the factors often hypothesized to influence inefficiency it is not possible to undertake the analysis. The further studies should, whenever possible include more exhaustive list of inputs like capital, pharmaceutical and non-pharmaceutical supplies than those considered in the present study. The studies

regarding cost and allocative efficiency can be done whenever data on prices on inputs are available. In countries where such district wise panel data on PHCs are available, then using Malmquist DEA approach the further studies will be conducted to calculate the indices of total factor productivity change, technological change, technical efficiency change and scale efficiency change. The validity of the study can also be checked by using Stochastic Frontier estimation process of regression analysis.

BIBLIOGRAPHY

- Ahmed MS (2005): "Exploring Health-seeking behaviour of disadvantaged population of rural Bangladesh". Book, Published by Karolinska University Press, Stockholm, Sweden, ISBN 91-7140-435-X.
- Ahmed MS, Adam AM, Chowdhury M, Bhuiya A. (2003): "Changing health seeking behaviour in Matlab, Bangladesh: do development intervention matter?" Health Policy and Planning, Vol. 18(3), pp. 306-315.
- Arrow KJ. (1963): "Uncertainty and the welfare economics for medical care". American Economic Review. Vol. 53(5), pp 921-969.
- Agha S. 2000. "The determinants of infant mortality in Pakistan". Social Science and Medicine Vol 51 pp 199–208.
- Alderman H. & Gertler (1989): "The substitutability of public and private healthcare for the treatment of children in Pakistan" Living Standard Measurement Survey, Working paper No. 57, World Bank, Washington D.C.
- Alderman H & Levy V. (1996): "Household responses to public health services: Cost and quality tradeoffs". World Bank Research Observer, Vol. 11, No. 1, pp 3-22.
- Amooti-Kaguna B, Nuwaha F. (2000): "Factors influencing choice of delivery sites in Rakai district of Uganda". Social Science and Medicine, Vol 50, pp 203–13.
- Amrith S (2007): "Political Culture of Health in India A Historical Perspective". Economic and Political Weekly, January 13, 2007.
- Androutsou L, Geitona M & Ytantopoulos J. (2011): "Measuring efficiency and productivity access hospitals in the regional health authority of Thessaly in Greece". Journal of Health Management. Vol. 13(2) pp 121-140.
- Asenso-Okyere WK, Adote A, Issac Osei-Akoto, Augustina A. (1998): "Cost recovery in Ghana: Are there any changes in healthcare seeking behaviour". Health Policy & Planning. Vol. 13(2), pp 181-188.
- Audibert M, He Y, Mathonnat J, Xie Zhe Huang Fu. (2010): "Income growth, Price variation and Healthcare demand: A mixed Logit model applied to two-period comparison in rural China". CERDI, Etudes et Documents, 2010.
- Banker RD, Charnes A, Cooper WW, (1984): "Some models for estimating technical and scale efficiencies in data envelopment analysis", Management Science Vol (9), pp 1078-1092.
- Banker RD, Conrod RF & Strauss RP (1986): "A comparative application of data envelopment analysis and translog methods: An illustrative study on Hospital production". Management Science, Vol 32(1), pp 30-44.
- Banker RD, Cooper WW, Seiford LM, Thrall RM, & Zhu J (2004): "Return to scale in different DEA models", European Journal of Operation Research, Vol. 154, pp 345-362.

- Baru R, Acharya A, Acharya S, Shiv Kumar, Nagraj K. (2010): "Inequalities in access to health services in India: Caste, Class and region". *Economic Political Weekly*, Vol. XLV, No. 38.
- Begum S, Sen B. (2000): "Not quite, not enough: Financial allocation and the distribution of resources in the health sector". Research Report 167. Dhaka: Bangladesh Institute of Development Studies.
- Benefo & Schulz. (1994): "Determinants of fertility and child mortality in Cote d' Ivoire and Ghana". Living Standard Measurement Survey, Working paper No. 103, World Bank, Washington D.C.
- Bhatia J, Cleland J. (1999): "Health seeking behaviour of women and costs incurred. In: Pachauri S (eds). "Implementing a reproductive health agenda in India". New Delhi: Population Council, pp. 207–34.
- Bhatia JC, Cleland J. (2001): "Health-care seeking and expenditure by young Indian mothers in the public and private sectors". *Health Policy and Planning* Vol 16, pp 55–61.
- Bhattacharya K (2007): Book, "Silent Departure", Papyrus Publication, Kolkata.
- Bhushan, Indu, Keller S and Schwartz B (2002): "Achieving the Twin Objectives of Efficiency and Equity: Contracting Health Services in Cambodia." Asian Development Bank: ERD Policy Brief Series Number 6.
- Bloom G, Kanjilal B and Peters DH (2008): "Regulating Health Care Markets in China And India". *Health Affairs*, Vol. 27, No. 4 (2008), pp 952-963.
- Booth BE, Verma M. (1992): "Decreased access to medical care for girls in Punjab, India: the roles of age, religion, and distance". *American Journal of Public Health*, Vol 82 pp 1155–7.
- Borah BJ (2006): "A mixed logit model of health care provider choice: analysis of NSS data for rural India". *Health Economics*, Volume 15, Issue 9, pages 915–932.
- Bothwell JL & Cooley TF (1982): "Efficiency in the provision of healthcare: An analysis of health maintenance organisations." *Southern Economic Journal*, Vol. 48, No. 4, pp 970-984.
- Bourne AP. (2009): "Socio demographic determinants of healthcare-seeking behaviour, self reported illness and self-evaluated health status in Jamaica". *International Journal of Collaborative Research on International Medicine & Public Health* Vo.-1, No-4, pp 101-130.
- Burgess, JF, and Wilson . PW (1998): "Variation in inefficiency among US hospitals". *Canadian Journal of Operational Research and Information Processing*, Vol 36 (3), pp 84-102.
- Canaviri J. (2007): "A Random parameter Logit model for modeling healthcare provider choice in Bolivia". MPRA Paper No. 3263.

- Carr-Hill RA, Sheldon TA, Smith P, Martin S, Peacock S, Hardman G (1994): "Allocating resources to health authorities: development of method for small area analysis of use of inpatient services" British Medical Journal Vol 309, pp 1046-1049.
- Census Report, (2001): "Census Report of India, 2001" Source: www.censusindia.gov.in
- Chakraborty A (2004): "Epidemiology of Tuberculosis: Current Status in India", Indian Journal of Medical Research, Vol-120, pp 248-276.
- Chang H, Wen-Jing Chang, Das S & Shu-Hsing Li (2004): "Health care regulation and the operating efficiency of hospitals: Evidence from Taiwan", Journal of Accounting and Public Policy, Volume 23, Issue 6, pp 483–510.
- Charnes A, Cooper WW, & Rhodes E. (1978): "Measuring efficiency of decision making units", European Journal of Operation Research, Vol 2(6) pp 429-444.
- Charnes A, Cooper WW, & Rhodes E. (1981): "Evaluating programme and Managerial efficiency", Management Science.
- Charnes, Cooper, Banker, & Seiford (2007): "The basic CCR Model", in Cooper WW, Seiford LM, & Tone K, Edited Book, "Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-Solver Software" Publisher Springer, 2007
- Chauhan LS. (2011): "Public health in India: Issues and challenges". Indian Journal of Public health. Vol. 55 Issue 2.
- Chirikos TN & Sear AM (2000): "Measuring Hospital Efficiency: A Comparison of Two Approaches." Health Services Research, Vol-34, Issue-6.
- Chilingirian JA, (1995): "Evaluating Physician Efficiency in Hospitals: A multivariate analysis of best practice", European Journal of Operation Research, Vol. 80, pp 548-574.
- Chilingirian JA & David Sherman (2006): "DEA and primary care physician report cards: Deriving preferred practice cones from managed care service concepts and operating strategies", Annals of Operation Research, Vol 73.
- CIET Canada. (2000): "Service Delivery Survey: second cycle, 2000 preliminary findings". Dhaka: Health and Population Sector Programme.
- Cleland JG, van Ginneken JK. (1988). "Maternal education and child survival in developing countries: the search for pathways of influence". Social Science and Medicine Vol 27 pp 1357–68.
- Das J, Hammer J (2005): "Money for Nothing: The Dire Straits of Medical Practice in Delhi, India." World Bank Policy Research Working Paper 3669.
- Debnath S (2010): "The Dooars in Historical Transition", N L Publishers, ISBN: 978-81-86860-44-1
- De Auley et al (2013): "Arsenic body burden in coronary heart disease cases of West Bengal", IJMRHS, Vol-2

- De Clerque J, Tsui AO, Abul-Ata MF, Barcelona D. (1986). "Rumor, misinformation and oral contraceptive use in Egypt" *Social Science and Medicine* Vol 23 pp 83–92.
- Deininger K, Mpuga P (2004): "Economic and Welfare Effects of the Abolition of Health User Fees: Evidence from Uganda". World Bank Policy Research Working Paper 3276.
- Dow W.H (1996). "Unconditional demand for healthcare in Cote d' Ivoire: Does selection of health states matter?" *Living Standard Measurement Survey, Working paper No. 127*, World Bank, Washington D.C.
- Dreze & Sen. (1995): "India: Economic Development and Social Opportunity" Clarendon Press, Oxford.
- Duncan C, Jones K, and Moon G. (1998): "Context, Composition and heterogeneity: Using Multilevel Models in Health Research". *Social Science Medicine*. Vol. 46, No. 1. pp. 97-117.
- Ellis & Mwabu. (1991): "The demand for outpatient medical care in rural Kenya" (mimeo), Boston University.
- Ensor T. & Cooper S. (2004): "Overcoming barriers to health services access: Influencing the demand side", *Health policy & Planning*, OUP, pp-69-79.
- Ensor T, Cooper S. (2002): "Resource allocation and purchasing: Influencing the demand side". York Centre for Health Economics, University of York. Prepared for the World Bank, Resource Allocation and Purchasing Project.
- Ensor T, Witter S (2001): "Health economics in low income countries: adapting to the reality of the unofficial economy". *Health Policy*, Vol. 57, pp 1–13.
- Evans B. David, Tandon A, Murray JL, & Lauer J. (2000): "The comparative efficiency of National health systems in producing health: An analysis of 191 countries". GPE Discussion Paper series. No 29. Geneva, World Health Organisation.
- Fawcus S, Mbizvo M, Lindmark G, Nystrom L. (1996). "A community based investigation of avoidable factors for maternal mortality in Zimbabwe". *Studies in Family Planning* Vol 27 pp319–27.
- Farrell M J. (1957): "The measurement of productive efficiency", *Journal of the Royal Statistical Society Series*, Vol. 120, pp 253-281.
- Fare R, Grosskopf S, Lovel CAK (1994), Book, "Production Frontiers", Cambridge University Press.
- Frankenberg E. (1995): "The effects of access to healthcare on infant mortality in Indonesia". *Health Transition Review*, Vol 5.
- Garg CC. (1998): "National health accounts for India: A case study for Karnataka". Harvard School of Public Health, Research Paper No 145, Boston, USA.

- Gertler, P, Locay L and W. Sanderson (1987): "Are User Fees Regressive? The Welfare Implications of Health Care Financing Proposals in Peru", *Journal of Econometrics*, Vol 36, pp 67-88.
- Getzen TE. (2000): "Healthcare is an individual necessity and a national luxury: Applying multilevel decision models to the analysis of healthcare expenditure". *Journal of Health Economics* Vol. 19, pp 259-270.
- Gilick P, Razafindravonona J & Randretsa I. (2000): "Education and health services in Madagascar: Utilisation patterns and demand determinants". *Living Standard Measurement Survey, Working paper.*, World Bank, Washington D.C.
- Gobind M. (2009): "Primary Healthcare in Rural Bihar." Book, Jagriti Publications, Patna, 2009, p 155.
- Gerdtham UG, Lothgren M, Tambour M & Rehnberg C. (1999): "Internal markets and health care efficiency: A multiple-output stochastic frontier analysis", *Health Economics* Volume 8, Issue 2, pages 151–164.
- Grossman M. (1972): "On the concept of health capital and demand for health", *Journal of Political Economy* Vol 80(2), pp 223-255.
- Grossman M. (2000). "The human capital model of Health", Culyer AJ, Newhouse JP Edited Book: "Handbook of health economics", Vol 1A. Published by Elsevier.
- Gupta I (2007): "Health Coverage for All: Strategies and Choices for India", Published by GTZ, Germany, March 2007.
- Gupta I. & Dasgupta P. (2002): "Demand for curative healthcare in rural India: Choosing between private, public and no-care". NCAER Working Paper No. 82, National Council of Applied Economic Research, New Delhi.
- Giuffrida A, Gravelle H & Sutton M. (2000): "Efficiency and administrative costs in primary care", *Journal of Health Economics* Vol 19, pp 983–1006.
- Gertler P, Van der Gaag J. (1988). "Meaning of willingness to pay for social services in developing countries" *Living Standard Measurement Survey, Working paper* No. 45, World Bank, Washington D.C.
- Gertler P, Van der Gaag J. (1990). "The willingness to pay for medical care: Evidence from two developing countries", UDAID sponsored Project Report, www.popline.org, John Hopkins University Press, Baltimore.
- Gertler, P. and Van der Gaag J (1988), "Measuring the Willingness to Pay for Social Services in Developing Countries", *Living Standards Measurement Study Working Paper* No. 45, World Bank, Washington D.C.
- Ghuman BS, Mehta A. (2005): "Health Care for the Poor in India with Special Reference to Punjab State". Presented in the workshop on Health Care for the Poor in Asia, Beijing, PRC, 5-7, www.napsipag.org
- Hardeman W, Van Damme W, Van Pelt M, IR Por, Kimvan H AND Meessen B (2004): "Access to health care for all? User fees plus a Health Equity Fund in Sotnikum, Cambodia". *Health Policy and Planning*, Vol. 19, Issue 1, pp 22–32.

- Hitesh J. (1996). "Perceptions and constraints of pregnancy related referrals in rural Rajasthan". *Journal of Family Welfare* Vol 42 pp 24–9.
- Hsi-hui Chang (1998): "Determinants of Hospital Efficiency: the Case of Central Government-owned Hospitals in Taiwan". *Omega*, Vol. 26, Issue 2, pp 307-317, www.sciencedirect.com
- Hoel M. (2003): "Efficient use of healthcare resources: The interaction between improved health and reduced health related income loss". *International Journal of Healthcare Finance and Economics*, Vol. 2 pp 205-296.
- Hollingsworth B (2008): "The measurement of efficiency and productivity of health care delivery". *Health Economics*, Volume 17, Issue 10, pages 1107 -1128.
- Hollingsworth B & Wildman J. (2002) "The efficiency of Health Production: Re-estimating the WHO panel data using parametric and Non-Parametric approaches to provide additional information's". Monash Univ. Working Paper 131.
- Hotchkiss D. (1993): "Role of quality in demand for healthcare in Cebu, Philippines". Ph D Thesis, Department of Economics, University of North Carolina at Chapel Hill, www.google scholar.
- India Metrological Report (2010): "Rain fall report, 2010", Source www.imd.gov.in
- Iyenger S, Dholakia R. (2011): "Access of the rural poor to primary healthcare in India". IIMA Working Paper No 2011-05-03.
- Puig-Junoy J (2000): "Partitioning input cost efficiency into its allocative and technical components: An empirical DEA application to hospitals", *Socio-economic Planning Sciences*, Vol. 34, pp 199-218.
- Javali Sb. (2011): "A structural equation model of the determinants of healthcare survey Households in rural Dharwad district, Karnataka state, India". *Web-med central Biostatistics*, Vol 2(3), WMC 001698.
- Jayasuriya & Wodon Q. (2002): "Explaining country efficiency in improving health and education indicators: The role of Urbanizations". *Living Standard Measurement Survey, Background Paper of World Development Report*, 27863, World Bank, Washington D.C. USA.
- Jayasuriya & Wodon Q. (2007): "Efficiency in improving health and education outcomes: Provincial and state level estimates for Argentina & Mexico". *Estudios Economicos*, Vol. 22 No. 1(43) Stable URL: <http://www.Jstor.org>.
- Jeffery P et al (2007): "Unmonitored intrapartum use of Oxytocin use in home deliveries, evidences from UP, India", *Reproductive Health Matters*, Vol-15, pp 172-178.
- Kak N, Burkhalter B, and Cooper M (2001): "Measuring the Competence of Healthcare Providers." *USAID, Quality Assurance Project*, Vol. 2, Issue 1.
- Kaplan RM, Bush JW (1982): "Health-related quality of life measurement for evaluation research and policy analysis". *Health Psychology*, Vol. 1(1), pp 61-80.

- Kimani JK, Ettarh R, Kyobutungi C, Mberu B & Muindi K (2012): "Determinants for participation in a public health insurance program among residents of urban slums in Nairobi, Kenya: Results from a cross-sectional survey". BMC Health Services Research ISSN 1472-6963, Article URL <http://www.biomedcentral.com>
- Kirigia JM, Sambo LG, Scheel H. : "Technical efficiency of public clinics in Kwazulu-Natal province of South Africa", East African Medical Journal, Vol 78(3), pp 1-13.
- Kjekshus L, Hagen T (2007): "Do hospital mergers increase hospital efficiency? Evidence from a National Health Service country". Journal of Health Service Research Policy, Vol. 12 no. 4 pp 230-235, 2007.
- Kontodimopoulos N, Nanos P, Niakas D (2006): "Balancing efficiency of health services and equity of access in remote areas in Greece". Health Policy, Vol.76, Issue 1, pp 49-56.
- Koenig, Michel A, Jamil K, Streatfield KP, Saha T, Ahmed Ai-Sabir, Arifeen SE, Hill K, Haque Y. (2007): "Maternal health and care seeking behaviour in Bangladesh: Findings from national survey", International Family Planning Perspective, Vol 33(2), pp 75-82.
- Kuttichira P & Rejani PP. (2011): "User-satisfaction among inpatient in a tertiary care hospital: A case study". Journal of Health Management. Vol.13 (3) pp 347-360.
- Lawson D. (2004): "Determinants of health seeking behaviour in Uganda- Is just income and user fees that are important". University of Manchester.
- Leonard KL, Mliga GR, Mariam DH. (2002). "Bypassing health centers in Tanzania: revealed preferences for observable and unobservable quality". Department of Economics, Discussion Paper Series. New York: Columbia University.
- Lavy V. & Germin J. M. (1994): "Quality and cost in healthcare choice in developing countries", Living Standards Measurement Study Working Paper No. 105, World Bank, Washington D.C.
- Lavy, V., M. Palumbo and S. Stern (1995), "Health Care in Jamaica: Quality. Outcomes, and Labour Supply", Living Standards Measurement Study Working Paper No. 116, World Bank, Washington D.C.
- Lavy, V. and Quigley J. (1993), "Willingness to Pay for Quality and Intensity of Medical Care: Evidence from Low Income Households in Ghana", Living Standards Measurement Study Working Paper No. 94, World Bank, Washington D.C.
- Lhamsuren K, Chojiljav T, Budbazar E, Vanchinkhuu S, Blanc D C & Grundy J (2012): "Taking action on the social determinants of health: improving health access for the urban poor in Mongolia" International Journal for Equity in Health 2012, Publication date 20 March 2012, ISSN 1475-9276.
- Ley E. (1991): "Efficient productivity: A study application in all sector Hospital". Investigations Economics. Vol. 15(1) pp 71-88.

- Lindelow M. (2002): "Healthcare demand in rural Mozambique: Evidence from the 1996/97 Household survey". FCND Discussion paper No 126, IFPRI, Washington D.C.
- Litvack & Bodart (1993): "User fees and improved quality of healthcare equals improved access: Results of a field experiment in Cameroon". Social Science and Medicine. Vol. No. 37(3), pp 369-383.
- Lohlein D. Jutting J. and Wehrheim P. (2003): "Rural Russia in Transition: What determines access to healthcare services" V.H. Winston & Sons, 2003.
- Mahmood S.S., Mohammad Iqbal, S.M.A. Hanif (2009): "Health seeking Behaviour." Book " Health for the Rural Masses Insights from Chakaria" Editor Abbas Bhuiya Published by ICDDR,B, 68 Shaheed Tajuddin Ahmed Sharani, Mohakhali, Dhaka 1212, Bangladesh, 2009, Web source: www.icddr.org
- Masako L (1996), "The Demand for Medical Care: Evidence from Urban Areas in Bolivia", Living Standards Measurement Study Working Paper No. 123, World Bank, Washington D.C.
- Matthews Z, Mahendrs S, Kilaru A & Ganapathy S. (2011): "Antenatal care, care seeking and morbidity in rural Karnataka, India: Results of a prospective study". Asia-Pacific Population Journal, 2011.
- McFadden, DL. (1981), "Econometric Models of Probabilistic Choice", in Charles F. Manski and D.L. McFadden (eds), Structural Analysis of Discrete Data with Econometric Applications, MIT Press, Cambridge, Mass.
- Mehrotra S. (2000): "Integrating economic and social policy: good practices from high-achieving countries". Working Paper. Florence: Innocenti Research Centre, UNICEF.
- Milligan J A (1919): "Final Report on the Survey and Settlement Operations in the Jalpaiguri District", District Gazetteer, Jalpaiguri
- Mukhopadhyay P (2008): "A PPP Model for Medical Education and Tertiary Healthcare". India Infrastructure report, 2008, Report prepared by: Infrastructure Development Finance Company, Indian Institute of Management (Ahmadabad), & Indian Institute of Technology (Kanpur).
- Mwabu, G., M. Ainsworth and A. Nyamete (1993), "Quality of Medical Care and Choice of Medical Treatment in Kenya: An Empirical Analysis", (mimeo.), Kenyatta University and World Bank.
- Narayan D. (1997): "Voices of the poor: poverty and social capital in Tanzania". ESD Studies and Monographs Series No. 20. Washington, DC: World Bank.
- Naresh Kumar (2004): "Changing geographic access to and locational efficiency of health services in two Indian districts between 1981 and 1996". Social Science & Medicine, Vol. 58, Issue 10, pp 2045-2067.
- National Family Health Survey (2005): "Report NFHS-III, West Bengal Fact sheet", www.wbhealth.gov.in

- Newhouse JP. (1994): "Frontier estimation: How useful a tool for health economics". *Journal of Health Economics*. Issue 13(1994). pp 317-322.
- Okumura J, Wakai S, Umenai T. (2002): "Drug utilisation and self-medication in rural communities in Vietnam". *Social Science and Medicine* 54: 1875–86.
- Padma P, Rajendran C & Sai LP (2007): "A conceptual framework of service quality in healthcare: Perspectives of Indian patients and their attendants". *Benchmarking: An International Journal*, Vol. 16, Issue 2, pp 157-191.
- Pathak P & Gaur KK. (1997): "A composite index-based approach for analysis of the health system in the Indian context". IIMR Working Paper No 2.
- Perkins M, Brazier E, Themmen E, Bassare B, Diallo D, Mutunga A, Tuntufye, Mwakajonga & Ngobol O. (2009): "Out-of-pocket costs for facility based maternity care in three African countries". *Health Policy and Planning*, Vol. 24(4), pp 289-300.
- Peter S. Heller (1982): "A model of demand for medical and health services in Peninsular Malaysia". *Social Science Medicine*, Vol. 16 pp 267-284.
- Post M. (1997): "Preventing maternal mortality through emergency obstetric care". Washington D C, SARA Project, Academy for Educational Development.
- Puig-Junoy J and Ortun V. (2004): "Cost efficiency in primary care contracting: a stochastic frontier cost function approach." *Health Economics*, Vol. 13: 1149–1165.
- Purohit BC. (2008): "Efficiency of Healthcare System: A Sub-state level analysis for West Bengal (India)". *RURDS*. Vol. 20. No. 3, Blackwell Pub. Asia.
- Purohit BC. (2010): "Efficiency variations at the Sub-state level: The healthcare system in Karnataka". *Economic Political Weekly* Vol. XLV No. 19 pp 70-76.
- Pushkar & Gupta M (2011): "Democracy and Health: Evidence from Indian States". *Economic Political Weekly*, October 1, 2011 Vol. xlvi no 40, pp 38-43.
- Qian D, Lucas H, Chen J, Xu L, Zhang Y. (2010): "Determinants of the use of the care of different types of healthcare providers in urban China: A tracer illness study of URTI". *Health Policy* Vol. 06 No. 014.
- Quisumbing AR, Maluccio JA. (1999): "Intra-household allocation and gender relations: new empirical evidence from four developing countries". Working Paper 2. Washington, DC: World Bank.
- Raghupathy S. (1996): "Education and the use of maternal health care in Thailand". *Social Science and Medicine* Vol 43 pp 459–71.
- Ramanathan R. (2003): "An introduction to data envelopment analysis: A tool for performance measurement". Sage Pub. New Delhi, pp 201.
- Ramasubban R, Rishyasringa B. (2000): "Treatment-seeking by women in Mumbai slums. Paper presented at the workshop on Reproductive Health in India: New Evidence and Issues", Tata Management Training Centre, Pune, Maharashtra, India.

- Rankin SL, Hughes-Anderson W, House AK et al. (2001): "Costs of accessing surgical specialists by rural and remote residents". Australia and New Zealand Journal of Surgery Vol 71 pp 544–7.
- Rashid SF, Hadi A, Afsana K, Begum SA. (2001): "Acute respiratory infections in rural Bangladesh: cultural understandings, practices and the role of mothers and community health volunteers". Tropical Medicine and International Health Vol 6, pp 249–55.
- Ray SK, Basu SS and Basu AK (2011): "An assessment of rural healthcare delivery system in some areas of West Bengal- An overview". Indian Journal of Public Health, Vol. 55, Issue 2, pp 70-80.
- Rous J, Hotchkiss D. (2003): "Estimation of the determinants of household health care expenditures in Nepal with controls for endogenous illness and provider choice". Health Economics Volume 12, Issue 6, pages 431-451.
- Piette JD, Moos RH. (1996). "The influence of distance on ambulatory care use, death, and readmission following a myocardial infarction". *Health Services Research* 31: 573–91.
- Shenoy KT, Shenoy TS, Krishnan TN. (1997). "Determinants of healthcare service utilization in Kerala". *Journal of Clinical Epidemiology* 50: 45S.
- Siddharthan K, Ahern M and Rosenman R (1998): "Data Envelopment Analysis to determine efficiencies of health maintenance organizations". HEALTH CARE MANAGEMENT SCIENCE, Vol. 3, Number 1, pp 23-29.
- Siciliani & Luigi (2006): "Estimating Technical Efficiency in the Hospital Sector with Panel Data: A Comparison of Parametric and Non-Parametric Techniques". Applied Health Economics and Health Policy. Volume 5, Number 2, pp. 99-116(18).
- Singh LP & Gupta SD (1998): "Health Seeking Behaviour and Healthcare Services in Rajasthan, India: A Tribal Community's Perspective". IIHMR Working Paper No. 1, 1998.
- Sunder DHE (1895) : "Survey and Settlement of the Western Dooars in the District of Jalpaiguri", 1889 95, Calcutta
- Sundar, R. (1995): "Household Survey of Health Care Utilisation and Expenditure", NCAER Working Paper No. 53, National Council of Applied Economic Research, New Delhi.
- Suraratdecha C, Okunade AA (2006): "Measuring operational efficiency in a health care system: A case study from Thailand". Health Policy, Vol. 77, Issue 1, June 2006, pp 2-23.
- Schwartz JB, Akin JS, Popkin BM. (1993). "Economic determinants of demand for modern infant-delivery in low-income countries: The case of the Philippines". In: Mills A, Lee K (eds). *Health economics research in developing countries*. Oxford and New York: Oxford Medical Publications.

- Sengupta A. & Mondal SK. (2009): "Efficiency and financing in catering primary healthcare to the poor's: A study of rural health services in India". Journal of Health Management. Vol. 11 No. 3 pp 501-526. Sage Pub.
- Sharma RD and Chahal H (1999): "A Study of Patient Satisfaction in Outdoor Services of Private Health Care Facilities." Vikalpa, Vol. 24, No. 4, October-December 1999.
- Sodani PR. (2010): "Managing quality in healthcare". Rawat Publication, New Delhi, 2010, pp 180.
- Soman, Krishna (2002): "Rural Health Care in West Bengal". Economic and Political Weekly, Vol. XXXVII, No.26, June 29, 2002.
- Street A (2003): "How much confidence should we place in efficiency estimates?" HEALTH ECONOMICS. Vol.12, pp 895–907 (2003).
- Sutton M. Roy CW. Gravelle H. Rice N. (1999): "Do measures of self-reported morbidity bias the estimation of the determinants of healthcare utilisation?" Social Science and Medicine. Vol. 49 pp 867-878.
- Tamiya N, Araki S, Kobayashi Y et al. (1996). "Gender difference in the utilization and users' characteristics of community rehabilitation programs for cerebral-vascular disease patients in Japan". International Journal for Quality in Health Care 8:359–66.
- Valdmanis V. (1992): "Sensitivity analysis for DEA model", Journal of Public Economics, Vol. 48, pp 185-205.
- Varatharajan D (1999): "Improving the Efficiency of Public Health Care Units in Tamil Nadu, India." Harvard School of Public Health, Research Paper No. 165.
- Ved RR, Dua AS (2005): "Review of women and children's health in India: Focus on safe motherhood". Published in NCMH Background Papers, Burden of Disease in India, National Commission on Macroeconomics and Health, Ministry of Health & Family Welfare, Government of India, New Delhi, September 2005.
- Verma, Deepthi S, Khan M.E, & Hazra A. (2010): "Increasing institutional delivery and access to emergency obstetric care services in rural Uttarprades". The Journal of Family Welfare Vol. 06 (Special Issue) pp 23-30.
- Vissandjee B, Barlow R, Fraser DW. (1997). "Utilization of health services among rural women in Gujarat, India. *Public Health*" 111: 135–48.
- Wagstaff (1989) "Estimating efficiency in the hospital sector: A comparison of three statistical cost frontier models". Applied Econometrics 21(5) pp 659-672.
- World Bank. (1997): "India, New directions in Health sector development at the state level: An operational prospective Report". Report No. 15753-IN.
- World Health Organisation (2000): "World Health Report, 2000- Health System: Improving Performance", www.who.int

- Worthington AC. (2004): "Frontier efficiency measurement in healthcare: A Review of Empirical Techniques and selected applications" *Medical care Research Review*, 61(2), pp 1-36.
- Wouters A. (1993): "The cost and efficiency of public and private health care facilities in Ogun state, Nigeria". *Health Economics* Volume 2, Issue 1, pages 31–42, April 1993.
- Yip CW., Wang H. & Liu Y. (1998): "Determinants of patient choice of medical provider: A case study in rural China". *Health Policy and Planning*; 13(3) pp 311-322.
- Zavras AI, Tsakos G, Economou C and Kyriopoulos J (2002): "Using DEA to Evaluate Efficiency and Formulate Policy Within a Greek National Primary Health Care Network". *Journal of Medical Systems*, Vol. 26, No. 4, August 2002.
- Zuckerman S, Hadley J, Leezzoni L (1994): "Measuring hospital efficiency with frontier cost functions", *Journal of Health Economics*, Vol. 13, pp 255-280.

INDEX

A

Access to Healthcare-7,8,14,21,22,26,38,39,41,43,45,47-51,55,56,126,148,152,169,199-202
209,212,215,
Accredited Social Health activist-67,69,70,161,
Availability of Medicine-4,10,
Ailments-5,21,29,40,46,48,53-55,61,110-112,118,123,124,136, 138,139,142, 148,149, 194,
206,
Allocative Efficiency-5,36,218,
Antenatal Care-9,11,22,29,49,55,71,72,148,161,
Anganwadi Worker- 70,72,
Animal Attack-110,114,

B

Bad Background Index-197,198,215,
Bed Density- 164,167,168,
Bed Occupancy Rate-9,175,176,214,
Block Primary Health Center-3,4,9,66,67,71,147,158,161,164,167,171,176,192,207,218,
Burden of Disease-5,7,8,17,121,
Bypass local health facilities-7,9,134,
Bhore Committee-58,59,60,
Communicable Disease-59,127,

C

Caste-8,13,86,
Cost of Healthcare-3,60,176,201,
Cost efficiency-47,51,
Child Health-6-8,10,11,29,38,72,129,
Comparative Static - 10,
Curative Health Care-41,60,61,
Crude Death Rate-110,

D

Data Envelopment Analysis - 12,16,31-35,37,38,41-44,46,50-52,218,219-230,
Decision Making Unit - 13,
Demand for healthcare-2, 4,5,21,22,24,27,35,176,177,
Demography-47,
Disability-7,111,147,217,
District Hospital-3,10,63,
Drug Availability-21,22,209,212,215,

Drug Expenditure-43,193,

Dummy Variable-31, 33,47,

E

Efficiency-2, 3,5-9,12,14,16,31-35,37,39-44,46-48,50,52,56,66,172,173,177,192,214,217-244,

Efficiency Estimation-5,6,8,9,15,17,33,46,

F

Female Illiteracy- 168-170,

G

Good Background Index-197,198,215,

General Morbidity-5,7,8,

Gender Difference-53,86,92,93,96,111,

H

Hausman Test-34,

Health education-42,

Health Expenditure-44-46,48,50,54,72,

Health Indicator-7,8,11,85,86,

Health Inequity-8,14,

Health Infrastructure-4,13,43,50,72,167,171,

Health Interventions-46,56,163,187,

Health Insurance-46,47,49,

Health Sector-2,5,44,89,193,

Health Security-7,8,13,155,

Health Seeking Behaviour- 3,5-7,9,11,13-15,17,18,20,23-

27,29,42,46,48,49,52,72,80,89,129,135,138,139,179,203,217,

Health Status-3,5-7,11,15,22,27,32,38,40,41,53,89,101,109,119,120,127,201,

Healthcare Delivery-7,14,40,41,48,70,132,155,160,

Healthcare Distribution-8,14,134,200,209,

Healthcare Reform-44,

Healthcare Utilisation-5-7,11,13,23,32,35,42,50,54,55,129,152,170,177,178,199,200,

Healthcare-2, 3, 4,7,8,14,17,20,27,35,39,42-45,49,50,52,54-56,58,60,61,67,72,185,192,

Heteroscedasticity-34,46,

Hinderfall Index-33,

Home Delivery-28,145,146,147,148,

Hospital bed-4,9,12,62,159,173,192,

Hospitalisation Rate-5,8,23,129-133,176,

Human Development Index-2, 83,212,

Human Face - 15,75,78,82,

I

Institutional Delivery-4,9,29,71,143,144,145,146,147,155,176,

Infant mortality-20,22,24,26,37,45,49,55,70,72,86,100,101,

Immunisation Rate-5,21,23,29,37,55,61,70,72,

Inpatient Care-8,10,12,13,15,16,20,42,72,129,132-134,158,160,161,175,179,192-198,200,201-206,208,211,212,214,215,

J

Jalpaiguri-9,15,62,76,77-79,82,83,85,101,161,162,166,192-195,204,

Janani Suraksha Yojana-28,71,161,

K

Kish Table - 11

L

Life Expectancy-6,37,53,94,

Literacy Rate- 80,86,94,95,

Locational efficiency-47,

M

Malnourished-8,121,

Mental Health-5-7,10,38,49,129,185,

Maternal Health-6,7,9,11,27-29,42,61,71,161,162,186,

Mortality-7,22,23,32,35,41,45,49,68,72,78,100,101,106,110,123,193,201,

Malnutrition-17,24,79,201,

Mean age of marriage- 91,100,106,

Medical care-18,110,127,135,217,

Medical Representative- 181,182,

Monthly Per Capita Expenditure-195,201-205,208,209,213,

N

Natural Calamity- 86,104,105,107,

North Bengal-6,

Neo-natal-49,71,179,

Non-Communicable Disease-6,54,66,70,111,114,115,127,

No care-20,55,

National Rural Health Mission-37,54,67,69,70,71,72,

O

Out-of-Pocket Expenses-3,11,23,28,45,46,129,133,134,142,210,

Out Patient Care- 8-

16,20,23,24,26,37,42,43,49,50,54,62,72,129,135,137,138,140,141,158,160,161,164,177,192-198,200,201,203,207,208,209,211,212,214,215,

Obstetric care-27,

P

Parametric Technique - 12,39,50,51,52,218,

Patient Satisfaction-43,192,212,

Perceive Quality-40,

Placement Effects-23,144,145,

Population Density - 10,

Poverty -2,53,78,79,83,86,103-105,107,116,121,144,194,195,196,202,203,214,

Prenatal Care-9,22,

Prevalence of Ailments- 5,110,111,

Preventive Healthcare-60,61,66,68,

Price discrimination-18,

Primary Health Center-3, 4-7,9-13,15,16,37,49,53,58,60-67,69,71,86,155,160,161-164,166,167,169,171-173,176-179,192-215,218,

Primary Sampling Unit - 10,11,12,

Principal Component Analysis-32,

Private Health Facilities-5,7,14,21-23,25,29,45,47,48,55,131,134,155,158,197,206,

Productive Efficiency-36,51,

Public Health Facilities-5,7,14,22,23,25,29,48,49,55,131,151,152,155,158,206,

R

Referral System-7,8,12,43,60,62-64,66,71,72,132,159,176,187,188,

Rural Hospital-3,11,70,147,158,164,167,171,176,192,207,218,

Rural Medical Practitioners-3,5-9,12,29,46,49,55,126,132,138-143,151,155,177,181-190,202,203,205,207-209,

Rogi Kalyan Samiti- 71,

S

Scale Efficiency - 12,13,16,

Self care-20,22,33,36,46,

Sensitivity Analysis-46,

Service Delivery - 16,52, 59,

Service Gap-47,

Sex-Ratio-91,92,105,109,

Shadow Price-20,

Socio-economic-3,26,32,38,46,47,52,85,89,91,124,140,185,192,194,

State General Hospital-3,11,218,

Stochastic Frontier Analysis-12,31,32,34,36,37,42-44,46,47,52,53,218,

Sub-Center-3,5,60,62,66,86,159,160,161,162,164,179,203,218,

Sub-Divisional Hospital-3,10,62,64,207,

Supply induced Demand-30,146,

T

Technical Efficiency-5,12, 13,16,31,34,35,36,42,50,53,

Travel Cost-22,53,133,134,147,204,208,

Traditional Healers-42,46,126,

U

User Fee-45,48,

V

Vector borne disease-67,

W

Western Dooars-5,6,8-10,13,14,15,75-82,84,85,87,89,91,97,110,111,114,116,117,119,120-122,126,127,129-131,135,144,149,150,152,155,158,161,175-179,183,192,200,214,215,

West Bengal-8,11,62,75,76,84,101,110,131,149,158,161,164,167,210,

Woman Health-8,70,

World Health Organisation-2, 3,6,

