

India Studies in Business and Economics

Utpal Kumar De  
Manoranjan Pal  
Premananda Bharati  
*Editors*

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# Issues on Health and Healthcare in India

Focus on the North Eastern Region

 Springer

# **India Studies in Business and Economics**

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Utpal Kumar De · Manoranjan Pal  
Premananda Bharati  
Editors

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# Foreword

Here is a book that serves as a goldmine of data on health and health-related issues among very diverse and marginalized sections and societies. This book deals on “Issues on Health and Healthcare in India: Focus on the North-Eastern Region”. Conceptually planning the issues related to health and healthcare in India, the editors of the present volume, Profs. Utpal Kumar De, Manoranjan Pal and Premananda Bharati, who are highly respected in their own professions, have done a commendable job by compiling and editing papers on diverse but important aspects of health. Inviting papers from distinguished scientists who have made a significant mark in research on these issues must have been a Herculean task for the editors. United Nations deadline for achieving the Millennium Development Goals (MDGs) is already over and has met with moderate success only. New initiative with reframed set of goals emphasizing on saving the environment and saving the planet popularly known as Sustainable Development Goals (SDGs) has just begun. On 25 September 2015, almost all countries adopted a set of 17 goals to end poverty, protect the planet, and ensure prosperity for all. Started on 1 January 2016, these goals are promised to be fulfilled by 2030. Readers will find this volume with linkages to the United Nations SDGs and full of important findings obtained through original empirical data on health. Most of the contributors focused their analysis in North-Eastern regions of India. I am also amazed to see some of the foreign contributions in the volume.

Keeping consistency among the topics of the papers, the present volume has been divided into three parts, each one with similar type of themes. Part I deals with the Determinants of Status of Health. The papers in this part deal with the problems of nutrition deficient anaemia, low birth weight, teenage pregnancy, child immunization, mothers' composite health index, psychological well-being, nutritional status, health seeking behaviour and chronic energy deficiency.

Methods and Modelling forms Part II of the book. The papers in this section of the book have dealt in detail on the prevalence of Malaria and HbE, health and educational deprivation, budget allocation and expenditure for health and family welfare in India, effects of socio-economic classes on infant mortality, India's fertility trend and rural–urban gaps and differentials, prevalence of child

undernutrition, health expenditures in India, inequality in child mortality and out-of-pocket (OOP) payments for healthcare in Bangladesh

Part III refers to the existing health Facilities and Prevalence of Morbidity. Research in this section focuses on reviewing the policies related to essential medicines, meteorological conditions and occurrence of malaria in Meghalaya, health-related physical fitness among children of municipal and international schools, confrontation between an environment and an individual, management in the public health government hospital services organizations, factors affecting morbidity and utilization of healthcare services, chronic diseases among the elderly, drinking water availability and nutritional status of children of North-East India.

Hopefully it will find its readership among researchers and students of anthropology, sociology, economics, healthcare professionals, social workers, medical doctors and paramedical staff, health planners and administrators. Such a venture should come handy for the concerned governments whose task is to meet the health related SDGs set by the United Nations.

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# Preface

UN Millennium Development Goals (MDGs) identified eight major goals for addressing development perspectives in the new millennium. These goals were targeted to be achieved by the end of 2015. Apart from reducing poverty, inequality, promoting gender equality and empowering women, ensuring environmental sustainability; reducing child mortality, improving maternal health and halting the spread of HIV/AIDS are also very important goals under health and healthcare which are important components of human development.

Despite progress in several dimensions, hunger, malnutrition and starvation deaths are common in many parts of the world, particularly in a number of countries in Asia and Sub-Saharan Africa. Health still remains a critical issue and without proper health human resource development remain incomplete, which is crucial for the overall progress of any country. Proportion of underweight children in India has come down from 43% in 1998–1999 to only 40% in 2005–2006. This proportion, for the children below 3 years, was expected to reach about 33% by 2015. In this respect, discrimination between men and women is also prevalent in India. Moreover, there is also substantial spatial variation in the achievement of nutritional intake. Some states have prevalence of underweight children above the national average. These states are namely Madhya Pradesh (57.9%), Bihar (54.9%), Jharkhand (54.6%), Chhattisgarh (47.8%), Meghalaya (42.9%), UP (41.6%) and even economically vibrant Gujarat (41.1%). Thus, despite several efforts undertaken, it remains a challenge to achieve the target. The trend shows that Maternal Mortality Rate (MMR) would have come down to 140 per lakh population, which was above 31 points of the targeted figure of 2015. Also, in terms of infant mortality rate, India may be behind the target by 27 points in 2015. Several cases of malaria, incidences of malnutrition and work-related hazards have been observed all over the country and that is also prevalent in North-Eastern region of India.

Nutritional intake, which is directly related to the economic status and socio-economic relationship matters for the human development and performance of the workers in various sectors and that in turn affect nutritional intake through income. In many societies, nutritional intake of women and girl children is



comparatively poorer than that of men or boys. Also, it reflects an aspect of deprivation of women in the society.

From the above discussion, it is clear that we could not achieve the MDGs in all targets and there are also significant spatial variations in healthcare, nutritional intake, healthcare infrastructure, etc. Thus it is high time, we review our achievements and lapses incurred in comparison with the targets of the MDGs.

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# Abbreviations

AAMR	Age-Adjusted Mortality Rate
AARR	Average Annual Rate of Reduction
ABER	Annual Blood Examination Rate
ACF	Autocorrelation Function
ANC	Antenatal Care
ANM	Auxiliary Nurse Midwifer
AOR	Adjusted Odds Ratios
AP	Andhra Prades
API	Annual Parasite Index
ARI	Acute Respiratory Infection
ASHA	Accredited Social Health Activist
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
BIC	Bayesian Information Criteria
BMI	Body Mass Index
BPHC	Block Primary Health Centre
CAGR	Compound Annual Growth Rate
CBR	Crude Birth Rate
CC	Concentration Curves
CD	Communicable Diseases
CDR	Crude Death Rate
CDSCO	Central Drugs Standard Control
CEA	Clinical Establishment Act
CED	Chronic Energy Deficiency
CHC	Community Health Centres
CI	Concentration Index
CI	Confidence Interval
CIHI	Child Ill Health Index

CMR	Child Mortality Rate
CPA	Change-Point Analysis
DGHS	Director General of Health Services
DHS	Demographic and Health Survey
DLHS	District-Level Household and Facility Survey
DMPR	District Malaria Prevalence Rate
DPCO	Drug Price Control Order
EA	Enumeration Areas
EAG	Empowered Action Group
ECOWAS	Economic Community of West African States
FAOC	First Axis Ordering Consistency
FERA	Foreign Exchange Regulation Act
FFM	Five Factor Model
FRU	First Referral Unit
GDP	Gross Domestic Product
GFATM	Global Fund Against Aids Tuberculosis and Malaria
GSK	GlaxoSmithKline
GzLMM	Generalized Linear Mixed Model
HAZ	Height-for-Age H/A
Hb	Haemoglobin
HDI	Human Development Index
HI	Health Index
HKI	Helen Keller International
HP	Himachal Pradesh
ICC	Intra-class Correlation Coefficient
ICD	International Classification of Diseases
IFA	Iron and Folic Acid
IIPS	International Institute for Population Sciences
IMR	Infant Mortality Rate
IPHN	Institute of Public Health Nutrition
IRDA	Insurance Regulatory and Development Authority
IRS	Indoor Residual Spray
IS	International School
J&K	Jammu and Kashmir
LBW	Low birth weight
LE	Life Expectancy
LISA	Local Indicators of Spatial Association
LMIC	Low-Middle Income Countries
MBP	Market Based Pricing
MCA	Multiple Correspondence Analysis
MCH	Maternal and Child Health
MCHI	Mother Composite Health Index

MCI	Maternal Care Index
MDG	Millennium Development Goal
MGRS	Multicentre Growth Reference Study
MH	Mental Health
MIR	Malaria Incidence Rate
MMR	Maternal Mortality Rate
MoHFW	Ministry of Health & Family Welfare
MP	Madhya Pradesh
MRA	Multiple Regression Analysis
MS	Municipal School
MTP	Medical Termination of Pregnancy
NCAER	National Council of Applied Economic Research
NCD	Non-Communicable Diseases
NCHS	National Centre for Health Statistics
NES	North-Eastern States
NFHS	National Family Health Survey
NHI	Negative Health Index
NLEM	National List of Essential Medicines
NMR	Neo-Natal Mortality
NRHM	National Rural Health Mission
NSS	National Service Scheme
NSSO	National Sample Survey Office
NTI	Negative Translation Invariance
NVBDCP	National Vector Borne Disease Control Programme
OBC	Other Backward Class
OC	Organizational Culture
OLS	Ordinary Least Square
OOP	Out-of-Pocket
OOPP	Out-of-Pocket Payment
PACF	Partial Autocorrelation Function
PCA	Principal Component Analysis
PCNSDP	Per Capita Net State Domestic Product
PHC	Primary Health Centre
PPC	Positive Psychological Capital
PWB	Psychological Wellbeing
QWL	Quality of Work Life
SES	Socio-Economic Status
SNP	Single Nucleotide Polymorphisms
SRS	Sample Registration System
SSA	Sub-Saharan Africa
ST	Schedule Tribe
STG	Standard Treatment Guidelines

TFR	Total Fertility Rate
TMR	Truncated Mortality Rate
TN	Tamil Nadu
TP	Teenage Pregnancy
TT	Tetanus Toxoid
UMR	Under 5 Mortality Rate
UNDG	United Nations Development Group
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UP	Uttar Pradesh
UT	Union Territories
VBD	Vector-Borne Diseases
VIF	Variance Inflation Factor
WAZ	Weight-for-Age W/A
WB	West Bengal
WHO	World Health Organization
WHtR	Waist to Height Ratio
WHZ	Weight-for-Height W/H
WI	Wealth Index
WLR	Women Literacy Rate

# Chapter 1

## Introduction

**Utpal Kumar De, Manoranjan Pal and Premananda Bharati**

The book covers a wide range of issues related to health and healthcare at the international and national level, its regional complexities, socioeconomic factors behind observed healthcare pattern and morbidity. Sophisticated statistical techniques have been utilized for the analysis of health and healthcare dynamics, regional disparities, etc. A large number of studies also addressed the issues in northeast India.

Besides introducing some new questions on health and healthcare development, cross-country analyses, convergence of healthcare across Indian states and mortality, morbidity in northeast India have been included. Also, special techniques like two-level logistic regression, analysis of mental health, probabilistic and predictive analysis of nutritional deficit, generalized linear mixed model have been used to analyze mortality and morbidity and factors affecting out-of-pocket expenses on healthcare.

The book, therefore, covers a wide range of issues related to various socio-economic factors like education, incidence of poverty, inequality, etc., in connection with health and healthcare services in India in general and northeast India in particular. We hope that the readers of the volume will be highly benefitted and be

---

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encouraged to do further studies to meet the gaps which still remain. The research outputs presented here will also help the planners, politicians, and the social workers.

The contributions are invited to address the status, achievements, and challenges in health and healthcare. Chapters specific to health and healthcare are selected on the basis of quality, relevance to the present-day situation, and on the basis of the comments of reviewers with due modifications.

The whole volume is divided into three major parts: (1) Determinants of Status of Health, (2) Methods and Modeling on health and healthcare, (3) Healthcare and Morbidity.

## 1.1 Part I: Determinants of Status of Health

In Chap. 2, Prof. Golam Hossain, Md. Kamruzzaman and Md. Wadood explore various determinants of nutrition deficient anemia among nonpregnant women of reproductive age in Bangladesh using Bangladesh demographic and health survey (BDHS)-2011 data. It also examines the prevalence of anemia and various anthropometric, socioeconomic, and demographic factors to predict anemia among nonpregnant Bangladeshi women. The prevalence of anemia among Bangladeshi married women is more than 41% and among anemic women, 35.5, 5.6, and 0.2% are, respectively, mildly, moderately, and severely affected. Multilevel logistic regression model demonstrated that women, who are currently breastfeeding and with amenorrhea, are more likely ( $p < 0.01$ ) to get anemia than their counterparts. Underweight women have a higher chance ( $p < 0.01$ ) to get anemia than normal weight, overweight, and obese. Uneducated women are more likely to get anemia ( $p < 0.01$ ) than secondary and higher educated. Anemia is especially pronounced among nonpregnant women who have electricity at home ( $p < 0.01$ ), currently use contraceptive ( $p < 0.05$ ), are non-Muslim ( $p < 0.01$ ), and come from a rich family ( $p < 0.01$ ). Moreover, women who are 30–49-years old are more likely to get anemia than those who are younger. Undernutrition is the most important predictor for anemia among Bangladeshi married women and undernourished women are usually living under poor condition.

Chapter 3 by Rashidul Alam Mahumud et al. highlights Low birth weight (LBW) as a major public health concern in developing countries which is frequently related to child morbidity and mortality. This study identifies a number of determinants that have a direct influence on the prevalence of low birth weight. The study suggests for improvement of the overall maternal health status in order to reduce further adverse health sequence progression. Efforts on community-based intervention programs will likely reduce the occurrence of LBW infants.

In the next chapter, Dipankar Roy and Avijit Debnath investigate the incidence of teenage pregnancy in India based on data from National Family Health Survey 3 (NFHS 3). Also, he seeks to examine whether teenage pregnancy has any adverse impact on health status of children. The analysis reveals that incidence of teenage

pregnancy varies across the place of residence, religion, caste, region, etc. The analysis also reveals that teenage pregnancy is associated with poor child health status. Moreover, maternal care during pregnancy has been found to be positively associated with child health status.

In Chap. 5, Gurudas Bandyopadhyay in an exploratory framework examines the association among antecedent and outcome variables with psychological well-being (PWB) in an organizational setting. Determinants include individual factors like conscientiousness, optimism, and resilience and organizational factor like organizational culture. The impact of psychological well-being is examined on mental health, which ultimately affects individual performance, organizational and social engagements. The results reveal differences in employee perception with regard to gender, education, age, and the job level. The correlation results suggest that most of the variables are positively related. The MRA results suggest that conscientiousness, optimism, and resilience significantly contribute to PWB. Further, organizational culture significantly contributes to PWB. The results also suggest that PWB significantly contributes toward mental health. The study has contributed to the literature examining the dynamic interplay of those factors which influence PWB, to have happy and healthy employees who may be better engaged.

The next chapter by Pranti Dutta identifies the context-specific causes of maternal anemia that would help in taking appropriate preventive measures to combat anemia in a particular geographical arena rather than universal, “one-size-fits-all” type intervention. In other words, it would help in channelizing scarce resources according to the local needs. Examining the socioeconomic context-specific causes of maternal anemia is helpful in taking effective preventive measures and a better target for the improvement of hemoglobin level among the pregnant women. The study concludes that food-based approach can be considered as one of the effective intervention for multi-nutritional benefits.

Maumita Ghosh and Shrabanti Maity use YULE’S coefficient of association on a primary data set to find out the association of various socioeconomic variables with child immunization as presented in Chap. 7. Mothers’ composite health index has been constructed using the multiple correspondence analysis (MCA). Responses of the parents regarding the vaccination of their children and various socioeconomic determinants of such vaccination have been analyzed through the use of logistic regression analysis. It has been found that there is a lack of access to health services both for the child and for its mother and low rates of participation in vaccination coverage among poor households, minorities, and people living in rural areas of West Bengal.

Analysis of the core health indicators of the northeastern states of India in the recent years and the health-seeking behaviour and cost of treatment are undertaken in Chap. 8. The study also analyses the determinants of income loss due to the ailment in the northeast and other parts of the country. Recently, a few of the northeastern states, compared to other states of India have taken the initiative in adopting the Clinical Establishment Act (CEA) of 2010 in 2012. CEA sets standards for health infrastructure and provides guidance for cost of health services. It is argued that CEA would help in (a) addressing the critical gaps in human resources



in health facilities that force the consumers to seek healthcare beyond their own states and (b) reducing the health induced economic vulnerabilities among consumers in the northeastern region of India.

Chapter 9 examines the magnitude of the difference of Chronic Energy Deficiency (CED) between poor and nonpoor women and its variation across the states of northeast India, and it further analyses the probable reasons for such variation. The study finds that there is a large disparity between the occurrence of poor and nonpoor conditions as well as undernutrition in different states of northeast India. Here attainment of higher education, service holding, safe drinking, and toilet facility are found to have a positive impact on undernutrition.

## 1.2 Part II: Methods and Modeling

Chapter 10 emphasizes on the prevalence of Malaria and HbE which are endemic in some regions of northeast India. Of the total burden of malaria and its mortality in northeastern states of India contribute 10% of malaria incidence, and 20% of deaths. Similarly, the frequency of HbE varies from less than 10% to more than 50% in different populations in the region. It is known that the genes like HbE and G6PD are involved in the protection against malarial infection that might explain the differential prevalence of malaria in the region. Based on the field studies in Meghalaya the study investigates into the health and administrative implications that are of vital importance for the control of malaria and HbE. It is emphasized that for health planning, knowledge about the genetic basis or causes are important as well.

SK Datta and Krishna Singh, in Chap. 11, uses a recursive simultaneous equation framework to explain the variation of health deprivation of children as well as educational deprivation across the major Indian states, on the basis of some identified explanatory variables. The empirical analysis of health deprivation index reveals that factors like poverty, female literacy rate, low body mass index of mother and full antenatal care have significant association with the level of deprivation. The dropout rate of children is considered as reflective of their education deprivation. Household characteristics of the deprived children indicate that female literacy, poverty, availability of electricity, the gender of household head and children health status significantly influence the extent of their educational deprivation. This calls for urgent implementation of different Government schemes for promoting better health and education of children of identified poor and deprived families.

Chapter 12 examines budget allocation and expenditure, the utilization and per capita investment, etc., for health and family welfare in India as a whole and for states separately. The authors also propose to analyze the comparative status of northeastern states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura) vis a vis rest of the states in respect of the above variables.

Rimee Bhuyan, Nizara Kalita and Gayatri Goswami attempt to examine the performance of health indicators in Assam over the years. In order to investigate whether there is any structural change in pre-launch and post-launch of NRHM, Bai and Perron test has been used for the period 1995–2013. The study also examines the relative influence of state public expenditure on the performance index of health indicators of Assam with the help of linear regression model. The study reveals that performance of health indicators of Assam has been showing a positive trend over time and there are three break points in the performance index namely 2002, 2005, and 2009. It has found that there is a positive and significant impact of increasing public expenditure on the performance index of health indicators of Assam.

The burden of infant mortality on socioeconomic classes by measuring the effects of socioeconomic classes on infant mortality is assessed in Chap. 13. The socioeconomic classes as provided by the district level household and facility survey (DLHS-3) conducted by International Institute of Population Sciences (IIPS), Mumbai in collaboration with Ministry of Health and Family Welfare (MoHFW), Government of India, and district level infant mortality data for the seven northeast Indian states as reported by MoHFW, are used for the analysis. The data exhibit a high degree of intra-state correlation as well as a high degree of inter-district spatial correlation. A generalized linear mixed model approach capitalizing on the intra-state correlation is adopted for the analysis. Further, spatial analysis of data has been performed using Conditional Autoregressive (CAR) model.

Chapter 14 aims at probing India's fertility trend from the perspectives of rural–urban gaps and differentials and to answer the following questions. (i) Is the nation's fertility transition is typical of its rural part or has it proceeded at a different pace of decline? (ii) To what extent the transition characteristics, e.g., pace and timing are different in rural and urban parts of the nation? Do we identify distinct rural–urban trajectories? (iii) Do these differentials play a significant role in taking the nation from third to the fourth stage of demographic transition? The authors used the method of change point analysis to identify the significant change points associated with the TFR series of rural, urban and the entire country as a whole during 1971–2013. Finally, using a class of ARIMA models forecasts are obtained and the implications of the results are discussed.

Using a distribution of nutritional outcomes, Chap. 15 examines the prevalence of child undernutrition and its extent in India. Distribution of Z-scores is found to follow a general class of skew normal distribution, in which the reference population is a member and compares two and more members in this family. The degree of nutritional deficit is then quantified in terms of the population parameters. The findings of this study are indicative of the existence of comprehensive gaps in the perceived level of undernutrition prevalence for selected Indian states.

Health expenditures across the major states of India has been investigated in Chap. 16. Health expenditure in India has become an important policy variable so far as the concept of social sector development is concerned. The distributional aspect of such expenditure is one of the important sides of the overall development of a country or state using the data of Reserve Bank of India.

Impact of literacy and other factors like societies outlook on healthcare and deprivation is analyzed by constructing a suitable health index in Chap. 17. The authors provide a theoretical axiomatic structure for constructing the index. Then the index has been applied to the state level data for northeast India across two time points to understand the relative dynamics of the constructed index.

In the study on inequality in child mortality in the northeastern states of India, Partha De concentrates on how do these disparities differ from state to state within the northeastern states of India? As a measure of inequality and to compare the disparities among different states of northeast India, concentration curves and indices are constructed from infant and under-5 mortality data classified under different quintiles of wealth index from the National Family Health Survey (NFHS-3) data. The result shows that the states may be classified into different groups according to the level of inequality in infant and under-5 mortalities. The states of Tripura, Manipur, and Meghalaya have shown higher inequality levels compared to remaining selected states, where as the group of states are Sikkim and Arunachal Pradesh where inequality in child mortality among different socioeconomic groups are least.

Chapter 19 intends to examine the factors that are mostly influencing out-of-pocket (OOP) payments for healthcare in Bangladesh. A multiple regression model is used for the estimation of impacts of determinants on OOP payments. They mainly used economic, demographic, social, financial safety, and health-related variables in our analysis. The findings from the multivariate analysis show that the variables reflecting socioeconomic status of Bangladeshi households are important determinants of incidence of OOPP expenditure. The result shows that household characteristics like unsafe water, unhygienic toilet and household belonging to the urban community are significantly associated with OOP payments. The other significant factors are household income, age, sex, informal healthcare.

### 1.3 Part III: Facilities and Prevalence of Morbidity

Imteyaz Ahmad and Anita Rath in Chap. 20 review the policies related to essential medicines in Aurangabad district of Bihar and assess the availability and accessibility to essential medicines and healthcare in primary health centers. Scarcity and low-quality medicine and healthcare treatment are highlighted in the area.

The association between meteorological conditions and occurrence of malaria in Meghalaya is examined in Chap. 21. It also tries to understand the district-wise prevalence of Malaria cases in Meghalaya. The results from the data portray that average temperature has a significant positive association (coeff 0.2,  $p < 0.01$ ), whereas the rainfall indicates a significantly negative association with the incidence rate of malarial cases in Meghalaya. However, there is a relatively small effects that rainfall contributes to the rise in malarial cases (coeff 0.0006,  $p < 0.01$ ). This study shows that weather conditions like temperature play a major role which leads to the rise in the malaria cases in the state of Meghalaya, but the rainfall shows a very

small negative effect in increasing the malaria cases. The study also shows that there is significant regional variation in the prevalence of malaria cases in Meghalaya.

Manjusha Bhakay and Sabiha Vali, in Chap. 22, compare the health related physical fitness among children aged 7–9 years attending municipal schools and international schools in Nasik city. Children from municipal schools reflects lower mean height, weight, and BMI. Whereas, the Municipal school children has larger mean muscular strength and endurance (21.52 sit ups). Many of the children from the international school have completed the one-mile run test but those from municipal school have completed the test in lesser time (10.66 min). Municipal school children are more flexible (13.37 in.). They also have a lower waist-to-height ratio (0.40) as compared to the international school children (0.46). Physical activity is considered a key factor for healthy physical and mental development of children. The municipal school children being more physically active have better physical fitness and hence are at a lesser risk of developing lifestyle related disorders.

Natália Talita Araújo Nascimento et al. in their study examine the causal relationship between the confrontation between an environment and an individual; which is defended by Contingency Theory of Management in the public health government (hospital) services organizations. The study is done through the qualitative analysis, by questionnaires from stake holders in the location of investigations and by support from the focus group. The results of individual behavior are described after an investigation in the context of the processes of the service delivery. The participation of social actors in the interaction with the public body in order to infer in the quality of service delivery is analyzed. Following the scientific recommendations, the citizen participation in the projects can improve this process. This research activity contributes as an academic tool for improvement of the service delivery quality offered by public institutions. The findings and suggestions developed from the analysis of data obtained from employees delivering services and the service users would be used to diagnose the necessities and opportunities aiming the elaboration of government policies for the process of community development.

In the next chapter (Chap. 24), Nirmala Devi and Rajshree Bedamatta examine the extent of morbidity, factors affecting morbidity, as well as the extent of utilization of healthcare services in one of the villages of Nagaon district of Assam. The study is based on a household survey conducted in 2014 in Bamunipathar village of Nagaon district. The morbidity prevalence rate is found higher among males as compared to females. However, cases of untreated morbidity are higher among females. Regression analysis shows that morbidity increases with increase in age of an individual. Low levels of literacy and nonavailability of toilet facilities pose as risk factors to morbid conditions. Households having access to safe drinking water shows a negative causal relationship with morbidity.

Chapter 25 sheds light on the pattern and trend of chronic diseases among the elderly over time. Trends in prevalence of diseases under these three broad classifications by sex, age groups, and residence are estimated and analyzed.

A decomposition method has been used, to check the significant difference in the gender gaps in the prevalence of morbidity. Non-communicable and other diseases and disabilities are found to have increased over time regardless of background characteristics of individuals, whereas it is the reverse case for communicable diseases and the prevalence of diseases are higher among elderly females than the males. The gender differentials in the prevalence of diseases are found to be statistically significant. The concluding message of the study is that morbidities among the elderly are expected to escalate in future.

Chapter 26 intends to focus on the association of drinking water with the nutritional status of children (0–5 years) of northeast India. Results show that undernutrition level is the highest in Tripura and Assam as compared to the other northeastern states. The authors have also checked the relation between nutritional status and other socio-demographic variables. Statistically significant association is found between drinking water and nutritional status. The study also discusses the possibilities of integrating human rights-based approaches, in relevant national MDG-based policies to combat the problem.

**Part I**  
**Determinants of Status of Health**