HEALTH CARE ACCESSIBILITY AND SOCIO-ECONOMIC GROUPS: A STUDY OF KERALA

By

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CERTIFICATE

Certified that this written account on 'HEALTH CARE ACCESSIBILITY AND SOCIO- ECONOMIC GROUPS: A STUDY OF KERALA' submitted for the award of the degree of Doctor of Philosophy of the University of Calicut is a bonafide record of research work done by Mr. T. D. Simon, under my supervision. No part of this has been submitted earlier for any other purposes.

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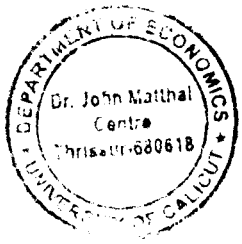
24.08.2007



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DECLARATION

I, T.D. Simon, do hereby declare that this written account titled 'HEALTH CARE ACCESSIBILITY AND SOCIO- ECONOMIC GROUPS: A STUDY OF KERALA' is a bonafide record of research work done by me under the guidance of Prof. U.T. Damayanthi, Head, Department of Economics, University of Calicut.

I also declare that this has not been submitted by me earlier for the award of any degree, diploma, title or recognition.

Aranattukara,
24.08.2007

T.D. Simon

To

Mr. E. H. Abdul Sathar & Dr. T. V. Salma

for their parental affection and wholehearted support

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INTRODUCTION

1.1 Introduction

Access to health care is an important component of an overall health system and has a direct impact on the burden of disease that affects many developing countries. Measuring accessibility to health care contributes to a wider understanding of the performance of health systems within and between countries, which facilitates the development of evidence based health policies (Black et al. 2004[1]).

Access to health care has multiple definitions and its meaning in a given context is too often assumed (Khan and Bhardwaj 1994[2]). The access to health care is defined as the potential and actual entry of a group of population into the health and health care delivery system (US Congress 1988)[3]. Health care for the preservation and promotion of health is one of the most basic human rights, as declared in the Universal Declaration of Human Rights (Article 25).

It would depend on availability, awareness, affordability and accessibility to health care services (Uplekar and George 1994[4]). The factors of accessibility can be grouped into (i) affordability (ii) availability and (iii) acceptability and with

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[1] M. Black, S. Ebener, P. Aguilar Najera, M. Vidaurre and E.I. Morjani (2004). *Using GIS to Measure Physical Accessibility to Health Care,* Paper presented during 2004 International Health Users Conference, Washington D.C.

[2] A.A. Khan and S.M. Bhardwaj (1994). "Access to Health Care: A Conceptual Framework and its relevance to Health Care Planning" *Eval Health Prof,* 17: 60-76.

[3] US Congress (1988). *The Quality of Medical Care,* Office of the Technology Assessment, Publication No. OTAH – 386, US Government Printing Office, Washington D C.

[4] Mukund Uplekar and Alex George (1994). *Access to Health Care in India: Present Situation and Innovative Approaches*, Studies on Human Development in India, The Foundation for Research in Community Health, Bombay.

socio-economic dimensions like ethnicity, religion; gender, age; caste (Penchansky and Thomas 1981[5]; Oliver and Mossialos 2004[6]).

The physical existence of health care facilities is necessary but not a sufficient condition for access. Apart from the physical existence, the people's ability to utilise those facilities and the quality of care available effectively determine the actual access. Further, the access to health care is influenced by the attitude of the people to receive the medical service, the knowledge about the disease and the awareness of the medical facilities. In short, access to health care is the combination of affordability, availability and acceptability of health care.

In Alma Ata Declaration in 1978, 134 countries subscribed the goal of "Health for all by the year 2000" and they affirmed World Health Organisation's broad definition of health as "a state of complete, physical, mental and social well-being". Sadly the year 2000 has passed and the goal of health for all in some ways seems farther than ever from being reached (Werner 2005[7]).

While a few health indicators have improved modestly since 1978, for billions of people, health and quality of life have actually deteriorated. This is partly because of the decreasing access to costly health services. But it is also because the world's neediest people have been increasingly marginalised by the dominant model of economic development (Werner 2005[8]). Even though, India has a large network of health care systems of the world, this is not adequate and

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[5] R. Penchansky and J.W. Thomas (1981). "The concept of access", *Med Care*, 19 (2), pp.127-140.

[6] A. Oliver and E. Mossialos (2004). "Equity of access to health care: Outlining the foundations for action", *Journal of Epidemiol Community Health,* 55, pp. 655-658.

[7] David Werner (2005). "The Alma Ata Declaration and the goal of 'Health for All' 25 years later: Keeping the dream alive", *In* Ravi Narayan and P.V. Unnikrishnan (Ed.), *Health for All Now: Revive Alma Ata!,* People's Health Movement, National Printing Press, Bangalore.

[8] David Werner (2005). "The Alma Ata Declaration and the goal of 'Health for All' 25 years later: Keeping the dream alive", *In* Ravi Narayan and P.V. Unnikrishnan (Ed.), *Health for All Now: Revive Alma Ata!,* People's Health Movement, National Printing Press, Bangalore.

affordable to the people in a country, with more than 50 per cent below poverty line (World Development Report 2000-01).

Health is a fundamental human right and is inculcated in the Indian Constitution. The Constitution directs the state must stand for the improvement of public health as one of the primary duties (John 2005[9]).

The relationship between health and social condition is a constantly changing one. It is said that social conditions primarily determine the health status of various group of people.

Kerala is one of the few regions having an active policy of providing health care efficiently and equitably. Kerala's governments have pursued a pro-active role in the provision of health care for the past several decades to all its needy at the public facilities in all the three systems – allopathy, ayurveda and homeopathy. However, the Kerala situation in the provision and the use of health care services is complex. This complexity is due to the diversity – plurality and multiplicity – of systems, sectors and institutions of health care services. The state has recognised and institutionalised three major systems of medicines. Along with the government provision and the private provision, there is a hidden sector also – the practice by government doctors which may be referred to as 'private in public' (Sankar 2001[10])

1.2 Rationale of the Study

Kerala's development experience has been differentiated by the dominance of the social sectors. Kerala has achieved remarkable progress in human

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[9] Prem Chandra John (2005). "Whatever happened to Alma Ata", *In* Ravi Narayan and P.V. Unnikrishnan (Ed.), *Health for All Now: Revive Alma Ata!*, People's Health Movement, National Printing Press, Bangalore.

[10] Deepa Sankar (2001). *Access to and Utilisation of Health Care Services in Kerala: Patterns and Determinants*, Unpublished Ph.D. Thesis submitted to Jawaharlal Nehru University, Centre for Development Studies, Thiruvananthapuram.

development, as reflected in the high levels of education and health of its population. Crude death rate, infant mortality rate and life expectancy at birth in Kerala are comparable even to those of the developed regions. The state health development is generally attributed to spread of basic education, public awareness through specific activities of state and advances in infrastructure facilities. The availability of medical care facilities at easy access, along with factors such as education, has helped the state in attaining a higher rate of health care utilization than other parts of India (CDS-UN 1975[11]; Nag 1983[12]; Krishnan 1985[13]; Navaneetham and Dharmalingam 2003[14])

However, the rosy picture of the health status in the state is based on aggregates and they conceal rather than reveal the inequalities that exist in the health conditions in the state. Even with its universally known distinctiveness of 'development experience', disparities exist between the main stream and some sections of the society. The inequality in health status among socio-economic groups and better health status is associated with higher socio-economic status and the rate of morbidity was higher than the rate for the better off (Kannan et al. 1991[15]). Kerala's achievements have not been uniform across the different geographical locations of the state and have also eluded some of the margnialised sections like fishermen and tribal (Vimalakumari 1978[16]; Kurian 1995[17]; Shyjan

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[11] CDS-UN (1975). *Poverty, Unemployment and Development Policy: A Case Study of Selected Issues with Reference to Kerala,* Centre for Development Studies, Thiruvananthapuram.

[12] M. Nag (1983). "The impact of social and economic development on mortality: A comparative study of Kerala and West Bengal", *Economic and Political Weekly,* 18-21.

[13] T.N. Krishnan (1985). "Health statistics in Kerala state, India", *In* Halstead et al. (Ed.), *Good Health at Low Cost,* Rockefeller Foundation, New York.

[14] K. Navaneetham and A. Dharmalingam (2002). "Utilisation of maternal health care services in Southern India, *Social Science and Medicine,* Vol.55, pp.1849-1869.

[15] K.P. Kannan, K.R. Thankappan, V. Raman Kutty and K.P. Aravindan (1991). *Health and Development in Rural Kerala,* Integrated Rural Technology Centre of the Kerala, Sastra Sahitya Parishad.

[16] T.K. Vimalakumari (1991). *Infant Mortality among Fishermen,* Discovery Publishing House, New Delhi.

2000[18]). For the real development of the state, these outliers have to be included in the development process (Shyjan and Sunitha 2007[19]). Outliers with respect to accessibility is an important aspect in this regard. Existing literature deals with the disparity (outliers) with respect to health care and other social sectors, but not accessibility to health care. Against this background, the present study becomes relevant.

1.3 Objectives of the study

The specific objectives of the study are as follows:

(i) To analyse the pattern of morbidity and hospitalisation in Kerala

(ii) To explore the various factors determining affordability, availability and acceptability of health care, and

(iii) To examine the disparity in health care accessibility among different socio-economic groups at disaggregate level.

1.4 Data Source and Methodology

1.4.1 Data source

The study is based on cross sectional analysis with the help of both secondary and primary data. The unit level data of National Sample Survey Organisation's 60th Round 'Morbidity and Health Care' were extensively used for the analysis. In order to supplement the results of NSSO data, primary data from

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[17] John Kurien (1995). "Kerala model of development: Its central tendency and outliers', *Social Scientists,* 23 (1-3).

[18] D. Shyjan (2000). *Health Status of Fisherfolk in Kerala: A Case Study of the Fishing Village of Poovar, Thiruvananthapuram.* Unpublished dissertation submitted to University of Kerala, Thiruvananthapuram.

[19] D. Shyjan and A.S. Sunitha (2007). "Kerala's development experience: A fresh look at its outliers", Paper presented in the National Seminar on *Making Growth Inclusive of Marginal Sections with Special Reference to SC, ST and Women,* held at CESS, Hyderabad, February.

600 households in Thrissur district of Kerala with an adequate representation from rural and urban areas (27:33 ratio) were collected following probabilities proportional to their size. Further, secondary data collected from different sources like Directorate of Economics and Statistics, Directorate of Public Health, Planning Board, District Medical Offices, periodicals, journals, books, etc. were also used.

1.4.2 Sample selection

The household survey was conducted in Thrissur district of Kerala. The rationale for selecting Thrissur district was that it stands in the midway while considering many socio-economic and health variables. A sample of 600 households from Thrissur district was selected for the study. For giving adequate representation to rural-urban areas, 435 households from rural area and 165 households from urban area were selected. The sample panchayats were selected on the basis of probability proportion to size method. For this purpose, the existing information of caste structure and health infrastructure facilities were taken into account. The data were collected with the help of a detailed survey schedule during the period July – November 2005.

Table 1.1
Sample framework of the study

Area	Panchayat	ST	SC	OBC	Other	Total	Grand Total
Rural	Athirappilly	70	22	9	8	109	435 [72.5]
	Nattika	1	23	37	1	62	
	Pazhayannur	8	48	21	28	105	
	Puthoor	21	39	53	46	159	
	Total	100 (22.99)	132 (30.34)	120 (27.59)	83 (19.08)	435 (100.00)	
Urban	Guruvayur	-	51	44	29	124	165 [27.5]
	Irinjalakkuda	-	17	8	16	41	
	Total	-	68 (41.21)	52 (31.52)	45 (27.27)	165 (100.00)	
Grand Total		100 (16.67)	200 (33.33)	172 (28.67)	128 (21.33)	600 (100.00)	600 [100.00]

For analysing the data, suitable statistical and mathematical methods have been used. Apart from simple statistical tools like graphs, percentages and tabular analysis, various methods like indices, correlation, multiple regression, ordinal and multinomial logistic regression techniques have been used.

1.4.3 Major definitions

Health

Health is a state of complete, physical, mental and social well being and not merely the absence of disease or infirmity.

Health care

Health care is the prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical, nursing, and allied health professions. According to the World Health Organization, health care embraces all the goods and services designed to promote health, including "preventive, curative and palliative interventions, whether directed to individuals or to populations".

Health care accessibility:

Health care accessibility is the combination of health care affordability, health care availability and health care acceptability.

Health care affordability

Health care affordability is the capacity to buy a health care service.

Health care availability

Health care availability is the condition of existing health care facilities. Availability to health care is concerned with the ability of a population to obtain a specified set of health care services (Oliver and Mossialos 2004[20]).

[20] A. Oliver and E. Mossialos (2004). "Equity of access to health care: Outlining the foundations for action", *Journal of Epidemiol Community Health,* 55, pp. 655-658.

Health care acceptability

Health care acceptability is the willingness to buy a health care service.

1.5 Scheme of the study

The study has been divided into seven chapters. In the present chapter, importance, conceptual discussion, rationale of the study, objectives and methodology have been discussed. The second chapter deals with the theoretical framework and detailed review of literature. The third chapter analyses the health care scenario at national, state and district level. The fourth chapter is dealing with analysis of secondary level data especially from NSSO rounds. In the fifth chapter detailed analysis of the primary data collected from 600 households from Thrissur district is done. The sixth chapter focuses on the model building in order to measure the extend of disparity in affordability, availability and acceptability in deciding accessibility to health care. The seventh chapter concludes the study with major findings and further scope of the study.

Chapter II
THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

2.1 Introduction

This chapter is divided into two sections. First section deals with the theoretical background and second section deals with the review of literature. The theoretical framework of our study is depicted in the third section.

2.1 Theoretical background

There are different theoretical models with regard to the health care services and utilization of the models. The major models are discussed in this section

2.1.1. Health Services Model

The health service model developed by Kohn and White (1976[1]) stands for the macro level of health services systems within which the health care process occurs will determine the magnitudes of the probabilities (Figure 2.1), since the structure and supply of services, as well as the philosophies underlying a given health services system, regulate the individual's use of them. Although the social objectives of health services systems are rarely precisely articulated, their domains are at least crudely indentifiable. If these boundaries differ within and among nations and cultures, one would expect that under one system people with particular disorders might seek care from personnel within a formal health services framework, while under another system similar disorders might be taken to other social institutions. Likewise, the functional division of labour within a health

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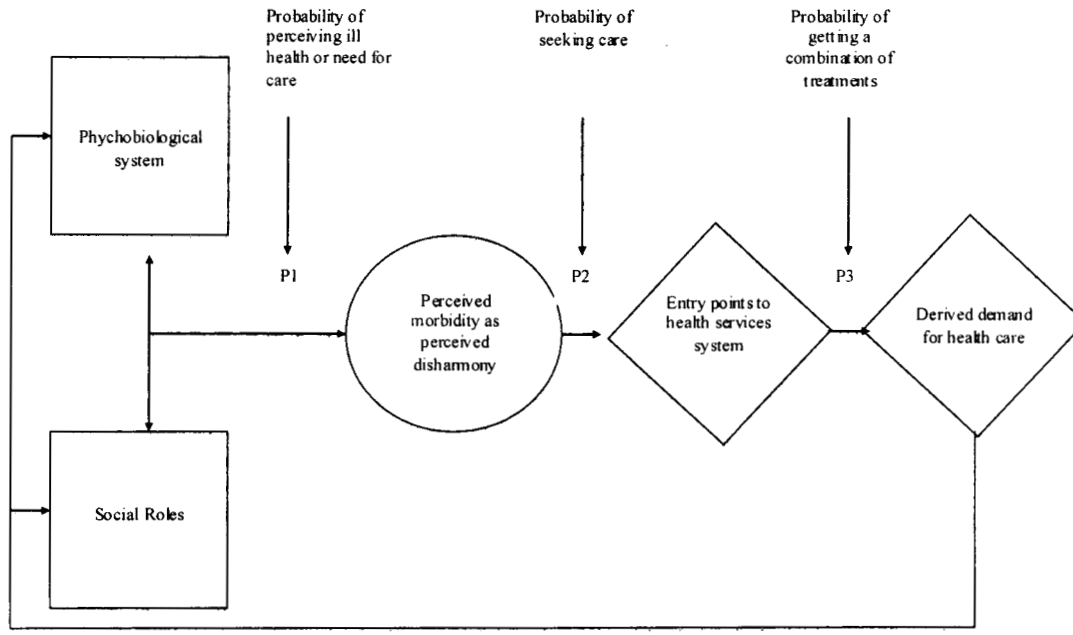
[1] Robert Kohn and Kerr L. White *(1976). Health Care: An International Study,* Oxford University Press, New York.

services system specifies domains for each of its components, such as categories of manpower and facilities, thereby defining conventional points of entry as well as patterns of referral for particular disorders.

Fig. 2.1

Model of stages in the health care process



2.1.2 Health Behavioral model

The health behavior model was developed by Aday and Andersen in 1974[2]. This model attempted to explain variations in health services resulting from the interplay between predisposing, enabling, and need for care factors. The variables were predicted to have direct/indirect impact on the decision to delay needed medical care and on utilization.

This conceptual model was designed to take into account both: (1) the direct effects of the predisposing, enabling and need-for-care factors on physician utilization; and (2) the indirect effects of these variables on physician utilization

[2] L.A. Aday, R.A. Andersen (1974). "Framework for the study on access to medical care", *Health Service Research*; 9:208-18.

via delay behaviors attributed to perception about access to and/or attitude toward medical care.

2.1.3 The Interaction Model of Client Health Behavior (IMCHB)

The IMCHB was used to explain the interaction between health care providers and the mother's decision about whether or not to maintain health care. The components include client singularity, client-professional interaction, and client health outcomes.

2.1.4 Empowerment Theory

Empowerment theory by Koroloff and Elliot (1996)[3] stands for low-income families have difficulties accessing and continuing services and their was designed to describe the barriers to access to children's mental health care and focused on the effectiveness of the Family Associates who provided information, emotional and social support, and helped families to reduce barriers to services. This study was based on the concept of the Empowerment Theory. Empowerment was defined as a social action process for people to gain mastery over their lives and their lives of their communities (Glanz et al. 1997[4]). The family associates helped families to obtain knowledge and experience leading to an increased sense of empowerment. From this study, the barriers were lack of respite care, transportation problems, lack of recreational opportunities, lack of emotional support and difficulty paying for utilities.

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[3] M.N. Koroloff and D.J. Elliott (1996). "Linking low-income families to children's mental health services: An outcome study", *Journal of Emotional & Behavioral Disorder,*4:2-11.

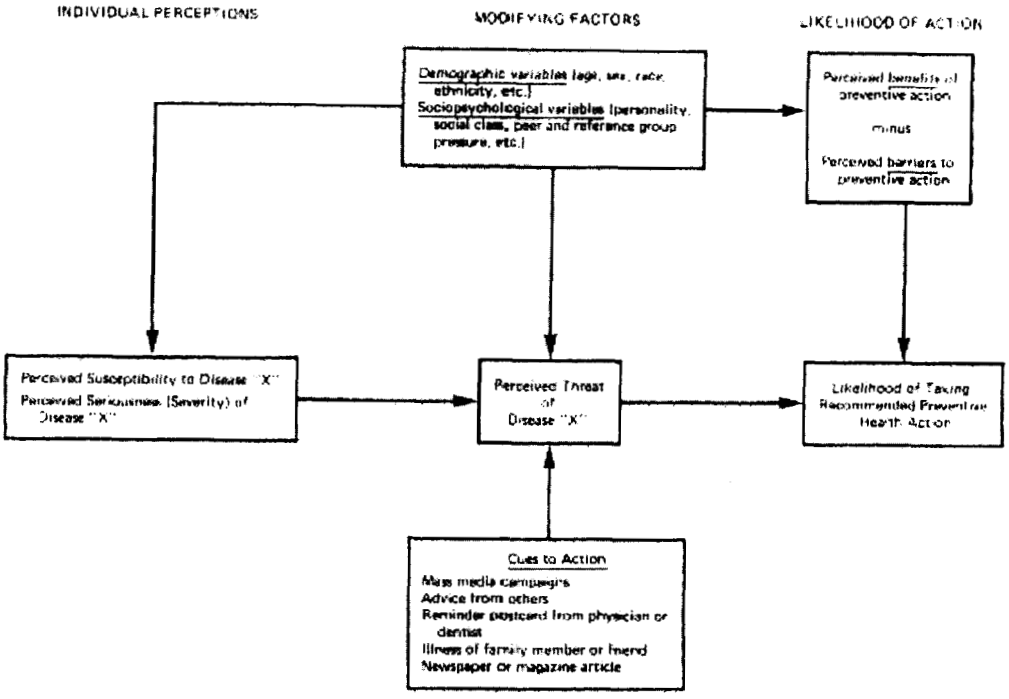
[4] K. Glanz, F.M. Lewis and B.K. Rimer (1997) *Health behavior and health education,* Jossey-Bass, San Francisco.

2.1.5 The Health Belief Model (HBM)

The HBM was defined as a value expectancy theory applied to factors that influence someone to take prevention. The components included perceived susceptibility, perceived severity, perceived benefit, perceived barrier, cue to action, self-efficacy and modifying factors (socio-demographic variables; age, sex, race, income, etc.). The Health Belief Model formulated by Rosenstock (1966)[5] contains the following elements (displayed in Figure 1) : (i) the individual's subjective state of "readiness to take action" relative to a particular health condition, determined by both the person's perceived likelihood of "susceptibility" to the particular illness, and by his or her perceptions of the probable "severity" of the consequences of contracting the disease; (ii) the individual's evaluation of the advocated health behavior in terms of its feasibility and efficaciousness (i.e., an estimate of the action's potential "benefits" in reducing susceptibility and/or severity), weighed against perceptions of physical, psychological, financial, and other costs or "barriers" involved in the proposed action; and (iii) a "cue to action" must occur to trigger the appropriate health behavior; this stimulus can be either "internal" (e.g., perception of bodily states) or "external" *(e.g.,* interpersonal interactions, mass media communications). While it is assumed that diverse demographic, personality, structural, and social factors can, in any given instance, affect an individual's health motivations and perceptions, these variables are not seen as directly causal of compliance.

[5] I.M. Rosenstock (1966). *Why people use health services.* Milbank Mem. Fund Q. 44:94 .

Fig.2.2
The Health Belief Model

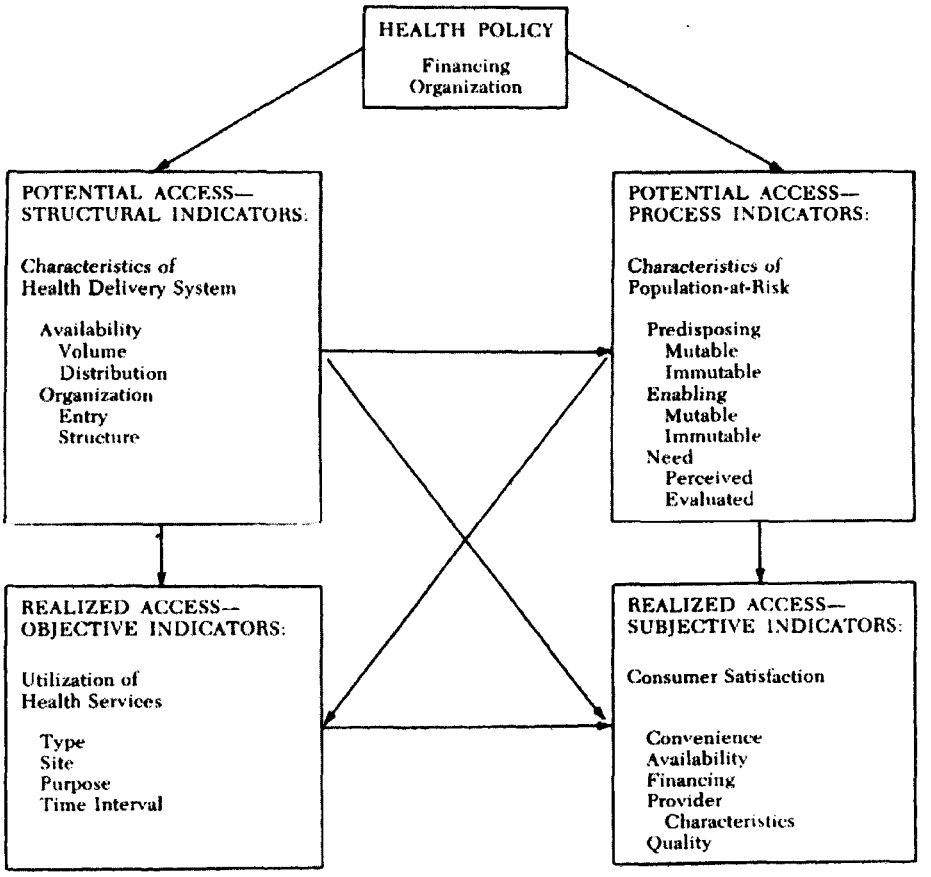


2.1.6 Equity of access model

The model of equity of access to care developed by Adey and Anderson (1981)[6] is said to exist "when services are distributed on the basis of people's need for them. Inequity is suggested, however, if services are distributed on the basis of demographic variables, such as race, family income, or place of residence, rather than need. In terms of Fig.2.3,variation in the use of services as a function of the need.component or associated age and sex correlates within the predisposing variables represent equity. Variation that is a function of the availability of services or how they are organized or other predisposing or enabling characteristics of the individuals themselves means that services are not equitably distributed.

[6] Lu Ann Aday and Ronald M. Andersen (1981). "Equity of Access to Medical Care: A Conceptual and Empirical Overview", *Medical Care*, Vol. 19, No. 12, Supplement: Access to Medical Care: Progress, Problems and Prospects. (Dec., 1981), pp. 4-27.

Fig. 2.3
Framework for study of access



Source: Aday and Anderson (1981)

These are the specific models which are relevant to our study. In the next section we are over viewing the empirical literature in international and national level related to health status and health care accessibility.

2.2 Review of literature

In this section, the review of literature related to health care is given in a thematic sections and it has been arranged chronologically.

2.2.1. Definitions on health care access

The Institute of Medicine defines access to health care as " . . . the timely use of personal health services to achieve the best possible outcomes" (Millman 1993)[7]

Health care or is the prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical, nursing, and allied health professions (Bond and Bond 1994[8]).

Access to care is defined as "the timely use of personal health services to achieve the best possible health outcomes including preventive care and ongoing care for health problems or emergencies" (Berman 2001[9]). On the other hand, lack of access to health care means people use health services and achieve worse health outcomes (Mitchel et al. 1993[10]).

Access to health care has multiple definitions and its meaning in a given context is too often assumed (Khan and Bhardwaj 1994[11]).

Uplekar and George (1994)[12] said that "conceptually speaking, access to health care would depend on availability, awareness, affordability and

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[7] M.L. Millman (1993). Access to Health Care in America. Institute of Medicine. (Ed.),Washington, DC: National Academy Pr; 1993.

[8] J. Bond and S Bond (1994). *Sociology and Healthcare*. Churchill Livingstone.

[9] J. Berman (2001). *Turning Point Initiative,* Colorado Department of Public Health and Environment, P.37, 40, 44.

[10] J.B. Mitchel, M.C. Rosenback, L.A. McCormach, A.N. McConnel (1993). *Access to Health Care,* The Robert Wood Johnson Foundation, Princeton, New Jersey.

[11] A.A. Khan and S.M. Bhardwaj (1994). "Access to Health Care: A Conceptual Framework and its relevance to Health Care Planning" *Eval Health Prof,* 17: 60-76.

accessibility to health care services". They added that determinants of access to health care are of two categories: factors concerning the users and those concerning the providers of health services.

The most basic problem is that it is both a noun referring to potential for health care use, and a verb referring to the act of using or receiving health care. This leads to confusion between ability to get care, the act of seeking care, the actual delivery of care and indicators thereof (Guagliardo 2004[13]).

A number of barriers can impede progression from potential to realized access. Potential exists when a needy population coexists in space and time with a willing and able health care delivery system. Realised care, sometimes referred to as actualized care, follows when all barriers to provision are over come (Guagliardo 2004). Penchansky and Thomas (1981)[14] have usefully grouped barriers into five dimensions: availability, accessibility, affordability, acceptability and accommodation.

Truly 'accessible' health care means the three basic things: (i) care is available: people are diagnosed and treated promptly and can obtain quality preventive care early enough to avoid illness or complications. Services are offered within a reasonable distance from where people live; (ii) care is appropriate: the right mix of health care professionals exists to attend to people's most frequent needs. Cultural and linguistic barriers are addressed in such a way that patients get proper diagnoses and can communicate effectively with their providers, (iii) care is affordable: Basic health insurance coverage is provided for

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[12] Mukund Uplekar and Alex George (1994). *Access to Health Care in India: Present Situation and Innovative Approaches*, Studies on Human Development in India, The Foundation for Research in Community Health, Bombay.

[13] Mark F. Guagliardo (2004). "Spatial Accessibility of Primary Care: Concepts, Methods and Challenges", *International Journal of Health Geographics*, 3:3.

[14] R. Penchansky and J.W. Thomas (1981). "The concept of access", *Med Care*, 19 (2): 127-140.

all. Additional out of pocket costs are adjusted for those with low incomes (National Policy Consensus Centre 2004[15]).

Accessibility is the ease with which health services are reached. Access can be physical, financial or physiological and requires that health services are *a priori* available (Kelly and Hurst 2006[16]).

The factors of accessibility are grouped into three groups (i) availability (ii) acceptability and affordability (socio economic – ethnicity, religion; gender, age; caste) and (iii) geography (Penchansky and Thomas 1981[17]; Oliver and Mossialos 2004[18])

2.2.2 Geographical aspects of health care access

Chambers (1982)[19] argued that in many tropical environments, the wet season is the most crucial time of year, especially for the poor people, women and children. Commonly at that time malnutrition, morbidity and mortality peak; the costs of sickness are at their highest; sickness is most liable to make poor people permanently poorer; and health services are likely to be at their least effective.

Udupa (1991)[20] observed that in Varanasi district of Uttar Pradesh, awareness about the Primary Health Centre declined as the distance between PHC

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[15] National Policy Consensus Centre (2004). *Improving Health Care Access: Finding Solutions in a Time of Crisis: Collaborative Problem Solving for States and Communities,* Portland.

[16] Edward Kelly and Jeremy Hurst (2006). *Health Care Indicators Project: Conceptual Framework Paper,* OECED Health Working Papers No.23, OECD.

[17] R. Penchansky and J.W. Thomas (1981). "The concept of access", *Med Care*, 19 (2), pp.127-140.

[18] A. Oliver and E. Mossialos (2004). "Equity of access to health care: Outlining the foundations for action", *Journal of Epidemiol Community Health,* 55, pp. 655-658.

[19] R. Chambers (1982). "Health, agriculture and rural poverty: Why seasons matters?", *The Journal of Development Studies, 18(2).*

[20] K.N. Udupa (1991). *A Final Report of Operations Research in Delivery of Primary Health Care in Varanasi District,* Institute of Medical Sciences, BHU, Varanasi, p.7.

and the respondent's village increased. The decline in awareness as the distance increase was due to the poor outreach of PHCs and subcentres.

Visaria and Gumber (1996)[21] analysed utilisation of health services by using survey data of 13,600 households from Gujarat. They found out the problem of physical access to various services in rural areas of the country. According to their opinion, the better-educated mother and adult female relatives would be able to ensure greater care in this respect than their less educated or illiterate sisters. They found out that the level of immunization is higher among scheduled caste and tribe households and the immunization level is positively associated with the educational level of the adult female in the household.

Yadav *et al.* (1999)[22] presented geographical information system which could be extremely useful in public health for analysing spatial and non-spatial data. The GIS helps in indicating longitudinal trends, mapping population at risk, stratifying risk factors, planning and targeting interventions, forecasting epidemics, monitoring diseases and interventions over time, determining geographical distribution and vaccination of diseases.

Khan *et al.* (2001)[23] illustrated a method of planning the geographic distribution of health facilities in order to maximise the social benefits achievable from the investment in Bangladesh costs incurred by households, including the costs associated with maternal morbidity, tend to increase with increasing radius

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[21] Pravin Visaria and Anil Gumber (1996). "Socio-economic differentials n patterns of health care access and utilization", *In* Monica Das Gupta, Lincoln C. Chen and T.N. Krishnan (Ed.), *Health, Poverty and Development in India,* Oxford University Press, Delhi.

[22] S.K. Yadav, M. Bhattacharya and M.C. Kapilashrami (1999). "Geographical information systems – A potential tool for planning and management in health care", *Health and Population*, 22(1&2):51-58.

[23] M.M. Khan, D. Ali, D. Ferdousy and A. Al-Mamun (2001). "A cost minimisation approach to planning the geographical distribution of health services", *Health Policy and Planning*, 19(3):264-272.

of a facilities catchments area. The average facility based costs tend to decline with increasing radius due to lower per capita capital expenditure.

Black et al. (2004)[24] developed the methods and models for measuring physical accessibility to health care using several layers of information integrated in a GIS. The results of those methods were used for cost effectiveness analysis, population coverage estimates as well as for resource planning within countries. They also discussed the benefits for better health planning and policy development through the use of those methods before describing potential improvements to the models in the future.

Guagliardo (2004)[25] explained basic concepts and measurements of access, provides some historical background, outlines the major questions concerning geographic accessibility of primary care and described recent developments in GIS and spatial analysis. He presented different measurements of geographical accessibility like provider-to-population ratio, travel impedance to nearest provider, average travel impedance to provider. He has also presented gravity model in measuring health care access.

Levesque (2005)[26] was of the opinion that his study represents the first assessment of access to health care in urban Kerala using the NSSO database. He used multi level logistic regressions (with binomial link function) to use model utilisation (vs. non-utilisation) of health care services among those reporting an illness episode and utilisation of private (vs.public) providers as source of care.

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[24] Michael Black, Steev Ebener, Patricia Najera Aguilar, Manuel Vidaurre and Zine Elmorjani (2004). *Using GIS to Measure Physical Accessibility to Health Care,* Paper presented during 2004 International Health Users Conference, Washington D.C.

[25] Mark F. Guagliardo (2004). "Spatial Accessibility of Primary Care: Concepts, Methods and Challenges", *International Journal of Health Geographics,* 3:3.

[26] Jean-Frederic Levesque (2005), *Deconstructing access to health care in urban south India: Multilevel methodologies to assess the impact of community characteristics on utilization of health services,* Working Paper, IGIRD (www.igird.ac.in/whatsnew/csh/Jean-Fredric.doc)

Multinominal regression (with multinominal link function) was used to model source of hospital care using three response categories variable developed. It is said that it is the first multi level assessment of health care utilisation in the Indian context and this method was increasingly used in studies where lower level units are nested into higher units because of sampling design, or because of naturally occurring clustering.

2.2.3 Economic status and Inequality in health care

Mencher (1980)[27] questioned greater social equity as a factor contributing to fertility decline in Kerala. She suggested that political awareness helped the rural poor attain greater access to health care. According to Mencher, the main reason why the rural poor (agricultural labourers) in Kerala prefer to have fewer children when compared with rest of India is that it is no longer economically advantageous to have children.

Townsend (1990)[28] criticised the findings of Black Report that for nearly all adult male and female age groups in Britain, inequalities in morality between occupational class groups have widened during recent decades. This article seeks to refute one of the cities, using data published during the 1980's , and goes on to point out that if, as the Black Report also argued, material deprivation is the predominant scientific explanation for inequalities in mortality, then it is widening living standards between classes that we must examine to understand the trend.

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[27] J. Mencher (1980). "The lessons and non-lessons of Kerala: Agriculture labourers and poverty", *Economic and Political Weekly,* 15(41-43)1781-1802.

[28] P. Townsend (1990). "Widening inequalities of health in Britain: A rejoinder to Rudolph Kuen", *International Journal of Health Services,* 20(3):363-372.

Kannan *et al.* (1991)[29] conducted a study on rural Kerala regarding the linkage between socio-economic status and health status, based on the data surveyed in 1987. Their study was based on two status groups; one is socio-economic status (SES) and the other is Environmental status (ENS). In their judgment, the high rate of morbidity in Kerala is a manifestation of its continued economic backwardness and the poverty of the masses. This study is criticized on the ground that it completely ignores the occupational structure of the household and give less importance to caste while occupation and caste play an important role in accessing the health care opportunities.

Wagstaff et al. (1991)[30] offered a critical appraisal of the various methods employed to date to measure inequalities in health. By analysing five inequalities measurement in health, i.e., range, Lorenz curve and Gini coefficient, Pseudo Lorenz curve, index of dissimilarity, the slope and relative indices of inequality and the concentration index, they have found out that the two of them are – the slope index of inequality and the concentration index – were likely an accurate picture of socio economic inequalities in health.

Kutty *et al.* (1993)[31] analyse birth and death rates as calculated from sample of 9940 households (57665 persons) with respect to other variables such as region, religion and socio-economic status. In order to study the effect of socio-economic factors on birth and death rates, a socio-economic status rating (SES rating) was developed, taking into account such factors as income, education,

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[29] K.P. Kannan, K.R. Thankappan, V. Raman Kutty and K.P. Aravindan (1991). *Health and Development in Rural Kerala*, Integrated Rural Technology Centre of the Kerala, Sastra Sahitya Parishad.

[30] Adam Wagstaff, Pierella Paci and Eddy van Doorslaer (1991). "On the measurement of inequalities in health", *Social Science Medicine,* 33 (5).

[31] V. Raman Kutty, K.R. Thankappan, K.P. Kannan and K.P. Aravindan (1993). "How Socio Economic status affects birth and death rates in rural Kerala, India", *Results of a Health Study,* Sree Chitra Tirunal Institute for Medical Seminars and Technology, Thiruvananthapuram.

housing conditions and land ownership. SES was found to have a definite influence on birth and death rates, with higher socio-economic status resulting in lower birth and death rates. This effect was independent of such confounding variables as age structure of the population, religion and region. The higher risk of mortality among the poorer households can partly be explained by their material deprivation; the higher birth rates explained by the material deprivation and the higher birth rates could be result of poorer educational attainments.

Reddy and Selvaraju (1994)[32] estimated the size and composition of health care expenditure by government and examined the trends in health care expenditure. They also presented the inter-state variations in health care expenditure and examined the linkages between plan and non-plan expenditure. Based on a simple regression technique, it had been seen that priorities had little effect on health status barring the fact that curative services had a significant impact on health status and they also found out by using a multiple regression that health expenditure did affect health status but not so significantly.

Ravindran (1996)[33] attempted to draw attention to the consequences of material and social deprivation on the health of a scheduled caste population through an examination of the health status of the most vulnerable population sub-group, namely children under the age of five years. Environmental factors – both social and physical – are known to play a greater role in child health after the period of infancy, when a baby has been weaned, and was more exposed to sources of infection due to change in food take and greater physical mobility. Her study confirmed the fact that the scheduled caste population, both infant mortality

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[32] K.N. Reddy and V. Selvaraju (1994). *Health Care Expenditure by Government of India: 1974-75 to 1990-91,* Seven Hills Publications, New Delhi.

[33] T.R. Sundari Ravindran (1996). "Social inequality and child health status: A study of a scheduled caste population", *In* Monica Das Gupta, Lincoln C. Chen and T.N. Krishnan (Ed.), *Health, Poverty and Development in India,* Oxford University Press, Delhi.

rates and probability of dying before the age of five are higher than for the general rural population, as indicated by comparable rates for rural Tamil Nadu.

Krieger and Fe (1996)[34] focussed on the paid from 1900 to 1950 and examine how public health researchers and agencies conceptualised and analysed socio-economic inequalities in health in US. This rich history can help inform current debate about collecting and evaluating data on social inequalities in health.

Borell *et al.* (1999)[35] described social class inequalities in health status and use of services, both curative and preventive in Barcelona, in a country with a National Health Service. Their findings are sufficient to defend the understanding of equitable health policies especially in providing access to preventive care for the entire population.

Krieger (1999)[36] reviewed definitions and patterns of discrimination within the United States and evaluates analytic strategies and instruments researchers have developed to study health effects of different kinds of discrimination.

Kunhikannan and Aravindan (2000)[37] tried to link the socio-economic and the health status of the State and found out that an inverse relationship between the rate of mortality and socio-economic status was noted. The study was an comparison with the KSSP survey done in 1987 and one of the chief objectives of this study was the comparison of morbidity and health expenditure with the 1987

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[34]N. Krieger and E. Fe (1996), Measuring social inequalities in health in US. This rich history can help inform current debates about collecting and evaluating data on social inequalities in health.

[35] C. Borell, I. Rohlfs, J. Fernando, I.M. Pasarin, F. Dominguez-Berjon and A. Plasencia (1999). "Social inequalities in perceived health and the use of health services in a Southern European urban area", *International Journal of Health Services,* 29(4):743-764.

[36] N. Krieger (1999). "Embodying inequality: A review of concepts, measures and methods for studying health consequences of discrimination", *International Journal of Health Services,* 29(2):215-226.

[37] T.P. Kunhikannan and K.P. Aravindan (2000). *Changes in the Health Status of Kerala 1987-1997,* Discussion Paper No.20, Kerala Research Programme on Local Level Development, Centre for Development Studies, Thiruvananthapuram.

findings. The figures for total morbidity in their study and the proportions of acute and chronic diseases highlighted a significant change of the emergence of non-communicable diseases as the important public health problem. The reasons for this phenomena were the changing lifestyle, increasing life expectancy, better access to health care and socio-economic changes. The period under study they saw a pronounced increase in per capita medical expenditure constituting a 'mediflation' with the irony that it happened during a period of remarkable decline n morbidity.

Starfield (2001)[38] presented a working definition of equity in health and health services, a conceptual framework in which to view the various types of influence on health and distribution of health in population.

Dilip (2002)[39], using 52nd NSSO Round data, examined the prevalence of ailments and hospitalisation in Kerala. Using multivariate analysis of logistic regression, he found that age and seasonality had considerable effects on the morbidity of individuals and the burden of ill health was higher in rural areas than in urban areas. He opined that people who were more likely to have a better lifestyle had a higher level of morbidity and hospitalisation and factors like physical accessibility of health care services and capacity to seek health care services could create artificial differences in morbidity and hospitalisation among different subgroups of the population in Kerala.

Using 1996 National Sample Survey data, Borah (2006)[40] found that price and distance to a health facility play significant roles in health care provider choice decision. However, when the health status is poor, distance plays a less

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[38] B. Starfield B (2001). "Improving equity in health: A research agenda", *International Journal of Health Services,* 31(3):545-566.

[39] T.R. Dilip (2002), 'Understanding levels of morbidity and hospitalization in Kerala, India', *Bulletin of the World Health Organization,* 80 (9).

[40] Bijan Jyoti Borah (2006). "A mixed logit model of health care provider choice: Analysis of NSS data for rural India", *Health Economics,* 15 (6).

significant role in a adult individual's provider choice decision. Price elasticity of demand for outpatient care is higher for people in the lower income groups than those in the higher income groups. Moreover, outpatient care for children is more price sensitive than that for adults, which is perhaps reflective of the socio-economic structure of a typical household in rural India where an adult's health is more important than that of a child for the household's economic sustenance.

2.2.3 Gender aspects of health care

Fox and Storms (1981)[41] posited that sex is a significant predictor of satisfaction with health care services through its influence is not always consistent.

Nag (1983)[42] attributes the decline in death rates to increased availability of health care and its utilisation, which is made possible by greater female literacy. He also suggested that the greater decline of fertility in Kerala when compared with rest of India is associated with greater equity in education and health rather than in income and assets

Bhattacharjee (1981)[43] argued that in developed countries, the females have chances of surviving right from childhood to old age. But in India, the females are suffering from relatively bad mortality condition as compared to males and the major possible reason for this is the poor nutrition, housing and sanitary conditions and in adequate medical facilities.

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[41] J.G. Fox and D.M. Storms (1981). "A different approach to sociodemographic predictors of satisfaction with health care", *Social Science and Medicine,* 15A (3):557-564.

[42] M.Nag (1983). "Impact of social development and economic development on mortality: Comparative study of Kerala and West Bengal", *Economic and Political Weekly,* 18(19-21):877-900.

[43] P.J. Bhattacharjee (1981). "Sex differentials in mortality and available medical faculties in India", *Artha Vijnana,* 23(2):182-190.

Caldwell (1984)[44] links mortality decline in Kerala with socio-economic indicators such as women's education and gives emphasis on decision making power of women.

Singh and Kumar (1988)[45] found that gender is a weak discrimination between the satisfied and dissatisfied groups

On the neglect of women, Freeman and Maine (1993)[46] aptly point out that "a shamefully large number of girls and women die each year because of unique risk inherent in being female in a world where females are second class citizens".

Gopalakrishna and Mummalaneni (1993)[47] opined that females are more satisfied than males perhaps because of their different utilisation pattern.

Muntaner and Lynch (1999)[48] by criticising Nilkinson's model argued that an emphasis on social cohesion can be used to render communities responsible for their mortality and morbidity rates.

Bajaj (1999)[49] attempted to study the knowledge and utilisation of MCH services available to women residing in the slums of South Delhi. The findings of the field study based on 500 women selected from five slums in South Delhi indicated low utilisation of the maternal and child health services provided by the

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[44] J.C. Caldwell (1986). "The conditions of unusually low mortality: Optimum paths to health for all", *Population and Development Review* .12(2).

[45] Ratanjit Singh and Narendra Kumar (1988). "Qualitative assessment of functioning of a PHC in a tribal centre: A case study", *Journal of Family Welfare,* 35 (2): 33-41.

[46] L. Freeman and D. Maine (1993). "Women mortality: A legacy of neglect", *In* Kobilnsky *et al.* (Eds.), *The Health of Women: A Global Perspective,* West View Press, Boulder, Colo.

[47] P. Gopalakrishna and V. Mummalaneni (1993). "Influencing satisfaction for dental services", *Journal of Health Care Marketing,* 13 (4): 16-23.

[48] C. Muntaner and J. Lynch (1999). "Income inequality, social cohesion and class relations: A critique of Wilkinson's Neo-Ourkheinian Research Programme", *International Journal of Health Services,* 29(1):59-81.

[49] J. Bajaj (1999). "Knowledge and utilisation of maternal and child health services in Delhi slums", *The Journal of Family Welfare,* 45(1):44-52.

public health care system. An important reason for the non-utilisation of these services may be the lack of knowledge about these services offered by the government which may in turn be attributed to the high level of literacy and lower accessibility of those institutions providing the services. It was shocking to observe that a very large number of deliveries were being conducted at home and continued to be attended by the traditional *dais* under the most unhygienic condition.

Sivakumar (2000)[50] found out that there is a rising trend in the age at marriage of women, but a declining trend in fertility. He was the opinion that both the Hindu and Christian women have higher age at marriage and lower fertility than the Muslim women over the birth cohorts and the enhancement of social status of women played an important role in raising the age at marriage of females and ultimately reduces the fertility level of a region.

Sen (2001)[51] opined that the most immediate adversity caused by a high rate of population growth lies in the loss of freedom that women suffer when they are shackled to a life of persistent bearing and rearing of children. He concludes women's empowerment and agency are control to an effective resolution of the so called population problem, including its environmental consequences. Gender equity is not only valuable in itself, it also has far-reaching consequences on the lives of all – men, women and children. The expansion of women's empowerment, through such factors on women's education and economic independence, has an extensive consequential role in addition to its immediate relevance to gender justice.

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[50] M.N. Sivakumar (2000). "Timing of marriage and fertility in Kerala: A cohort analysis", *The Indian Journal of Social Work*, 61 (1).

[51] A. Sen (2001). "Gender equity and the population problem", *International Journal of Health Services*, 31(3): 469-474.

Sinha (2001)[52] was of the opinion that there are indications that the states of the average Indian women is rather low. For example, according to the 1991 Government of India Census, there are 927 females per 1000 males as against 972 females per 1000 in 1901. These figures suggest that women face several constraints. These constrains erode the superiority women enjoy in most societies in terms of longer life expectation.

Kumar (2001)[53] says that adolescent girls need to be considered as a special target group by schemes and development programmes. They need a package of services/facilities, which will enhance their capacity for advancement and enable them to become capable citizens. Adolescent girls health plays an important role in determining the health of future population, because adolescent health has an intergenerational effect. The cumulative impact of the low health situation of girls is reflected in the higher MMR, the incidence of low birth weight babies, high prenatal mortality and foetal wastage and consequent high fertility rates.

Das (2001)[54] focused on issues relating to fertility transition and related socio-economic variables. The observed differential in fertility between different states as determined by the cluster-cum-discrinant analysis, by suing district level data, clearly establishes the link between fertility change and social backwardness of women, especially in respect of female education and age at marriage. The economic variables on the other hand, are found to be less important for the existing fertility differential between states. The findings suggest that the threshold of female literacy for a faster fertility dielima in India is about 43 per

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[52] S. Sinha (2001). "Gender inequality in India", *In* Yuan Y J, Kabir M, Prasad K, Sivaraju S, Bourdier F, Pillai V K, Junquing W and Kumar V K R (Eds.), *Health Strategies and Population Regulation,*

[53] A. Kumar (2001). "Poverty and adolescent girl health", *Yojana,* Vol.45. September. P.30.

[54] A. Das (2001), "Fertility transition and threshold estimation: A district level analysis in India", *Journal of Social and Economic Development*, 3(2).

cent; once that level is achieved, fertility rate will decline faster towards the stability of the population.

By using data from the National Family Hesalth Survey, Dilip (2002)[55] found out that a majority of women were found to prefer treatment from the private medical service providers if their children were suffering from fever or cough. Class differentials were severe, with the public sector being the major provider of RCH care services for the poorer sections of the society. People with a higher potential to pay preferred the private sector irrespective of the nature of service they required.

2.2.4 Economic status and inequality of health care

Pauly (1986)[56] opined that tax subsidies to health insurance are a major cause of the behaviour in the medical care industry, behaviour that many feel to be inefficient.

Santana (1987)[57] said that the health care system in Cuba has rightfully taken a share of the credit. Health services have evolved in stages corresponding to changing health needs and population pressures. He examines the reasons for this latest reorganisation of health services and the mechanism that have made it possible.

Kaplan (1996)[58] said while a substantial body of evidence demonstrates a strong association between socio-economic variables and health outcomes, most analysis conceptualise socio-economic status as an individual characteristic. He

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[55] T.R. Dilip (2002). "Utilisation of reproductive and child health care services: Some observations from Kerala", *Journal of Health Management*, 4 (19).

[56] M.V. Pauly (1986). "Taxation, health insurance and market failure in the medical economy", *Journal of Economic Literature*, 24(2).

[57] S.M. Santana (1987). "The Cuban health care system: Responsiveness to changing population needs and demands", *World Development*, 15(1).

[58] G.A. Kaplan (1996). "People and places: Contrasting perceptiveness on the association between social class and health", *International Journal of Health Services*, 26(3):507-519.

argues for an expanded view that focuses on the relationship between social class and characteristics of the neighbourhood and communities in which people live, and illustrate how these characteristics can provide some new directions for research relating class and health. They indicate that socio-environmental characteristics of individuals, and that personal and socio-environmental risk factors cluster together in areas of low income and high mortality.

Wilkinson (1999)[59] suggested that social cohesion is indicative of underlying psychosocial risk factors that re known to be closely associated with health. Given that social status and social affiliation, in terms of population - attributable risks, are among the most powerful influences on population health in the developed world, that is a potentially potent mixture for health.

George *et al.* (1993)[60] tried to estimate the expenditure of households on health as a proportion of total consumption expenditure in the study related to the household health expenditure in Madhya Pradesh and find that the acute prevalence rate was 162.16/ 1000, and the chronic prevalence rate 128.33 / 1000. Acute morbidity was found to be high in the urban areas, whereas chronic and handicapped morbidity was high in the rural areas. It seemed to indicate that the definition of morbidity was influenced by the seriousness of illness and the accessibility to health facilities.

Sodani and Gupta (2001)[61] provided insight into the healthcare expenditure and utilisation to elicit information on patterns of household expenditure on government and private sources of treatment in both rural and urban segments of

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[59] R.G. Wilkinson (1999). "Income inequality, social cohesion and health: Classifying the theory – A reply to Muntaner and Lynch", *International Journal of Health Services*, 29(3):525-543.

[60] Alex George, Ila Shah and Sunil Nandraj (1993). *A Study of Household Health Expenditure in Madhya Pradesh*, Foundation for Research in Community Health (FRCH), Bombay.

[61] P.R. Sodani and S.D. Gupta (2001). "Household health care expenditure in tribal areas of Rajastan", *The Asian Economic Review*, 43(1).

the tribal areas of Rajastan. Their study reveals that a high dependence (50%) on the traditional practioners in the rural areas and also reveals that rural people have significantly higher burden of almost all components of indirect expenses for treatment.

Siddiqui and Hertzman (2001)[62] argued that the 'Tiger' economies of Southeast Asia provide examples of developing nations where economic growth and increasing income equality are competable and when occurring together, are associated with superior health trends over time.

2.2.5 Policy aspects of health care

Panikar (1979)[63] found out that Kerala's achievement in the health field became all the more significant and relevant to low income countries when viewed against the facts that the level of per capita income, per capita expenditure on health and medical infrastructure measures in terms of bed-population ratio, doctor-population ratio, etc. were actually lower in Kerala than in some of the other states. The reasons for the better health status of Kerala lies in the state having given equal importance to preventive and promotive measures like sanitation, hygiene, immunisation programmes, infant and ante-natal care, health education, etc, as to curative medicine. Moreover, the spread of education, especially among women in the rural parts of Kerala, was a crucial factor contributing to the high degree of awareness of health problems and fuller utilisation of available health care facilities.

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[62] A. Siddiqi and C. Hertzman (2001). "Economic growth, income equality and population health among the Asian tigers", *International Journal of Health Services,* 31(2):323-333.

[63] P.G.K. Panikar (1979). "Resources not the constraint on health improvement: A case study of Kerala", *Economic and Political Weekly,* November 3.

Raju (1989)[64] refered to the concept of Primary Health Care, evolved at Alma Ata Conference in 1978 and suggests that conducting of comprehensive evaluation studies is quite necessary in order to assess the performance of the 'Health for all by 2000 AD'. Programme after completion of the first decade of it. The author also feels the need for coordination between government and non-government health sectors, so that the fruits of health care programme may reach all and sundry in the country.

Soman *et al.* (1990)[65] have conducted a study of two areas in Thiruvananthapuram city and found out the high morbidity with common symptoms predominating in under 3 children, with a significant gradient between the slum area and socio-economically better area. They have found that policies in respect of certain non-health sectors did have a positive impact on the health status.

Franke *et al.* (1993)[66] identified several roles for the public sector including acceptable and accessible health care to the population that is not covered by the private health services especially in the poor rural areas where about 70 per cent of all African live and ensuring standard of care that is compatible with the resources available and provides a balanced system of preventive, promotive, curative and rehabilitative care.

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[64] S. Siva Raju (1989). "Evaluating 'Health for all by 2000 A.D'". *Yojana.* 33 (8).

[65] C.K. Soman, Malathi Damodaran, S. Rajasree, V. Raman Kutty and K.Vijayakumar (1991). "High morbidity and low mortality: The experience of urban preschool children in Kerala". *Journal of Tropical Pediatrics.* February.

[66] J. Franke, E. Lambo, H.W. Mosley and U. Reinhardt (1993). "The health of the Public: A public responsibility? Round Table Discussion", Proceedings of the World Bank annual conference on Development Economics, 1992, supplement to the *World Bank Economic Review* and *The World Bank Research Observer.*

Kabir and Krishnan (1996)[67] analysed the historical evolution of Kerala's health transformation, apart from reinforcing the known findings, has demonstrated how important were social policies and programmes, without which the health transition would not have taken place. They were of the opinion that the Kerala experience also demonstrated that demand creation and 'right to access' are as important as the expansion in health care for health transition. According to them, the expansion of public activities and measures will not only be a most cost-effective health measure in the long run, but would also go a long way as an anti-poverty measure.

Hammer (1997)[68] said that a health project evaluation should establish a firm jurisdiction for public involvement; establish the counterfactual – what would happen with and without the project; and determine the fiscal effect of the project and the appropriate levels of fees in conjunction with project evaluation.

Countries especially developing countries can significantly improve the health care means by setting the existing conditions. Misra (1999)[69] stressed the need for voluntarism in health and family planning practices that are culture compitable and sensitive to the ground realities of the specific localities and through community-accepted change agents. According to various case studies, he said that the main reason for the low utilisation of health and family welfare measures is the complete reliance on the traditional system, coupled with ignorance of and inaccessibility to the formal system. He also makes a strong case for voluntarism in effecting social changes in health and family welfare. But

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[67] M. Kabir and T.N. Krishnan (1996). "Social intermediation and health change: Lessons from Kerala", *In* Monica Das Gupta, Lincoln C. Chen and T.N. Krishnan (Ed.), *Health, Poverty and Development in India,* Oxford University Press, Delhi.

[68] J.S. Hammer (1997). "Economic analysis for health projects", *Research Observer,* 12(1).

[69] S. Misra (Ed.) (1999). *Voluntary Action in Health and Population: The Dynamics of Social Transition*, Sage Publications, New Delhi.

in the light of public outbursts in some parts of the country against certain voluntary agencies, this needs to be reconsidered.

Nayar (2001)[70] considered the implementation of people's planning has been considered as a panacea for overcoming the collapse of the heath service system and to counter the new agenda in public health.

Sebastian (2001)[71] was of the opinion that withdrawal of subsidies and credit facilities as part of Structural Adjustment Programmes have further affected the food production levels and therefore nutritional standards of households in the regions have suffered.

Navarro and Shi (2001)[72] tried to reflect the importance of political parties and the policies they implement in determining the level of equalities/inequalities in a society, the extent of the welfare state (including the level of health care coverage by the state) the employment/unemployment rate and the level of population health. The study looks at the impact of the major political tradition in the advanced OECD countries during the golden years of capitalism. The results indicate that political traditions more commited to redistributive policies (both economic and social) and full employment policies such as the social democratic parities, were generally more successful in improving the health of population. the world today.

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[70] K.R. Nayar (2001). "Politics of decentralization: Lesson from Kerala", ", *In* Imrana Qadeer, Kasturi Sen and K.R. Nayar (Ed.), *Public Health and the Poverty of Reforms: The South Asian Predicament*, Sage Publications, New Delhi.

[71] K.S. Sebastian (2001). "Public health issues of small towns: The case of Alleppey", ", *In* Imrana Qadeer, Kasturi Sen and K.R. Nayar (Ed.), *Public Health and the Poverty of Reforms: The South Asian Predicament*, Sage Publications, New Delhi.

[72] V. Navarro and L. Shi (2001). "The political context of social inequalities and health", *International Journal of Health Services*, 31(1):1-21.

Wikramsinghe (2001)[73] opines the major criticism of the liberalised economic regime is that it tends to make the poor and the disadvantaged economically weaker. One way of strengthening these groups is by introducing a compulsory national health scheme and makes these groups part of the system by the state bearing the burden of payment of premium of these groups and this system will keep those groups within the main stream without distorting the system.

Yang *et al.* (2001)[74] showed that the health care consumption of Korean households has been adversely affected by the recent economic crisis as measured by the amount of expenditure on health. Analysis show that for all households, the rate of expenditure decrease in relatively higher for drug expenditure than for expenditure on medical services. That is, facing delivering income, people cut their spending in area where the need is non-essential or less inevitable.

Sankar (2001)[75] opined that the integration of conventional, non-conventional and traditional systems of medicine facilitates better access to health care. But the lack of government initiative promoted private action in their provision, which could make them more costlier. She advocated that with careful planning and collaboration aong different levels of the health sector, a partnership can be built which in response to public demand, creates a pluralistic health care environment based on quality in health care and on the provision of services which complement one another.

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[73] J.W. Wikramasinghe (2001). "National Health Insurance Scheme for a developing country with special reference to Sri Lanka", *The Asian Economic Review,* 43(1).

[74] B. Yang, N. Prescott and E. Bac (2001). "The impact of economic crisis on health care consumption in Korea", *Health Policy and Planning,* 16(4):372-385.

[75] Deepa Sankar (2001). *The Role of Traditional and Alternative systems in Providing Health Care Options,* Discussion Paper Series No.38/2001, Institute of Economic Growth, University of Delhi Enclave, North Campus, Delhi.

Kutty (2001)[76] opined that the proposition that there cannot be expansion in public spending in health was not necessarily correct and the planned remedies such as user charges, will undermine the very foundation of the health care network in Kerala, which is based on a premise of universal access and further he advocated alternative policy instruments which can lead to greater resource mobilisation as well as efficiency in resource use in health.

By using a detailed review of Kerala's health status, Michael and Singh (2003)[77]argued the rapid improvements that have occurred simultaneously in public education are more likely to example an increase in the effective reporting of disease conditions. Their study underlined the link between achieving a sustained enhancement in health promotion and the coincidence of community support.

Varatharajan et al. (2004)[78] brought out the importance of decentralisation of health care sector and said that Kerala's government health care system functioned relatively well compared with other Indian states, but utilisation levels are decreasing due to lack of essential facilities. The opportunity cost of seeking medical care from the government sector was high, even for the poor. The authors argued that decentralisation brought no significant change to the health sector, but wherever the active panchayat support was given, the result was positive.

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[76] V. Raman Kutty (2001). "Reforms and their relevance: The Kerala experience", *In* Imrana Qadeer, Kasturi Sen and K.R. Nayar (Ed.), *Public Health and the Poverty of Reforms: The South Asian Predicament*, Sage Publications, New Delhi.

[77] E.J. Michael and B. Singh (2003). "Mixed signals from Kerala's improving health status", *The Journal of the Royal Society for the Promotion of Health*, 123 (1).

[78] D. Varatharajan, R. Thankappan and Sabeena Jayapalan (2004). "Assessing the performance of primary health centres under decentralized government in Kerala, India", *Health Policy and Planning*, 19 (1).

Gupta (2005)[79] said that the poor pay a high price in terms of debility, reduced earning capacity, health expenditures and death. The rich suffer little mortality from communicable diseases, but neverthelessness suffer repeated episodes of morbidity which are reflected in high rates of stunting amongst their children. In India, public policies and programmes have focused largely on the provision of curative care and personal prophylactic interventions such as immunisation, while public health activities have been relatively neglected.

Levesque (2005)[80] was of the opinion that his study represents the first assessment of access to health care in urban Kerala using the NSSO database. He used multi level logistic regressions (with binomial link function) to use model utilisation (vs. non-utilisation) of health care services among those reporting an illness episode and utilisation of private (vs.public) providers as source of care. Multinominal regression (with multinominal link function) was used to model source of hospital care using three response categories variable developed. It is said that it is the first multi level assessment of health care utilisation in the Indian context and this method was increasingly used in studies where lower level units are nested into higher units because of sampling design, or because of naturally occurring clustering.

Sankaranarayanan (2005)[81] opined that contaminated water supply, polluted environment, water logging, lack of cleanliness in public places and other related issues are not properly addressed and effective remedial action is lacking in

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[79] Monica Das Gupta (2005). "Public health in India: Dangerous Neglect", *Economic and Political Weekly,* XL (49).

[80] Jean-Frederic Levesque (2005), *Deconstructing access to health care in urban south India: Multilevel methodologies to assess the impact of community characteristics on utilization of health services,* Working Paper, IGIRD (www.igird.ac.in/whatsnew/csh/Jean-Fredric.doc)

[81] K.C. Sankaranarayanan (2005), "Education, health and housing", *In* D. Rajasenan and Gerald de Groot (Ed.), *Kerala Economy: Trajectories, Challenges and Implications*, Department of Applied Economics, CUSAT, Cochin.

all these areas in Kerala. Though the proportion of population in the state with access to protected water supply has been increasing, a substantial portion of the population remains to be covered. Government hospitals charges have become beyond the reach of common man. Patients are charged on several counts such as nursing charges, treatment charges, service charges and professional charges apart from medicines. The net result has been the exclusion of the marginalized and vulnerable sections of the community from enjoying medical care facilities. This is expected to produce irreparable damages in health care system of the state

Levesque et al. (2006)[82] confirmed high utilisation of private outpatient care in Kerala and suggested problems of access for the poorest. Using multilevel analysis of individual and urban characteristics from the NSSO 1995-96 survey data, they found that there was a high level of utilisation (83.6%) of allopathic medical services and controlling for illness severity and age, utilisation thereof was lower for the very poor, inhabitants of medium towns and inhabitants of cities with a lower proportion of permanent material houses. Their study pointed to the need for continuing improvements and development of public health systems in urban areas of developing countries, especially in medium-sized towns, as a means to promote equity.

Navaneetham et al. (2006)[83] attempted to study the patterns and determinants of morbidity in Kerala. Based on the survey data of 3320 households from three districts from Kerala, they found out that greater risk of ill health among illiterates and among the poor, which was an indicative that high level of morbidity was more real. The prevalence of communicable diseases had been

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[82] Jean-Frederic Levesque, Slim Haddad, Delampady Narayana and Pierre Fournier (2006), 'Outpatient care utilization in urban Kerala, India', Oxford University Press and The London School of Hygiene and Tropical medicine.

[83] K. Navaneetham, M. Kabir and C.S. Sivakumar (2006). "Patterns and determinants of morbidity in Kerala", Paper presented at the *International Conference on Emerging Population Issues in the Asian Pacific Region: Challenges for the 21st Century*, International Institute for Population Sciences, Mumbai, India, December 10-13.

lowered and non-communicable diseases dominated the morbidity profile in Kerala. They opined that most of the diseases warranted constant medical attention and treatment and sustained medical treatment is beyond the wherewithal of the average household. The private heath care system cannot be an answer because of the high average cost of treatment.

2.2.6 Infrastructure facilities and health care

Mathew (1979)[84] considered the factors such as the neglect of health promotion and of disease prevention, disinterest in the rural areas and common people, concentration of facilities in urban areas, excessive dependence on hospital and costly facilities, catering mainly for the privileged, lack of health education orientation towards disease, obsession with specialisation, apathy and indifference, vested interests, reluctance to change, redtapism, which were the main defects of Kerala's health care system.

Rao and Veerasekharappa (1989)[85] stated that providing safe drinking water to the rural masses is of paramount importance because this is a basic minimum need for improvement in the living standard of the rural people.

Murray and Chen (1990)[86] strengthened the case of viewing morbidity largely in terms of self-perception by carrying out cross-country comparisons that yield counterintuitive results. In a comparison between Kerala and the United States, the latter has an even higher morbidity rate than Kerala, leading apparently absurd conclusion that Americans suffer a higher illness burden than Indians or even Keralites.

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[84] K.J. Mathew (1979). "Health care in Kerala", *Social Scientist,* 8 (3).

[85] N. Rao and S. Veera (1989). "Rural community water supply system: Some observations", *Kurukshethra,* 37(9):4

[86] C.J.L. Murray and L.C. Chen (1990). "Understanding morbidity change", *Population and Development Review,* 18.

Shatrugna (1994)[87] opined that the health care system will have to reach out and get involved in understanding the social ramification of a disease.

Nagaraj and Prasad (1994)[88] analysed the influence of socio-demographic factors like maternal age, maternal education, maternal occupation, caste, number of living children, and distance of medical facility on utilisation of ante-natal care services.

Behrman (1996)[89] said that child health and nutrition are strongly associated with educational achievement. But association do not necessarily indicate causality; estimates generally are likely to be biased in one direction or the other.

Narayana and Kurup (2000)[90] discussed about the inequality in accessing the health care. They say that there is a striking regional dimension to the unequal distribution of hospital beds. The inequality in the distribution of hospitals would affect the access to a certain minimum level of secondary health care services. As regards secondary care, the concentration of hospitals and unequal distribution of hospitals across the *taluks* of the state is a given reality to be properly accounted for.

2.2.7 Education and health care

Kumar (1993)[91] found out the reasons for the higher morbidity in Kerala due to the highly literate population that has access to an extensive health

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[87] V. Shatrugna (1994). "Women and health", *The Indian Journal of Social Sciences,* 7(3,4).

[88] K. Nagaraj and R.K. Prasad (1999). "Socio demographic factors influencing ante-natal care: a community based study", *Health and Population,* 22(1$2):59-67.

[89] J.R. Behrman (1996). "The impact of health and nutrition on education", *Research Observer,* 11(1).

[90] D. Narayana and K.K. Hari Kurup (2000). *Decentralisation of the Health Care Sector in Kerala: Some Issues,* Working Paper No. 298, Centre for Development Studies, Thiruvananthapuram.

[91] B. Gopalakrishna Kumar (1993). "Low mortality and high morbidity in Kerala reconsidered", *Population and Development Review,* 19 (1).

infrastructure. The availability of medical services by itself could have an impact on perceptions of illness. Kerala's experience may simply reflect greater popular awareness of and sensitivity to the concept of freedom from illness, given the state's higher level of education and greater access to and use of modern health care facilities.

Nagaraj and Prasad (1994)[92] analysed the influence of socio-demographic factors like maternal age, maternal education, maternal occupation, caste, number of living children, and distance of medical facility on utilisation of ante-natal care services.

Sharma and Chahal (1995)[93] found that the low degree of patient satisfaction was significantly related to all factors hypothessed to be important – doctors, nurses, medical assistants, management, sanitation and cleanliness and other medical facilities. The highly educated class is least satisfied with outpatient and inpatient services. Female outpatients are more satisfied as compared to male outpatients.

Behrman (1996)[94] said that child health and nutrition are strongly associated with educational achievement. But association do not necessarily indicate causality; estimates generally are likely to be biased in one direction or the other.

Ramachandran (1996)[95] argued literacy, political awareness and political action through political parties and mass organisations were crucial for better

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[92] K. Nagaraj and R.K. Prasad (1999). "Socio demographic factors influencing ante-natal care: a community based study", *Health and Population,* 22(1$2):59-67.

[93] R.D. Sharma and Hardeep Chahal (1995). "Patient satisfaction in public health system - A case study", *The Indian Journal of Social Work,* LVI (4).

[94] J.R. Behrman (1996). "The impact of health and nutrition on education", *Research Observer,* 11(1).

[95] V.K. Ramachandran (1996). "On Kerala's development achievements", *In* Jean Dreze & Amartya Sen (Ed.), *Indian Development: Selected Regional Perspectives*, Oxford University Press, Delhi.

health conditions because they helped make people sensitive to their rights and to the duties of the State to its citizens. People demanded more health facilities in Kerala than in the rest of India and they utilized them better.

Homan and Thankappan (1999)[96] provided a description of the structure of the health care sector in Trivandrum district of Kerala state, examine patients' perception of quality, factors affecting choice of provider and evaluate the financial burden of care and conclude with a description of the challenges facing the public sector health delivery system and identify some potential responses to these challenges.

Panikar (1999)[97] said that the morbidity pattern of Kerala is a mixed one with the existence of dominant disease group comprises acute infectious diseases and the emergence of chronic diseases and he opined the reasons for the high morbidity in Kerala are the spread of education, especially female education and of medical care facilities have emerged as the most important.

2.2.8 Caste/Religion/Race and health care

Balasubramanian (1984)[98] said that religious affiliations have been found to have a significant bearing as fertility by various background variables.

Williams (1996)[99] considered the ways in which race/ethnity and socio-economic status (SES) relate to each other and combine to affect racial variations

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[96] K. Rick Homan and K.R. Thankappan (1999). *An Examination of Public and Private Sector Sources of Inpatient Care in Trivandrum District, Kerala (India),* Achuta Menon Centre for Health Services, Thiruvananthapuram.

[97] P.G.K. Panikar (1999). *Health Transition in Kerala,* Discussion Paper No. 10, Kerala Research Programme on Local Level Development, Centre for Development Studies, Thiruvananthapuram.

[98] K. Balasubramanian (1984). "Hindu –Muslim differentials in fertility and population growth in India: Role of proximate variables", *Artha Vijnana,* 26(3):189-216.

[99] D.R. Williams (1996). "Race/ethnity and socio-economic status: Measurement and methodological issues", *International Journal of Health Services,* 26(3):483-505.

in health status. He reviews a number of methodological issues concerning the assessment of race in United States that importantly affect the quality of the available data on racial differences in health.

Muntaner *et al.* (2001)[100] examined the nature of attributions for racial inequalities in health among university standards among who by definition are likely to be involved in research, policy and service profession (the upper middle class). Results suggests that contemporary middle class whites' 'self-serving' explanations for racial inequalities in health are comprised of two beliefs; implicit biologism (race is an attribute of organisms rather than a social relation) and liberal belief in self determination, choice and individual responsibility – sine of the core lay beliefs of the world view that sustains neo-liberal capitalism.

Shi *et al.* (2001)[101] examined the disparities in health status among individuals of different racial and ethnic groups cared for by the nation's Community Health Centres (CHCs) and compared these results with the findings for individuals using non-CHC sites as their usual source of care.

2.2.9 Socio-economic status and health care

Phadke *et al.* (1995)[102] found that the drug supply to the public sector in Satara District was a mere Rs. 5.6 million, as compared to the most minimum, reliable estimate of a drug sale of Rs. 212.8 m in the private sector during 1991-92. The drug supply especially to PHCs and RHs suffers from chronic gross shortages and haphazardness. The overall quality of prescriptions of doctors both

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[100] C. Muntaner and J. Lynch (1999). "Income inequality, social cohesion and class relations: A critique of Wilkinson's Neo-Ourkheinian Research Programme", *International Journal of Health Services,* 29(1):59-81.

[101] L.R.J. Shi, R. Politzer and J. Luo (2001). "Community health centres and racial/ethnic disparities in healthy life", *International Journal of Health Services,* 31(3):567-582.

[102] Anant Fernandes Audrey Phadke, L.Sharda, Pratibha Mane and Amar Jesani (1995). *A Study of Supply and use of Pharmaceuticals in Satara District. (Part 2),* Foundation for Research in Community Health (FRCH), Pune.

in public and private sector was low. There was a very high proportion of use of unnecessary, irrational, hazardous drugs and injections especially in the private sector. Public Sector prescriptions were more rational than private sector prescriptions.

Alderman and Lavy (1996)[103] described the types of services for which households indicate they are willing to pay increased fees. They also indicate the potential gains from improving these services, as well as the consequences of moving faster on cost recovery than on providing improved or better targeted services.

Desai (1997)[104] primarily focused on problems faced by people from low income families, their relationship with the family environment and its influence on health perception and behaviour.

Iyer (1997)[105] examined the relationship between demographic, socio-economic, cultural factors and prevalence of malaria, and relationship between certain vector factors and finds that Malaria was prevalent among the most illiterate. It was also more prevalent among those living in thatched/sheet houses.

Singh and Rahman (1998)[106] provided a coherent assessment of the housing conditions and the health status on the life of the poor households. They say that there is acute shortage of housing in Aligarh city both quantitatively and qualitatively. The poor household environmental condition existing in the very

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[103] H. Alderman and V. Lavy (1996). "Household responses to public health services: Cost and quality trade offs", *Research Observer,* 11(1).

[104] K.N. Desai (1997). *A Psychosocial Study of Selected Health Problems in Low Income Urban Colonies of South Delhi*, Unpublished Ph.D. Thesis Submitted to Jawaharlal Nehru University.

[105] R.H. Iyer (1997). *An Epidemiological Study on the Outbreak of Malaria in Valiyathura: A coastal area of Kerala*, M D dissertation, Dept of Community Medicine, Medical College, Thiruvananthapuram, Kerala.

[106] A.L. Singh and A. Rahman (1998). "Housing and health in the low income households of Aligarh City", *Indian Journal of Regional Science,* 30(2).

low, low and medium income households is mainly responsible for the frequent occurrence of the environmental related diseases.

Stewart (2001)[107] examined the impact of health status on the duration of unemployment spells and finds that individuals with impaired health will have significantly longer unemployment spells. These longer unemployment spells will result in the stock of unemployed being composed of a larger proportion of individuals with impaired health than the stock of employed.

Gao *et al.* (2001)[108] said that access to health care by the urban population in China has become inequitable and one of the most pressing concern is that those who have lost jobs have increasing difficulties in health care.

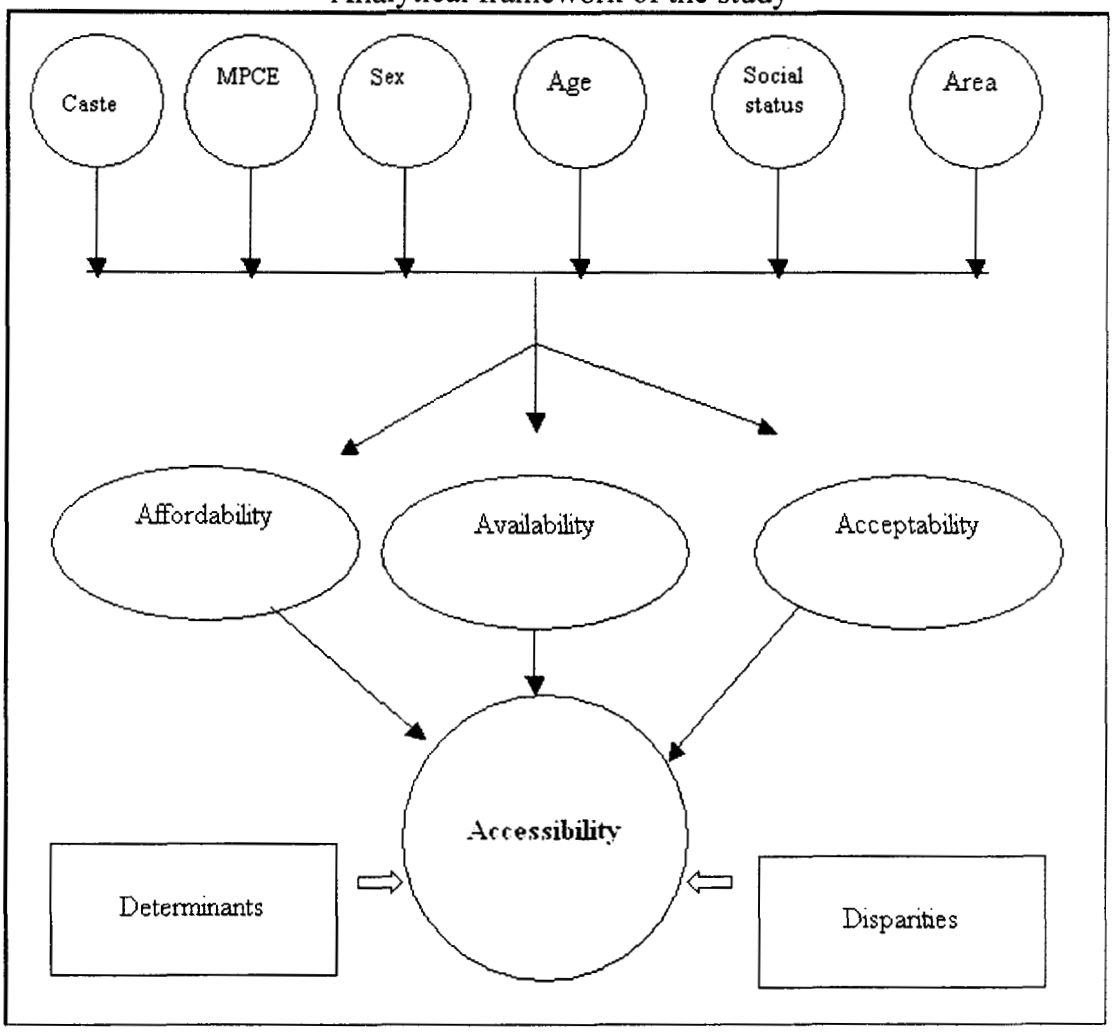
2.3 Theoretical framework

By considering the health behavioural model, empowerment theory, health belief model and equity access model and the detailed review of literature we have formulated the analytical framework on the basis of the conceptual discussion, objectives and methodology, which is shown in Fig.4.4.

[107] J.M. Stewart (2001). "The impact of health status on the duration of unemployment spells and the implications for studies of the impact of unemployment on health status", *Journal of Health Economics,* 20(5):781-796.

[108] J. Gao, S. Tang, R. Tolhurst and K. Rao (2001). "Changing access to health services in China: Implications for equity", *Health Policy and Planning,* 16(3):302-316.

Fig. 4.4
Analytical framework of the study



2.4 Conclusion

In this chapter, we have discussed theoretical models, reviewed empirical studies and developed a framework for analysis in the study. In chapters to follow, we have made detailed analysis especially the determinants and disparities of health care accessibility.

CHAPTER III
HEALTH CARE SCENARIO IN KERALA - AN OVERVIEW

"Health is wealth" goes the axiom in India and it is relevant for all countries in the world. Good health is an essential requirement for the enjoyment of every aspect of life. The organised provision of services like prevention, treatment and management of illness and the preservation of mental and physical well-being may constitute a health care system. The health sector is far from being as homogenous, predictable and amenable to measurement as other service sectors. In this chapter, health scenario of Kerala is analysed. For facilitating the comparison, global and national scenario have also been discussed.

3.1. Global Scenario

In this section, we attempt to compare the achievements of India is health scenario in relation to other countries. The objective is to get a macro picture in the global context. Over the years, India has made substantial progress in human development. However, India's overall performance on human development has been mixed in last decade[1]. Improvements in health indicators like life expectancy and infant mortality rates have been much slower than expected. There is widespread under-nutrition among women and children, and maternal and child health still remain areas of concern. UNDP measures the achievement in the human development of any country using the Human Development Index[2] (HDI). From Table 3.1 it is clear that, even though there is a marginal increase in HDI value of India from 0.577 in 2000 to 0.611 in 2004, the HDI rank has come down from 124 in 2000 to 126 in 2004. In the case of Gender Development Index, there

[1] See Shiva Kumar A.K. (1996) for a detailed description of India's HDI achievements over decades.
[2] HDI is a combined Index of achievement of a country on Income, health and education.

is substantial improvement both in GDI value and GDI rank. The GDI rank has improved from 105 in 2000 to 96 in 2004.

Table 3.1
India's Global Position in Human and Gender Development

Country	Human Development Index (HDI)			HDI Rank		
	2000	2003	2004	2000	2003	2004
Norway	0.942	0.963	0.965	1	1	1
Australia	0.939	0.955	957	5	3	3
Sri Lanka	0.741	0.751	755	89	93	93
China	0.726	0.755	768	96	85	81
Indonesia	0.684	0.697	0.711	110	110	108
India	**0.577**	**0.602**	**0.611**	**124**	**127**	**126**
Pakistan	0.499	0.527	0.539	138	135	134
Bangladesh	0.478	0.520	0.530	145	139	137
Nepal	0.490	0.526	0.527	142	136	138
Mozambique	0.322	0.379	0.390	170	168	168
Niger	0.277	0.281	0.448	172	177	159

Source: UNDP Human Development Report (HDR) 2002, 2005 and 2006

Between 2000 and 2004, while the absolute values of HDI and GDI consistently improved for India, its ranking remained invariant at 127 consecutively for three years in a row. On the other hand, some of India's neighbouring countries like China not only improved their HDI and GDI values, but also improved their relative ranks (Economic Survey 2005-06).

Given this trend in HDI and GDI, we tried to compare various health specific variables of India and with other income group countries and global average. The comparison reveals that in most cases, India lags far behind other countries. In almost all the positive and negative health indicators, India lags behind world except, in one indicator, i.e., prevalence of HIV.

One of the important points to be noted from Table 3.2 is the difference in percapita expenditure on health. There is a high deficiency in health expenditure of India compared to world average with an index value of 2175.6. There exists a difference in the case of hospital beds and number of physicians also. These two

factors are expected to explain the lower achievement of the country in her health care outcome.

Table 3.2
Health Indicators: India Vs. Country Groups based on Income (2004)

Indicator	India	Low Income	Low & middle Income	Lower middle Income	Upper middle Income	High Income Group	World
Positive Health Indicators							
Births attended by skilled health staff (% of total)	42.5 (100.0)	40.7 (95.8)	60.1 (141.4)	85.7 (201.6)	94.7 (222.8)	98.5 (231.8)	62.2 (146.4)
Child immunization rate, DPT3 (% of ages 12-23 months)	64.0 (100.0)	67.0 (104.7)	77.0 (120.3)	88.0 (137.5)	94.0 (146.9)	96.0 (150.0)	79 (123.4)
Child immunization rate, measles (% of ages 12-23 months)	56.0 (100.0)	63.0 (112.5)	74.0 (132.1)	85.0 (151.8)	91.0 (162.5)	93.0 (166.1)	76 (135.7)
Health expenditure per capita ($)	27.0 (100.0)	29.5 (109.3)	78.6 (291.1)	76.2 (282.2)	275.3 (1019.6)	3449.1 (12774.4)	587.4 (2175.6)
Hospital beds (per 1,000 people)	0.9 (100.0)		2.8 (311.1)	3.3 (366.7)	5.7 (633.3)	6.4 (711.1)	3.5 (388.9)
Life expectancy at birth (years)	63.0 (100.0)	59.0 (93.7)	65.0 (103.2)	70.0 (111.1)	69.0 (109.5)	79.0 (125.4)	67 (106.3)
Physicians (per 1,000 people)	0.6 (100.0)	0.5 (83.3)	1.2 (200.0)	1.3 (216.7)	2.7 (450.0)	2.6 (433.3)	1.6 (266.7)
Negative Health Indicators							
Infant mortality rate (per 1,000 live births)	62.0 (100.0)	80.0 (129.0)	59.0 (95.2)	33.0 (53.2)	23.0 (37.1)	6.0 (9.7)	54 (87.1)
Adolescent fertility rate (births per 1,000 women ages 15-19)	73.0 (100.0)	95.0 (130.1)	62.0 (84.9)	29.0 (39.7)	47.0 (64.4)	25.0 (34.2)	58 (79.5)
Maternal mortality ratio (per 100,000 live births), modelled estimates	540.0 (100.0)	684.0 (126.7)	450.0 (83.3)	163.0 (30.2)	91.0 (16.9)	14.0 (2.6)	410 (75.9)
Prevalence of child malnutrition--underweight (% of children under age 5)	47.0 (100.0)	39.0 (83.0)	26.0 (55.3)	12.0 (25.5)	7.0 (14.9)	3.0 (6.4)	25 (53.2)
Total fertility rate (births per woman)	2.9 (100.0)	3.7 (127.6)	2.8 (96.6)	2.2 (75.9)	1.9 (65.5)	1.7 (58.6)	2.6 (89.7)
Tuberculosis incidence (per 100,000 people)	168.0 (100.0)	224.0 (133.3)	162.0 (96.4)	115.0 (68.5)	114.0 (67.9)	17.0 (10.1)	140 (83.3)
Under-5 mortality rate (per 1,000)	85.0 (100.0)	122.0 (143.5)	86.0 (101.2)	42.0 (49.4)	28.0 (32.9)	7.0 (8.2)	79 (92.9)
Prevalence of HIV, total (% of population ages 15-49)	0.9 (100.0)	1.7 (191.0)	1.1 (119.1)	0.3 (32.6)	2.2 (251.7)	0.4 (41.6)	0.95 (105.6)

Note: Figures in brackets show the index value where value of India=100
Source: Computed from www.worldbank.org

The comparison of India with various income group countries, show that income plays a very important role in the health care delivery. In most of the health indicators, India is even behind low income countries. Only in four indicators, India is favourable with low income country, i.e., contraceptive prevalence rate, life expectancy at birth, number of physicians per 1,000 people and births attended by skilled health staff. The information from the above table clearly indicates that income plays a very important role in determining health care development. When income increases, the health care facilities also increase,

except in the case of prevalence of HIV, where we can see that even in the upper middle income group countries, there exist HIV with an index of 251.7.

3.2. Health Status in India: Relative position of Kerala

India is a developing country with a population of more than 100 crores. Studies have shown that general health standard in India is quite low and most of the people in India have poor health and fall sick quite often. The main reasons for the poor health of the population in this country are lack of nutritious diet, inadequate medical care and living under unhygienic conditions. As medical system is costly, majority cannot afford it. Hospitals which are located in urban areas are not within the reach of most of the rural population. Still, there has been significant improvement in the country since independence. One of the major limitations of India's achievements in health status is the existence of have been the wide inter regional inequality across the states. In this section, we would analyse the achievements of various states in demographic and health indicators and examine the relative position of Kerala.

3.2.1. Life Expectancy

The attainment of various states in Life Expectancy[3] variable is given in Table 3.3. The table clearly shows wide disparity in the attainment of life expectancy. Kerala is ranking first with an average life expectancy of 73.5 years. This is 10 years higher than the all India average of 62.5 years. The difference

[3] Life expectancy is a statistical measure defined as the expected (mean) survival of human beings based upon a number of criteria such as gender and geographic location. Popularly, it is most often constructed to mean the life expectancy at birth for a given human population, which is the same as the expected age at death. However, technically life expectancy means the expected number of years remaining to live, and it can be calculated for any age.

between Kerala (the best performer) and Madhya Pradesh (worst performer) is 17 years.

Table 3.3
State Wise Life Expectancy at Birth over the Years

States	1981-1991	1988-1992	1989-1993	1998-2002
Andhra Pradesh	59.9	60.2	60.6	63.5
Assam	53.9	54.1	54.9	57.9
Bihar	56.7	57.5	58.5	60.8
Gujarat	58.8	59.5	60.1	63.4
Haryana	62.7	62.5	62.9	65.5
Karnataka	61.7	62.2	61.9	64.5
Kerala	**70.4**	**71.3**	**72**	**73.5**
Madhya Pradesh	53.3	53.4	54	56.9
Maharashtra	63	63.4	64.2	66.2
Orissa	55	55.4	55.5	58.5
Punjab	66.4	66.6	66.4	68.5
Rajastan	55.8	56.3	58	61.1
Tamil Nadu	61.1	61.5	62.4	65.2
Uttar Pradesh	54.7	55.4	55.9	59.1
W.B	61.2	61.4	61.5	63.9
All India	58.2	58.7	59.4	62.5

Source: (i) Selected Socio Economic Statistics, India-1996-97
(ii) Economic Survey 2005-2006, p-S111.

The ranking of the states in terms of life expectancy at birth has always put Kerala at the top. It would be interesting, however, to see how life expectancy has improved in Kerala vis-à-vis other states in the past decades. We have noted that the absolute improvement in life expectancy in Kerala between the 1970 and 1990s has been greater than that in India as a whole. However, the absolute improvement, as measured by the simple difference, does not truly reflect the state's relative performance since it does not take into account the importance of the difference in the initial levels. It can be argued that as the level of achievement rises it becomes more and more difficult to make further improvements. Since Kerala has already achieved a higher life expectancy at birth relative to other states, it may be more difficult to make further improvements in this indicator. In order to incorporate this, an achievement index was constructed using a concave

function[4]. The difference in the achievement index at two points in time would give an improvement index, which would correct for the differential initial levels (Table 3.4).

In terms of absolute difference Kerala's achievement does not appear outstanding, even though it is above average. There are eight other states that have made higher absolute improvements than Kerala. However, the improvement index, which incorporates the idea that it is more difficult to improve from a higher level than from a lower level, places Kerala in the first position. It indicates that Kerala has not only had a better achievement level in any given year but also had impressive performance over the years in making further improvements. Punjab, which is ranked second in terms of achievement, slides down to the 8th in terms of the improvement index.

Table 3.4
Life Expectancy at Birth: Achievement and Improvement By States, 1970-1997

States	Life Expectancy at birth		Ranking in Absolute Increase	Achievement Index				Improvement index	Rank
	1970-75	1993-97		1970-75	Rank	1993-97	Rank		
India	49.70	61.1	9	0.233	7	0.369	10	0.131	9
Andhra Pradesh	48.80	62.4	3	0.223	8	0.386	8	0.162	3
Assam	45.50	56.7	10	0.189	13	0.313	13	0.117	11
Bihar	52.9+	59.6	N.A	N.A	N.A	N.A	N.A	N.A	N.A
Gujarat	48.80	61.9	4	0.223	8	0.380	9	0.151	6
Haryana	57.50	64.1	14	0.323	3	0.410	5	0.081	14
Himachal Pradesh	52.60	65.1	5	0.265	6	0.424	4	0.158	4
Karnataka	55.20	63.3	13	0.295	4	0.399	7	0.097	12
Kerala	**62.00**	**73.3**	**9**	**0.381**	**1**	**0.558**	**1**	**0.185**	**1**
Madhya Pradesh	47.20	55.5	12	0.206	11	0.299	14	0.086	13
Maharashtra	53.80	65.5	6	0.279	5	0.430	3	0.148	7
Orissa	45.70	57.2	8	0.191	12	0.319	12	0.125	10
Punjab	57.90	67.7	11	0.328	2	0.463	2	0.135	8
Rajastan	48.40	60.0	7	0.219	10	0.355	10	0.129	9
Tamil Nadu	49.60	64.1	2	0.232	7	0.410	5	0.175	2
Uttar Pradesh	43.00	57.6	1	0.163	14	0.324	11	0.157	5
West Bengal	57.4+	62.8		N.A	N.A	N.A	N.A	N.A	N.A

+ 1981-85; N.A – Not Applicable

[4] for details, see Bhaskar Dutta et al. (1997)

3.2.2. Infant mortality

Infant mortality rate (IMR)[5] is commonly included as a part of standard of living evaluations in economics and it is universally acknowledged as one of the best indicators of the health of a nation. IMR has significantly declined in the Western countries mainly due to improvements in basic health care and high technology medical advances.

From Table 3.5, it is clear that over the past 30 years, India had succeeded to reduce IMR more than half to 60 per 1000 live births today. It is undoubtedly a significant achievement. But here also one can find wide interregional inequality across the states.

Table 3.5
Infant Mortality Rate at National and State levels

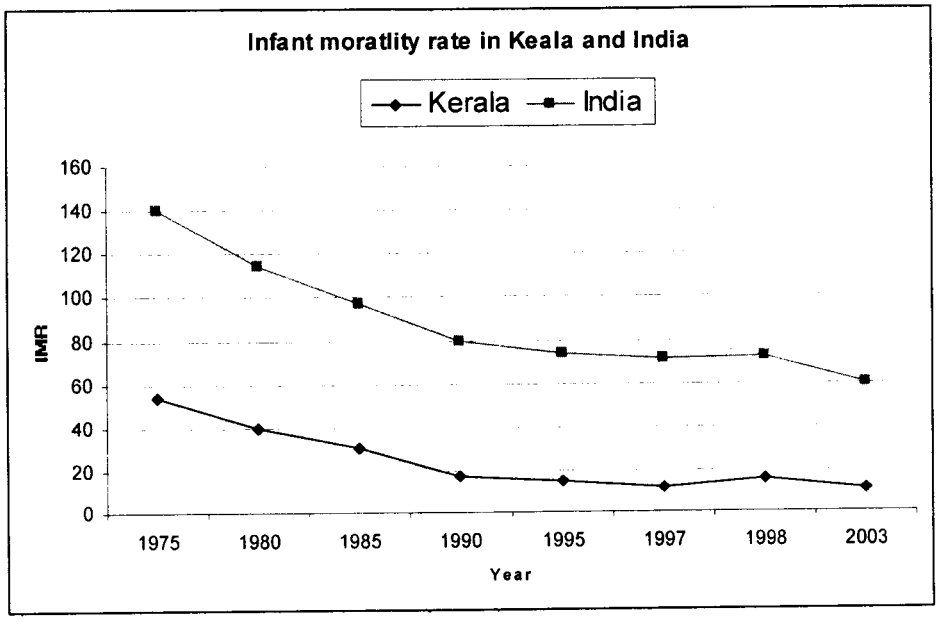
States	1975	1980	1985	1990	1995	1997	1998	2003
Andhra Pradesh	123	92	83	70	63	63	66	59
Assam	144	103	111	76	76	76	78	67
Bihar	..	..	106	75	73	71	67	60
Gujarat	154	113	98	72	62	62	64	57
Haryana	114	103	85	69	69	68	69	59
Karnataka	80	71	69	70	62	53	58	52
Kerala	**54**	**40**	**31**	**17**	**15**	**12**	**16**	**11**
Madhya Pradesh	151	142	122	11	99	94	97	82
Maharashtra	92	75	68	58	55	47	49	42
Orissa	149	143	132	122	103	96	98	83
Punjab	98	89	71	61	54	51	54	49
Rajastan	155	105	108	84	86	85	83	75
Tamil Nadu	112	93	81	59	54	53	53	43
Uttar Pradesh	198	159	142	99	86	85	85	76
West Bengal	N A	N A	74	63	58	55	53	46
All India	140	114	97	80	74	71	72	60

Source: Sample Registration System, Government of India, 2003

[5] Infant mortality rate (IMR) is the number of newborns dying under a year of age divided by the number of live births during the year. The infant mortality rate is also called the infant death rate.

Maharashtra has an estimated 42 infant deaths per 1000 live births, which is the second lowest among the Indian states. Kerala has performed remarkably in reducing the infant mortality rate. Kerala's IMR has declined from 120 in the 1950s to 11 in 2003. For India, as a whole, it has declined from 140 to 60 during the same period. Since Kerala has already achieved a lower level of IMR, further decline is expected to be slower due to the non-linear nature of relationship between the level and improvement that we discussed earlier. Even with the lowest IMR (57) in 1970-75, Kerala is in the third position in terms of the improvement index. The difference in IMR was only 19 points between Kerala and India in 1950s, which widened to 78 in 1976-80, but came down to 57 in 1996-2000. Overall it indicates that Kerala's IMR has declined much faster than the all India average. Children born in states like Madhya Pradesh, Uttar Pradesh, Rajasthan and Orissa are at more than six times as high risks of death before their first birthday as those born in Kerala during the 1990s. Even in Maharashtra, the second best performer in terms of IMR, the risk is more than three times as much as that in Kerala. The relative position of IMR of Kerala and India is shown in Fig.3.1

Fig. 3.1



3.2.3 Morbidity

The term morbidity can refer to (i) the state of being diseased (from Latin morbidus: sick, unhealthy), (ii) the degree or severity of a disease, (iii) the prevalence of a disease: the total number of cases in a particular population at a particular point in time, (iv) the incidence of a disease: the number of new cases in a particular population during a particular time interval. (v) disability irrespective of cause (e.g., disability caused by accidents).

Even though Kerala had made remarkable achievement in human development front as per the available morbidity statistics, the morbidity rate in Kerala is much more than at the All India level[6]. The prevalence rate of tuberculosis is 5 per 1000 population in Kerala, which is significantly higher than many other states such as Tamil Nadu, Karnataka, Maharashtra, Rajasthan, Punjab and Haryana. However, the incidence and prevalence of malaria and jaundice in Kerala are the lowest among the Indian states. Although Kerala shows a high tuberculosis morbidity rate, the case fatality rate is low in Kerala, compared to other states (5 per 1000 cases for Kerala as against 9 for all India). The highest case fatality rate was reported in West Bengal (25) followed by Himachal Pradesh (18) and Karnataka (14) (Table 3.6). This might be due to greater use of health care services in the state. However, the higher rates of some of the acute and chronic illnesses would have serious implications in terms of constrains on the allocation health care resources. Among all these variables also one has to note higher degree of interstate differential.

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[6] For details see K.P. Kannan, K.R. Thankappan, V. Raman Kutty and K.P. Aravindan (1991). *Health and Development in Rural Kerala*, Integrated Rural Technology Centre of the Kerala, Sastra Sahitya Parishad

Table 3.6
State wise Morbidity Rates in India (1998-99)

State	Number of Persons per 1000 suffering from				Case Fatality Rate Per 1000 Cases Tuberculosis
	Asthma	Tuberculosis	Jaundice	Malaria	
Andhra Pradesh	42.92	5.92	15.71	48.51	8.32
Assam	32.78	7.10	27.68	29.74	N.A
Bihar	20.28	9.89	15.15	37.88	N.A
Gujrat	19.79	4.35	11.09	44.49	2.33
Haryama	19.22	3.58	9.93	20.93	7.37
Himachal Pradesh	13.39	2.59	4.50	3.74	18.22
Jammu and Kashmir	17.25	4.28	9.42	6.02	0.00
Karnataka	17.33	2.69	3.73	6.00	14.28
Kerala	**48.06**	**5.26**	**5.28**	**0.56**	**5.39**
Madhya Pradesh	22.73	6.02	19.27	100.15	1.60
Maharashtra	25.24	2.82	15.34	40.98	8.50
Orissa	32.55	8.33	12.53	74.14	9.59
Punjab	13.08	2.07	9.76	10.82	4.76
Rajasthan	30.73	3.97	10.05	40.99	5.24
Tamil Nadu	15.46	4.79	11.42	3.80	5.91
Uttar Pradesh	19.79	5.51	9.63	35.52	4.27
West Bengal	25.93	4.92	23.81	14.82	25.57
India	24.68	5.44	13.61	36.97	9.04

Source: NFHS-II and Health Information of India, 1999

One has to look in to the extent of Diarrhoeal diseases also to get a complete picture on morbidity, which is given in Table 3.7. There were 1793189 diarrhoeal diseases reported in country for the year 2005, from which 285 were died. 19.0 per cent of the cases were reported from Andhra Pradesh followed by Karnataka with 12.79 per cent. 6.17 per cent cases were reported from Kerala out of which none had died. The highest diarrhoeal diseases were reported from Karnataka.

Table 3.7
State-wise Number of Cases and Deaths Due to Acute Diarrhoeal Diseases in India -2005

State/Uts	Male		Female		Total		Reference Period up to
	Cases	Deaths	Cases	Deaths	Cases	Deaths	
Andhra Pradesh	174597	41	170811	13	345408	54	MAR. 2005
Assam	-	-	-	-	-	-	NR
Bihar	-	-	-	-	-	-	NR
Gujarat	79508	1	75753	0	155261	1	MAY. 2005
Haryana	40436	1	39257	4	79693	5	APR. 2005
Karnataka	123840	95	105574	49	229414	144	FEB. 2005
Kerala	41568	0	69059	0	110627	0	APR EXCP.FEB 2005
Madhya Pradesh	53585	18	45491	4	99076	22	APR. 2005
Maharashtra	79400	5	76224	1	155624	6	APR. 2005
Orissa	57233	9	43464	1	100697	10	APR. 2005
Punjab	22263	4	22089	3	44352	7	APR. 2005
Rajasthan	29060	1	22076	0	51136	1	MAR. 2005
Tamil Nadu	-	-	-	-	-	-	NR
Uttar Pradesh	-	-	-	-	-	-	NR
West Bengal	-	-	-	-	-	-	NR
India	858601	198	813534	87	1793189	285	

Source : Lok Sabha Starred Question No. 255, dated on 10.08.2005.

We have also looked into the state wise analysis of prevalence of anaemia among women and children in India (Table 3.8).

Table 3.8
State-wise Prevalence of Anaemia Among Women and Children in India
(1998-1999)

States/UTs	Percent of Women With				
	Mild Anaemia	Moderate Anaemia	Severe Amaemia	Percent of Women Age 15-49 with Any Anaemia	Age 6-35 Months with Any Anaemia
Andhra Pradesh	32.5	14.9	2.4	49.8	72.3
Assam	43.2	25.6	0.9	69.7	63.2
Bihar*	42.9	19	1.5	63.4	81.3
Gujarat	29.5	14.4	2.5	46.3	74.5
Haryana	30.9	14.5	1.6	47	83.9
Karnataka	26.7	13.4	2.3	42.4	70.6
Kerala	19.5	2.7	0.5	22.7	43.9
Madhya Pradesh*	37.6	15.6	1	54.3	75
Maharashtra	31.5	14.1	2.9	48.5	76
Orissa	45.1	16.4	1.6	63	72.3
Punjab	28.4	12.3	0.7	41.4	80
Rajasthan	32.3	14.1	2.1	48.5	82.3
Tamil Nadu	36.7	15.9	3.9	56.5	69
Uttar Pradesh*	33.5	13.7	1.5	48.7	73.9
West Bengal	45.3	15.9	1.5	62.7	78.3
India	35	14.8	1.9	51.8	74.3

Source : Women and Men in India 2004, Ministry of Statistics and Programme Implementation, Govt. of India & India Yearbook 2003, Manpower Profile.

Tamil Nadu is in the first place in severe anaemia affected cases with 3.5 per cent of acute anaemia affected women of Tamil Nadu were affected severe anaemia, where Kerala reported lowest with 0.5 per cent. In the case of moderate anaemia, Assam places first with 25.6 per cent while Kerala places lowest with 2.7 per cent.

From the anthropometric indications, it is seen that According to the NFHS estimates, around 5 per cent of the children below three years are severely malnourished and 27 per cent are moderately malnourished in Kerala according to the weight-for-age measure in 1998-99 (Table 3.9).

Table 3.9
Anthropometric Indicators for Children below 3 Years (1998-99)

States	Weight-for-age		Height-for-age		Weight-for-height	
	Percentage below -3 SD	Percentage below -2SD[1]	Percentage below -3 SD	Percentage below -2SD[1]	Percentage below -3 SD	Percentage below -2SD[1]
India	**18.0**	**47.0**	**23.0**	**45.5**	**2.8**	**15.5**
Andhra Pradesh	10.3	37.7	14.2	38.6	1.6	9.1
Assam	13.3	36.0	33.7	50.2	3.3	13.3
Bihar	25.5	54.4	33.6	53.7	5.5	21.0
Gujrat	16.2	45.1	23.3	43.6	2.4	16.2
Haryama	10.1	34.6	24.3	50.0	0.8	5.3
Himachal Pradesh	12.1	43.6	18.1	41.3	3.3	16.9
Jammu & Kashmir	8.3	34.5	17.3	38.8	1.2	11.8
Karnataka	16.5	43.9	15.9	36.6	3.9	20.0
Kerala	**4.7**	**26.9**	**7.3**	**21.9**	**0.7**	**11.1**
Madhya Pradesh	24.3	55.1	28.3	51.0	4.3	19.8
Maharashtra	17.6	49.6	14.1	39.9	2.5	21.2
Orissa	20.7	54.4	17.6	44.0	3.9	24.3
Punjab	8.8	28.7	17.2	39.2	0.8	7.1
Rajasthan	20.8	50.6	29.0	52.0	1.9	11.7
Tamil Nadu	10.6	36.7	12.0	29.4	3.8	19.9
Uttar Pradesh	21.9	51.7	31.0	55.5	2.1	11.1
West Bengal	16.3	48.7	19.2	41.5	1.6	13.6

For India, the corresponding figures are 18 and 47 respectively. In terms of height-for-age, 7 per cent are moderately and 22 per cent are severely stunted in

Kerala, the all-India figures being 23 and 46. Kerala's rank is the highest among the major Indian states in terms of all the three indicators of nutritional outcome among children, as well as prevalence of anaemia.

In the case of women, the NFHS II (1998-99) indicates that 18.7 per cent of the women in Kerala are undernourished in terms of Body Mass Index (BMI) (i.e., BMI below 18.5 kg/m2), whereas in India it is 29 per cent (Table 3.10). Kerala attains the second highest position among major Indian states in terms of this indicator of nutritional achievement among women, following Punjab. However, for both Kerala and Punjab a high prevalence of obesity is reported. The percentage of women with obesity is 24 in Kerala, which is the second highest after Punjab's 40 per cent. But the national average is only 12.8 per cent

Table 3.10
Nutritional Status of Women, 1998-99

States/UTs	Weight-for-height1			% of women with			
	% with BMI below 18.5 kg.m2	% with BMI below 25.0 kg.m2	% with BMI below 3.0 kg.m2		Moderate anaemia	Severe anaemia	Any anaemia
India	**35.8**	**10.6**	**2.2**	**35.0**	**14.8**	**1.9**	**51.8**
Andhra	37.4	12.0	2.2	32.5	14.9	2.4	49.8
Assam	27.1	4.2	0.7	43.2	25.6	0.9	69.7
Bihar	39.3	3.7	0.5	42.9	19.0	1.5	63.4
Gujrat	37.0	15.8	4.4	29.5	14.4	2.5	46.3
Haryama	25.9	16.6	3.9	30.9	14.5	1.6	47.0
Himachal Pradesh	29.7	13.1	2.3	31.4	8.4	0.7	40.5
Jammu & Kashmir	26.4	13.8	3.0	39.3	17.6	1.9	58.7
Karnataka	38.8	13.6	2.9	26.7	13.4	2.3	42.4
Kerala	**18.7**	**20.6**	**3.8**	**19.5**	**2.7**	**0.5**	**22.7**
Madhya Pradesh	38.2	6.1	1.2	37.6	15.6	1.0	54.3
Maharashtra	39.7	11.7	2.9	31.5	14.1	2.9	48.5
Orissa	48.0	4.4	0.6	45.1	16.4	1.6	63.0
Punjab	16.9	30.2	9.1	28.4	12.3	0.7	41.4
Rajasthan	36.1	7.1	1.6	32.3	14.1	2.1	48.5
Tamil Nadu	29.0	14.7	2.7	36.7	15.9	3.9	56.5
Uttar Pradesh	35.8	7.5	1.5	33.5	13.7	1.5	48.7
West Bengal	43.7	8.6	1.3	45.3	15.9	1.5	62.7

Source: National Family Health Survey, 1998-99, International Institute for Population Sciences

Another indictor we have explored as health care out come is the prevalence of under nutrition and Obesity among the adults. The results are given in Table 3.11. Here also there is noticeable inter state differential. Kerala ranks 6th in terms of this variable. The state which fares better is Assam and Orissa's performance is very poor.

Table 3.11
Prevalence of Under Nutrition and Obesity among Adults according to BMI in Rural Areas

	Prevalence (%)			
	CED	Rank	Obese	Rank
Andhra Pradesh	49.4	8	4.2	6
Assam	17.1	1	2.4	4
Bihar	51.3	10	1.3	2
Gujrat	53.1	11	4.8	10
Haryama	25.9	3	4.4	8
Himachal Pradesh	38.9	7	3.8	5
Karnataka	37.3	6	9.6	12
Kerala	**33.2**	**4**	**10.3**	**13**
Madhya Pradesh	53.3	12	0.7	1
Maharashtra	51.0	9	4.4	8
Orissa	57.3	14	1.6	3
Punjab	23.0	2	14.8	14
Rajasthan	36.2	5	6.6	11
Tamil Nadu	53.8	13	4.3	7
India	34.6		4.1	

3.3. Health Expenditure

Having examined the various health outcome indicators, we would be analysing the contributory factors in this section. The public expenditure on health care is an important determinant of health outcome. Studies[7] have found a trend decline in the social sector expenditure in general and expenditure on health in particular across the Indian states.

It was mainly through the state initiatives, the state could enhance the level of human development, which was already attained at the initial stages. Kerala has allocated large portions of its resources to health and education. Still the share

[7] Ravi Duggal et al (1995) and S. Mahendra Dev and Jos Mooij (2002) gives a detailed account on health sector expenditure and other social sector expenditure in India.

of health expenditure has been declining (Table 3.12). It has declined from 9.57 per cent in 1980-81 to 6.76 per cent and further it declined to 5.47 in 1998-99.

Table 3.12
Share of health expenditure in social sector

Year	States	Development expenditure	Social sector	Education	Health	Amenities	Other social services
1980-81	Kerala	77.18	44.98	25.30	9.57	1.48	8.63
	All states	70.42	29.12	13.89	7.10	1.14	7.00
	Central government	54.70	5.30	2.70	1.40	0.40	0.80
1990-91	Kerala	64.79	39.91	23.55	6.76	2.92	6.69
	All states	69.57	32.89	17.36	5.88	3.86	5.79
	Central government	48.10	6.40	3.50	1.50	0.40	1.00
1998-99	Kerala	62.45	33.31	18.73	5.47	3.69	5.42
	All states	61.76	33.07	17.39	5.78	4.53	5.38
	Central government	34.90	8.20	3.90	1.80	1.00	1.40

Source: Verghese (2004)[8]

3.4. Health Care Institutions

Availability of health care institutions is another major determinant of health care outcome. In this section we would look in to various dimensions of availability of health care system in India. Ministry of Health and Family Welfare, Government of India estimated the state wise shortage of primary health centres, community health centres and sub centres (Table 3.13). One important observation we can make from the table is, the states which are lagging behind in the health outcome are the states which are having higher shortage of health care institutions. One can find a positive correlation between the availability of health care institutions and health outcome. The BIMARU states, which had a poor record on health achievement lags behind other states in terms of availability of health care institutions. Kerala had sufficient number of primary health centres and sub centres, but there is a shortage of 91 community centres in Kerala as on September

[8] Bindu P. Verghese (2004). *Human Development in Kerala: Disparities and Distortions,* Unpublished Ph.D. Thesis submitted to University of Calicut.

2005. At the all India level, there is a shortage of 19269 sub centres, 4337 primary health centres, and 3206 community health centres.

Table 3.13
State-wise Shortfall in SCs, PHCs and CHCs in India (As per 2001 Population)
(As on September, 2005)

States/UTs	No. of Sub Centres			No. of PHCs			No. of CHCs		
	Requi-red	In Posi-tion (P)	Short-fall	Requi-red	In Posi-tion (P)	Short-fall	Requi-red	In Posi-tion (P)	Short-fall
Andhra Pradesh	11699	12522	*	1924	1570	354	481	164	317
Assam	5063	5109	*	826	610	216	206	100	106
Bihar	14959	10337	4622	2489	1648	841	622	101	521
Gujarat	7263	7274	*	1172	1070	102	293	272	21
Haryana	3005	2433	572	500	408	92	125	72	53
Karnataka	7369	8143	*	1211	1681	*	302	254	48
Kerala	4761	5094	*	791	911	*	197	106	91
Madhya Pradesh	10402	8874	1528	1670	1192	478	417	229	188
Maharashtra	12153	10453	1700	1984	1780	204	496	382	114
Orissa	7283	5927	1356	1171	1282	*	292	231	61
Punjab	3219	2858	361	536	484	52	134	116	18
Rajasthan	9554	10512	*	1555	1713	*	388	326	62
Tamil Nadu	7057	8682	*	1173	1380	*	293	35	258
Uttar Pradesh	26344	20521	5823	4390	3660	730	1097	386	711
West Bengal	12101	10356	1745	1993	1173	820	498	95	403
India	158792	146026	19269	26022	23236	4337	6491	3346	3206

* : Surplus. P : Provisional.
Source : Ministry of Health and Family Welfare, Govt. of India.

We also explored the average number of persons covered by Primary Heath Centres (PHC) in India. The results of which, given in table shows that on an average 31954 people are covered under one PHC in India (Table 3.14). Here also the performance of BIMARU states are very poor. Surprisingly West Bengal is the state with highest number of people covered by a PHC in India. This may be due to the higher population density in the state. In Kerala 25878 persons are covered by a single PHC.

Table 3.14
State-wise Classification According to Average Population Covered by a Primary Health Centre in India
(As on September, 2005)

States/Uts	Average Population (2001) covered
Andhra Pradesh	35287
Assam	38059
Bihar	45095
Gujarat	29664
Haryana	36836
Karnataka	20755
Kerala	25878
Madhya Pradesh	37232
Maharashtra	31336
Orissa	24405
Punjab	33257
Rajasthan	25273
Tamil Nadu	25306
Uttar Pradesh	35972
West Bengal	49232
India	31954

Source : Ministry of Health and Family Welfare, Govt. of India.

3.4.1 Health care Institutions in Tribal Areas

Deficiency of adequate number of health care institutions is cited as one of the major reasons for the low health care outcome of the tribal areas in India. These areas are far away from the cities without adequate transport facilities; hence the availability of health care institutions will have a higher impact on their health care outcome. Table 3.15 gives the state wise position of primary health care institutions in tribal areas in different states. Madhya Pradesh , which is having a high proportion of tribal areas of the country is having the maximum shortfall of health care institutions followed by Rajasthan. At the all India level, there is a shortage of 4679 sub centres, 650 PHC's and 227 CHC's. Kerala is

having more number of heath care institutions than required by the government of India norms in tribal areas.

Table 3.15
State-wise Position of Primary Health Care Institutions in Tribal Areas of India (As on September, 2005)

States/UTs	Tribal Population in Rural Areas	No. of Sub Centres			No. of PHCs			No. of CHCs		
		Required	In Position	Short-fall	Required	In Position	Short-fall	Required	In Position	Short-fall
Andhra Pradesh	4646923	1548	1012	536	232	113	119	58	32	26
Assam	3154546	1051	841	210	157	133	24	39	34	5
Bihar	717702	239	NA	NA	35	NA	NA	8	NA	NA
Gujarat	6866637	2288	2209	79	343	328	15	85	70	15
Haryana *	0	0	0	0	0	0	0	0	0	0
Karnataka	2934530	978	1661	**	146	286	**	36	36	0
Kerala	350019	116	298	**	17	85	**	4	21	**
Madhya Pradesh	11446448	3815	2917	898	572	349	223	143	85	58
Maharashtra	7486537	2495	1946	549	374	293	81	93	65	28
Orissa	7698358	2566	2296	270	384	424	**	96	147	**
Punjab *	0	0	0	0	0	0	0	0	0	0
Rajasthan	6717830	2239	1200	1039	335	195	140	83	36	47
Tamil Nadu	551143	183	50	133	27	25	2	6	3	3
Uttar Pradesh	95828	31	154	**	4	NA	NA	1	NA	NA
West Bengal	4136366	1378	738	640	206	205	1	51	29	22
India	77338597	25761	19798	4679	3853	3205	650	954	740	227

Source : Ministry of Health and Family Welfare, Govt. of India.

It is not only the physical presence of the health care institutions, but the kind of infrastructure available with them also has an impact on its outcome. From Table 3.16, one can find a high degree of variability across states in terms of availability of infrastructure. Bihar is the state having very poor infrastructure facility in its PHC's. In Kerala more than 90 percent of the PHC's are having own building, toilet and electricity connection. But only 42 percent of them are having labour room and only 48.6 percent are having at least one bed.

Table 3.16
State-wise Status of Infrastructure in Primary Health Centres in India
(2003-2004)

State	No. of PHCs	Percentage of PHCs Having: Own Building	Toilet Facility #	Water @	Electricity	Labour Room	Telephone	Vehicle	% of PHCs with at least one bed
Andhra Pradesh	380	90.8	89.5	16.3	98.4	87.4	36.3	24.5	92.4
Assam	290	96.9	37.6	14.8	65.5	56.2	3.8	12.4	41.7
Bihar	845	64.6	29.5	2.1	32	27	2.4	19.4	3.9
Gujarat	356	79.5	91.3	59.3	96.1	66.9	85.7	86.5	92.7
Haryana	254	57.1	56.3	48.4	85.4	39	67.6	4.7	96.5
Karnataka	540	85.6	88.9	40.7	95.9	61.3	58.7	17.2	77.6
Kerala	**70**	**91.4**	**98.6**	**24.3**	**92.9**	**42.9**	**35.7**	**41.4**	**48.6**
Madhya pradesh	721	70.7	56.9	16.4	64.5	41.9	3.7	1.8	54.4
Maharashtra	677	84.2	87.7	49.6	95.3	78.9	47.1	55.8	96.8
Orissa	595	71.9	28.1	5.7	47.7	25.7	1.7	1	46.4
Punjab	71	76.7	60.6	46.5	80.3	45.1	49.3	11.3	95.8
Rajasthan	671	71.7	71.4	38.2	79.6	66	7.3	8.8	95.8
Tamil Nadu	501	94.4	98.2	34.3	99.8	95.6	39.7	41.7	73.5
Uttar Pradesh	2083	58.2	14.7	5.7	45	36	5.5	18.1	89.3
West Bengal	209	93.8	85.2	11.5	61.2	56	11	2.4	23.9

Note : @ : Water facility through only Tap water
: Toilet facility : Flush toilet.
Source : Rajya Sabha Starred Question No. 77, dated on 04.03.2005.
Year: Period of fiscal year in India is April to March, e.g. year shown as 1990-91 relates to April 1990 to March 1991.
Units: (a) 1 Lakh (or Lac) = 100000.

3.4.2. Availability of Doctors:

The availability of qualified doctors in the PHC's is another important variable which affects the health care outcome. At the all India level there are 4282 posts lying vacant and there is an absolute shortfall of 1004 doctors (Table 3.17). The higher number of shortfall are in Madhya Pradesh, Gujarat and Rajasthan. The maximum numbers of posts lying vacant are in Tamil Nadu followed by Andrapradesh. Unfortunately in most of the poorer states like Bihar and Uttar Pradesh, data is not available on this variable. Kerala is having a vacancy of 396 doctors in PHCs.

Table 3.17
State-wise Number of Doctors at Primary Health Centres in Rural Areas of India
(As on September, 2005)

States/Uts	Doctors at PHCs				
	Required[1] (R)	Sanctioned (S)	In Position (P)	Vacant (S-P)	Shortfall (R-P)
Andhra Pradesh	1570	2497	2137	360	*
Assam	610	NA	NA	NA	NA
Bihar	1648	NA	NA	NA	NA
Gujarat	1070	1070	848	222	222
Haryana	408	862	862	0	*
Karnataka	1681	2237	2041	196	*
Kerala	911	1345	949	396	*
Madhya Pradesh	1192	1278	839	439	353
Maharashtra	1780	3157	3158	*	*
Orissa	1282	1353	1353	0	*
Punjab	484	646	373	273	111
Rajasthan	1713	1517	1506	11	207
Tamil Nadu	1380	3806	2257	1549	*
Uttar Pradesh	3660	NA	NA	NA	NA
West Bengal	1173	1560	1319	241	*
India[2]	23236	24476	20308	4282	1004

Source : Ministry of Health and Family Welfare, Govt. of India.

3.4.3 Access to drinking water

The availability and access to safe drinking water is a major factor which have a direct impact on waterborne diseases. The Census figures given in Table 3.18 show that at the all India level 77.9 percent of households are having access to safe drining water. On this variable the Kerala's attainment is far behind all other states in India. This is specifically because of the definition used in census estimates. The drinking water used directly from wells, which is most prevalent in Kerala, is not treated as safe drinking water[9] .

[9] See K.Pushpangadan (2003) for details.

Table 3.18
Access to safe drinking water (tap/handpump /tubewell) in households in India (in per cent)

States	1981			1991			2001		
	T	R	U	T	R	U	T	R	U
Andhra Pradesh	25.9	15.1	63.3	55.1	49.0	73.8	80.1	76.9	90.2
Assam	-	-	-	45.9	43.3	64.1	58.8	56.8	70.4
Bihar	37.6	33.8	65.4	58.8	56.5	73.4	86.6	86.1	91.2
Gujarat	52.4	36.2	86.8	69.8	60.0	87.2	84.1	76.9	95.4
Haryana	55.1	42.9	90.7	74.3	67.1	93.2	86.1	8131	97.3
Karnataka	33.9	17.6	74.4	71.7	67.3	81.4	84.6	80.5	92.1
Kerala	**12.2**	**6.3**	**39.7**	**18.9**	**12.2**	**38.7**	**23.4**	**16.9**	**42.8**
Madhya Pradesh	20.2	8.1	66.7	53.4	45.6	79.4	68.4	61.5	88.6
Maharashtra	42.3	18.3	85.6	68.5	54.0	90.5	79.8	68.4	95.4
Orissa	14.6	9.5	51.3	39.1	35.3	62.8	64.2	62.9	72.3
Punjab	84.6	81.8	91.1	92.7	92.1	94.2	97.6	96.9	98.9
Rajastan	27.1	13.0	78.7	59.0	50.6	86.5	68.2	60.4	93.5
Tamil Nadu	43.1	31.0	69.4	67.4	64.3	74.2	85.6	85.3	85.9
Uttar Pradesh	33.8	25.3	73.2	62.2	56.6	85.8	87.8	85.5	97.2
West Bengal	69.7	65.8	79.8	82.0	80.3	86.2	88.5	87.0	92.3
All India	38.2	26.5	75.1	62.3	55.5	81.4	77.9	73.2	90.0

Source: (i) Economic Survey 2005-2006, p-S116.

There is a high incidence in Kerala in using boiled water for drinking which had a direct positive impact on her health outcome. It is a culture or part of living style of the Kerala people to use boiled water for drinking[10]. Table 3.19 clearly shows that all other states are lagging far behind Kerala in this practice. At the all India level only 4.3 per cent of rural population and 11 percent of urban population use boiled water for drinking, while the respective figures are 49.3 per cent and 65.3 percent for Kerala.

[10] K.Pushpangadan (2003) examined the issue in detail and found that Kerala is the state having maximum efficiency in water utilization and follows the best hygienic practice.

Table 3.19
Percentage of Households using boiled water for drinking

State	Rural	Urban
Andhra Pradesh	2.6	6.1
Assam	21.6	28.1
Bihar	0.7	3.5
Gujarat	0.4	1.2
Haryana	0.4	2
Karnataka	2.8	12
Kerala	49.3	65.3
Madhya Pradesh	0.4	1.2
Maharashtra	1.2	9.1
Orissa	1.8	10.6
Punjab	0.3	1.6
Rajasthan	0.2	1.6
Tamil Nadu	8.1	33.7
Uttar Pradesh	0.2	1.2
West Bengal	1.3	5
India	4.3	11
Source: Pushpangadan (2003)		

3.5. State Level Health Scenario

The analysis of health status at the national level in the previous section shows that Kerala has made notable achievements in health and other social sectors. Kerala's achievements in health status are reflected in attainment of low infant mortality rate, low maternal mortality rate, low birth rate, low death rate, high life expectancy[11]. The history and experience of Kerala's health and demographic transitions provide a number of lessons to other states in India and to other developing societies[12]. The current health status of Kerala, as levels of mortality rate and life expectancy of its population, is more akin to those of countries with much higher levels of per capita income than to those with comparable levels of income. Kerala has managed to achieve the demographic

[11] The attainment of Kerala was noticed and discussed in detail in UN/CDS (1975). It had later popularly become Kerala model of development.
[12] See Sen.A.K (2002) for comparison of health care achievement of Kerala with China and other developed countries.

transition from high (premodern) to low (modern) birth and death rates-something no other Indian state has been able to attain. Indeed, the magnitude of Kerala's fertility decline-the birth rate fell from 39 in 1961 to 26.5 in 1974-has never before been observed in a nation with comparable levels of income and under nutrition (Ratcliffe 1978[13]).

3.5.1 Demographic Trends

The population of Kerala is 31.84 million according to the 2001 Census. This is 3.01 per cent of the population of India. Kerala's share of land, on the other hand, is only 1.1 per cent of the total land area. The density of population in Kerala is 819 persons per sq.km, whereas that of India is 324. The density has increased from 435 per sq.km. in 1961 to 819 per sq.km in 2001. Kerala is the second highest densely populated states in India, after West Bengal (904 per sq.km). However, in the recent period, Kerala's population has been growing at a much slower rate than the population of India as a whole.

The population of Kerala was 16.9 million in 1961. The growth rate of the population was 2.3 per cent per year during the period 1961-71, which declined to 1.31 per cent during 1981-91 and further to 0.93 per cent during 1991-01. This is the lowest among the major Indian states, followed by Tamil Nadu. The decline in growth rate was contributed partly by decline in fertility and partly by net out-migration. Kerala has been the net out-migration state from the 1930s, and the rate of net out-migration reached its peak during the decade 1981-91. The important demographic characteristics of Kerala are given in Table 3.20.

[13] J. Ratcliffe J. 'Social justice and the demographic transition: lessons from India's Kerala State', International Journal of Health Serv. 1978;8(1):123-44

Table 3.20
Population Size, Growth Rate, Sex Ratio and Density of Population in Kerala and India

Year	Population ('000)	Growth Rate (%)	Natural Increase Rate (%)	Net Migration Rate (%)	Sex Ratio (Females per 1000 males)	Density (Per sq.km)
1961	16904	-	-	-	1022	435
1971	21347	2.33	2.47	-0.16	1016	549
1981	25455	1.76	1.96	-0.22	1032	654
1991	29011	1.31	1.63	-0.31	1036	749
2001	31839	0.93	1.20	-0.27	1058	819

3.5.1.1 Sex Ratio

The overall sex ratio of the population in Kerala has always been favourable to females. It was 1022 females per 1000 males in 1961 and increased to 1058 in 2001. This is in sharp contrast to India's 933 females per 1000 males in 2001. The child sex ratio in the age group (0-6) is also favourable to female children in Kerala. According to 2001 Census, the child sex ratio is 963 females per 1000 males. The normal sex ratio at birth is 950 females per 1000 males. Given the higher biological risk of mortality among male children relative to females, the child sex ratio should be higher than the sex ratio at birth. Kerala seems to have followed this pattern.

3.5.1.2 Fertility Trends

Fertility in Kerala started declining since the 1960s. The total fertility rate, which is defined as the number of children born to woman if she follows the current fertility pattern in her reproductive life, was 5.6 per woman in the 1950s and declined to 3.7 in the 1970s, and reached 1.8, which is below replacement level, in the 1990s. The fertility rate declined in both rural and urban areas and there is virtually no difference between the two. By contrast, in India, the TFR was 6.3 in the 1950s and declined to 3.3 in 1990s. Though Kerala and India had a

difference of only 0.7 children during the 1950s, the difference has been widened to 1.5 children in the 1990s indicating a faster decline in Kerala than in India as a whole (Table 3.21). Though in Kerala, fertility had started declining even before 1950, the decline became faster only from 1960 onwards. As Kerala's TFR approached the replacement level (i.e., 2.1 children per woman), the rate of decline naturally slowed down from the late 1980s. Among the major Indian states, Tamil Nadu has the next lowest TFR of 2.0 children per woman in 1996-98. It is generally agreed that one of the most important factors behind Kerala's remarkable performance in reducing fertility is the high level of female education.

Table 3.21
Fertility Trends in Kerala and India

Year	Total Fertility Rate per woman	
	Kerala	India
Census		
1951-61	5.6	6.3
1961-71	5.0	6.0
1971-81	3.4	5.2
SRS		
1971-75	3.7	5.0
1976-80	3.1	4.5
1981-85	2.6	4.5
1986-88	2.2	4.1
1991	1.8	3.6
1996-98	1.8	3.3

3.5.2 Life expectancy

One of the quickly noticed differences in well being between Kerala and India is the life expectancy of male and female. Men on an average live 10 years longer in Kerala than for men in India. And the life expectancy of the women of Kerala is 15 years longer than all India average.

Kerala's life expectancy at birth of over 73 years is the highest among the major Indian states, and compares well with such countries in Asia as South Korea, Malaysia, China and Indonesia, which unlike Kerala, have achieved high

levels of per capita income in the recent period. The life expectancy at birth in Kerala is 70.4 years for males and 75.9 years for females in 1993-97. During the same year, India's life expectancy at birth was 60.4 years for males and 61.8 years for females. Punjab, which is the second position, has the life expectancy at birth of 66.7 years for males and 68.8 years for females.

The life expectancy at birth of Kerala males increased from 44.3 years in 1956 to 70.4 years in 1995, an increase of 26.1 years in a span of 40 years. For females, it has increased even more – from 45.3 years to 75.9 years, an increase of 30.6 years. During the same period, India's life expectancy at birth for males has increased by 24.9 years (from 35.5 to 60.4 years) and for females by 26.1 years (from 35.7 to 61.8 years). The improvement in life expectancy at birth has been greater in Kerala than in India since Independence and India is 25 years behind Kerala in terms of the achievement of life expectancy at birth.

A comparison of Kerala's life expectancy with India and some neighbouring countries are given in Table 3.22. It indicates that Kerala is doing exceptionally well in terms of both male and female life expectancy and it had achieved higher expectancy than China and equivalent to Srilanka.

Table 3.22
Life expectancy in selected regions (2000)

Region	Female Life Expectancy	Male Life Expectancy
Kerala	74	69
West Bengal	62	61
Uttar Pradesh	55	57
INDIA	59	59
Bangladesh	56	55
Pakistan	59	59
Sri Lanka	74	70
China	71	68

Source: Data from Statistical Appendix of Dre'ze(a) and Sen

The expectation of life at birth of males is projected to increase from 73.43 years during 1991-96 to 77.15 during 2021-26 and 78.85 during 2046- 51 (Table

3.23). The corresponding changes in the female expectation of life at birth are from 79.43, 83.15 and 84.85 (Rajan and Zachariah 1997)[14]

Table 3.23
Expectation of life at Birth Assumed in the Projections

Period	Expectation of Life at Birth	
	Males	Females
1991-1996	73.43	79.43
1996-2001	74.47	80.47
2001-2006	75.20	81.20
2006-2011	75.78	81.78
2011-2016	76.29	82.29
2016-2021	76.74	82.74
2021-2026	77.15	83.15
2026-2031	77.53	83.53
2031-2036	77.89	83.89
2036-2041	78.23	84.23
2041-2046	78.55	84.55
2046-2051	78.85	84.85
Source: Rajan and Zachariah (1997)		

3.5.3 Infant mortality

Infant Mortality Rate or IMR is universally acknowledged as one of the best indicators of the health of a nation. Over the past fifty three years since Independence, we have halved our IMR to 72 per 1000 live births to 11 per 1000 live births today. It is undoubtedly a significant achievement. Among the major Indian states, Kerala's infant mortality rate is the lowest as per the latest available estimates given by SRS (2000). In Kerala, out of every 1000 children born, only 14 per 1000 die before attaining their first birth day, whereas in India as a whole it is 71 per 1000. Maharashtra has an estimated 48 infant deaths per 1000 live births, which is the second lowest among the Indian states. Kerala has performed remarkably in reducing the infant mortality rate. Kerala's IMR has declined from

[14] S. Irudaya Rajan and K. C. Zachariah (1997), *Long Term Implications of Low Fertility in Kerala*', CDS Working Paper No. 282.

120 in the 1950s to 14 in 2000. For India, as a whole, it has declined from 139 to 71 during the same period.

Life expectancy at birth and infant mortality rates show almost no difference between rural and urban areas in Kerala. In 2000, they were just equal. In the case of India as a whole, however, a large gap exists – 74 in rural and 44 in urban areas

3.5.4 Morbidity

The term morbidity can refer to (i) the state of being diseased (from Latin morbidus: sick, unhealthy), (ii) the degree or severity of a disease, (iii) the prevalence of a disease: the total number of cases in a particular population at a particular point in time, (iv) the incidence of a disease: the number of new cases in a particular population during a particular time interval. (v) disability irrespective of cause (e.g., disability caused by accidents).

According to the available morbidity statistics the morbidity rate in Kerala is much more than at the All India level. With increasing levels of literacy and extension of medical services, it is conceivable that even minor ailments are reported as illness. State like Bihar and Uttar Pradesh lagging far behind in terms of literacy and medical services, have also the lowest morbidity rates. It may also be noted that morbidity correlates with density of population and that Kerala having the highest density thus has high morbidity too. The increase in old age population is also a factor for high morbidity in Kerala (Department of Health and Family Welfare)

Although different sources of data throw up substantially different rates of morbidity, they all indicate that Kerala has the highest rates of morbidity among the major Indian states. This led to an interesting debate on whether the reported

high rates of morbidity were all 'real'. Some argued that the high reported rates were due to higher levels of education and awareness among the people about the availability of health care interventions. However, in a study based on a survey of 10,000 households, Kannan et al. (1991) argue that Kerala's high morbidity was to a large extent real. They give two reasons. One is that infections constitute a large share of morbidity, which can hardly be attributed to the perception alone. And, secondly, the poor people reported more illness than the rich, which also goes against the argument that the perception factor is the major contributor of high reported morbidity in the state.

3.5.5 Health expenditure

The achievements of Kerala in health sector are even more spectacular than in education. Health indicators like life expectancy and infant mortality in the state are comparable to those in developed countries. These are the outcomes of investment in health infrastructure in all sectors, public, private and co-operative, along with people's awareness of their health needs. Kerala's health care network in the public sector under the three systems of Allopathy, Ayurveda and Homoeopathy had a total of 7831 institutions in 2001-2002. This allows accessibility and choice of the preferred system of medicine for vast majority of the people even in the public sector (Department of Health 2006[15]).

The health expenditure share to the total development expenditure shows a stagnating pattern. It ranges from 11 to 14 per cent over the period from 1996-97 to 2004-05 (Table3.24).

[15] Department of Health (2006), Kerala Public Expenditure Review Committee, First Report May 2006, Government of Kerala

Table 3.24
Health and development expenditure (Rs. In crores)

Year	Health Expenditure	Total Development Expenditure	Percentage of Health Expenditure to Total Expenditure	Growth Rate of Health Expenditure
1996-97	535.33	4047.96	13.22	-
1997-98	634.12	5031.26	12.60	18.45
1998-99	694.86	5642.03	12.32	9.58
1999-00	870.38	6510.24	13.37	25.26
2000-01	837.04	6396.50	13.09	-3.83
2001-02	861.21	6028.34	14.29	2.89
2002-03	954.78	8064.80	11.84	10.86
2003-04	1062.00	8061.94	13.17	11.23
2004-05	1153.76	9244.46	12.48	8.64

Source: Economic Review (various issues)

3.5.6. Health Infrastructure in Kerala

A wide network of health infrastructure, general health consciousness and clean health habits of the people, combined with virtually total literacy among not only men but also women of Kerala have helped to achieve high success in health care outcome. The health needs of the people of Kerala are fulfilled by the three sectors; government sector, private sector and corporate sector. It is the private sector which dominates the health care delivery system. In the case of hospital beds, 59.5 per cent of the total is under private sector followed by government sector with 38.1 per cent and corporate sector with mere 2.4 per cent. But, we cannot say that it is the right way to increase the health care opportunity in the private sector, as it gives less importance to the low income groups due to the accessibility problems. It is the government's duty to create a welfare state by giving more opportunities to the low income groups.

Geographical aspect of health care institutions

The geographical spread of the health care institutions showed that majority of the institutions like PHC, SC, PHC/SC hospital, dispensary/clinic, etc. are within the village itself (Table 3.25).

Table 3.25
Percentage distribution of village according to distance from nearest health facility in Kerala

Distance	PHC	SC	PHC/SC	Hospital	Dispensary/ clinic	Any health facility
Within village	82.7	92.1	96.2	66.4	87.4	98.2
Less than 5 kms.	2.6	0.8	0.8	4.3	9.6	1.8
5-9 kms.	8.8	3.6	1.8	18.3	0.9	-
Above 10 kms.	3.2	0.3	-	9.3	1.0	-
Don't know/ missing	2.7	3.2	1.2	1.1	1.1	-
Total %	100.0	100.0	100.0	100.0	100.0	100.0

Source: International Institute for Population Sciences

The family welfare programmes in the state are implemented through the network of 944 Primary Health Centres, 105 Community Health Centres and 5094 sub-centres. The present couple protection rate in the state is 64.32 as against the all India average of 60.

The total government expenditure on health stood at Rs.639.25 crore in 1999-2000. The per capital expenditure on health increased from Rs.178 in 1998-99 to Rs.233 in 1999-2000.

3.5.7 Growth of hospital infrastructure

Institutions

There were 2711 health care institutions recorded in 2004-05. Among the total health care institutions, 47.18 per cent of the institutions are of allopathic institutions followed by ayurveda with 32.31 per cent. Here the hospital institutions include hospitals, primary health centres, community health centres, dispensaries etc (Table 3.26).

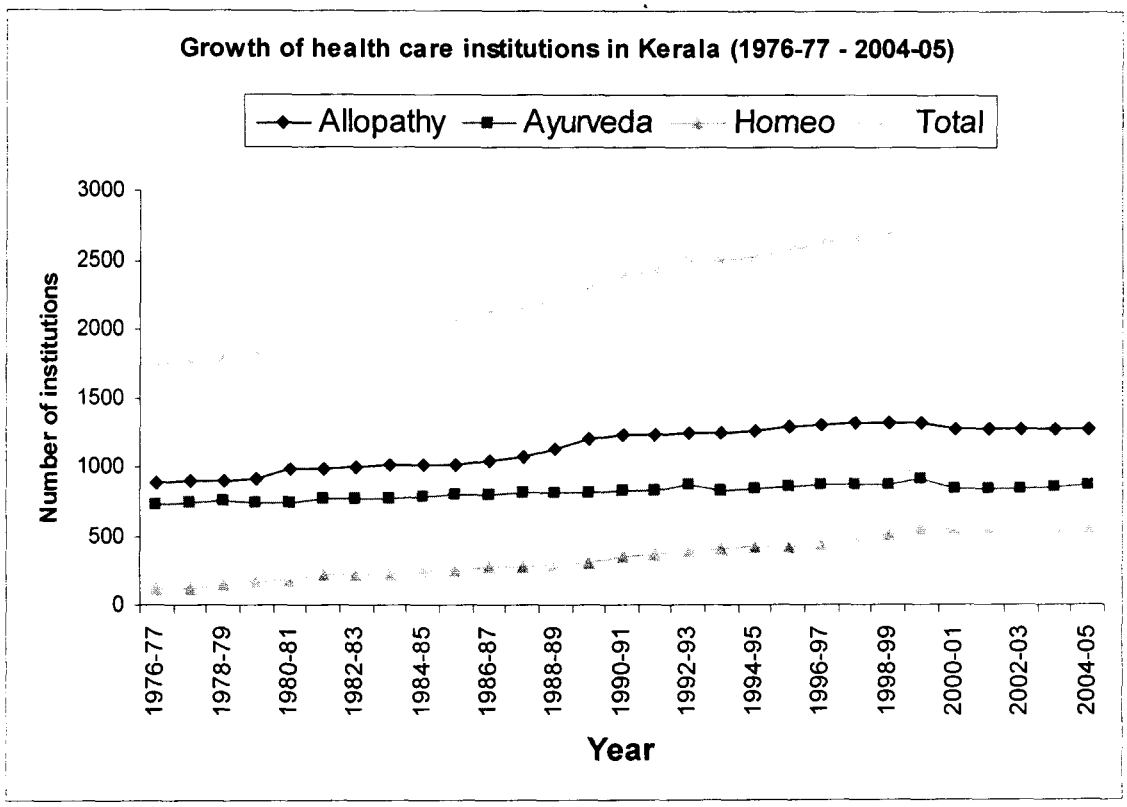
Table 3.26
Growth of health care institutions in Kerala

Year	Allopathy	Ayurveda	Homeo	Total
1976-77	888	725	121	1734
1977-78	893	742	122	1757
1978-79	905	747	143	1795
1979-80	918	740	170	1828
1980-81	981	742	174	1897
1981-82	988	768	213	1969
1982-83	1007	772	223	2002
1983-84	1012	775	223	2010
1984-85	1017	779	251	2047
1985-86	1015	795	251	2061
1986-87	1048	802	279	2129
1987-88	1066	805	279	2150
1988-89	1126	811	286	2223
1989-90	1199	807	300	2306
1990-91	1226	825	342	2393
1991-92	1229	830	368	2427
1992-93	1240	863	391	2494
1993-94	1249	832	405	2486
1994-95	1263	837	415	2515
1995-96	1295	848	425	2568
1996-97	1310	875	436	2621
1997-98	1316	867	476	2659
1998-99	1316	869	505	2690
1999-00	1317	909	555	2781
2000-01	1281	842	555	2678
2001-02	1281	842	555	2678
2002-03	1270	842	555	2667
2003-04	1278	857	561	2696
2004-05	1279	871	561	2711
Growth rate	1.53	0.66	5.68	1.77

Source: (i) *Economic Review* (various issues)
(ii) *Statistics for Planning* (various issues)

The trend of 29 year information showed that allopathic institutions increased from 888 in 1976-77 to 1279 in 2004-05 with an exponential growth rate of 1.53. The growth of ayurveda institutions was much lower when compared to other categories. It increased from 725 institutions in 1976-77 to 871 in 2004-05. The homeo institutions recorded tremendous increase with an exponential growth rate of 5.68. Overall, the total health care institutions recorded a growth rate of 1.82 in the reference period. The trend of the health care institutions is shown in Fig.3.2

Fig. 3.2



Hospital beds

The total number of hospital beds recorded 50515 of which almost all of them (89.88 per cent) was under allopathy in 2003-04. 7.8 per cent of institutions were under ayurveda followed by homeo with 2.3 per cent (Table 3.27).

Table 3.27
Growth of hospital beds in Kerala

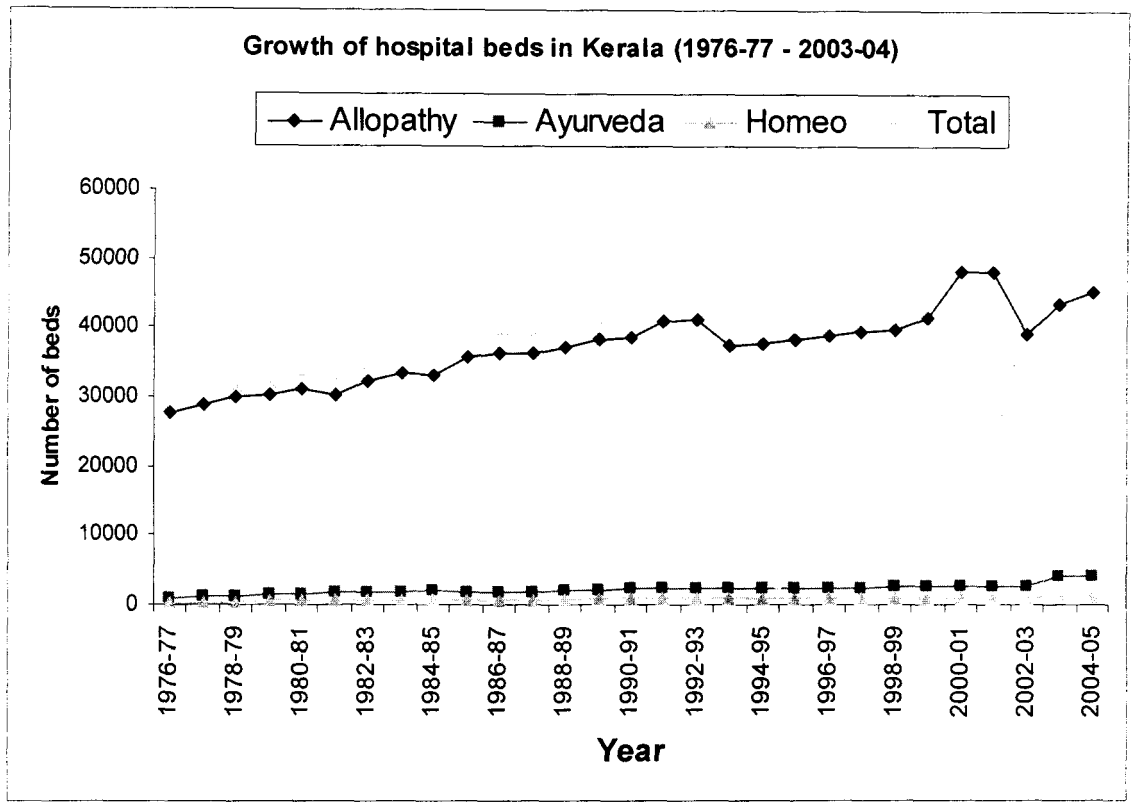
Year	Allopathy	Ayurveda	Homeo	Total
1976-77	27607	1008	250	28865
1977-78	28862	1018	275	30155
1978-79	29947	1094	300	31341
1979-80	30220	1409	510	32139
1980-81	31206	1472	535	33213
1981-82	30298	1647	650	32595
1982-83	32428	1649	675	34752
1983-84	33329	1659	675	35663
1984-85	33125	1979	675	35779
1985-86	35740	1689	700	38129
1986-87	36344	1769	700	38813
1987-88	36479	1869	708	39056
1988-89	37100	1929	715	39744
1989-90	38223	1979	780	40982
1990-91	38726	2229	900	41855
1991-92	40831	2229	900	43960
1992-93	41227	2259	950	44436
1993-94	37511	2267	950	40728
1994-95	37905	2337	950	41192
1995-96	38348	2357	950	41655
1996-97	38943	2377	950	42270
1997-98	39450	2377	970	42797
1998-99	39678	2482	970	43130
1999-00	41462	2612	970	45044
2000-01	48263	2644	970	51877
2001-02	48263	2644	970	51877
2002-03	39148	2644	970	42762
2003-04	43619	3920	1295	48834
2004-05	45405	3940	1170	50515
Growth rate	1.63	3.63	4.34	1.77

Source: (i) *Economic Review* (various issues)
(ii) *Statistics for Planning* (various issues)

The exponential growth rate of hospital beds in homoeo was higher (4.34) in the reference period of 1976-77 to 2004-05 followed by ayurveda with 3.63 per cent. The hospital beds in allopathi recorded an exponential growth rate of 1.63

per cent. Altogether hospital beds recorded 1.77 per cent. The trend of the growth of the hospital beds in allopathy, ayurveda and homoeo has been given in Fig.3.3.

Fig. 3.3



Inpatient and patients treatment

The number of patients treated in allopathic hospitals in 2003-04 was 1385081. The exponential growth rate of the period 1980-81 to 2003-04 showed that the number of inpatients treated show a low growth rate of 0.07 (Table 3.28). Among the inpatients, the treatment of children showed a negative growth rate (-0.09). The growth rate was higher for male inpatients (0.60) when compared to female inpatients (0.43). The same trend was also seen in the case of outpatients also. Number of outpatients showed a growth rate of 1.55. The details of the the growth of inpatients and outpatients over the years is shown in Fig.3.4.

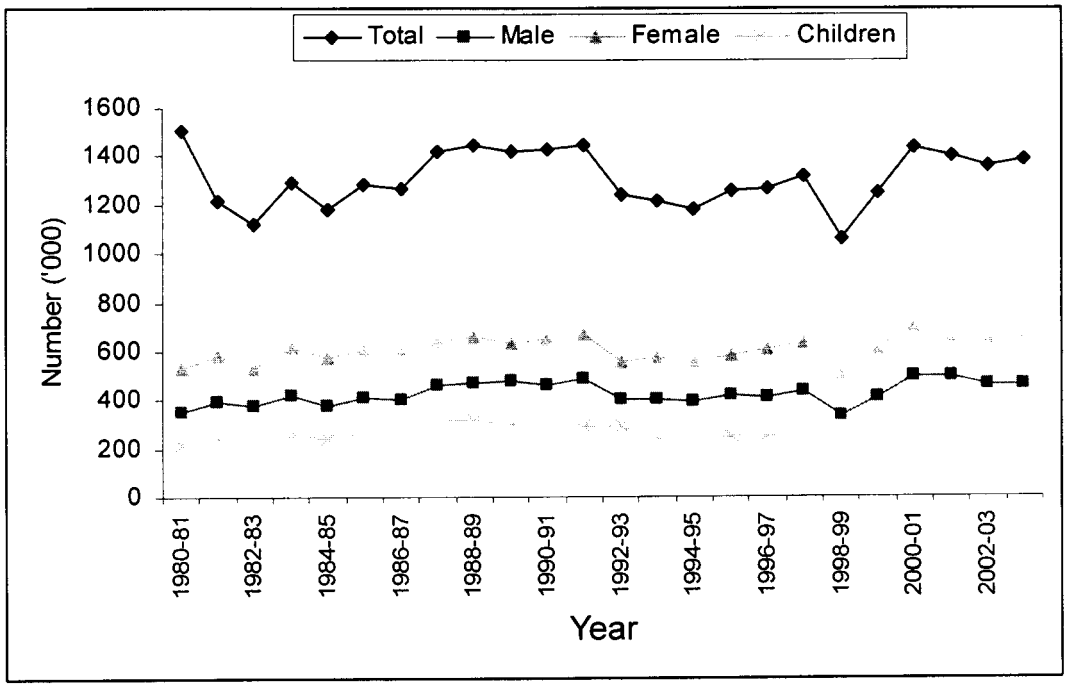
Table 3.28

Number of inpatients and outpatients treated in allopathic hospitals over the years

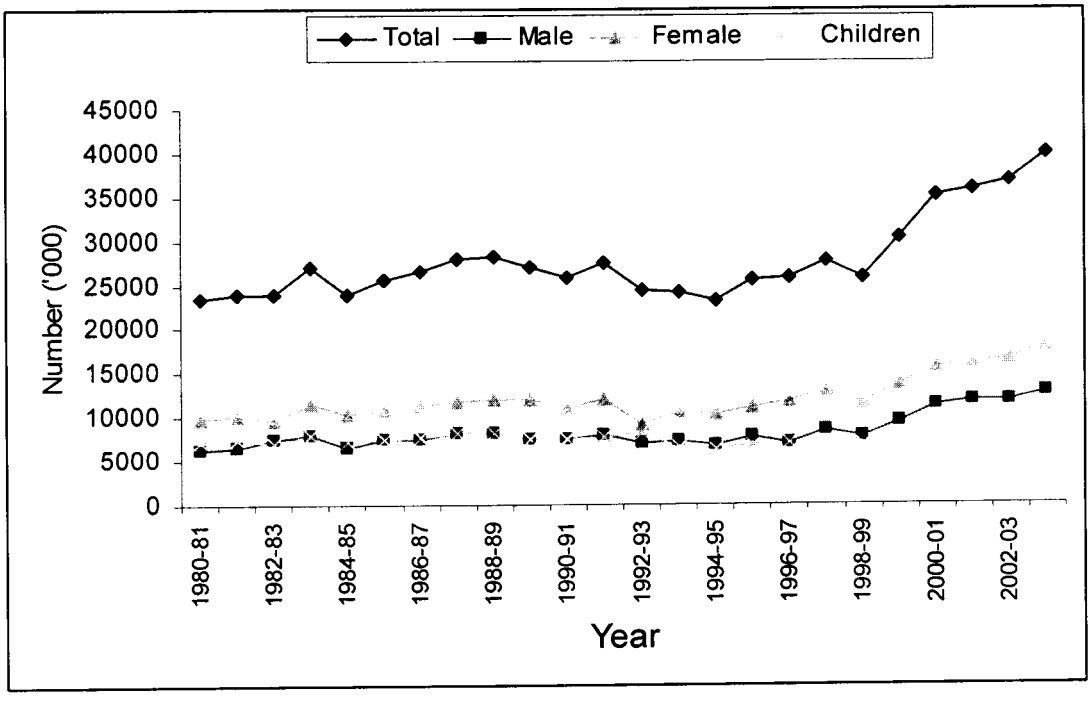
Year	Number of inpatients treated ('000)				Number of outpatients treated ('000)			
	Total	Male	Female	Children	Total	Male	Female	Children
1980-81	1506	348	533	215	23357	6201	9884	7273
1981-82	1215	396	581	238	23897	6433	10112	7352
1982-83	1119	380	530	210	24014	7343	9661	7010
1983-84	1293	420	613	260	27149	7821	11453	7875
1984-85	1182	372	573	237	23820	6563	10184	7072
1985-86	1286	412	611	263	25505	7355	10767	7383
1986-87	1269	406	598	265	26494	7531	11223	7740
1987-88	1420	458	643	319	27888	8121	11653	8114
1988-89	1448	472	658	318	28216	8210	11936	8070
1989-90	1417	481	635	301	26946	7449	11987	7510
1990-91	1427	458	653	316	25943	7475	11117	7352
1991-92	1442	486	666	291	27492	7932	11865	7695
1992-93	1242	398	557	287	24369	7057	9196	8115
1993-94	1216	398	576	243	24192	7295	10471	6427
1994-95	1177	392	560	224	23207	6804	10178	6225
1995-96	1256	420	586	250	25549	7653	11115	6781
1996-97	1265	411	610	245	25732	7012	11690	7029
1997-98	1315	433	634	248	27742	8464	12863	6415
1998-99	1059	334	506	219	25774	7628	11523	6622
1999-00	1248	414	605	229	30459	9382	13536	7541
2000-01	1437	494	705	238	35144	11136	15548	8460
2001-02	1400	497	659	244	35972	11688	16151	8133
2002-03	1358	459	639	261	36939	11717	16485	8736
2003-04	1385	465	657	263	39997	12683	17851	9463
Growth rate	0.07	0.60	0.43	-0.09	1.55	2.13	1.92	0.32

Fig. 3.4
Growth of inpatients and outpatients in Kerala over the period 1980-81 – 2003-04

Inpatients



Outpatients



3.5. Health Care Condition: District Level

District wise analysis of the health care condition will be useful for identifying the health care accessibility of the different strata of the society.

There are wide variability across the districts of Kerala in terms of health care indicators. The IMR ranges from 8 in Kollam to 22in Wayanad. There is a coefficient of variation of 36. In case of institutional delivery at the public system also there are marked variability. 67.3 percent of institutional deliveries in Trivandrum district are in public system, while it is only 11 percent in Kasargod district (Table 3.29).

Crude Birth Rate (CBR) in all districts of the state is comparatively low when compared to the other states. Highest CBR recorded in the year 1999 is 21.92 at Malappuram followed by Kozhikode with 20.27 and it was 36.55 and 28.68 respectively inn the year 1991 (Table 3.30). The reason for the high rate of birth rate may be due to the domination of the Mulsim community.

Same is the case with TFR also. Thus, it is evident that there is a difference between north and south Kerala in the case of TFR. The entire southern districts show the average of below 2.5 where in the northern state, it is above 3. In short, we can say that there exist wide disparities in the health status across the districts. As we have already pointed out, locational factors play an important role in determining the health care accessibility which determine the health status. The Table 3.31 clearly shows about the existing condition of the hospital strength.

Table 3.29
District wise health system

District	IMR (per 1000 birth)	Life expectancy at birth (Years)	CBR (per 1000 population)	TFR (per woman)	FAC (%)	Institutional Deliveries (%)		Complete Immunisation (%)	Low Birth Weight (%)	Suicide Rate (per lack population)	Number of beds (per lack of population
						Public	Private				
Thiruvananthapuram	11.0	75.2	16.4	1.6	71.8	67.3	32.6	81.6	11.4	33.4	238.0
Kollam	8.0	77.1	16.2	1.6	90.2	48.3	51.6	90.6	12.0	43.6	92.0
Pathanamthitta	8.0	76.7	14.5	1.5	84.8	27.5	72.4	91.4	18.0	32.9	97.0
Alappuzha	8.0	77.1	15.2	1.5	93.1	54.4	45.5	97.4	12.0	25.3	207.0
Kottayam	12.0	75.6	15.6	1.6	91.9	40.7	59.2	79.1	18.0	26.3	189.0
Idukki	20.0	72.4	17.0	1.6	82.1	25.4	74.5	90.8	15.0	51.7	96.0
Ernakulam	11.0	75.9	15.7	1.5	89.6	29.1	70.8	93.4	18.0	24.4	150.0
Thrissur	9.0	76.4	16.1	1.6	89.3	28.5	71.4	90.5	13.0	34.3	154.0
Palakkad	11.0	76.1	17.3	1.8	86.2	30.6	69.3	75.1	16.0	33.6	94.0
Malappuram	10.0	75.6	22.4	2.4	78.8	31.4	68.5	59.8	17.0	13.3	71.0
Kozhikode	12.0	75.4	17.4	1.7	93.1	54.3	45.6	90.9	17.0	23.3	210.0
Wayanad	22.0	73.5	19.5	2.0	90.4	54.2	45.7	82.3	30.0	46.7	122.0
Kannur	12.0	75.6	16.6	1.7	90.2	35.9	64.0	84.7	15.0	46.7	127.0
Kasaragod	10.0	75.7	18.9	1.9	75.4	11.1	88.8	87.4	15.0	24.0	77.0
Coefficient of variation (%)	36.0	1.7	12.0	14.4	7.9	39.7	24.9	11.2	28.3	33.6	39.9

Source: Compiled from Kerala Human Development Report, 2005.

Table 3.30
District wise fertility characteristics

Districts	Girls married < 18 years 1998-99	CBR 1999	Birth Order 3+	Children Ever born (CEB)	Institutional deliveries 98-99	Complete immunization 1998-99	CPR 1999
Thiruvananthapuram	2.9	16.92	8.5	2.4	99.5	81.6	81.08
Kollam	2.3	15.39	5.5	2.5	99.0	90.6	63.07
Pathanamthitta	0	15.06	1.9	2.4	99.4	91.4	64.38
Alappuzha	0	13.16	8.0	2.5	100	97.3	72.67
Kottayam	0	15.93	9.7	2.3	99.4	79.1	70.56
Idukki	1.5	13.26	12.6	2.8	93.3	90.8	56.56
Ernakulam	0	16.45	5.9	2.5	99.4	93.4	66.89
Thrissur	2	18.28	13.4	2.6	99.2	90.5	55.92
Palakkad	10.3	18.11	20.8	3.3	93.4	75.1	43.11
Malappuram	35.7	21.92	36.2	4.6	88.0	59.8	70.76
Kozhikode	13.6	20.27	19.2	3.0	98.9	90.9	68.64
Wayanad	8.4	16.99	16.7	3.4	97.7	82.3	62.85
Kannur	19	17.87	26.8	3.9	98.4	84.7	54.30
Kasaragod	18.1	19.86	28.2	3.7	96.7	87.4	64.80

Source: District Atlas of Women and Children in Kerala, Unicef, July 2001, p.52

Apart from health infrastructure in allopathy, ayurveda and homoeo systems of health care have been played vital roles in enhancing the health status of Kerala for centuries. Hence we have made a glance at the health facilities available in ayurveda and homeo systems.

Table 3.31
District wise number of Medical and Paramedical personnel under DHS-2004

Districts	Medical officers	Dentists	Senior Nurses	Junior Nurses	Lady health inspectors	Pharmacists	JPHN (ANMS)	Junior Health Inspectors	Health Inspectors
Thiruvananthapuram	428	6	305	1099	71	194	527	296	75
Kollam	234	6	81	335	79	102	427	292	84
Pathanamthitta	156	4	27	180	44	70	266	184	43
Alappuzha	253	7	158	606	71	133	381	224	53
Kottayam	229	5	101	663	61	108	328	220	51
Idukki	116	4	24	129	59	63	315	223	56
Ernakulam	329	9	171	657	76	148	427	265	64
Thrissur	304	8	166	610	99	162	499	328	79
Palakkad	253	6	73	356	80	127	515	294	71
Malappuram	287	6	67	384	97	136	589	333	83
Kozhikode	267	3	203	889	67	156	419	272	66
Wayanad	110	4	28	142	34	46	205	126	30
Kannur	253	3	102	397	83	132	423	290	74
Kasaragod	134	3	31	145	41	61	249	168	38
Kerala	3353	77	1537	6590	962	1638	5570	3515	867

Source: Economic Review 2004

But, in the case of number of beds under ayurvedic system of medicine in Kerala, Thrissur ranks first with 90 ayurveda institutions.

3.5.1 Index on inter district disparities in health status

The previous sections in this chapter clearly show that there exist wide disparities in health care status in Kerala. Different districts have their own priorities in different variables. Two indices have been constructed to capture the disparities of achievements and deprivations in health care status among the districts (Table 3.32).

Table 3.32
District wise health achievement and deprivation indices

District	Achievement Index		Deprivation Index	
	Score	Rank	Score	Rank
Thiruvananthapuram	0.794	2	0.218	5
Kollam	0.652	4	0.230	6
Pathanamthitta	0.551	8	0.173	2
Alappuzha	0.896	1	0.087	1
Kottayam	0.607	7	0.246	7
Idukki	0.307	13	0.496	13
Ernakulam	0.608	6	0.202	3
Thrissur	0.619	5	0.204	4
Palakkad	0.420	11	0.336	10
Malappuram	0.261	14	0.489	12
Kozhikode	0.767	3	0.287	8
Wayanad	0.476	10	0.812	14
Kannur	0.530	9	0.367	11
Kasaragod	0.368	12	0.323	9

Source: Computed from Kerala Human Development Report 2005

For constructing achievement index, we have selected life expectancy, institutional delivery, complete immunisation rate, number of beds per lack of population and for the deprivation index the variables like IMR, CBR, percentage of low birth weight and suicide rate per lack of population have been selected. We followed UNDP methodology for the construction of index (UNDP 1990[16]). From

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[16] $$\text{Dimension Index} = \frac{X_i - \text{Minimum}(X_i)}{\text{Maximum}(X_i) - \text{Minimum}(X_i)}$$

Where, X_i = actual value of the i^{th} indicator.

United Nations Development Programme (1990), Human Development Report *1990, Oxford University Press, New York.*

the table, it is seen that sothern districts have achieved more while northern districts are deprived off health status. Thrissur, Ernakulam, Pathanamthitta and Kottayam stand as moderate districts with the achievement index value ranges from 0.55 to 0.65.

3.6 Conclusion

In this chapter, we have made an overview of the health care status of Kerala with comparison to other Indian states as well as at disaggregated district level. We could see that Kerala's position is the highest among other Indian states with regard to health and demographic indicators and Kerala has achieved advanced health care facilities. Though, Kerala has the advantage of high health status, inter-regional variations exist in among the districts of Kerala. Even with more than 50 years of attempts, there exists a north-south division in Kerala, though the division is meagre. As the geographical position has importance we have selected a moderate district (Thrissur) for our indepth analysis.

CHAPTER IV
Morbidity and Hospitalisation in Kerala: Evidence from NSSO Data

The objective of this chapter is to provide a background information about the morbidity and hospitalisation pattern in Kerala based on secondary data. The major data sources of health system available in India are National Family Health Surveys, DHS surveys and National Sample Survey Organisation (NSSO) survey results. Among them, the most comprehensive data set is available from NSSO. In this chapter, data from NSSO rounds, especially unit level data on 52nd and 60th Round has been relied upon. The chapter is divided into five sections. The fist section deals with a review of earlier works done using NSSO data for the analysis of health care in Kerala and all India level. The second section deals with the NSSO survey details. The third section analyses the morbidity pattern in Kerala and India. Fourth section is devoted to the hospitalisation in Kerala and India. Ageing and health care are dealt with in the fifth section. The sixth section deals with the health care of women and children. The last section analyses the determinants of health care by using an econometric model.

4.1. Review of literature on unit level data of NSSO rounds

There are very few studies which deals with health care system in India using NSSO unit level data. Dilip (2002)[1], using 52nd NSSO Round data, examined the prevalence of ailments and hospitalisation in Kerala. Using multivariate analysis of logistic regression, he reported that age and seasonality had considerable effects on the morbidity of individuals and the burden of ill health was higher in rural areas than in urban areas. He opined that people who were more likely to have a better lifestyle had a higher level of morbidity and

[1] T.R. Dilip (2002), 'Understanding levels of morbidity and hospitalization in Kerala, India', *Bulletin of the World Health Organization,* 80 (9).

hospitalisation and factors like physical accessibility of health care services and capacity to seek health care services could create artificial differences in morbidity and hospitalisation among different subgroups of the population in Kerala.

Levesque (2005)[2] was the first to assess the accessibility to health care in urban Kerala using the NSSO database. He used multi level logistic regressions (with binomial link function) to use model utilisation (vs. non-utilisation) of health care services among those reporting an illness episode and utilisation of private (vs.public) providers as source of care. Multinominal regression (with multinominal link function) was used to model source of hospital care using three response category variables. It is considered to be the first multi level assessment of health care utilisation in the Indian context and this method is increasingly used in studies where lower level units are nested into higher units because of sampling design, or because of naturally occurring clustering.

Borah (2006)[3], using 1996 NSSO data, found that price and distance to a health facility play significant roles in health care provider choice decision. However, he added that, when the health status is poor, distance plays a less significant role in an adult individual's provider choice decision. He found that price elasticity of demand for outpatient care is higher in people with lower income groups compared to those from the higher income groups. Similarly, outpatient care for children is more price sensitive than that of adults which was perhaps reflective of the socio-economic structure of a typical household in rural India, where an adult's health is more important than that of a child for the household's economic conditions. He advocated that this was the first application

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[2] Jean-Frederic Levesque (2005), *Deconstructing access to health care in urban south India: Multilevel methodologies to assess the impact of community characteristics on utilization of health services,* Working Paper, IGIRD (www.igird.ac.in/whatsnew/csh/Jean-Fredric.doc)

[3] Bijan Jyoti Borah (2006), 'A mixed logit model of health care provider choice: Analysis of NSS data for rural India', *Health Economics,* 15 (9).

of the MMNL (Mixed Multi Nominal Logit) model to analyse health care provider choice in rural India using nationally representative household survey data.

Levesque et al. (2006)[4] confirmed high utilisation of private outpatient care in Kerala and suggested problems of access was mainly confined to the poorest. Using multilevel analysis of individual and urban characteristics from the NSSO 1995-96 survey data, they recorded high level of utilisation (83.6 per cent) of allopathic medical services. Their study pointed to the need for continuing improvements and development of public health systems in urban areas of developing countries, especially in medium-sized towns, as a means to promote equity.

4.2. National Sample Survey Organisation (NSSO) Surveys:

The NSSO carried out the first all India Survey on Social Consumption in its 35th Round (July 1980 –June 1981). The items covered were the public distribution system, health services including mass immunisation and family welfare programmes, and educational services. The results of the survey could not be brought out owing to some unavoidable reasons. The second survey on Social Consumption was carried out in the 42nd Round (July 1986 – June 1987) with some modifications in the coverage of subjects. Topics like problems of aged persons were included in this round. The third survey on Social Consumption was carried out in the 52nd Round (July 1995 – June 1996). Two topics, viz., utilisation of public distribution system and utilisation of family planning services, were dropped, as these were covered in NSSO 50th Round and in a nationwide survey by the Ministry of Health and Family Welfare, respectively.

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[4] Jean-Frederic Levesque, Slim Haddad, Delampady Narayana and Pierre Fournier (2006), 'Outpatient care utilization in urban Kerala, India', Oxford University Press and The London School of Hygiene and Tropical medicine.

The NSSO 60th Round (January – June 2004) was based on the enquiry on morbidity and health care. The entire area of the country was covered with the exception of some interior areas of Nagaland, Andaman & Nicobar Islands, Leh (Ladakh) and Kargil districts of Jammu & Kashmir. A total of 73868 households with a population of 383338 were covered in the survey. In Kerala 2829 households were surveyed scanning a population of 13333. The estimated households throughout India were 198770700 with a population of 958921600 individuals and in Kerala the estimated households were 7197500 with a population of 31448000 persons. The details of the villages/blocks, households, persons and aged persons and its corresponding estimated figures in Kerala and India are shown in Appendix 4.1. The estimated household and population covered under the survey among different socio economic groups are given as Appendix 4.1, 4.2 and 4.3.

4. 3. Morbidity pattern in Kerala and India

There is a well-established direct association between morbidity reporting and level of health consciousness. Ailment, such as illness or injury, mean any deviation from the normal state of physical and mental well-being. An ailment may not necessarily cause any hospitalisation, confinement to bed or restricted activity. An ailing member is a normal member of the household who is suffering from any ailment during the reference period. It also includes cases of visual, hearing, speech, locomotor and mental disabilities (ii) injuries will cover all types of damages, such as cuts, wounds, haemorrhage, fractures and burns caused by an accident, including bites to any part of the body (iii) cases of spontaneous abortion – natural or accidental. But this will not include (i) cases of sterilization, insertion of IUD, getting MTP, etc. (ii) cases of pregnancy and child birth (NSSO 2006)[5].

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[5] NSSO (2006), *Morbidity, Health Care and the Condition of the Aged, NSSO 60th Round (January-June 2004)*, Report No. 507, p.5.

The morbidity pattern of Kerala during the 52 and 60th round of NSSO are reported in Table 4.1 The morbidity rate is reported as highest in Kerala both in Persons Reporting Ailment (PAP) and Reporting commencement of any ailment (PPC). PAP was reported as 255 in rural Kerala as against 88 in rural India in 2004. In urban areas also Kerala reported highest PAP of 240 as against 99 from all India. PPC was reported as 103 in rural Kerala and 240 in urban area as against 45 in rural India and 44 in urban India. The rate of PAP from the year 1995-96 to 2004 is higher (116 per cent) in Kerala when compared to all India change (60 per cent). The infant mortality rates are quite high both in rural and urban areas of Kerala.

Table 4.1
Number (per 1000) of persons reporting ailment (PAP)
and number reporting commencement of any ailment (PPC)
during last 15 days, along with mortality rate (IMR) for Kerala and India

Year	Area	Indicators	Kerala	India
1995-96	Rural	PAP	118	55
		PPC	60	31
		IMR	15	79
	Urban	PAP	88	54
		PPC	43	30
		IMR	15	17
2004	Rural	PAP	255	88
		PPC	103	45
		IMR	11	*69
	Urban	PAP	240	99
		PPC	100	44
		IMR	8	*40

* Excludes Nagaland
Source: NSSO Reports Nos. 441 & 507

The debates on whether high morbidity of Kerala is a positive indicator exists or not. As people in Kerala are highly educated and more aware, the ailments are easily diagnosed and this is often cited as reasons for high morbidity (Murray and Chen 1990[6], Kannan et al. 1991[7]; Gamber and Berman 1997[8]).

[6] C.J.L. Murray and L.C. Chen (1990). "Understanding morbidity change", *Population and Development Review*, 18.

The MPCE class wise distribution of morbidity are given in Table 4.2. In Kerala, out of the estimated population of 7930800 persons who reported ailments during the reporting time of last 15 days, 25 per cent reported different types of ailments. Among them, 31 per cent was from the MPCE class of Rs.1285 and above, which is the highest MPCE class. The lowest ailment rate (18 per cent) was reported in the MPCE class Rs.460-520. There is no difference in ailments gender wise in the case of highest morbidity rate. But the lowest morbidity rate for male was reported in the second MPCE class, i.e., Rs. 235 – 265 and the lowest rate for female was reported in the MPCE class of 460 – 520, i.e., seventh MPCE class.

The rural urban comparison shows that the higher morbidity rate was reported in rural area with a rate of 26 per cent as against 24 per cent in urban area. In rural area, the highest morbidity rate was reported in the lowest MPCE class, i.e, very poor class, with a rate of 30.4 per cent. But in urban area the highest morbidity rate was reported in the highest MPCE class with a rate of 32.4 per cent. The gender wise analysis shows that the males in poor households reported highest morbidity (39 per cent) in rural area. But, the females from the highest MPCE class reported highest morbidity in rural area with a rate of 33.5 per cent. But in urban area, males from the highest MPCE class reported highest morbidity rate of 37 per cent and the females from the 10^{th} MPCE class, i.e, Rs.1120 - 1500 , reported the highest rate of 32 per cent. The MPCE morbidity analysis shows that there exist wide differences in rural-urban, male-female and MPCE classes.

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[7] K.P. Kannan, K.R. Thankappan, V. Raman Kutty and K.P. Aravindan (1991). *Health and Development in Rural Kerala*, Integrated Rural Technology Centre of the Kerala, Sastra Sahitya Parishad.

[8] A. Gumber and P. Berman (1997). "Measurement and pattern of morbidity and utilization of health services: Some emerging issues from recent health surveys in India", *Journal of Health and Population in Developing Countires,* 1: 16-43.

Table 4.2

Number per 1000 of persons reporting ailment during the last 15 days by MPCE class for Kerala and India

Area	MPCE Class	Kerala			India		
		Male	Female	Total	Male	Female	Total
Rural	0-225	390	229	304	65	63	64
	225-255	133	266	202	57	56	56
	255-300	276	190	228	61	66	64
	300-340	290	217	252	65	67	66
	340-380	161	237	203	72	81	77
	380-420	250	214	231	79	81	80
	420-470	168	158	193	80	92	86
	470-525	219	289	257	88	99	93
	525-615	247	239	243	88	100	94
	615-775	245	257	251	106	119	112
	775-950	273	316	296	123	151	137
	950+	266	335	302	142	189	165
	All	242	266	255	83	93	88
Urban	0-300	187	173	179	68	61	65
	300-350	179	169	174	86	92	89
	350-425	136	204	172	80	85	83
	425-500	171	200	186	77	89	83
	500-575	222	152	184	80	90	85
	575-665	185	282	238	73	98	85
	665-775	179	235	208	91	113	101
	775-915	223	199	211	85	102	93
	915-1120	243	240	242	88	115	100
	1120-1500	310	321	316	111	126	118
	1500-1925	299	302	301	104	127	115
	1925+	369	285	324	132	168	149
	All	235	244	240	91	108	99
Rural + Urban	0-235	267	194	228	66	62	64
	235-265	154	221	189	62	61	62
	265-320	214	196	204	65	70	67
	320-365	213	206	210	69	74	71
	365-410	186	203	195	74	82	78
	410-460	225	241	234	77	84	81
	460-520	171	184	178	83	98	90
	520-605	220	269	246	87	100	93
	605-730	246	239	243	88	104	96
	730-980	258	270	264	107	121	114
	980-1285	278	314	297	119	145	132
	1285+	280	328	305	139	181	159
	All	240	261	251	85	97	91

Source: NSSO Report No. 507, p.A-134-A150

Another interesting break up of the morbidity pattern would be the caste wise break up. The results given in Table 4.3 shows that SC population got more ailments with a rate of 27 per cent. Gender wise comparison shows that it is SC women who reported highest morbidity with a rate of 29 per cent, while it is the males from other category that got more ailments with a rate of 25 per cent. In

rural area, SC population reported highest rate of morbidity with a rate of 27 per cent and gender wise comparison also shows that SC males (25 per cent) and females (30 per cent) suffered much when compared to other category. In urban area, other category reported highest morbidity rate (29 per cent) as in gender wise (28 per cent each for males and females).

Table 4.3
Number per 1000 of persons reporting ailment during the last 15 days by caste group for Kerala and India

Area	Caste	Kerala			India		
		Male	Female	Total	Male	Female	Total
Rural	ST	221	304	264	52	63	58
	SC	245	299	272	83	93	88
	OBC	242	258	250	82	92	87
	Others	242	268	255	98	106	102
Urban	ST	0	149	79	60	63	61
	SC	227	264	249	80	91	86
	OBC	214	224	220	84	98	91
	Others	279	277	278	102	125	113
Total	ST	190	282	238	53	63	58
	SC	242	292	268	83	93	88
	OBC	234	249	242	82	93	88
	Others	252	271	261	99	113	106

Source: NSSO Report No. 507, p A-134-A150

The age wise classification (Table 4.4) shows that individuals above 60 age group reported more illness (57 per cent) in both rural (58 per cent) and urban areas (55 per cent) .

Table 4.4

Number of per 1000 of populations reporting ailment during the last 15 days by sex and age-group for Kerala and India

Area	Age group	Kerala			India		
		M	F	T	M	F	T
Rural	0-14	222	186	205	76	68	72
	15-29	118	160	141	41	57	49
	30-44	192	220	207	64	93	78
	45-59	315	390	353	107	132	119
	60 & Above	562	586	575	285	282	283
	All	242	266	255	83	93	88
Urban	0-14	255	198	226	84	74	79
	15-29	122	136	129	44	56	50
	30-44	137	153	146	64	95	79
	45-59	322	363	344	127	173	149
	60 & Above	529	574	554	352	383	368
	All	235	244	240	91	108	99
Total	0-14	229	189	210	78	69	74
	15-29	119	154	138	42	56	49
	30-44	177	203	191	64	93	78
	45-59	317	382	350	113	143	128
	60 & Above	554	583	570	301	307	304
	All	240	261	251	85	97	91

Source: NSSO Report No. 507, p A127-132

The ailments reported in Kerala among the different socio-economic groups have been presented in the Table 4.5. Of the total population, 252 per thousand of population reported ailment. Among the caste group, the highest ailment rate was reported in SC group with 269 per thousand population followed by OBC with 243. The religion wise break up shows that the highest rate of morbidity was reported among Christians with 310 per thousand followed by Hindus with 247 per thousand population.

Table 4.5
Ailments reported by different socio-economic groups in Kerala and India

Selected Variables	Description	No. of persons ailed in last 15 days	Morbidity rate per 1000 population
Caste	ST	107621	238
	SC	909626	269
	OBC	4327401	243
	Others	2564325	262
Religion	Hinduism	4607813	247
	Islam	1462416	212
	Christianity	1838743	310
Place of residence	Rural	5948022	255
	Urban	1960951	241
MPCE Quartile Group	0 –25	670707	206
	25 – 50	1726341	228
	50 – 75	2823475	246
	75 – 100	2688448	295
Size of household	3 & below	1865221	331
	4 – 5	3659513	252
	6 – 7	1525959	233
	8 & Above	858279	182
Type of household	Self employed in non-agri.	1909237	246
	Agri.labour/regular wage/salary earners	1315281	242
	Casual labour/Other labour	2407258	263
	Self employed in agriculture	1043745	261
	Others	1229049	244
Sex	Male	3594125	241
	Female	4314848	261
Age (years)	0 – 4	713249	271
	5 – 14	960211	179
	15 – 34	1433691	137
	35 – 59	2736361	288
	60 & above	2065460	584
Total		7904570	252

Source: Computed from NSSO unit level data

The place of residence group showed that more morbid persons were found in rural area with 255 per thousand whereas it was 241 in urban area. MPCE group break up showed that high income group showed high morbid person. Here, the highest MPCE group, the quartile group 75 – 100 reported 295 per

thousand population followed by the third quartile group with 245 per thousand population. The number of persons living in a household and morbidity rate showed an inverse relationship. A group of 3 and below in a household showed highest morbidity rate, i.e., 331 per thousand population followed by the size group 4 – 5 with 252 per thousand population. Among the type of household group, it is casual labour/ other labour group that reported high morbid values (263 per thousand population) followed by self employed groups in agriculture (261 per thousand population). Gender wise classification showed that females were more morbid 261 per thousand population when compared to males (241 per thousand population). The age group classification showed that aged persons were more morbid (584 per thousand of population) when compared to other age groups.

The type of ailments reported in Kerala shows that fever of unknown origin is the major ailment with a share of 15.9 per cent, followed by other diagnosed ailments (15.7 per cent) and respiratory diseases (12.7 per cent). There were some variability across the castes in the occurrence of disease as well. Psychiatric diseases, heart problems, accidents and injuries are highest among STs, while highest rates of diabetic and hyper tension were reported among forward caste (Table 12.6).

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Table 4.6

Percentage distribution of population with reported ailments in 15 days reference period in Kerala

Type of ailments	ST	SC	OBC	Others	Total Number	Percentage
Fever of unknown origin	3.1	20.6	15.3	15.8	1361474	15.9
Other diagnosed ailments	28.2	18.0	17.2	11.9	1341840	15.7
Respiratory including ear/ nose/throat ailments	29.1	14.0	12.5	11.8	1083251	12.7
Disorders of joints and bones	1.9	8.5	7.5	10.6	734962	8.6
Hyper tension	0.0	4.3	8.1	9.9	698824	8.2
Diabetes mellitus	1.3	3.4	6.3	8.2	561566	6.6
Bronchial asthma	0.0	3.7	5.1	4.6	405586	4.7
Heart disease	8.8	2.2	4.0	4.1	335432	3.9
Neurological disorders	8.4	2.2	2.7	2.7	232307	2.7
Gastritis/gastric or peptic ulcer	5.9	2.7	2.4	2.3	209368	2.4
Accidents/injuries/burns/ fractures/poisoning	2.9	2.1	2.5	1.4	181897	2.1
Other undiagnosed ailments	0.0	1.1	2.3	1.2	151779	1.8
Diseases of skin	0.0	2.9	1.2	2.3	150339	1.8
Locomotor	0.0	1.7	1.5	1.3	123176	1.4
Psychiatric disorders	4.5	1.3	1.1	1.7	116522	1.4
Cataract	0.0	1.1	1.0	1.4	95773	1.1
Wooping cough	1.4	0.6	1.4	0.7	90034	1.1
Diseases of kidney/ urinary system	0.0	1.3	0.8	0.9	73473	0.9
Gynaecological disorders	4.4	0.1	1.0	0.8	73090	0.9
Diarrhoea/Decentry	0.0	0.8	1.1	0.4	68920	0.8
Hearing	0.0	1.1	0.6	0.8	60258	0.7
Tuberculosis	0.0	1.7	0.6	0.4	54778	0.6
Visual including blindness (excluding cataract)	0.0	0.3	0.6	0.9	54739	0.6
Diseases of mouth/teeth/gum	0.0	1.1	0.5	0.4	48242	0.6
Cancer and other tumours	0.0	0.4	0.6	0.2	36047	0.4
Worm infestation	0.0	0.2	0.4	0.5	34580	0.4
Eruptive	0.0	0.0	0.1	0.9	29203	0.3
Speech	0.0	0.4	0.2	0.3	23255	0.3
Goitre	0.0	0.2	0.2	0.4	22607	0.3
Conjunctivitis	0.0	0.8	0.1	0.4	22497	0.3
Anaemia	0.0	0.2	0.4	0.0	22338	0.3
Amoebiosis	0.0	0.0	0.3	0.3	19434	0.2
Glaucoma	0.0	0.0	0.2	0.2	14773	0.2
Filariasis/Elephantiasis	0.0	0.6	0.0	0.0	6802	0.1
Prostatic disorders	0.0	0.4	0.1	0.0	6336	0.1
Mumps	0.0	0.0	0.1	0.0	4402	0.1
Diphtheria	0.0	0.0	0.0	0.1	3800	0.0
Tetanus	0.0	0.0	0.0	0.1	3723	0.0
Hepatitis/Jaundice	0.0	0.0	0.0	0.0	2165	0.0
Under-nutritiion	0.0	0.0	0.0	0.0	1870	0.0
Total	100.0	100.0	100.0	100.0	8561462	100.0

Source: Computed from NSSO unit level data

4.3.1. Source of Treatment and Cost of Treatment:

Given the nature and extent of morbidity pattern in the previous section, this section intends to examine the sources of treatment and cost involved in treatment. The change in the share of government institutions in the case of non-hospitalized treatment of ailments for Kerala and India over the period is given in Table 4.7. It can be seen that there has been a marginal change in the share at the all-India level in both rural and urban areas. In rural Kerala, the percentage of receiving non-hospitalized treatment has decreased from 37 per cent in 1986-87 to 32 per cent in 2004, with highest decline in 1995-96 with 28 per cent. But, in urban Kerala, a steady increase is seen from 22 per cent in 1986-87 to 28 per cent in 1995-96 which again increased to 33 per cent in 2004.

Table 4.7
Percentage of treated ailments receiving
non-hospitalised treatment from government sources

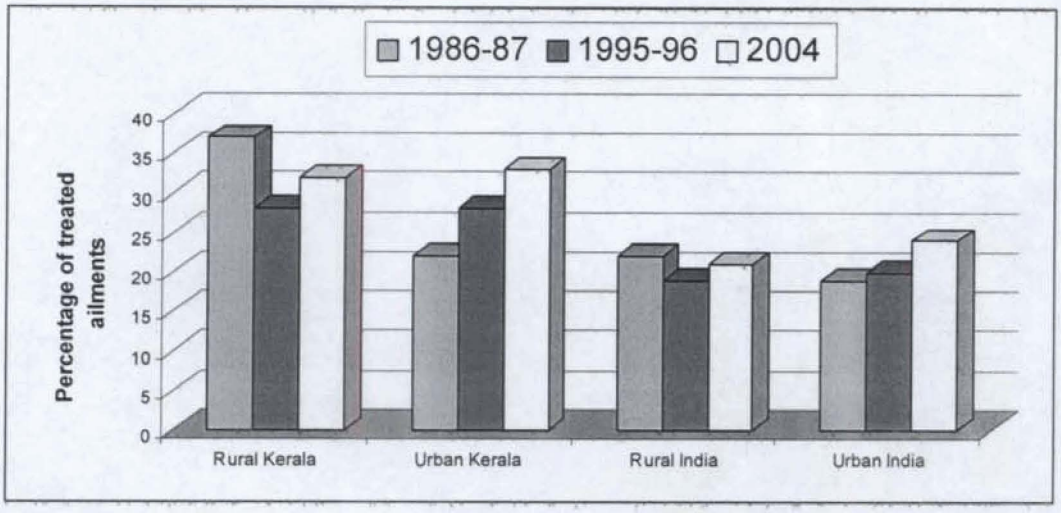
Area	Year	Kerala	India
Rural	1986-87	37	22
	1995-96	28	19
	2004	32	21
Urban	1986-87	22	19
	1995-96	28	20
	2004	33	24

Source: NSSO Report No. 507, p.23.

The following figure shows the percentage share of treatment received as non-hospitalized treatment over the years. It can be seen that the percentage share of using sources are higher when compared to all India figure. While comparing the rural and urban sector from Kerala and India a similar trend was noticed whereby the percentage share of resource utilization was found decreasing in rural areas while the same increased in urban areas.

Fig 4.1

Percentage share of using non-hospitalized treatment from government source over the years in Kerala and India



Wide variations are seen in the percentage of ailments treated from government sources. Percentage of spells ailments treated is higher in urban area (90) when compared to rural area (87). In the urban area, although the proportion of treated cases of ailments was, in general, higher than in the rural, the reliance on the government health institutions was less in the rural areas (Table 4.8). This is perhaps, to some extent, due to easy availability of and accessibility to the private health institutions in urban. Here, both in rural and urban Kerala private source dominates with 63 per cent and 78 per cent respectively.

Table 4.8

Percentage of spells of ailments treated (non-institutional) during 15 days and percentage distribution of treated spells of ailments by source of treatment in Kerala and India (2004)

Area	Indicators		Kerala	India
Rural	Percentage spells of ailments treated		87	82
	Source of treatment (Percentage)	Government	37	22
		Private	63	78
Urban	Percentage spells of ailments treated		90	89
	Source of treatment (Percentage)	Government	22	19
		Private	78	81
Source: NSSO Report No. 507, p.22				

4.3.2 Total expenditure per non-hospitalised ailing person

Given the nature of non-hospitalisation , we have to examine the average cost involved in it to measure the its impact on households. It is seen that the average total expenditure per treated ailment was Rs. 285 and Rs. 326 in rural and urban areas respectively at the all India level (Table 4.9). The medical expenditure per treated ailment varied widely across the states. In the rural areas, it varied from Rs. 182 in Kerala to Rs. 390 in Rajastan and in the urban areas from Rs. 193 in Kerala to Rs. 443 in Jammu & Kashmir. However, its noteworthy that in Kerala, the proportion of cases treated through government institutions was also very high.

Often ailment of a working member of the household causes loss of household income. Ailment of a non-working member too causes disruption of usual activity of the working member. The loss of household income was Rs. 72 for rural Kerala and Rs. 83 for urban Kerala. For all India, Rs. 135 and Rs. 96 were reported in rural and urban areas receptivity. The loss of household income was the highest in Bihar (Rs. 585) followed by Himachal Pradesh.

Table 4.9
Average medical and other related non-medical expenditure per treated person during 15 days by source of treatment (Rs.)

Indicators		Kerala		India	
		Rural	Urban	Rural	Urban
Medical expenditure by source of treatment	Government	3	5	11	7
	Private	179	189	246	299
	All	182	193	257	306
Other expenditure		16	13	27	20
Total expenditure		198	203	285	326
Loss of household income per treated person		72	83	135	96

Source: NSSO Report No. 507, p 41,42

4.3.3 Type of medical services received for Outpatients

The important medical services provided for ailing persons among those who were medically treated but not as inpatient of hospital during the reference period of last 15 days are (i) surgery, (ii) medicine (iii) X-ray, ECG, EEG, Scan, and (iv) other diagnostic tests (Table 4.10).

Table 4.10

Per 1000 distribution of ailing persons among those who were medically treated but not as inpatient of hospital during last 15 days by type of payment made for availing some services for each category of specific medical service for Kerala and India

Kerala/ India	Medical service	Area	Type of payment for services					No. of persons with ailments treated	
			Medical service not received/ required	Services received			Total	Estimated No (00)	Sample
				Free	Partly free	On payment			
Kerala	Surgery	Rural	982	2	3	12	1000	49700	1797
		Urban	995	1	0	4	1000	17272	939
		Total	986	2	2	10	1000	66971	2736
	Medicine	Rural	28	111	85	776	1000	49861	1802
		Urban	50	66	63	821	1000	17330	942
		Total	33	99	79	788	1000	67191	2744
	X-ray, ECG, EEG, SCAN	Rural	959	7	5	29	1000	49598	1794
		Urban	965	1	12	22	1000	17227	937
		Total	961	5	7	27	1000	66825	2731
	Other diagnostic tests	Rural	888	16	9	88	1000	49395	1788
		Urban	892	10	4	94	1000	17240	938
		Total	889	14	7	90	1000	66635	2726
India	Surgery	Rural	984	4	0	12	1000	499762	18166
		Urban	987	3	0	10	1000	210686	11581
		Total	925	3	0	11	1000	710448	29747
	Medicine	Rural	104	64	42	790	1000	505239	18398
		Urban	82	70	38	811	1000	211746	11676
		Total	97	66	41	796	1000	716986	30074
	X-ray, ECG, EEG, SCAN	Rural	948	6	1	44	1000	499872	18159
		Urban	936	8	2	54	1000	210571	11566
		Total	945	6	2	47	1000	710443	29725
	Other diagnostic tests	Rural	891	14	3	92	1000	499190	18146
		Urban	872	17	5	107	1000	210569	11569
		Total	885	15	4	96	1000	709758	29715

Source: NSSO Report No. 507, p.A210-A221

Among those services, it is the service of medicine, which was used by 97 per cent people in Kerala. Among the medicine users, 78 per cent received it on payment freely, 8 per cent received as partly free and 10 per cent received as freely. The percentage share of receiving medicine as freely is higher (11 per cent) in rural area when compared to urban area (7 per cent). The other important service received was other diagnostic test. 11 per cent of the people in this category used this service. Only 1.4 per cent received it freely. While, 4 per cent received X-ray, ECG, EEG and scan facilities, only 1 per cent received the service of surgery.

4. 4. Hospitalisation in Kerala

The pattern of hospitalisation in Kerala indicates an increase in the inpatient treatment both in rural and urban areas. The proportion is higher in rural areas compared to the urban areas. The results also shows that there is a five times higher incidence of hospitalisation in Kerala compared to the all India figures in rural areas and three times higher figure for urban areas. The results are given in Table 4.11.

Population per hospitalised bed is an important indicator of health infrastructure. It shows that for 382 patients there is one bed in Kerala compared to 1412 at the all India level.

Table 4.11
Proportion (per 1000) of persons hospitalised
in rural and urban areas and population per bed in the state

Year	Indicators	Indicators	Kerala	India
1995-96	No. per 1000 hospitalised	Rural	70	13
		Urban	65	20
	Population per hospitalised bed		382	1412
2004	No. per 1000 hospitalised	Rural	101	23
		Urban	90	31
	Population per hospitalised bed		325	1503

Source: NSSO Reports Nos. 441 & 507

The public private classification of persons treated indicates that the private hospitals outnumber public facilities in the case of in-patient treatment. In the rural Kerala 64 percentage are treated in private hospitals, while the corresponding rate are only 58.3 percentage at all India level (Table 4.12). In the case of urban patients 65 percentage are treated by private hospital compared to 61 percentage at the all India level.

Table 4.12
Number (per 1000) of hospitalised cases treated in public hospital and private hospital (2004)

Area	Indicators	Kerala	India
Rural	Government hospital	356	417
	Private hospital	644	583
Urban	Government hospital	346	382
	Private hospital	654	618
Percentage of beds in government hospitals		31	62

Source: NSSO Report No. 507, p.28.

The average annual hospitalisation rates are around 9.7 percentage (Table 4.13). The rates are higher for rural areas compared to urban areas and males do have higher incidence of inpatient treatment compared to females. Among the age wise classification, old age people above 60 and children below the age of 4 have higher incidence of hospitalisation.

Table 4.13
Hospitalisation during last 365 days

Selected Variables	Description	No. of persons hospitalised	Annual Hospitalisation Rate (Percentage)
Caste	ST	38832	8.6
	SC	305477	9.0
	OBC	1738162	9.8
	Others	959736	9.8
Religion	Hinduism	1711140	9.2
	Islam	648020	9.4
	Christianity	680172	11.5
	Others	2875	100.0
Place of residence	Rural	2322183	10.0
	Urban	720024	8.8
MPCE Quartile Group	0 -25	296309	9.1
	25 - 50	759202	10.0
	50 - 75	1132495	9.9
	75 - 100	854202	9.4
Size of household	3 & below	672107	11.9
	4 - 5	1309308	9.0
	6 - 7	660716	10.1
	8 & Above	400076	8.5
Type of household	Self employed in non-agriculture	695636	9.0
	Agri.labour/regular wage/salary earners	502611	9.2
	Casual labour/Other labour	950918	10.4
	Self employed in agriculture	431454	10.8
	Others	458197	9.1
Sex	Male	1535551	10.3
	Female	1506657	9.1
Age (years)	0 - 4	331898	12.6
	5 - 14	315770	5.9
	15 - 34	726384	7.0
	35 - 59	964200	10.2
	60 & above	703955	19.9
Total		3042207	9.7

Source: Computed from NSSO unit level data

4.4.1 Cost of hospitalisation:

A major indicator, which have direct impact on health care affordability is the cost of treatment. The NSSO data gives and interesting picture of lower average hospitalisation cost in Kerala compared to the all India level. This is true in the case of both rural and urban areas as well as public and private systems of medicine. As evident in Table 4.14 one can observe that on an average in rural Kerala Rs. 4059 is spent per hospitalisation, where as it is Rs. 6225 for rural India. In urban Kerala, the average cost is Rs. 5201 compared to an all India rate of Rs. 9367. The loss of household income due to hospitalisation is also lower in Kerala compared to the all India level.

Table 4.14
Average medical and total expenditure per hospitalisation case by type of hospital and loss of household income due to hospitalisation in Kerala and India (Rs.)

Indicators		Kerala		India	
		Rural	Urban	Rural	Urban
Medical expenditure by source of treatment	Government	2174	2600	3238	3877
	Private	4565	6179	7408	11553
	All	3717	4954	5695	8851
Other expenditure		342	247	530	516
Total expenditure		4059	5201	6225	9367
Loss of household income		431	578	636	745

Source: NSSO Report No. 507, p..43,44.

4.5. Women, children and aged

The availability of health care facilities to women and children are very important in the context of overall health care accessibility.

Women

Antinatal and pre-natal treatment are another important indicator of the health care availability for women and children. From Table 4.15, one can observe that a major proportion of women in Kerala are receiving anti natal and pre natal

treatment compared to all India, even though the cost of treatment is higher in Kerala. For antenatal care services, average expenditure is highest in private sector. In Kerala, expenditure on PWANC is highest in urban area while that of PWPNC is highest in rural. But in India, the expenditure on PWANC as well as PWPNC is highest among urban area. In India, the urban-rural difference is very visible in the case of above said categories. Likewise, the expenditure on natal care services is seen as highest in private sector compared to government sector.

Table 4.15
Number (per 1000) of women who availed antenatal and post natal care services in Kerala and India

Services	Indicators		Kerala		India	
			Rural	Urban	Rural	Urban
Antenatal care services	PWANC		958	976	698	836
	Services from government sources		294	290	609	462
	Average expenditure (Rs.)	Government	1337	1163	230	356
		Private	1492	1905	918	1377
		All	1446	1690	499	905
Post-natal care services	PWPNC		873	830	626	729
	Services from government sources		297	336	449	422
	Average expenditure (Rs.)	Government	784	1614	232	367
		Private	1388	1331	541	762
		All	1209	1426	402	595

Source: NSSO Report No. 507, p.52-53

Children

The immunization programmes are part of the preventive health care and, in this regard, Kerala performs better than all India average. More than 95 per cent of children in Kerala are given immunization (Table 4.16). But the cost of immunization is higher in Kerala when compared to all India. The average cost involved in child delivery is also higher in Kerala compared to all India.

Table 4.16

Percentage of children of age 0 – 4 years receiving immunisation in Kerala and India

Area	Indicators	Percentage of children receiving immunisation		Average expenditure on immunisation	
		Kerala	India	Kerala	India
Rural	Boys	93	89	53	22
	Girls	96	89	47	17
	Children	95	89	50	20
Urban	Boys	95	93	119	109
	Girls	97	94	137	118
	Children	96	94	128	113
Total	Boys	94	90	67	41
	Girls	96	90	68	37
	Children	95	90	68	39

Source: NSSO Report No. 507, p.49, 50

The expenditure status of the child birth shows that on an average the expense is very high in rural Kerala when compared to rural India with a difference of Rs. 3884 and the same pattern is also seen urban area where Kerala is higher with the percentage difference of Rs. 2100 (Table 4.17). Both in urban and rural Kerala, the average expenditure per childbirth is higher.

Table 4.17

Average expenditure per childbirth (Rs.) by place of delivery in Kerala and India

Area	Indicators	Kerala	India
Rural	Government hospital	2088	1165
	Private hospital	6391	4137
	Home	-	414
	All	4983	1169
Urban	Government hospital	1686	994
	Private hospital	6172	5480
	Home	-	552
	All	4906	2806

Source: NSSO Report No. 507, p.51

4. 6. Aging

The demographic transition with low death rate in Kerala and the higher life expectancy has increased the number of old age people in the state. This has lead to an increase in old age dependency ratio. The rates are higher in Kerala compared to all India. The number of old age population reporting illness are higher in Kerala compared to all India (Table 4.18).

Table 4.18
Number of aged per 1000 persons for each sex in Kerala and India

Indicators	Sex	Kerala		India	
		Rural	Urban	Rural	Urban
Number of aged per 1000 persons	Male	106	103	70	62
	Female	123	109	71	71
	Persons	115	106	70	66
Old age dependency ratio		155	139	139	94

Source: NSSO Report No. 507, p.61

The number of aged females is higher than that of male in both in rural and urban areas in Kerala as well as in India. As females live longer than males, who live alone are much greater than those of males (Table 4.19).

Table 4.19

Per 1000 distribution of aged persons with illness or otherwise by their perception about current state of health for each sex in Kerala and India

Area	Perception on current state of health		Kerala			India		
			M	F	T	M	F	T
Rural	No. of per 1000 of aged persons reporting illness		582	593	588	292	286	289
	Aged persons with illness	Excellent/Very good	5	3	4	19	14	17
		Good/Fair	443	490	470	569	511	541
		Poor	532	499	513	393	448	420
		N.R	20	8	13	19	26	22
		Total	1000	1000	1000	1000	1000	1000
	Aged person without illness	Excellent/Very good	24	16	20	77	41	59
		Good/Fair	787	684	730	731	731	731
		Poor	189	244	220	139	177	158
		N.R	0	55	31	53	51	52
		Total	1000	1000	1000	1000	1000	1000
Urban	No. of per 1000 of aged persons reporting illness		537	601	572	360	390	376
	Aged persons with illness	Excellent/Very good	46	23	33	31	19	24
		Good/Fair	552	574	564	635	611	622
		Poor	386	403	396	324	355	340
		N.R	16	0	7	11	15	13
		Total	1000	1000	1000	1000	1000	1000
	Aged person without illness	Excellent/Very good	153	72	112	110	69	89
		Good/Fair	749	698	723	747	753	750
		Poor	78	176	127	107	143	125
		N.R	20	55	38	36	36	36
		Total	1000	1000	1000	1000	1000	1000
Total	No. of per 1000 of aged persons reporting illness		570	595	584	308	312	310
	Aged persons with illness	Excellent/Very good	15	8	11	22	16	19
		Good/Fair	469	510	492	587	542	565
		Poor	497	476	485	374	419	397
		N.R	19	6	12	17	23	20
		Total	1000	1000	1000	1000	1000	1000
	Aged person without illness	Excellent/Very good	60	29	43	84	47	66
		Good/Fair	776	688	728	734	736	735
		Poor	159	228	196	132	170	151
		N.R	6	55	32	49	48	48
		Total	1000	1000	1000	1000	1000	1000

Source: NSSO Report No. 507, p.A336-A353

4.7 Multivariate Analysis: Logistic Regression

Morbidity rate

National level surveys showed that the morbidity in Kerala is higher than elsewhere in India (GoI 1980[9]; NCAER 1992[10]; NSSO 1998[11]). All these surveys depended on reported morbidity or on perceived morbidity, which, to a large extent, is based on an individual's perception of illness (Murray and Chen 1992[12]). Universal literacy, coupled with extended medical services has resulted in earlier diagnosis and detection of diseases than ever before, and this is often cited as a reason for the high morbidity seen in Kerala (Kannan et al. 1991[13]; Gamber and Berman 1997[14]). In the present study the differences in prevalence of ailments and hospitalisation within the population of Kerala state according to 2004 NSSO Data has been examined.

In order to find out the effect of selected background characteristics on reported health status of the population, the multivariate logistic regression analysis was carried out. The odds ratio (exp (b)) for each category of independent variable obtained from the analysis indicated the odds of reporting ill or getting hospitalized compared to the reference category during the reference

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[9] Government of India (1980). "Notes on morbidity: NSS 28th Round, October 73-June 74", *Sarvekshana,* 3: 17-21.

[10] National Council for Applied Economic Research (NCAER) (1992). *Household Survey of Medical Care,* New Delhi

[11] National Sample Survey Organisation (1998). *Morbidity and Treatment of Ailments,* Department of Statistics, Government of India, New Delhi.

[12] C.J.L. Murray and L.C. Chen (1992). "Understanding morbidity change", *Population and Development Review,* 18:481-503.

[13] K.P. Kannan, K.R. Thankappan, V. Raman Kutty and K.P. Aravindan (1991). *Health and Development in Rural Kerala*, Integrated Rural Technology Centre of the Kerala, Sastra Sahitya Parishad.

[14] A. Gumber and P. Berman (1997). "Measurement and pattern of morbidity and utilization of health services: Some emerging issues from recent health surveys in India", *Journal of Health and Population in Developing Countires,* 1: 16-43.

period, when the effect of all other variables was kept constant. The category with odds ratio one was the reference category.

Among the caste group, ST population showed 20 per cent less likely to report an illness than Forward Caste, but the result was not statistically significant. SC category showed 29 per cent more likely to report an illness. The place of residence category showed that the people from rural area showed 27 per cent more likely to report illness than urban area. Among the MPCE group, highest chance to report illness was shown in the highest MPCE group, but with low statistical significance. MPCE group 25-50 showed 27 per cent less likely to report an illness (Table 4.20).

Household size and morbidity showed an inverse relationship. The morbidity rate was high in the low size household group. In 3 & below size group household were 90 per cent more likely to report an illness than the highest size group family, followed by 4-5 group with 59 per cent more likely to report the morbidity. Among the type of household, casual labour/other labour showed 48 per cent more likely to report the morbidity when compared to the other category. Gender group analysis showed that females were more morbid and they showed 11 per cent more likely to report morbidity than males. Among the age group category, as it is well known, the old age group was more morbid. The age group 5-14 was the least morbid group and they showed 85 per cent less likely to be morbid when compared to the old age group.

Table 4.20

Results of logistic regression analysis for determinants of morbidity in Kerala, 2004

Independent Variable	Attributes	B	Sig.	Exp(B)	95.0 percentage C.I.for EXP(B)	
					Lower	Upper
Caste	ST	-0.206	0.380	0.814	0.514	1.288
	SC	0.260	0.001	1.297	1.105	1.523
	OBC	0.042	0.414	1.043	0.943	1.154
	Forward Caste		0.007	1.00		
Area	Rural	0.245	0.000	1.278	1.155	1.414
	Urban			1.00		
MPCE Quartile Group	0 – 25	-0.449	0.000	0.638	0.551	0.739
	25 – 50	-0.303	0.000	0.739	0.651	0.838
	50 – 75	-0.119	0.078	0.888	0.778	1.013
	75 – 100		0.000	1.00		
Household size	3 & below	0.645	0.000	1.906	1.621	2.242
	4 – 5	0.468	0.000	1.597	1.399	1.823
	6 – 7	0.243	0.001	1.276	1.104	1.473
	8 & Above		0.000	1.00		
Type of household	Self employed in non-agri.	0.242	0.001	1.274	1.106	1.467
	Agri.labour/ regular wage/ salary earners	0.159	0.046	1.172	1.003	1.369
	Casual labour/ Other labour	0.393	0.000	1.482	1.286	1.709
	Self employed in agriculture	0.058	0.507	1.060	0.893	1.258
	Others		0.000	1.00		
Sex	Male	-0.112	0.011	0.894	0.821	0.974
	Female					
Age group	0 – 4	-1.343	0.000	0.261	0.222	0.307
	5 – 14	-1.895	0.000	0.150	0.129	0.175
	15 – 34	-2.355	0.000	0.095	0.083	0.109
	35 – 59	-1.360	0.000	0.257	0.227	0.290
	60 & above		0.000			
Constant		-0.189	0.081	0.827		

No of observations = 13333
Omnibus Tests of Model Coefficients Chi-square = 1684.927, p (0.000)
-2Log Likelihood = 13017.016
Cox & Snell R Square = 0.119
Nagelkerke R Square = 0.178
Hosmer and Lemeshow Test Chi-square = 19.858, p(0.011)

Hospitalisation

Household size was an important determinant of the hospitalisation in Kerala. When compared to highest household size group, 3 & below size group showed 74 per cent more likely for hospitalisation . Among the type of

household, labour group showed 26 per cent more likely to hospitalise when compared to the other type of households(Table 4.21).

Table 4.21
Results of logistic regression analysis for determinants of hospitalisation in Kerala, 2004

Independent Variable	Attributes	B	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
					Lower	Upper
Caste	ST	0.114	0.673	1.120	0.661	1.900
	SC	0.006	0.955	1.006	0.813	1.245
	OBC	0.103	0.122	1.108	0.973	1.262
	Others		0.405	1.000		
Area	Rural	0.058	0.378	1.060	0.932	1.205
	Urban			1.000		
MPCE Quartile Group	0 – 25	-0.101	0.297	0.904	0.748	1.093
	25 – 50	0.001	0.988	1.001	0.851	1.178
	50 – 75	-0.030	0.734	0.970	0.816	1.154
	75 – 100		0.609	1.000		
Household size	3 & below	0.556	0.000	1.743	1.423	2.135
	4 – 5	0.258	0.003	1.295	1.093	1.533
	6 – 7	0.159	0.090	1.172	0.975	1.408
	8 & Above		0.000	1.000		
Type of household	Self employed in non-agri.	0.093	0.322	1.097	0.913	1.317
	Agri.labour/ regular wage/ salary earners	0.171	0.091	1.186	0.973	1.446
	Casual labour/ Other labour	0.238	0.011	1.269	1.057	1.523
	Self employed in agriculture	0.053	0.638	1.054	0.845	1.315
	Others		0.090	1.000		
Sex	Male	0.202	0.000	1.223	1.096	1.366
	Female			1.000		
Age group	0 – 4	-0.560	0.000	0.571	0.466	0.701
	5 – 14	-1.259	0.000	0.284	0.230	0.350
	15 – 34	-1.158	0.000	0.314	0.267	0.369
	35 – 59	-0.608	0.000	0.544	0.468	0.634
	60 & above		0.000	1.000		
Constant		-1.886	0.000	0.152		

No of observations = 13333
Omnibus Tests of Model Coefficients Chi-square = 326.853, p (0.000)
-2Log Likelihood = 8949.386
Cox & Snell R Square = 0.024
Nagelkerke R Square = 0.048
Hosmer and Lemeshow Test Chi-square = 6.608, p(0.580)

Males were 22 per cent more likely to report hospitalisation when compared to females. The age group analysis showed that hospitalisation rates were more highest age group followed by lowest age group.

4.8 Conclusion

By analysing the NSSO survey results, some interesting features of Kerala's health status in comparison to that of India could be observed. Even with notable improvements in health and demographics indication, Kerala shows high morbidity rate compared to all India level both in urban and rural area. Another interesting point noted was the higher morbidity among highest income groups. There exists urban-rural as well as gender wise difference in morbidity. Both in Kerala as well as India females are more morbid as against their male counterparts. Morbidity is seen higher in rural Kerala in total contrast to all India scenario were it is higher in urban India. The logistic regression model which was worked to find out the effect of selected background characteristics on reported health status and hospitalisation showed that morbidity rate is more influenced by the socio-economic variables like caste, area, MPCE, household size, type of household, sex and age group, while the hospitalisation is influenced by household size, type of household and sex.

CHAPTER V
Health Care Accessibility among Socio-Economic Groups

In the previous chapter, we have analysed the morbidity pattern, hospitalisation and its cost in Kerala using unit level data of NSSO 60th Round. One of the major limitations of NSSO unit level data in our specific context is that it fails to provide key household level information on health care affordability, availability and acceptability. Hence the data are not sufficient in analysing the minute level health care accessibility. In order to fill the gap of NSSO data, we had done a primary survey of 600 selected households from Thrissur district. In this chapter we do examine some of the key results of our primary survey data. The chapter is divided into Four sections. First section deals with description of sample selection procedure and basic characteristic of households, Second section deals with morbidity and hospitalisation, Third section deals with health care expenditure and burden of diseases, Fourth section deals with the existing scenario of health care accessibility among socio economic groups.

5.1 Profile of Thrissur District

Thrissur district falls in the central region of Kerala and lies between 10^0 10' and 10^0 46' North latitudes and 75^0 57' and 76^0 54' East longitudes. It came into existence on 1st July 1949. It is bounded on the north by Ponnani Taluk of Malappuram District and Ottapalam Taluk of Palakkad district, on the east by the Alathur Taluk of Palakkad District and Pollachi Taluk of Coimbatore district, on the south by Deviculam Taluk of Idukki district and Kunnathunadu, Alwaye and Parur taluks of Ernakulam district and on the west by the Lakshadweep and Arabian sea. It is known as the cultural capital of Kerala.

Area and Population of Thrissur district

Thrissur district, which is popularly known as 'cultural capital of Kerala' has an area of 3032 sq.km, which is 7.8 per cent of the area of the state (38863 sq.km). As per the 2001 Census, Thrissur district has a population of 29.75 lakhs, which is 9.34 per cent of state's population. In the total population, 14.22 lakhs are males and 15.53 lakhs are females. The urban population of Thrissur district is 28.21 per cent (8.39 lakhs) as against 25.9 per cent at the state level, with 4.04 lakhs males and 4.36 lakhs females. On the basis of level of urbanisation, the district captures sixth place among the districts in Kerala. The rural population of Thrissur is 71.79 per cent (21.36 lakhs) as against 74.03 per cent at the state level, in which 10.18 lakhs are males and 11.18 lakhs are females. The rural population of the district is spread over 92 gram panchayats, and the urban population is spread over, six municipalities and one corporation. The decadal growth rate of population during 1991-2001 was 8.70 per cent in Thrissur district, while it was 9.42 per cent in Kerala. Thrissur is having fourth place among the districts in the level of population. The density of population of Thrissur district is 981 persons, per sq.km, with seventh rank in the state in 2001, which is very much higher than the state average (810 persons per sq.km). Population density in urban and rural areas is 2154 persons per sq.km. and 808 per sq.km. respectively.

Birth rate, death rate and infant mortality rate for the district (17.0, 6.0 and 29.0 respectively) are less than that in Kerala (18.0, 6.2 and 42.0 and respectively). The male-female infant mortality rates for Thrissur is 30 and 27 respectively while it is 45 and 41 respectively for Kerala. The district has ninth place in female elderly population (10.53 per cent) and fifth place in male elderly (12.03 per cent) in 1998. The district has ninth place in Crude Birth Rate (16.1) and second lowest

place in Total Fertility Rate (1.6), which are below the state average of 17.1 and 1.7 respectively in 2001 (Guilmoto and Rajan 2002[1]).

5.2 Sample Framework

The study made use of primary data collected from 600 households from Thrissur district of Kerala state. The sample district was selected on the basis of health care characteristics, ST and SC population and geographical area. Thrissur district places a median position in most of the above said indicators. From Thrissur district, four panchayats (rural area) and two municipalities (urban area) were selected on the basis of ST/SC population and health care facilities.

A sample of 600 households from Thrissur district was selected with an adequate representation from rural and urban areas by following the method of probability proportionate to size The details of the sample framework is shown in the Table 5.1.

Table 5.1
Sample Framework

Area	Panchayat	ST	SC	OBC	Other	Total	Grand Total
Rural	Athirappilly	70	22	9	8	109	435 [72.5]
	Nattika	1	23	37	1	62	
	Pazhayannur	8	48	21	28	105	
	Puthoor	21	39	53	46	159	
	Total	100 (22.99)	132 (30.34)	120 (27.59)	83 (19.08)	435 (100.00)	
Urban	Guruvayur	-	51	44	29	124	165 [27.5]
	Irinjalakkuda	-	17	8	16	41	
	Total	-	68 (41.21)	52 (31.52)	45 (27.27)	165 (100.00)	
Grand Total		100 (16.67)	200 (33.33)	172 (28.67)	128 (21.33)	600 (100.00)	600 [100.00]

[1] Christophe Z. Guilmoto and S. Irudaya Rajan (2002), 'District Level Estimates of Fertility from India's 2001 Census', *Economic and Political Weekly*, February 16, p.669.

435 households from rural area and 165 households from urban area were selected for the study. The sample panchayats were selected in such a way as to get adequate representation from each caste groups. For this purpose, the existing information of caste structure and health infrastructure facilities was taken into account. The selected places for the studies were Athirapily, Nattika, Pazhayannur and Puthur panchayats from rural area and Guruvayur and Irinjalakkuda municipalities from urban area.

5.2.1 *Details of sample area*

The general profile of the sample panchayats/municipalities have been given in Table 5.2. Among the rural area the density is high in Nattika while lowest was reported in Athirippilly. The female literacy is lowest in Athirapilly when compared to other sample areas. The ST population is higher in Athirapily while the SC population dominated in Pazhayannur.

Table 5.2
Key Profile of Sample Area

Details	Rural				Urban	
	Athirapilly	Puthoor	Pazhayannur	Nattika	Guruvayur	Irinjalakkuda
Area (sq.km)	489.00	79.07	59.03	9.60	6.49	11.24
Density/sq.km	19	501	588	1999	3115	1786
Total Population	9216	39632	34713	19192	20216	45069
Male Population	4662	19462	16684	9072	9365	22303
Female Population	4554	20170	18029	10120	10851	22766
Total Literacy	76.66	89.85	81.20	94.07	92.52	94.47
Male Literacy	82.57	93.52	87.00	94.86	94.71	96.97
Female Literacy	70.12	86.37	75.91	87.74	90.67	92.12
Sex ratio	976	1036	1081	1115	1158	1020
ST population	752	234	214	0	3	2
SC population	2539	4747	5855	3894	2254	2757
Total WPR	46.83	37.52	37.62	27.37	27.10	28.08
Male WPR	55.23	53.89	48.59	43.42	43.53	43.94
Female WPR	38.23	21.71	27.46	12.97	12.92	12.94
Total Main Workers	3475	14054	12540	5019	5376	7499
Male Main Workers	2109	10176	7953	3839	4024	5733
Female Main Workers	1366	3878	4587	1180	1352	1766
Total Marginal Workers	841	815	519	233	103	220
Male Marginal Workers	466	313	155	100	53	165
Female Marginal Workers	375	502	364	133	50	55

Source: (i) Census of India 2001; (ii) Panchayat Level Statistics 2001.

5.3 Relationship between Background variables and health care access

In this section, we examine the relationship between the health care access and background variables like caste, place of residence, monthly pr capita consumption expenditure, size of the household, their occupational structure and their socio-economic status in the context of existing literature. This has been done for find out proper justification for the selected variables in our specific context in the light of available literature.

5.3.1 Caste

Caste is a prominent determinant in deciding a health status of the society. Iyer (2005)[2] discussed the influence of caste, class, and gender over treatment seeking decisions for short-term and long-term sicknesses. The study found how class-based inequities were more sharply defined than caste-based inequities. Luke and Munshi (2006)[3] assessed the role of social affiliation, measured by caste, in shaping investments in child health. Mohnidra et al. (2006)[4] examined the social patterning of women's self-reported health status in India and the validity of the two hypotheses (i) low caste and lower socioeconomic position are associated with worse reported health status, and (ii) associations between socioeconomic position and reported health status vary across castes and found out that women from lower castes Scheduled Castes/Scheduled Tribes (SC/ST) and Other Backward Castes (OBC) reported a higher prevalence of poor health than women

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[2] Aditi Iyer (2005). *Gender, caste, class, and health care access Experiences of rural households in Koppal district, Karnataka.* Small Grants Programme on Gender and Social Issues in Reproductive Health Research, Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum.

[3] Nancy Luke and Kaivan Munshi (2006). *Social Affiliation and the Demand for Health Services: Caste and Child Health in South India,* (www.stanford.edu/group/SITE/archive/SITE_2006/Web%20Session%202/Munshi.pdf).

[4] K.S. Mohindra, Slim Haddad and D. Narayana (2006). "Women's health in a rural community in Kerala, India: do caste and socioeconomic position matter?" *Journal of Epidemiology and Community Health* 2006; **60**:1020-1026.

from forward castes. The multilevel multinomial models indicate that the associations between socioeconomic indicators and health vary across caste and concluded that even in a relatively egalitarian state in India, there are caste and socioeconomic inequalities in women's health.

Drawing the importance of caste and class from the above literature, in our analysis, the sample households have been categorised into four caste groups, viz., Scheduled Tribe (ST), Scheduled Caste (SC), Other Backward Class (OBC) and 'Others'[5].

5.3.2 *Place of residence*

Hendricks and Cromwell (1989)[6] evaluated the cost difference between the rural and urban treatment centres. They claim that Rural Referral Centers (RRCs), have average costs similar to urban hospitals and multivariate analysis led them to conclude that RRC medicare costs were 13 percent higher than those of other rural hospitals in 1984, holding constant Medicare case mix, teaching activity, and relative wages. By analysing the employment of non-physician providers, Shi et al. (1994)[7] found out that rural or urban location was not significantly related to the employment of non physical providers after controlling for center size. The fact that rural centers employ fewer non physician providers than urban centers can primarily be accounted for by their relatively small size, rather than a lack of

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[5] The caste wise breakup was done as per the government norms with the help of the caste group list from www.keralapsc.org. The details are furnished in Appendix. 5.1.

[6] A. Hendricks and J.Cromwell (1989). "Are rural referral centres as costly as urban hospitals?" *Health Serv Res.*, 24(3): 289-309.

[7] L. Shi, M.E. Samuels, T.C. Ricketts and T.R. Konrad (1994). "A rural-urban comparative study of nonphysician providers in community and migrant health centers", *Public Health Rep,* 109(6): 809-815.

interest. Narayana and Kurup (2000)[8] discussed about the inequality in accessing the health care. They argue that there was a striking regional dimension to the unequal distribution of hospital beds. The inequality in the distribution of hospitals would affect the access to a certain minimum level of secondary health care services. As regards secondary care, the concentration of hospitals and unequal distribution of hospitals across the *taluks* of the Kerala state was a given reality to be properly accounted for. Eberhardt and Pamuk (2004)[9] examined differences in health measures among rural, suburban, and urban residents and factors that contribute to these differences and were of the opinion that if health disparities are to be successfully addressed, the relationship between place of residence and health must be understood.

From the above literature we can conlude that the place of residence do have an impact on the access to health care and in our analysis, it is taken as a major variable.

5.3.3 Monthly Per capita Consumption Expenditure (MPCE)

MPCE is taken as the proxy for the income level of the household. A very high correlation is seen between MPCE and health status. Su et al. (2006)[10] quantified the extent of catastrophic household health care expenditure and determined the factors responsible for it and found out that the key determinants of catastrophic health expenditure were economic status, household health care

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[8] D. Narayana and K.K. Hari Kurup (2000). *Decentralisation of the health care sector in Kerala: Some Issues.* Working paper No. 298. Centre for Development Studies, Thiruvananthapuram.

[9] Mark S. Eberhardt and Elsie R. Pamuk (2004). "The Importance of Place of Residence: Examining Health in Rural and Nonrural Areas", *American Journal of Public Health*, 94 (10).

[10] Tin Tin Su, Bocar Kouyate and Steffen Flessa (2006). "Catastrophic household expenditure for health care in a low income society: A study from Nouna District, Burkina Faso", *Bulletin of the World Health Organization,* 84 (1).

utilisation especially for modern medical care, illness episodes and presence of a member with chronic illness.

Selwyn (1987)[11] considered family size as a factor in utilisation of health care service and found a positive relation among the two variables. Repetti et al. (1989)[12] reviewed empirical evidence concerning the effects of paid employment on women's mental and physical health, with special attention to variations in the effects of employment depending on the characteristics of women and their jobs. With the current evidence, they suggested that increased social support from co-workers and supervisors may be one important mediator of the beneficial health effects of employment.

5.3.4 Socio Economic Status (SES) group:

Alder et al. (1994)[13] found out that Socio- Economic Status (SES) is consistently associated with health outcomes, yet little was known about the psychosocial and behavioural mechanisms that might explain this association. There was evidence of a graded association with health at all levels of SES, an observation that required new thought about domains through which SES may exert its health effects. Examples are also given of new analytic approaches that can better illuminate the complexities of the SES-health gradient.

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[11] B.J. Selwyn (1987). "Family size, illness and use of medical services among pre-school Colombian children", *Journal of Tropical Paediatrics,* 33, 16-23.

[12] Rena L. Repetti, Karen A. Matthews and Ingrid Waldron (1989). "Employment and Women's Health: Effects of Paid Employment on Women's Mental and Physical Health", *American Psychologist*, Vol. 44, No. 11, 1394-1401.

[13] N.E. Adler, T. Boyce, M.A. Chesney, S. Cohen, S. Folkman, R.L. Kahn, S.L. Syme (1994). "Socioeconomic status and health. The challenge of the gradient", *Am Psychol., 49(1):15-24.*

Veenstra (2000)[14] found out that the relationship between SES and health was the same for men and women and strongest among the elderly; that socialization with colleagues from work is relevant and that attendance at religious services and participation in clubs were related to health for the elderly.

Smith (2005)[15] found out that people of lower socioeconomic status (SES) consistently appear to have much worse health outcomes. Contrary to widespread and deeply held beliefs within the policy and research community, his empirical evidence demonstrated that the principal financial measures of SES—household income and household wealth— did not seem to be related to individual health outcomes. But in research, one finding always begets another puzzle. There was growing evidence, including some presented there, that measures of economic circumstances during childhood have a bearing on health outcomes later in life. Parental incomes appear to be central correlates of the onset of some critical childhood diseases, which then set the stage for the adult SES health gradient

A household's socio-economic status is undoubtedly an important determinant of health care access. We used a Socio Economic Status (SES) group by using Principal Component Analysis by using 25 variables including type of household variables, asset variables and hygienic and social variables. The more details of the construction of the Socio Economic Status group by using Principal Component Analysis have been given in Appendix.

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[14] Gerry Veenstra (2000). "Social capital, SES and health: an individual-level analysis" *Social Science & Medicine*, 50, 619-629.

[15] James P. Smith (2005). Unraveling the SES–Health Connection, (www.rand.org/pubs/reprints/2005/RAND_RP1170.pdf)

5.3.5 Demographic Characteristics:

Age and sex are the two major demographic charectersitcs discussed in the literarure, which do have a direct link with the health care outcome and health care accessibility.

Gabriel (1994)[16], Al-Sekait (1988)[17], and Basu (1990)[18] considered age as major factor determining the utilisation of health care service.

The authors like Acton (1975)[19], Cleary et al (1982)[20], Meinger (1986)[21], Sabir and Ebrahim (1984)[22] and Levine (1987)[23] were of the opinion that women tend to be relatively more responsive to price changes in the use of health care services. Reasons for gender differences in utilisation included factors such as biological differences, differences in the preference of care, life style differences and risk averting behaviours and traditional role of women. Merzel (2000)[24] examined factors associated with gender differences in health insurance coverage

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[16] B.F. Gabriel (1994). "Childhood morbidity and health service utilisation: Cross national comparisons of user-related factors from DHS data", *Social Science and Medicine,* 38 (9).

[17] M.A. Al-Sekait (1988). "A study of factors affecting incidence of diarrhoeal disease in children under 5 years in Saudi Arabia", *Saudi Medical Journal,* 9 (5).

[18] Alaka Malwade Basu (1990). "Cultural influences on health care use: Two regional groups in India", *Studies in Family Planning*, 21 (5).

[19] J.P. Acton (1975). "Non-monetary factors in the demand for medical services: Some empirical evidence", *Journal of Political Economy,* 83, 595-614.

[20] P.D. Cleary, D. Mechanic and J.R. Greenley (1982). "Sex differences in medical care utilization: An empirical investigation", *Journal of Health and Social Behaviour,* 23, 106-19.

[21] J.C. Meinger (1986). "Sex differentials in factors associated with use of medical care and alternative illness behaviours", *Social Science and Medicine,* 22, 285-92.

[22] N.I. Sabir and G.J. Ebrahim (1984). "Are daughters more at risk than sons in some societies?", *Journal of Tropical Paediatrics,* 30, 237-9.

[23] N.E. Levine (1987). "Differential childcare in three Tibetan communities: Beyond son preference", *Population and Development Review,* 13, 281-304.

[24] C. Merzel (2000). "Gender differences in health care access indicators in an urban, low-income community", *American Journal of Public Health,* 90 (6).

and having a usual source of medical care and found out that expanding the availability of both public insurance and affordable private coverage for men living in low-income communities was an important means of reducing gender disparities in access to health care.

5.4 General Particulars of Sample Households

Our sample consisted of 600 households with 435 households from rural area (72.5 per cent) and 165 households from urban area (27.5 per cent), with a population of 2771 persons having a sex ratio of 1056 (Table 5.3).

Table 5.3
Distribution of sample households by socio-economic variables

Selected Variables	Description	Households		Population	
		No.	Percentage	No.	Percentage
Caste	ST	100	16.7	463	16.7
	SC	200	33.3	945	34.1
	OBC	172	28.7	807	29.1
	Others	128	21.3	556	20.1
Place of residence	Rural	435	72.5	1985	71.6
	Urban	165	27.5	786	28.4
MPCE Quartile Group	0 -25	149	24.8	740	26.7
	25 - 50	151	25.2	744	26.8
	50 - 75	149	24.8	694	25.0
	75 - 100	151	25.2	593	21.4
Size of household	3 & below	145	24.2	356	12.8
	4 - 5	309	51.5	1357	49.0
	6 - 7	100	16.7	633	22.8
	8 & Above	46	7.7	425	15.3
Type of household	Salary	31	5.2	145	5.2
	Business	47	7.8	229	8.3
	NRI	25	4.2	131	4.7
	Cultivators	26	4.3	109	3.9
	Fishing	38	6.3	170	6.1
	Coolie/Forest related	344	57.3	1602	57.8
	Others	89	14.8	385	13.9
SES Group	SES I	151	25.2	712	25.7
	SES II	148	24.7	642	23.2
	SES III	151	25.2	704	25.4
	SES IV	150	25.0	713	25.7
Total		600	100.0	2771	100.0

Caste wise break up of sample shows that 33.3 per cent of the households are SC households followed by OBC households with 28.7 per cent, 'Other' households with 21.3 per cent, and ST households with 16.7 per cent. 72.5 per cent of the sample households were from rural area while 27.5 per cent were from urban area. Majority of the households (51.5 per cent) are of the household size between 4 and 5 and 57.3 per cent of the households relied on coolie or forest related work for their daily bread. The variables MPCE group and SES group are categorised into quartile groups and the size comes around 25 per cent. By using Principle Component Analysis (PCA) technique, we categorised the household into different socio-economic status group (SES group). The details of the PCA technique for making the SES group is given in Appendix 5.2.

5.5 Key Results from Primary Data

The major results from our primary data are discussed in this section. The results are classified under various subsections like morbidity, type of ailment, affordability of health care, availability of health care and heath care acceptability.

5.5.1 Morbidity

The morbidity or the prevalence of any ailment has been defined as number of persons who were ailing during the 15 days prior to the survey divided by total population present in the sample, multiplied by 1000.

Our results on morbidity pattern among the sample population are given in Table 5.4. The morbidity rate was reported as 271 per 1000 population. The rate was higher among females (294) when compared to males (247). Among the age group, the morbidity was higher among the age group of 60 & above (616). ST households reported highest morbidity (287) among caste group, followed by SC group (276). The rate was higher in urban area (300) when compared to rural area

(260). The highest MPCE group reported highest morbidity (315). The morbidity rate was higher in low household size group, where the low socio-economic status group reported highest morbidity. Likewise, morbidity rate was higher among the nuclear families (296) when compared to joint families (249). Here, size of household showed an inverse relationship with morbidity rate, while age group, MPCE, SES group showed a positive relationship.

Table 5.4

Socio-economic variables by morbidity percentage in 15 days reference period

Selected Variables	Description	Ailment persons	Morbidity rate (per 1000)
Sex	Male	333	247
	Female	419	294
Age group	4 & below	52	241
	5 - 14	59	146
	15 - 34	163	165
	35 - 59	292	340
	60 & above	186	616
Caste	ST	133	287
	SC	261	276
	OBC	212	263
	Others	146	263
Place of residence	Rural	516	260
	Urban	236	300
MPCE Quartile Group	0 -25	208	281
	25 - 50	191	257
	50 - 75	166	239
	75 - 100	187	315
Size of household	3 & below	156	438
	4 - 5	344	254
	6 - 7	166	262
	8 & Above	86	202
Type of household	Salary	30	207
	Business	59	258
	NRI	37	282
	Cultivators	26	239
	Fishing	48	282
	Coolie/Forest related	447	279
	Others	105	273
SES Group	SES I	205	288
	SES II	184	287
	SES III	183	260
	SES IV	180	252
Type of family	Nuclear family	388	296
	Joint family	364	249
Total		752	271

In order to find out the effect of selected background variables on morbidity, a logistic regression analysis was done. The results of which are given in Table 5.5. The odds ratio (Exp (b)) for each category of independent variable obtained from the analysis indicated the odds of reporting ill compared to the reference category, when the effect of all other variables was kept constant. Based on the Omnibus test of model coefficients chi-square (335.205 with the probability 0.000) and Hosmer & Lemeshow test chi-square 9.809, with the probability of 0.279, the model goodness of fit was satisfactory.

Size of the household was an important determinant of morbidity. The odds ratios were 2.109, 1.295, 1.404 for the groups, 3 & below, 4 – 5 and 6 – 7 respectively. It should be noted that the effect of household size was still significant when other background characteristics were controlled for; this indicated that ailments in larger households were underreported.

Being ST among caste group was another determinant of morbidity. They had 75 per cent more likely to report an illness than the forward caste, while SC groups had 37 per cent more likely to report an illness than the forward caste.

Age was another important determinant of morbidity. The olds ratios of 0.206, 0.106, 0.114 and 0.295 were observed for 4 & below, 5 – 14, 15 – 34 and 35 – 59 respectively over the reference group of the age 60 & above, which means that age group 60 & above had 79 per cent more likely to report an illness than the second highest age group of 4 & below. Females were 21 per cent more likely to report an illness than males. Likewise, the nuclear family had 31 per cent more likely to report an illness than the joint family. There is higher chance to be reported in nuclear families[25] as more attention is given to each member.

[25] The family in which the father, mother and their own children only live

Table 5.5
Results of logistic regression analysis for determinants of morbidity

Variables		B	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
					Lower	Upper
Sex	Male	-0.237	0.010	0.789	0.659	0.945
	Female			1.000		
Age group	4 & below	-1.579	0.000	0.206	0.138	0.308
	5 - 14	-2.245	0.000	0.106	0.073	0.155
	15 - 34	-2.174	0.000	0.114	0.084	0.154
	35 - 59	-1.221	0.000	0.295	0.222	0.392
	60 & above		0.000	1.000		
Caste	ST	0.560	0.000	1.750	1.282	2.389
	SC	0.313	0.018	1.367	1.055	1.773
	OBC	0.279	0.041	1.322	1.011	1.729
	Others		0.005	1.000		
Place of residence	Rural	-0.279	0.008	0.756	0.615	0.930
	Urban			1.000		
Size of household	3 & below	0.746	0.000	2.109	1.398	3.182
	4 - 5	0.258	0.120	1.295	0.935	1.794
	6 - 7	0.339	0.036	1.404	1.022	1.929
	8 & Above		1.000	1.000		
Type of family	Nuclear Family	0.268	0.030	1.307	1.026	1.666
	Joint family			1.000		
Constant		0.106	0.598	1.112		

No of observations	=	2771
Omnibus Tests of Model Coefficients Chi-square	=	335.205, p (0.000)
-2Log Likelihood	=	2904.807
Cox & Snell R Square	=	0.114
Nagelkerke R Square	=	0.165
Hosmer and Lemeshow Test Chi-square	=	9.809, p (0.279)

5.5.2 **Type of Ailment**

The ailment pattern of the sample population are given in Table 5.6. Among the total sample population of ailed persons, the major ailment affected was fever of unknown reason (28.25 per cent) followed by high/low BP with 9.86 per cent. Apart from fever, in ST population, rheumatism and paralysis (7.30 per cent) followed by skin disease (4.38 per cent) are prominent. SC, OBC and general categories reported high/low BP as the other important ailment apart from fever.

Table 5.6

Type of ailments among caste groups during 15 days

Ailments	ST		SC		OBC		Other		Total	
	No		No		No		No		No	
Fever of unknown origin	61	44.53	64	24.33	49	23.00	41	27.70	215	28.25
High/low BP	4	2.92	22	8.37	26	12.21	23	15.54	75	9.86
Disorders of joints and bones	5	3.65	18	6.84	15	7.04	5	3.38	43	5.65
Diabetes mellitus	1	0.73	13	4.94	11	5.16	17	11.49	42	5.52
Allergy	0		11	4.18	13	6.10	8	5.41	32	4.20
Bronchial asthma	0		16	6.08	10	4.69	3	2.03	29	3.81
Rheumatism	10	7.30	8	3.04	4	1.88	6	4.05	28	3.68
Suffocation	4	2.92	8	3.04	5	2.35	9	6.08	26	3.42
Backpain	3	2.19	11	4.18	4	1.88	2	1.35	20	2.63
Gastritis/gastric or peptic ulcer	3	2.19	4	1.52	11	5.16	1	0.68	19	2.50
Psychiatric disorders	4	2.92	7	2.66	4	1.88	3	2.03	18	2.37
Headache	2	1.46	2	0.76	11	5.16	3	2.03	18	2.37
Stomach ache	5	3.65	7	2.66	5	2.35			17	2.23
Diseases of skin	6	4.38	6	2.28	4	1.88			16	2.10
Heart dsease	1	0.73	6	2.28	3	1.41	5	3.38	15	1.97
Chest pain	7	5.11	6	2.28	1	0.47	1	0.68	15	1.97
Other diagnosed ailments	1	0.73	5	1.90	6	2.82	2	1.35	14	1.84
Respiratory including ear/nose/throat ailmetns	0		6	2.28	1	0.47	3	2.03	10	1.31
Diseases of kindney/urinary system	1	0.73	4	1.52	2	0.94	3	2.03	10	1.31
Diarrhoea/Decentry	1	0.73	3	1.14	4	1.88	1	0.68	9	1.18
Dizziness/giddiness	3	2.19	4	1.52	2	0.94			9	1.18
Tuberculosis	4	2.92	3	1.14	1	0.47			8	1.05
Jaundice	0		1	0.38	6	2.82			7	0.92
Glaucoma	0		3	1.14	1	0.47	2	1.35	6	0.79
Thairoid	0		2	0.76	2	0.94	2	1.35	6	0.79
Cough	1	0.73	4	1.52	1	0.47			6	0.79
Gynaecological disorders	1	0.73	3	1.14	1	0.47			5	0.66
Epilepsy	0		4	1.52	1	0.47			5	0.66
Cataract	1	0.73	3	1.14					4	0.53
Cancer and othe tumours	0		1	0.38	3	1.41			4	0.53
Body pain	1	0.73	1	0.38			2	1.35	4	0.53
Ear ache	0	0.00	1	0.38	2	0.94	1	0.68	4	0.53
Neurological disorders	0		1	0.38	1	0.47	1	0.68	3	0.39
Speech	1	0.73	1	0.38			1	0.68	3	0.39
Leprosy	3	2.19							3	0.39
Numonia	0		2	0.76	1	0.47			3	0.39
Prostatic disorders	2	1.46							2	0.26
Locomotor	0		1	0.38			1	0.68	2	0.26
Diseases of mouth/teeth/gum	1	0.73					1	0.68	2	0.26
Accidents/injuries/burns/fractures/poisoning	0		1	0.38	1	0.47			2	0.26
Conjunctivitis	0				1	0.47			1	0.13
Chicken pox	0						1	0.68	1	0.13
Total	137	100.00	263	100.00	213	100.00	148	100.00	761	100.00

5.5.3. Affordability of health care

Socio economic characteristics of households

The affordability of the health care depends on the socio economic characteristics of the household. As discussed earlier, it is clear that the average landholding is the lowest among the ST category followed by the SC. On an average the ST is holding less than one cent of land, while it is as high as 41 cent for others. The average plinth area of the house also indicates that the ST households live in small houses compared to other categories. Similar results are observed in the case of percentage of households electrified also.

The sources of income of the households also do have an impact on the affordability of health care. From Table 5.7, a major proportion of ST households do depend on the forest for their livelihood followed by the occupation of daily wage labour (Coolie).

Table 5.7
Major source of income and caste group

Household type	ST		SC		OBC		Other		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Salary	1	1.0	8	4.0	10	5.8	12	9.4	31	5.2
Business			2	1.0	31	18.0	14	10.9	47	7.8
NRI			2	1.0	13	7.6	10	7.8	25	4.2
Cultivators			1	.5	6	3.5	19	14.8	26	4.3
Self employment			5	2.5	4	2.3	4	3.1	13	2.2
Fishing			10	5.0	28	16.3			38	6.3
Forest related	47	47.0	5	2.5	1	.6			53	8.8
Coolie	44	44.0	133	66.5	35	20.3	22	17.2	234	39.0
Driver			4	2.0	8	4.7	7	5.5	19	3.2
Pension			4	2.0	5	2.9	17	13.3	26	4.3
Other coolie	1	1.0	14	7.0	20	11.6	9	7.0	44	7.3
Other service	7	7.0	12	6.0	11	6.4	14	10.9	44	7.4
Total	100	100.0	200	100.0	172	100.0	128	100.0	600	100.0

Monthly Per Capita Expenditure

Average monthly Percapita expenditure is an important variable affecting the affordability to health care. The results from our sample are given in Table 5.8. The average monthly per capita consumption expenditure of the total sample households were Rs.704.95 and the average per capita health expenditure were 67.22, which is the 9.54 per cent of the total consumption expenditure. There existed high variation among socio economic groups.

Table 5.8
Socio-economic variables by average monthly per capita consumption expenditure and monthly per capita health expenditure

Selected Variables	Description	Average MPCE	Average MPHE	Percentage
Caste	ST	372.62	53.01	14.23
	SC	593.51	64.82	10.92
	OBC	832.40	87.90	10.56
	Others	967.43	54.29	5.61
Place of residence	Rural	663.05	55.71	8.40
	Urban	815.39	97.56	11.97
MPCE Quartile Group	0 -25	265.89	19.96	7.51
	25 – 50	480.55	46.52	9.68
	50 – 75	706.68	55.19	7.81
	75 – 100	1360.87	146.42	10.76
Size of household	3 & below	880.86	80.40	9.13
	4 – 5	679.23	56.25	8.28
	6 – 7	571.42	60.92	10.66
	8 & Above	613.46	113.05	18.43
Type of household	Salary	1010.82	69.14	6.84
	Business	1003.11	75.37	7.51
	NRI	1166.52	72.33	6.20
	Cultivators	1221.95	36.51	2.99
	Fishing	614.92	58.45	9.51
	Coolie/Forest related	538.74	57.73	10.72
	Others	841.11	110.19	13.10
SES Group	SES I	546.35	80.31	14.70
	SES II	487.41	56.56	11.60
	SES III	692.73	56.44	8.15
	SES IV	1091.54	75.41	6.91
Total		704.95	67.22	9.54

Among caste groups, highest percentage share of health expenditure was recorded in ST group (14.23 per cent) followed by SC group (10.92 per cent) and OBC (10.56 per cent). Very low share was recorded in 'other category' with a 5.96 per cent. The share of health expenditure was higher in urban area (11.97 per cent) when compared to rural area (8.40 per cent). A positive relationship was observed between size of household and percentage share of health expenditure. The daily wage households paid more for health expenditure (10.72 per cent). The highest percentage was observed in SES I with a share of 14.70 per cent.

Table 5.8 does not convey the actual idea of the relationship between health care expense among socio-economic groups because it is the percentage of the per MPHE to MPCE. In order to get the clear picture, we have used household non-food expenditure as a proxy measure for a household's capacity to pay (Su et al.)[26]. The share of health care expenditure in non-food expenditure was calculated[27] in order to find out the real impact of health care expenditure. WHO estimated that families who spend 50 per cent or more of their non-food expenditure on health care are likely to be impoverished (WHO 2000)[28]. Health expenditure has been also defined as catastrophic if a household's health expenditure exceeds 40 per cent of income remaining after subsistence needs have been met[29]. We calculated the prevalence of catastrophic expenditure among households and the average monthly health expenditure for six levels. Among the

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[26] Tin Tin Su, Bocar Kouyate and Steffen Flessa (2006). "Catastrophic household expenditure for health care in a low income society: A study from Nouna District, Burkina Faso", *Bulletin of the World Health Organization,* 84 (1).

[27] The share of health care expenditure (Sj) was derived as follows:

$$S_j = \frac{H_{\exp}}{NF_{\exp}} \times 100$$

[28] World Health Organisation (2000). *The World Health Report 2000: Health Systems-Improving Performance.*

[29] K. Xu, D.B. Evans, K.Kawabata, R. Zeramdii, J. Klavus, C.J.L. Murray (2003). "Household catastrophic health expenditure: A multi-country analysis. *Lancet*, 362:111-7.

total sample, 17.3 per cent households reported monthly health care expenditure as above 40 per cent (Table 5.9). 458 households (76.3 per cent) reported ailment in 15 days reference period and the corresponding number in 30 days reference period was 492 (82 per cent).

Table 5.9.
Prevalence of catastrophic health expenditure, by threshold/cut-off levels

Catastrophic threshold (percentage of non-food expenditure)	No. of households	Percentage of household	Percentage of households with illness in 15 days reference period (n= 458)	Percentage of households with illness in 30 days reference period (n= 492)	Household monthly health expenditure	
					Mean	SD
Below 20	409	68.2	59.6	61.2	72.44	119.27
20 - 30	50	8.3	10.7	10.2	347.22	265.10
30-40	37	6.2	8.1	7.5	590.41	968.38
40 - 60	60	10.0	12.4	12.2	759.20	751.52
60 & above	44	7.3	9.2	8.9	1670.80	3752.17
Total	600	100.0	100.0	100.0	313.17	1156.64

Catastrophic health care expenditure among socio-economic groups shows that 7.3 per cent of the households pay 60 per cent and more as their share in non-food expenditure (Table 5.10). 10 per cent of the households pay 40 – 60 per cent of their non-food expenditure for their health expenditure purpose. Among the caste group, 18 per cent of the ST households paid 60 per cent and more of their non-food expenditure for health purposes, while only 3.9 per cent of the forward caste group paid 60 per cent and above.

Table 5.10

Catastrophic health care expenditure among socio economic groups (percentage)

Selected Variables	Description	Nil	Below 20 per cent	20 - 30 per cent	30-40 per cent	40 - 60 per cent	60 per cent & above	Total
Caste	ST	42.0	21.0	4.0	3.0	12.0	18.0	100.0
	SC	27.0	39.5	8.5	7.5	9.5	8.0	100.0
	OBC	30.2	37.8	9.9	8.1	11.0	2.9	100.0
	Others	37.5	37.5	9.4	3.9	7.8	3.9	100.0
Place of residence	Rural	35.6	34.9	8.7	5.5	8.3	6.9	100.0
	Urban	24.8	37.0	7.3	7.9	14.5	8.5	100.0
MPCE Quartile Group	0 -25	47.0	19.5	6.0	5.4	11.4	10.7	100.0
	25 - 50	31.1	30.5	11.3	11.3	8.6	7.3	100.0
	50 - 75	31.5	40.3	8.7	2.0	12.1	5.4	100.0
	75 - 100	21.2	51.7	7.3	6.0	7.9	6.0	100.0
Size of household	3 & below	37.9	29.7	8.3	6.2	8.3	9.7	100.0
	4 - 5	32.0	37.2	8.7	4.9	10.7	6.5	100.0
	6 - 7	34.0	31.0	8.0	9.0	9.0	9.0	100.0
	8 & Above	17.4	52.2	6.5	8.7	13.0	2.2	100.0
Type of household	Salary	38.7	45.2	3.2		9.7	3.2	100.0
	Business	27.7	44.7	14.9	4.3	8.5		100.0
	NRI	28.0	40.0	16.0	4.0	8.0	4.0	100.0
	Cultivators	30.8	53.8	7.7	3.8	3.8		100.0
	Fishing	15.8	44.7	15.8	5.3	10.5	7.9	100.0
	Coolie/Forest related	34.9	29.4	7.3	7.3	11.6	9.6	100.0
	Others	33.7	40.4	5.6	6.7	6.7	6.7	100.0
SES Group	SES I	34.4	27.2	7.9	7.9	15.2	7.3	100.0
	SES II	34.5	28.4	7.4	6.8	10.1	12.8	100.0
	SES III	31.8	38.4	9.9	6.6	6.0	7.3	100.0
	SES IV	30.0	48.0	8.0	3.3	8.7	2.0	100.0
Total		32.7	35.5	8.3	6.2	10.0	7.3	100.0

In order to predict the probability of catastrophic health expenditure in household, we have developed a logistic regression model. We assumed that households having catastrophic expenditure are affected by number of illness, professional-care illness ratio, presence of chronic ailments, female education, size of household, caste and their employment status. Here, we consider the cases of the catastrophic health care expenditure having 60 per cent and above. The results are given in Table 5.11

Among 600 households, 44 (7.34 per cent) households are having the catastrophic health care expenditure more than 60 per cent. The following descriptive table clearly demonstrate the association of the independent variables and the presence of the higher catastrophic health care expenditure. The average illness number (2.23) and average professional care illness ratio (94.70) were higher in the case of higher catastrophic health care expenditure but low average size of household (94.70) showing that when the size of household increases, the high catastrophic health expenditure decreases may be due to the reason that when size of household increases, the chance to be treated in the large family decreases.

The occurrence of chronic ailments is very much high (77.3 per cent) in higher catastrophic health expenditure group when compared to the lower group (52.2 per cent) and the association is shown with the chi-square value of 10.353 with the probability of 0.001. In the same way, the association between the female education (the presence of the any adult female having the education of standard 7 or above) and the high catastrophic expenditure is shown with the chi-square value of 11.357 with the probability of 0.001.

There is an association between the independent variable caste and the high catastrophic health expenditure. The results of chi square test of independence shows that probability of accepting the null hypothesis (the two variables are independent) is 0.00, which means there is a significant relationship existing between the high catastrophic health expenditure and the caste. Among the households who have included in high catastrophic health expenditure, 40.0 per cent are of ST households followed by SC households with 36.4 per cent.

With regard to the type of household, there exists the association between the type of household and the high catastrophic health expenditure. The Pearson

chi square value shows 9.165 with the probability of 0.057. Among the high health expenditure reported, 75 per cent are from the coolie/forest related households.

Table 5.11
Descriptive statistics of the independent variables in deciding high catastrophic health care expenditure

Variables		Not 60 per cent and above		60 per cent and above		Chi-square (Probability)
		Mean or No	SD or Percentage	Mean or No	SD or Percentage	
No. of illness episodes		1.55	1.29	2.23	1.16	
Professional care-illness ratio		60.55	44.93	94.70	12.71	
Size of household		4.64	1.95	4.30	1.62	
Chronic ailment	Not having chronic ailments	266	47.8	10	22.7	10.353 (0.001)
	Having chronic ailments	290	52.2	34	77.3	
Female education	Not having educated female	198	35.6	27	61.4	11.357 (0.001)
	Having educated female	358	64.4	17	38.6	
Caste	ST	82	14.7	18	40.9	24.054 (0.000)
	SC	184	33.1	16	36.4	
	OBC	167	30.0	5	11.4	
	Forward Caste	123	22.1	5	11.4	
Type of household	Salary	30	5.4	1	2.3	9.165 (0.057)
	Business/cultivators/NRI	97	17.4	1	2.3	
	Fishing	35	6.3	3	6.8	
	Coolie/forest related	311	55.9	33	75.0	
	Others	83	14.9	6	13.6	
N		556		44		

The logistic regression results show that many variables in the illness and treatment group were statistically significant. Based on the Omnibus test of model coefficients chi-square (89.584 with the probability 0.000) and Hosmer & Lemeshow test chi-square (2.678 with the probability of 0.953), the model goodness of fit was satisfactory (Table 5.12). The presence of educated female in the size of household showed the inverse relationship as we saw in the descriptive statistics analysis in the previous table. The odds ratio (Exp(B)) showed that the two major determinants of the higher catastrophic health expenditure are the presence of the chronic ailments in the household (OR = 6.918) and the caste being ST (OR = 5.048).

Table 5.12
Results of the logistic regression model in determining the probability of the catastrophic health expenditure

Variables		60% and above					40% and above				
		B	Sig.	Exp (B)	95.0% C.I.for EXP(B)		B	Sig.	Exp (B)	95.0% C.I.for EXP(B)	
					Lower	Upper				Lower	Upper
No. of illness episodes		0.390	0.009	1.477	1.100	1.983	0.473	0.000	1.606	1.299	1.984
Professional care-illness ratio		0.043	0.000	1.044	1.023	1.066	0.032	0.000	1.033	1.022	1.044
Having chronic ailments		1.733	0.000	5.659	2.336	13.709	1.119	0.000	3.063	1.745	5.378
Place of residence		0.945	0.040	2.573	1.042	6.352	0.968	0.001	2.632	1.456	4.756
Having educated female		-0.675	0.094	0.509	0.231	1.123	-0.189	0.499	0.828	0.479	1.430
Size of household		-0.249	0.042	0.780	0.613	0.991	-0.164	0.030	0.848	0.731	0.984
Caste	ST	1.982	0.004	7.260	1.880	28.037	1.208	0.010	3.345	1.336	8.379
	SC	0.303	0.621	1.353	0.408	4.491	-0.018	0.963	0.982	0.445	2.166
	OBC	-0.102	0.882	0.903	0.235	3.474	0.245	0.536	1.278	0.588	2.779
	FC		0.002					0.008			
Socio Economic Status Group	SEG I	0.915	0.254	2.498	0.517	12.058	1.157	0.009	3.181	1.336	7.573
	SEG II	1.727	0.026	5.623	1.235	25.603	1.245	0.005	3.473	1.463	8.245
	SEG III	1.443	0.055	4.235	0.969	18.509	0.674	0.113	1.963	0.853	4.517
	SEG IV		0.073					0.030			
Constant			-8.818	0.000	0.000			-6.384	0.000	0.002	

No of observations	600	600
Omnibus Tests of Model Coefficients Chi-square	95.089 (0.000)	138.971 (0.000)
-2Log Likelihood	219.524	414.388
Cox & Snell R Square	0.147	.207
Nagelkerke R Square	0.359	.343
Hosmer and Lemeshow Test Chi-square	5.508 (0.702)	10.422 (0.237)

5.5.4 Availability of Health Care

Availability of health care is an important aspect in health care accessibility. The distance to the health care facility, type of connection to the facility centre, type of conveyance, the quality of health care service were assumed to be the major factors determining the availability of health care.

Distance to PHC

Distance to the health care centre is an important determinant of helath care availability. From Table 5.13, it is clear that among the total sample, 12.8 per cent of the households were away from PHC/CHC with a distance of 8 km and above followed by 38 per cent household were with the distance between 3 km and 8 km, 31.3 per cent household with the distance between 1 km and 3 km and only 17.8 per cent of the households were with the distance below 1 km.

Table 5.13
Distance to nearest PHC/CHC among different socio economic groups

Selected Variables	Description	Below 1 km	1km - 3km	3km - 8 km	8km & above	Total
Caste	ST		14.0	13.0	73.0	100.0
	SC	16.5	29.0	53.5	1.0	100.0
	OBC	25.0	41.9	32.6	.6	100.0
	Others	24.2	34.4	40.6	.8	100.0
Place of residence	Rural	21.1	33.6	27.6	17.7	100.0
	Urban	9.1	25.5	65.5		100.0
MPCE Quartile Group	0 –25	12.1	19.5	36.9	31.5	100.0
	25 – 50	18.5	31.8	40.4	9.3	100.0
	50 – 75	20.8	38.3	32.9	8.1	100.0
	75 – 100	19.9	35.8	41.7	2.6	100.0
Size of household	3 & below	16.6	31.0	38.6	13.8	100.0
	4 – 5	21.0	32.4	34.3	12.3	100.0
	6 – 7	14.0	29.0	44.0	13.0	100.0
	8 & Above	8.7	30.4	47.8	13.0	100.0
Type of household	Salary	32.3	29.0	38.7		100.0
	Business	19.1	27.7	53.2		100.0
	NRI	28.0	24.0	48.0		100.0
	Cultivators	34.6	34.6	30.8		100.0
	Fishing	34.2	65.8			100.0
	Coolie/Forest related	12.8	26.7	39.8	20.6	100.0
	Others	16.9	38.2	38.2	6.7	100.0
SES Group	SES I	7.1	15.3	34.1	43.5	100.0
	SES II	18.8	26.9	40.0	14.4	100.0
	SES III	20.8	36.6	36.9	5.7	100.0
	SES IV	15.8	40.4	43.9		100.0
Total		17.8	31.3	38.0	12.8	100.0

The caste group break up showed that majority of the ST households (73 per cent) were away from health care institutions beyond 8 km from the PHC, 13

per cent households were away between 3km and 8 km and 14 per cent ST households were away between 1 km and 3 km. No ST households were within the distance below 1 km. 54.5 per cent SC households are away 38 per cent of the household experienced the distance between 3km and 8 km to PHC/CHC. Among the ST households 73 per cent were living more than 8 km away from PHC/CHC. The MPCE group break up showed that the poor households, 0-25 quartile group, are very far away from health care institutions (31.5 per cent).

Transport facilities

Availability of transport facilities depends on the availability of pucca roads, especially tarred roads. Distance to the tarred roads is taken as a variable in order to capture the degree of availability of health care facility. The distance variable shows that the median distance is longer for the ST category and SES I category compared to any other group. All other groups are having lower distance to the tarred road.

A large proportion of sample households are depending on bus service as the major medium of transport to health care institution. In the absence of proper bus service, they are forced to depend on other means like rented vehicles (Table 5.14). ST households faced the problem of getting bus service with more severity than any other category. This is mainly because of their geographic location.

Table 5.14
Frequency of bus service to the next town (percentage)

Selected Variables	Description	Less than one hour	Every hour	One in two hours	More than two hours	Total
Caste	ST	18.0	3.0	33.0	46.0	100.0
	SC	92.5	2.0	1.0	4.5	100.0
	OBC	93.6	1.2	1.7	3.5	100.0
	Others	99.2			.8	100.0
Place of residence	Rural	75.2	1.8	8.7	14.3	100.0
	Urban	99.4	.6			100.0
MPCE Quartile Group	0 -25	61.1	2.0	14.1	22.8	100.0
	25 - 50	84.1	2.0	5.3	8.6	100.0
	50 - 75	87.2	.7	4.7	7.4	100.0
	75 - 100	94.7	1.3	1.3	2.6	100.0
Size of household	3 & below	84.8	.7	4.1	10.3	100.0
	4 - 5	79.9	1.9	6.8	11.3	100.0
	6 - 7	82.0	1.0	6.0	11.0	100.0
	8 & Above	84.8	2.2	10.9	2.2	100.0
Type of household	Salary	100.0				100.0
	Business	100.0				100.0
	NRI	96.0		4.0		100.0
	Cultivators	100.0				100.0
	Fishing	71.1	2.6	7.9	18.4	100.0
	Coolie/Forest related	74.1	2.0	9.6	14.2	100.0
	Others	91.0	1.1	1.1	6.7	100.0
SES Group	SES I	49.4		24.7	25.9	100.0
	SES II	76.3	3.8	6.9	13.1	100.0
	SES III	90.9	1.0	1.7	6.4	100.0
	SES IV	98.2		1.8		100.0
Total		81.8	1.5	6.3	10.3	100.0

The connectivity to the health care institutions by means of conveyance is low among backward communities (Table 5.15). Walking percentage of households to health care institutions is highest among STs, followed by SCs, OBCs and forward caste respectively. There is no rural-urban difference in getting any type of vehicles to teach to health care institutions.

Table 5.15
Type of conveyance to health care institution (Percentage)

Selected Variables	Description	Own vehicle	Rented vehicle	Bus	By walk	Total
Caste	ST	0.1	1.0	91.0	8.0	100.0
	SC	3.5	24.0	66.0	6.5	100.0
	OBC	13.4	19.2	62.2	5.2	100.0
	Others	17.2	15.6	62.5	4.7	100.0
Place of residence	Rural	6.2	11.7	77.2	4.8	100.0
	Urban	15.8	34.5	44.8	4.8	100.0
MPCE Quartile Group	0 -25	3.4	15.4	76.5	4.7	100.0
	25 - 50	4.6	19.9	67.5	7.9	100.0
	50 - 75	6.7	15.4	73.2	4.7	100.0
	75 - 100	20.5	21.2	56.3	2.0	100.0
Size of household	3 & below	11.7	17.9	66.9	3.4	100.0
	4 - 5	8.4	16.8	68.6	6.1	100.0
	6 - 7	4.0	15.0	78.0	3.0	100.0
	8 & Above	13.0	32.6	50.0	4.3	100.0
Type of household	Salary	22.6	19.4	58.1		100.0
	Business	23.4	17.0	53.2	6.4	100.0
	NRI	28.0	24.0	44.0	4.0	100.0
	Cultivators	7.7	11.5	73.1	7.7	100.0
	Fishing	5.3	21.1	63.2	10.5	100.0
	Coolie/Forest related	4.1	18.3	73.3	4.4	100.0
	Others	11.2	15.7	68.5	4.5	100.0
SES Group	SES I	2.4	8.2	83.5	5.9	100.0
	SES II	4.4	20.6	68.8	6.3	100.0
	SES III	5.7	19.5	70.5	4.4	100.0
	SES IV	47.4	17.5	33.3	1.8	100.0
Total		8.8	18.0	68.3	4.8	100.0

Visit of health personnel

The household visit of health personnel is another important variable, which do have direct impact on health care access. The health personnel visits are quite high among the ST households compared to other categories. The type of service they provide is mainly preventive health care like immunisation

The households benefited from the visits of health personnels mostly with regard to the immunisation and disease prevention. Backward communities

especially STs, low income households, low SES group also benefited in terms of nutritional status. (For more details see Appendix 5.2, 5.3, 5.4).

5.5.5 Health Care Acceptability

Willingness of the concerned person to buy or receive a health care service is called as acceptability of health care. Of the different elements that determine the acceptability of any health care system/medical practice among a given population, culture stands distinct not merely for its intangibility that makes it difficult to be quantified, but also for the influence culture exerts on the people in deciding which medical system is to be accepted and for what purpose; in some cases even for deciding whether or not to accept any system. For the purpose of this work, this aspect which is crucial in understanding the factors that influence the different choices that people make between different available health care systems as also their very acceptance/willingness to avail any medical practise, is evaluated in two parts.

The first part would explicitly look at such objective determinants as education, awareness etc., and their role in the subject's decision to accept any particular medical practise; the second part is more concerned about the subjective elements of culture in the form of different ideologies and/or traditions that determine the subject's choice between different medical practices or in preventing the subject's acceptance of any medical system. The very fact that the cultural aspect of acceptability has to be dealt with in two segments communicates and is caused by the difficulties associated with it.

The prime difficulty is in understanding the very definition of the term culture itself. Culture is an ambiguous and obscure term that communicates different understandings depending upon the context of its use. In short and for the purpose of this study culture could broadly be defined as a shared understanding

of any objective and subjective elements by the members of a community. The shared understanding varies between different communities and groups of population depending upon metaphysical elements as religious ideologies and principles, traditional knowledge systems and traditional medical practices. Nevertheless these factors, understood as fundamental of the culture of any community, could further be enhanced and modified through changes in the material spheres of life like education, awareness etc.

While defining it this way this aspect of the study, as suggested early, straddles between the subjective and objective elements. Subjective and objective elements of culture also indicate those determinant factors that could be quantified and those that could not. While the larger intention of this study is inherently to quantify and thus theorize factors that influence the accessibility of the current health care system within the context of Kerala state and thus not sufficiently equipped to observe the non-quantifiable factors, it will invariably touch upon the cultural elements for their significant role in shaping and enhancing people's approach towards the available medical practices and to the concept of health care system itself. Of the three paradigms within which this study locates the accessibility of health care system in Kerala and investigates its efficiency and effectiveness, acceptability part seems more intricate as it becomes inevitable to incorporate cultural elements within it that are handed over to the present generation from the previous generations in the form of metaphysical beliefs, practices in the form of black magic, tribal medicine etc.

In more than a sense the non-modern ways of saving and protecting lives from physical ailments, have immensely been replaced by the modern medical practices through the spread of education, awareness programmes by the government and non-government agencies through various medias. Nonetheless, practices that are not established as scientific still remain in the society and are

widely found among certain (a few although) communities. Hence the concept of acceptability needs to be clarified on these grounds. First of all it requires to be differentiated from a choice making process wherein people choose one system of medicine from among a given set of options. Whereas choice- making process is an inherent module of acceptability, acceptability is a wider concept in that there exist certain basic dispositions retained by the members of certain communities that preclude their acceptance of any medical practices and the concept of health care system itself. As mentioned in a previous paragraph of this section, this study is not sufficiently equipped to take note of cultural elements that could not be quantified, which will, albeit be mentioned in passing. Thus the second part here that is on the subjective elements of culture is intended to be a short and brief one and, making a detailed investigation of this aspect is beyond the purview of this study.

5.5.5.1 Role of Objective elements in enhancing the acceptability of current health care systems

The main task in this section is to investigate the role of objective elements in enhancing the choice making process as also in making the concept of medical care acceptable to the subject. In the choice making process the subject chooses from among a set of medical practices that are already available within the locality and irrespective of their cost wise or otherwise affordability. The main reason for including choice making process within the folds of the concept of acceptability is that it conveys the acceptance of a particular medical system that in turn is marked by the presence or absence of any of the objective elements.

Choice of the provider

Choice of the provider is a major determinant of health care acceptability. Among the 761 morbid persons, 371 persons (48.8 per cent) did not meet health

personnel in the 15 days reference period, because majority of them were suffering from chronic ailments and were taking medicines according to the prescription given by the health personnel consultation other than the reference period (Table 5.16).

Table 5.16
Choice of provider among socio-economic groups

Selected Variables	Description	Public	Private	Public in private	Total
Caste	ST	69.0	27.6	3.4	100.0
	SC	35.1	57.3	7.6	100.0
	OBC	27.3	66.4	6.4	100.0
	Others	29.0	64.5	6.5	100.0
Place of residence	Rural	49.7	42.3	8.0	100.0
	Urban	11.5	87.5	1.0	100.0
MPCE Quartile Group	0 –25	64.5	30.8	4.7	100.0
	25 - 50	37.9	54.4	7.8	100.0
	50 - 75	35.2	54.5	10.2	100.0
	75 - 100	16.3	81.5	2.2	100.0
Size of household	3 & below	39.4	56.3	4.2	100.0
	4 – 5	41.7	51.0	7.3	100.0
	6 – 7	35.1	57.1	7.8	100.0
	8 & Above	38.0	60.0	2.0	100.0
Type of household	Salary	28.6	71.4		100.0
	Business	16.1	71.0	12.9	100.0
	NRI	6.3	87.5	6.3	100.0
	Cultivators	36.4	63.6		100.0
	Fishing	24.0	52.0	24.0	100.0
	Coolie/Forest related	47.9	47.5	4.5	100.0
	Others	35.3	60.8	3.9	100.0
SES Group	SES I	51.6	41.9	6.5	100.0
	SES II	53.7	41.1	5.3	100.0
	SES III	28.7	66.0	5.3	100.0
	SES IV	15.6	76.6	7.8	100.0
Age group	4 & below	36.7	57.1	6.1	100.0
	5 – 14	37.2	62.8		100.0
	15 – 34	38.5	53.8	7.7	100.0
	35 – 59	41.0	53.7	5.2	100.0
	60 & above	41.7	48.3	10.0	100.0
Sex	Male	42.0	52.3	5.7	100.0
	Female	37.5	56.0	6.5	100.0
Total		39.5 (154)	54.4 (212)	6.2 (24)	100.0 (390)

Of the total morbid persons 390 persons (51.5 per cent) met health personnel. Among them, 54.4 per cent opted private agencies and 39.5 opted government sources. A share of 6.2 per cent resorted to the government doctors who gave private services (public in private).

Among caste group, a significantly higher proportion of ST group (69 per cent) opted government sources followed by SC (35.1 per cent). The use of public sources was higher in rural area (49.7 per cent) when compared to urban area (11.5 per cent). MPCE group wise results show that poor household opted government sources (39.4 per cent).

A logistic regression model was worked out in order to find out the effect of socio-economic variables on the choice of provider.

Prob (choice of public) = (Distance, Time of travel, consultation fee, availability of free medicine, place of residence, MPCE)

Distance, time of travel, consultation fee and availability of free medicine were the major determinant of choice of provider (Table 5.17). The probability to accept public facilities in rural areas was 2 times more likely the chance when compared to urban area. Among the MPCE quartile group, the lowest MPCE group showed 7 times more likely to accept public facility when compared to high MPCE group.

Table 5.17
Result of Logistic model of the choice of the provider (Private=0, public=1)

Variables		B	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
					Lower	Upper
Distance		.000	.000	1.000	1.000	1.000
Time of travel		-.098	.000	.907	.869	.947
Consultation fee		-.083	.000	.920	.891	.951
Availability of free medicine		-2.598	.000	.074	.025	.225
Place of residence	Rural	1.024	.050	2.783	1.000	7.749
	Urban			1.000		
MPCE Quartile group	0 -25	2.044	.003	7.718	1.978	30.118
	25 - 50	1.493	.028	4.451	1.171	16.924
	50 - 75	1.200	.080	3.321	.865	12.749
	75 - 100		.029			
Constant		6.343	.000	568.494		

No of observations	=	390
Omnibus Tests of Model Coefficients Chi-square	=	385.901, p (0.000)
-2Log Likelihood	=	137.384
Cox & Snell R Square	=	0.628
Nagelkerke R Square	=	0.851
Hosmer and Lemeshow Test Chi-square	=	18.622, p(0.017)

Preference of type of medicine

The preference of children and old aged for the type of medicine like allopathy, ayurveda and homeopathy is discussed here.

For Children

It is interesting to note that backward communities and low income groups prefer mostly to allopathy while forward castes, high SES groups preferred to ayurveda and homeopathic system (Table 5.18). The preference to homeopathic medicine for children increases when the status of the household increases. It is because of the opinion that homeopathic medicines has less side effect than allopathic medicine. The reason for their preference are given in Appendix.5.5, 5.6.

Table 5.18
Preference of the type of medicine do you prefer for children (for those households with children age <16)

Selected Variables	Description	Allopathic	Ayurvedic	Homeopathic	Total
Caste	ST	98.5	1.5		100.0
	SC	92.7	5.5	1.8	100.0
	OBC	88.7	4.7	6.6	100.0
	Others	86.8	2.9	10.3	100.0
Place of residence	Rural	94.7	3.0	2.3	100.0
	Urban	81.8	6.8	11.4	100.0
MPCE Quartile Group	0 -25	95.9	3.1	1.0	100.0
	25 - 50	95.2	1.9	2.9	100.0
	50 - 75	90.7	3.5	5.8	100.0
	75 - 100	79.4	9.5	11.1	100.0
Size of household	3 & below	90.0	10.0		100.0
	4 - 5	92.5	4.0	3.5	100.0
	6 - 7	90.5	3.6	6.0	100.0
	8 & Above	89.1	2.2	8.7	100.0
Type of household	Salary	94.1		5.9	100.0
	Business	84.4	3.1	12.5	100.0
	NRI	73.3	13.3	13.3	100.0
	Cultivators	100.0			100.0
	Fishing	91.3	4.3	4.3	100.0
	Coolie/Forest related	94.2	4.8	1.0	100.0
	Others	87.0		13.0	100.0
SES Group	SES I	94.1	5.9		100.0
	SES II	97.2	.9	1.9	100.0
	SES III	91.6	3.6	4.8	100.0
	SES IV	64.3	14.3	21.4	100.0
Total		91.5	4.0	4.6	100.0

For old aged

The preference of medicine for old aged people was to allopathic. 80 per cent of the old aged people preferred allopathic medicine followed by ayurveda (16.4 per cent) and homeopathy (3.4 per cent). Among the caste group, the preference for homoepathic treatment was higher in forward caste group (Table 5.19). The rural –urban break up showed that preference of ayurveda and homoeopathi is higher in urban area. Among the size of household group, low

number group preferred ayurveda and homeo. The type of household group showed that business and cultivators showed comparatively less preference to allopathy.

Table 5.19
Type of medicine of the preference for old aged (for those households with aged >59)

Selected Variables	Description	Allopathic	Ayurvedic	Homepathic	Total
Caste	ST	89.7	10.3		100.0
	SC	86.4	12.3	1.2	100.0
	OBC	78.1	18.8	3.1	100.0
	Others	70.3	21.9	7.8	100.0
Place of residence	Rural	82.4	15.1	2.5	100.0
	Urban	75.9	19.0	5.1	100.0
MPCE Quartile Group	0 -25	91.9	8.1		100.0
	25 - 50	79.0	17.7	3.2	100.0
	50 - 75	79.6	16.7	3.7	100.0
	75 - 100	70.0	23.3	6.7	100.0
Size of household	3 & below	77.6	17.2	5.2	100.0
	4 - 5	79.5	15.7	4.8	100.0
	6 - 7	80.0	20.0		100.0
	8 & Above	86.5	10.8	2.7	100.0
Type of household	Salary	86.7	13.3		100.0
	Business	55.0	40.0	5.0	100.0
	NRI	83.3	8.3	8.3	100.0
	Cultivators	75.0	12.5	12.5	100.0
	Fishing	100.0			100.0
	Coolie/Forest related	84.5	14.0	1.6	100.0
	Others	75.0	18.8	6.3	100.0
SES Group	SES I	90.3	9.7		100.0
	SES II	88.1	10.2	1.7	100.0
	SES III	78.0	17.8	4.2	100.0
	SES IV	63.3	30.0	6.7	100.0
Total		80.3	16.4	3.4	100.0

With regard to the selection of the system of medicine showed that the major reason for selecting allopathic was due to quick remedy (67 per cent). The ayurveda system is preferred especially for particular diseases like rhumatism (43.6 per cent). The another reason for the preference of ayurveda was due to no side effect. Among the homeo prefernce group, 50 per cent of the old aged

preferred this due to the reason of no-side effect (for more details see Appendix 5.7).

5.6 Conclusion

In this chapter, we have discussed the morbidity and ailments of the population and analysed the elements of health care accessibility deeply. Highest morbidity is seen among females, STs, low income people and low SES group. Fewer of unknown origin, blood pressure, joint pains and diabetics are the more incurred ailments. It is seen that the affordability of health care facilities to the backward communities and low socio-economic groups is less, through these percentage of health care expenditure is high. The availability of health care institutions in terms of vehicles, road connectivity and communication is also less among backward communities and low socio economic groups. Acceptability in terms of objectives elements like choices and preferences shows that government sector is more chosen than private sector and allopathic system is more preferred to ayurveda and homoeo. But, the preferences to homoeopathy is highest among the forward caste and high socio-economic groups for their children and aged. Accessibility in terms of availability is less among backward communities and low socio-economic groups.

CHAPTER VI
Determinants of Health Care Accessibility

In the previous chapter, we have examined various aspects of affordability, availability and acceptability of health care based on our primary survey results In this chapter, we attempt to identify disparities in health care accessibility and its determinants, which is a combination of health care affordability, availability and acceptability among different socio-economic groups in the study area. The chapter is divided in to two main sections. In the first section, we discuss the methodology used for developing various accessibility indices and the second section deals with the analysis of causative factors in health care affordability, availability and accessibility.

6.1 Methodology of Creating Various Accessibility Indices

In order to measure the overall picture of the health care affordability, availability, acceptability of and accessibility, we have developed different indices following the methodology of UNDP Hunan Development Report (UNDP 19901). For normalising the values we have used the following formula for respective indices.

$$\text{Dimension Index} = \frac{X_i - \text{Minimum}(X_i)}{\text{Maximum}(X_i) - \text{Minimum}(X_i)}$$

Where, Xi = actual value of the ith indicator.

The corresponding variables and methodologies for different indices are described below.

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[1] United Nations Development Programme (1990), Human Development Report *1990, Oxford University Press, New York.*

6.1.1 Affordability Index (AFFI)

The variables used for making the Affordability Index are:

(i) Monthly Per Capita Expenditure of the household (AFF1).

(ii) A five point scaling score (with values 1 for 'great difficulty', 2 for 'difficulty', 3 for 'Medium', 4 for 'Easily', 5 for 'Very easily' for the perception of the respondents regarding the situation in which a member of the family were to becomes seriously ill, how would they find the money needed for the necessary health care services (AFF2).

(iii) The presence of a situation in which, a morbid person could not avail treatment even though the patient is willing with value '0', and the reverse situation with the value '1' (AFF3).

After normalising the above three variables by using the formula referred above, we made the affordability index as follows:

$$AFFI = [(AFF1 \times 0.50) + (AFF2 \times 0.25) + (AFF3 \times 0.25)]$$

While calculating the Affordability Index, we had given more importance to Monthly Per Capita Consumption Expenditure by giving weight of 0.5, because MPCE is assumed to be the major determinant of health care affordability.

6.1.2 Availability Index (AVAI)

The variables used for making the Availability Index were:

(i) Distance to PHC (AVA1)

(ii) Conveyance and facilitating variables (AVA2):

Four attributes have been included in conveyance and facilitating variables. They are

(a) Visit of the health personnel to household (AVA2a): value 1 for health personal visit and 0 for absence of health personnel visit

(b) Availability of aid from external agencies (AVA2b): value 1 for availed help from external agencies and 0 for absence of help from external agencies,

(c) Frequency of bus service (AVA2c): value 1 for the bus service less than one hour and 0 for the bus services more than one hour;

(d) Type of conveyance (AVA2d): value 1 for the household having own vehicles used for visit of the health care institutions and 0 for the absence of own vehicles

Finally the variable AVA2 was calculated by:

AVA2 = AVA2a + AVA2b + AVA2c + AVA2d

After normalising the variables AVA1 and AVA2 , we calculated the availability index by the formula given below:

AVAI = [(AVA1 × 0.65) + (AVA2 × 0.35)]

Where AVAI = Availability Index; AVA1 = Distance to PHC; AVA2 = Conveyance and facilitating variable. We gave more importance to distance to PHC by giving weight 0.65, because it is assumed to be the major determinant in availability of health care institutions.

6.1.3 Acceptability Index (ACPI)

The acceptability of health care is the willingness to receive a health care service. Here, in order to make the acceptability index, we have selected variables which stand for facilitating which are directly or indirectly leads to the acceptability of health care.

The variables included in calculating acceptability index are:

(i) Female literary rate in the household (ACP1)

Percentage share of the adult females who completed education of 7 years and more to the total number of adult females in the household.

(ii) Facilitating variables (ACP2)

(a) Use of the modern medicine with the consultation of the doctors (ACP2a); scores 1 using consultation with doctors and 0 for without consultation.

(b) Involvement in the activities of any social/community organisations (ACP2b); scores 1 for involvement in the social/community organisation and 0 for non-involvement.

(c) Alcoholic consumption in the household (ACP2c): scores 1 for non-consumption of the alcohol and 0 for consumption of the alcohol.

(d) Drinking water treatment (ACP2d): scores 1 for treatment of the water with boiling, filter, cloth screen etc. and 0 for non-treatment.

Finally the variable ACP2 was calculated as:

ACP2 = ACP2a + ACP2b + ACP2c + ACP2d

(iii) Awareness of the need for facilitating services (ACP3)

Here four attributes have been selected regarding the awareness of the need and for each attribute the score 1 is given for awareness and 0 for non-awareness. Here the total score will be 4 for all four attributes having awareness. The variables were the awareness of the need for (a) immunisation of children (b) idolised salt (c) immunisation of pregnant woman (d) ORS for severe diarrhoea

(iv) Awareness of the reasons for heart attack (ACP4)

Here, 4 scores have been given for the respondents who gave any four reasons for the heart attack, 3 scores for any three reasons and so on. The reasons were listed as (a) cholesterol (b) blood pressure (c) diabetics (d) obesity (e) lack of exercise (f) smoking and (g) not known.

(v) Awareness of the reasons for the Dengue fever (ACP5)

For the awareness of the reasons for the Dengue fever, the score 2 has been given for 'Adis mosquito', 1 has been given 'Mosquito' and 0 for 'not known'.

After normalising the variables ACP1, ACP2, ACP3, ACP4 and ACP5, we made the availability index by the formula given below with appropriate weights:

$$ACPI = [(ACP1 \times 0.30) + (ACP2 \times 0.40) + (ACP3 \times 0.10) + (ACP4 \times 0.10) + (ACP5 \times 0.10)]$$

6.1.4 Accessibility Index (ACCI)

The accessibility to health care is a composite index of affordability, availability and acceptability indices. The Accessibility Index has been calculated by giving equal weight to each variable.

$$ACC\ I = 1/3 \times (AFFI + AVAI + ACPI)$$

Where ACCI – Accessibility Index; AFFI – Affordability Index; AVAI – Availability Index; ACPI – Acceptability Index.

6.2 Affordability, Availability and Acceptability Aspects of Health Care

In this section we analyse the health care accessibility in Kerala based on our survey results. The three characteristics which determine the accessibility are affordability, availability and acceptability and altogether health care accessibility have been discussed in each sub sections.

6.2.1 Health care affordability

In the present study, we do examine the health care affordability in terms of affordability Index scores, which are given in Table 6.1. and Figure 6.1. The average affordability index was reported to be 0.340 with the standard deviation of 0.156. The T test and Kruskal Wallis Test showed that all the results are statistically significant. The lowest standard deviation was reported in salary households showing low within group variation in health care affordability. The lowest health care affordability was reported for ST group followed by SC group (Fig.6.1- Panel 1). Rural area reported low affordability when compared to urban areas (Fig.6.1- Panel 2). In the case of MPCE group, it showed a positive relationship between affordability and MPCE status (Fig.6.1- Panel 3). The size of household group did not show any clear picture regarding the affordability by reporting low affordability among the size group of 6-7 (Fig.6.1- Panel 4). Among the type of household group, it was coolie/forest related household who reported lowest affordability followed by fishing community while the highest affordability was among salary households (Fig.6.1- Panel 5). The socio-economic status group showed that lower affordability was among SES II and SES I group (Fig.6.1- Panel 6).

Table 6.1

Descriptive statistics of health care affordability score among socio economic groups

Selected Variables	Description	Mean	Standard Deviation	T test	Mean difference[2]	Kruskal Wallis Test[3]: χ^2 (Asyp.sig.)
Caste	ST	0.258	0.133	19.362*	0.258	95.830*
	SC	0.305	0.133	32.549*	0.305	
	OBC	0.370	0.159	30.533*	0.370	
	Others	0.420	0.155	30.673*	0.420	
Place of residence	Rural	0.324	0.149	45.319*	0.324	19.615*
	Urban	0.383	0.165	29.904*	0.383	
MPCE Quartile Group	0 –25	0.238	0.146	19.897*	0.238	204.930*
	25 – 50	0.305	0.129	29.109*	0.305	
	50 – 75	0.362	0.117	37.945*	0.362	
	75 – 100	0.456	0.142	39.460*	0.456	
Size of household	3 & below	0.351	0.175	24.120*	0.351	15.329**
	4 – 5	0.350	0.143	42.946*	0.350	
	6 – 7	0.288	0.153	18.765*	0.288	
	8 & Above	0.353	0.156	15.353*	0.353	
Type of household	Salary	0.475	0.117	22.651*	0.475	140.788*
	Business	0.461	0.127	24.870*	0.461	
	NRI	0.462	0.146	15.795*	0.462	
	Cultivators	0.436	0.180	12.384*	0.436	
	Fishing	0.291	0.144	12.423*	0.291	
	Coolie/Forst.	0.287	0.134	39.855*	0.287	
	Others	0.394	0.150	24.789*	0.394	
SES Group	SES I	0.289	0.127	27.991*	0.289	155.042*
	SES II	0.269	0.145	22.561*	0.269	
	SES III	0.344	0.142	29.863*	0.344	
	SES IV	0.459	0.135	41.652*	0.459	
Total		0.340	0.156			

* indicates significance at 99 per cent confidence interval

** indicates significance at 95 per cent confidence interval

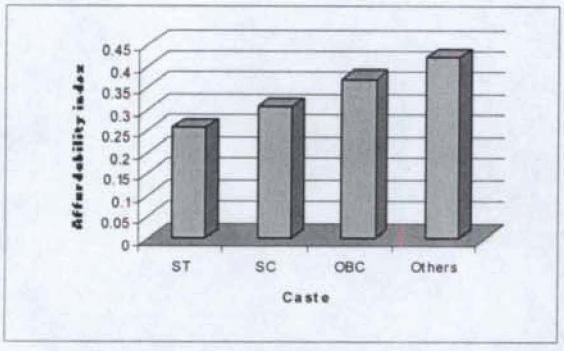
[2] The mean difference is a measure of statistical dispersion equal to the average absolute difference of two independent values drawn from a probability distribution. The mean difference is also known as the 'absolute mean difference' and the 'Gini mean difference'. The mean difference is sometimes denoted by Δ or as MD.

[3] The Kruskal Wallis test is used when you have one independent variable with two or more levels and an ordinal dependent variable. In other words, it is the non-parametric version of ANOVA and a generalized form of the Mann-Whitney test method since it permits two or more groups.

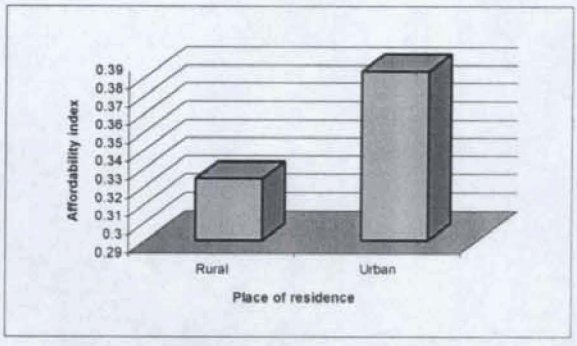
Fig. 6.1

Health care affordability among socio-economic groups

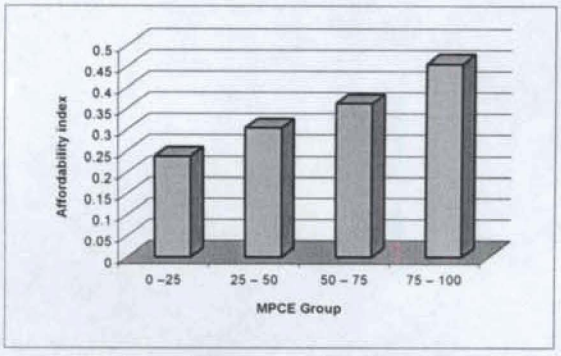
Panel 1: Caste



Panel 2: Place of residence

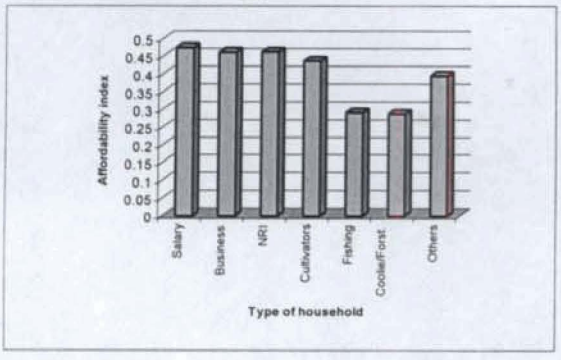


Panel 3: MPCE

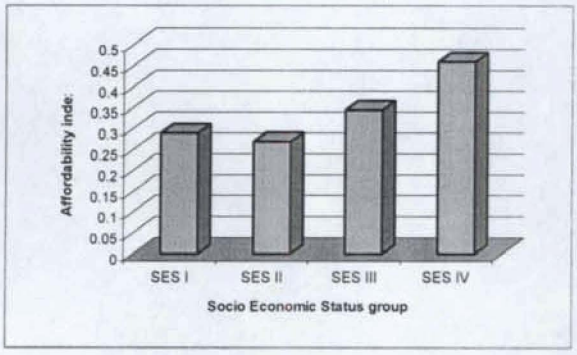


Panel 4: Size of household

Panel 5: Type of household



Panel 6: SES Group



6.2.1.1 Disparity in health care affordability

In the present section we explore various causative factors which determine the health care affordability. Health care affordability scores have been categorized into low, medium and high. The value of the scores ranged between 0 and 1. The scores below 0.33 were categorised into low affordability, between 0.34 and 0.39 as medium and 0.40 above as high affordability. Pearson Chi-Square analysis showed there exist association between affordability and socio-

economic variables (Table 6.2). Among the caste group, ST's condition was very pathetic with 54 per cent of low affordability and 43 per cent ofmedium affordability. Only 3 per cent ST households reported high affordability. Low affordability was higher among rural area. In the case of MPCE group, as it is well known, the low affordability was highest among 0-25 group and lowest in 75-100 group.

Table 6.2
Health care affordability among socio economic groups (Percentage)

Selected Variables	Description	Low	Medium	High	Total	Pearson Chi-Square
Caste	ST	54.0	43.0	3.0	100.0	106.253*
	SC	37.0	42.5	20.5	100.0	
	OBC	26.7	29.7	43.6	100.0	
	Others	24.2	17.2	58.6	100.0	
Place of residence	Rural	36.3	37.2	26.4	100.0	25.770*
	Urban	28.5	23.6	47.9	100.0	
MPCE Quartile Group	0 –25	68.5	20.1	11.4	100.0	222.795*
	25 – 50	30.5	52.3	17.2	100.0	
	50 – 75	21.5	48.3	30.2	100.0	
	75 – 100	16.6	13.2	70.2	100.0	
Size of household	3 & below	33.8	30.3	35.9	100.0	24.244*
	4 – 5	28.2	38.8	33.0	100.0	
	6 – 7	51.0	28.0	21.0	100.0	
	8 & Above	39.1	19.6	41.3	100.0	
Type of household	Salary	6.5	22.6	71.0	100.0	154.951*
	Business	14.9	12.8	72.3	100.0	
	NRI	24.0	4.0	72.0	100.0	
	Cultivators	23.1	7.7	69.2	100.0	
	Fishing	31.6	55.3	13.2	100.0	
	Coolie/Forest related	43.9	40.1	16.0	100.0	
	Others	23.6	29.2	47.2	100.0	
SES Group	SES I	45.0	44.4	10.6	100.0	175.860*
	SES II	43.2	46.6	10.1	100.0	
	SES III	34.4	29.1	36.4	100.0	
	SES IV	14.0	14.0	72.0	100.0	
Total		34.2	33.5	32.3	100.0	

* indicates significance at <1 per cent level.

We may infer from the above discussion that the rural, lower caste, low income, marginal workers and poor socio-economic groups are having worse affordability of health care facilities.

6.2.1.2 Multinomial logistic regression model

In order to estimate the degree of association between health care affordability and the its various causative factors, we have used a multinomial logistic regression model. In the multinomial logistic regression model tried to associate the health care affordability scores with caste, place of residence, size of household, type of household, and SES group. We have assumed a linear relationship between the transformed outcome variable (health care affordability scores) and our predictor variables (caste, place of residence, size of household, type of household, and SES group). The model for testing the probability of health care affordability is as follows:

Prob (healthcare affordability) = (Caste, Place of residence, Size of household, Type of household, SES Group).

The multinomial logistic regression model has been fitted taking into account of the three categories of health care affordability - low, medium and high. We have chosen high health care affordability (score = 3) as the base category for the comparison and the results of the multinomial logistic regression model for determining the factors affecting health care affordability are given in Table 6.3. These three categories were non-overlapping and together they constitute the total population surveyed.

Among the caste group ST households showed 7 times the chance to have low health care affordability when compared to Forward caste households. Among the type of household, fishing household showed 2.9 times followed by coolie/forest related households 2.3 times the chance to have low affordability

when compared to other type of household with regard to high affordability. Among SES group, SESII showed 8 times the chance to have low affordability when compared to SES IV group while SES I group showed 7 time the chance to have low affordability.

Table 6.3
Multinomial logistic regression results showing the probability of health care affordability
(Dependent variable - health care affordability score; reference category- high health care affordability)

Selected Variables	Description	Low		Medium	
		B	Exp(B)	B	Exp(B)
Caste	ST	1.957**	7.078	1.940**	6.961
	SC	0.210	1.234	0.680	1.974
	OBC	0.158	1.172	0.428	1.534
	Others	0.000	1.000	0.000	1.000
Place of residence	Rural	0.182	1.200	0.476	1.609
	Urban	0.000	1.000	0.000	1.000
Size of household	3 & below	-0.407	0.666	0.218	1.244
	4 – 5	-0.530	0.589	0.451	1.571
	6 – 7	0.616	1.851	0.726	2.067
	8 & Above	0.000	1.000	0.000	1.000
Type of household	Salary	-1.644**	0.193	-0.594	0.552
	Business	-0.340	0.711	-0.816	0.442
	NRI	0.062	1.064	-1.815	0.163
	Cultivators	-0.131	0.877	-1.473	0.229
	Fishing	0.992	2.697	0.968	2.632
	Coolie/Forst.	0.869**	2.385	0.451	1.569
	Others	0.000	1.000	0.000	1.000
SES Group	SES I	1.957*	7.080	1.797*	6.032
	SES II	2.090*	8.086	1.986*	7.287
	SES III	1.063**	2.896	0.721**	2.057
	SES IV	0.000	1.000	0.000	1.000
Intercept		-1.608**		-2.259*	

*significant at <1 per cent level
**significant at <5 per cent level

No of observations	= 600
-2 Log Likelihood intercept only	= 876.059
-2 Log Likelihood intercept final	= 609.289
Chi-square	= 266.770, p (0.000)
Cox & Snell Pseudo R-Square	= 0.359
Nagelkerke Pseudo R Square	= 0.404
McFadden Pseudo R-Square	= 0.202

6.2.4.3 Multinomial logistic regression model with dichotomous independent variables

In the foregoing analysis of the multinomial logistic regression, we found the impact of socio-economic variables in determining the health care affordability. One of the major lacuna of the previous model was that it failed to identify the most dominating factor deciding the health care affordability. To overcome this problem, we have done another multinomial logistic regression analysis in order to delineate the intensity of the impact socio-economic variables on health care affordability, where each attribute of the socio-economic variables were considered as each variable having the values of 0 and 1 (for eg., ST=1, else=0; SC=1, else=0, and so on).

We have assumed a linear relationship between the transformed outcome variable (health care affordability scores) and our predictor variables (caste, place of residence, size of household, type of household, and SES group). We had chosen high health care affordability (score = 3) as the base category for the comparison.

The model for testing the probability of health care affordability is as follows:

Prob (healthcare affordability) = (ST, SIZE_GR1, SIZE_GR3, FISHING, COOLIEF, SESG_1, SESG_2, SESG_3)

The result given in Table 6.4, showed that the most determining factor in deciding the low health care affordability is the condition of being an SEG II household. They showed 10 times the chance to have low health care affordability relative to other group having high health care affordability. The other major determining factor was the Socio-Economic group SESG I (Odds ratio - 9.130) followed by ST households (Odds ratio - 6.027). The major determining factors in affecting health care affordability are also given as Fig.6.2

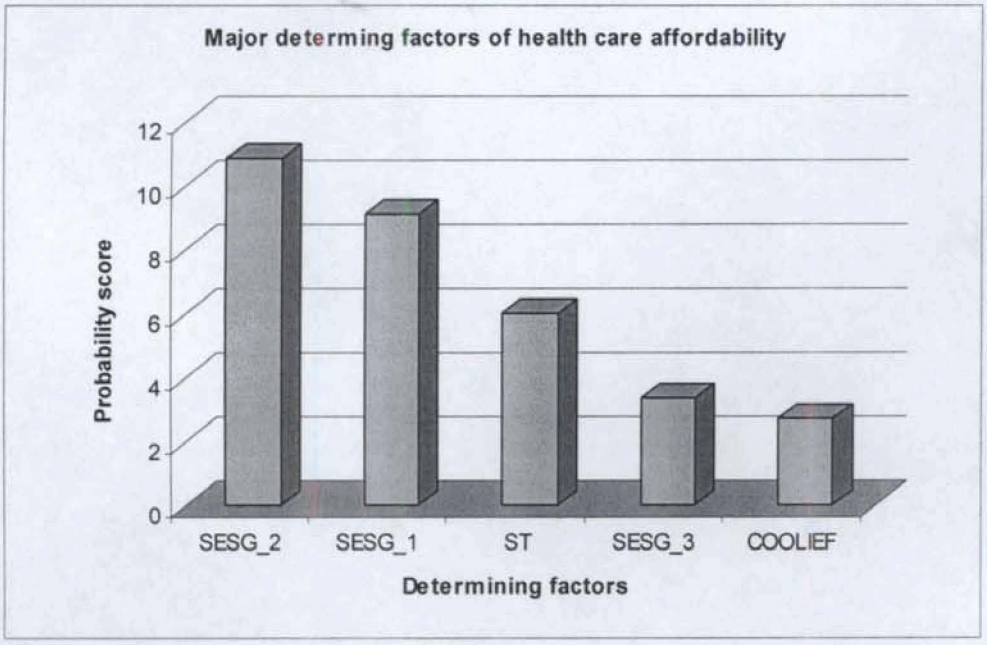
Table 6.4

Results of the multinomial logistic regression model for determining the factors affecting health care affordability (Reference category = High health care affordability)

Affordability Group		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
						Lower Bound	Upper Bound
Low	Intercept	-1.317	0.311	0.000			
	ST	1.796	0.630	0.004	6.027	1.754	20.702
	SIZE_GR1	-0.787	0.337	0.019	0.455	0.235	0.881
	SIZE_GR2	-0.779	0.290	0.007	0.459	0.260	0.810
	COOLIEF	1.012	0.258	0.000	2.751	1.658	4.565
	SESG_1	2.212	0.400	0.000	9.130	4.167	20.002
	SESG_2	2.388	0.400	0.000	10.897	4.977	23.860
	SESG_3	1.216	0.325	0.000	3.375	1.786	6.379
Medium	Intercept	-1.829	0.338	0.000			
	ST	1.477	0.633	0.020	4.382	1.267	15.152
	SIZE_GR1	-0.286	0.356	0.421	0.751	0.374	1.508
	SIZE_GR2	0.164	0.304	0.590	1.178	0.649	2.138
	COOLIEF	0.789	0.256	0.002	2.201	1.333	3.636
	SESG_1	2.410	0.393	0.000	11.138	5.159	24.047
	SESG_2	2.641	0.392	0.000	14.031	6.509	30.245
	SESG_3	1.126	0.325	0.001	3.082	1.630	5.828

No of observations	= 600
-2 Log Likelihood intercept only	= 457.572
-2 Log Likelihood intercept final	= 224.236
Chi-square	= 233.337, p (0.000)
Cox & Snell Pseudo R-Square	= 0.322
Nagelkerke Pseudo R Square	= 0.362
McFadden Pseudo R-Square	= 0.177

Fig.6.2



Hence me may state that the socio-economic status and caste are the major determining factors when compared to other factors.

6.2 Health care availability

The health care availability has been measured in scores derived from different availability variables and the value ranges from 0 – 1. Table 6.5. indicates the average availability score to be 0.647 with the standard deviation of 0.161. The Kruskal-Wallis test showed the socio-economic variables the results are statistically significant except in size of household. Among the caste group, ST group had very low availability with an average of 0.398 followed by SC group (0.676) (Fig.6.3-Panel 1). Here, ST group placed far away from other caste group. The availability was marginally higher in urban area (Fig.6.3-Panel 2).

Table 6.5
Descriptive statistics of health care availability score among socio economic groups

Selected Variables	Description	Mean	Standard Deviation	T test	Mean difference	Kruskal Wallis Test χ^2
Caste	ST	0.398	0.179	22.313*	0.398	186.383*
	SC	0.676	0.096	99.428*	0.676	
	OBC	0.712	0.099	94.771*	0.712	
	Others	0.709	0.103	77.644*	0.709	
Place of residence	Rural	0.641	0.182	73.322*	0.641	2.169
	Urban	0.664	0.082	104.075*	0.664	
MPCE Quartile Group	0 –25	0.549	0.200	33.489*	0.549	55.018*
	25 – 50	0.664	0.148	55.248*	0.664	
	50 – 75	0.678	0.132	62.858*	0.678	
	75 – 100	0.695	0.111	77.065*	0.695	
Size of household	3 & below	0.644	0.165	46.894*	0.644	1.634
	4 – 5	0.650	0.163	70.238*	0.650	
	6 – 7	0.650	0.158	40.997*	0.650	
	8 & Above	0.632	0.149	28.838*	0.632	
Type of household	Salary	0.703	0.091	42.790*	0.703	57.043*
	Business	0.687	0.092	51.446*	0.687	
	NRI	0.731	0.102	35.854*	0.731	
	Cultivators	0.731	0.092	40.363*	0.731	
	Fishing	0.749	0.081	56.642*	0.749	
	Coolie/Forst.	0.606	0.177	63.292*	0.606	
	Others	0.675	0.145	43.971*	0.675	
SES Group	SES I	0.606	0.164	45.321*	0.606	47.293*
	SES II	0.591	0.202	35.593*	0.591	
	SES III	0.681	0.136	61.694*	0.681	
	SES IV	0.708	0.094	92.750*	0.708	
Total		0.647	0.161			

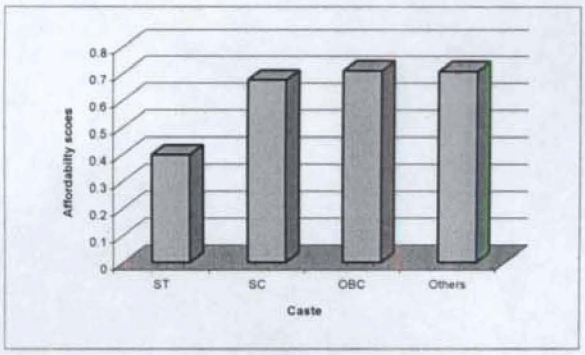
* significant at <1 per cent

Among the MPCE group 0-25 group got les availability (Fig.6.3-Panel 4). Similar to the case of affordability, the coolie/forest related households were backward in the case of availability too (Fig.6.3-Panel 5). Among SES group, SES II reported lowest availability followed by SES I group (Fig.6.3-Panel 6). The lowest variability was reported in fishing community with the standard deviation of 0.081 while the high variability was shown in SES II group.

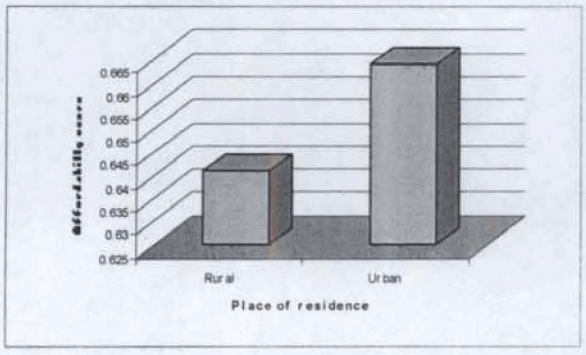
Fig. 6.3

Health care availability among socio-economic groups

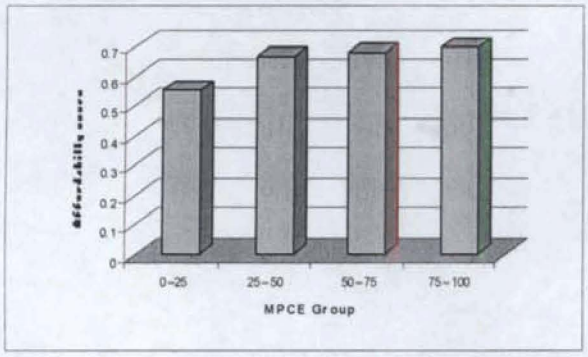
Panel 1: Caste



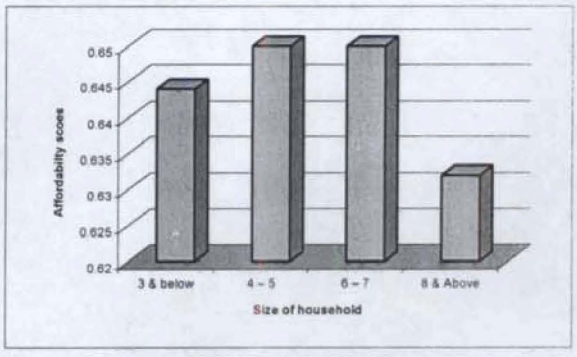
Panel 2: Place of residence



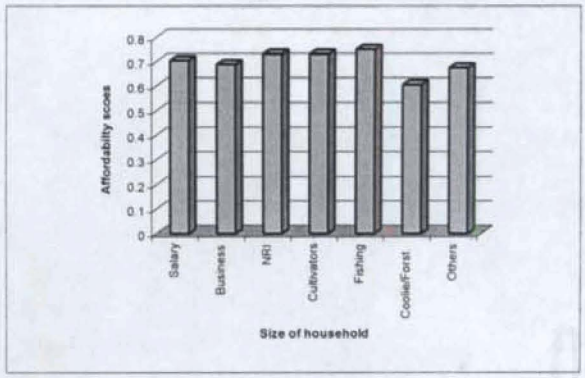
Panel 3: MPCE



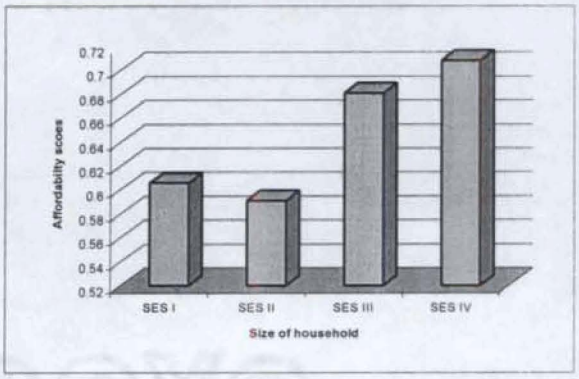
Panel 4: Size of household



Panel 5: Type of household



Panel 6: SES Group



6.2.2.2 Disparity in health care availability

Given the health care availability scores, the classification of low, medium and high health care availability status has been given Table 6.6. Chi-square test was significant except in the case of size of household. The scores with 0.61 and below were categorised into low availability, between 0.62 to 0.73 as medium and 0.74 and above as high availability.

Table 6.6
Health care availability among socio economic groups (Percentage)

Selected Variables	Description	Low	Medium	High	Total	Pearson Chi-Square
Caste	ST	81.0	18.0	1.0	100.0	142.200*
	SC	31.5	41.5	27.0	100.0	
	OBC	20.3	36.6	43.0	100.0	
	Others	21.1	29.7	49.2	100.0	
Place of residence	Rural	34.9	27.4	37.7	100.0	34.947*
	Urban	32.7	50.3	17.0	100.0	
MPCE Quartile Group	0 –25	55.7	26.2	18.1	100.0	44.275*
	25 – 50	31.8	35.8	32.5	100.0	
	50 – 75	24.2	36.9	38.9	100.0	
	75 – 100	25.8	35.8	38.4	100.0	
Size of household	3 & below	40.0	26.2	33.8	100.0	7.172
	4 – 5	32.4	36.2	31.4	100.0	
	6 – 7	30.0	35.0	35.0	100.0	
	8 & Above	39.1	37.0	23.9	100.0	
Type of household	Salary	29.0	35.5	35.5	100.0	52.353*
	Business	31.9	31.9	36.2	100.0	
	NRI	8.0	48.0	44.0	100.0	
	Cultivators	15.4	23.1	61.5	100.0	
	Fishing	5.3	42.1	52.6	100.0	
	Coolie/Forest related	43.6	32.3	24.1	100.0	
	Others	27.0	34.8	38.2	100.0	
SES Group	SES I	41.7	35.1	23.2	100.0	39.605*
	SES II	48.0	29.7	22.3	100.0	
	SES III	28.5	32.5	39.1	100.0	
	SES IV	19.3	37.3	43.3	100.0	
Total		34.3	33.7	32.0	100.0	

* significant at <1 per cent

Among the total sample, 34.3 per cent households belonged to low available households followed by 33.7 per cent with medium availability. Among the caste group, ST households were reported to be having lower availability compared to other caste groups. 81 per cent of the ST households experienced low availability. Low availability was higher in rural area. Availability and MPCE status showed a positive relationship. Among the type of households, coolie/forest related households experienced low availability (43.6 per cent). Among the SES group, it was SES II who experienced low availability severely (48 per cent).

6.2.2.3 Multinomial logistic regression model

In order to estimate the degree of association between health care availability and its various causative factors, we have used a similar multinomial logistic regression model, which was used for estimation of health care affordability. In the multinomial logistic regression model we have tried to associate the health care availability scores with caste, place of residence, MPCE, size of household, type of household, and SES group. The model for testing the probability of health care availability is as follows:

Prob (healthcare availability) = (Caste, Place of residence, MPCE, Size of household, Type of household, SES Group).

The multinomial logistic regression model has been fitted taking into account of the three categories health care availability of low, medium and high. We have chosen high health care availability (score = 3) as the base category for the comparison and the results of the multinomial logistic regression model for determining the factors affecting health care availability are shown in Table 6.7.

Table 6.7
Multinomial logistic regression results showing the probability of health care availability
(Dependent variable - health care availability score; reference category- high health care availability)

Selected Variables	Description	Low		Medium	
		B	Exp(B)	B	Exp(B)
Caste	ST	5.268*	193.999	3.704**	40.615
	SC	0.797**	2.219	0.859**	2.362
	OBC	0.204	1.226	0.303	1.354
	Others	0.000	.	0.000	.
Place of residence	Rural	-1.580*	0.206	-1.795*	0.166
	Urban	0.000	.	0.000	.
MPCE Quartile Group	0 –25	0.281	1.324	-0.189	0.827
	25 – 50	-0.003	0.997	-0.089	0.915
	50 – 75	-0.366	0.694	-0.183	0.833
	75 – 100	0.000	.	0.000	.
Size of household	3 & below	-0.367	0.693	-0.658	0.518
	4 – 5	-0.481	0.618	-0.151	0.860
	6 – 7	-1.197**	0.302	-0.603	0.547
	8 & Above	0.000	.	0.000	.
Type of household	Salary	0.171	1.187	-0.091	0.913
	Business	0.739	2.093	-0.011	0.989
	NRI	-1.161	0.313	0.100	1.105
	Cultivators	0.051	1.052	0.115	1.121
	Fishing	-1.426	0.240	0.335	1.398
	Coolie/Forest.	0.235	1.265	0.221	1.247
	Others	0.000	.	0.000	.
SES Group	SES I	0.332	1.394	0.308	1.360
	SES II	0.893**	2.441	0.292	1.339
	SES III	0.336	1.399	-0.080	0.923
	SES IV	0.000	.	0.000	.
Intercept		0.439		1.023	

* significant at <1 per cent
** significant at <5 per cent

No of observations	= 600
-2 Log Likelihood intercept only	= 1094.210
-2 Log Likelihood intercept final	= 848.128
Chi-square	= 246.082, p (0.000)
Cox & Snell Pseudo R-Square	= 0.336
Nagelkerke Pseudo R Square	= 0.379
McFadden Pseudo R-Square	= 0.187

Among the caste group ST households showed 193 times the chance to have low health care availability when compared to Forward caste households having high availability. Among the place of residence group, rural households

showed 20 per cent likely to have low availability when compared to urban households having high availability. Even though the Chi square analysis showed no statistical significance, here among the size of household the size group 6 – 7 showed 30 per cent likely to have low availability with a 95 per cent statistical significance. Among the socio-economic status group, SES II showed 2 times the chance to have low health care availability when compared to SES III relative to high health care availability.

6.2.2.4 Multinomial logistic regression model with Dichotomous independent variables

Analysis in the previous section showed the impact of socio-economic variable groups in deciding the health care availability. One of the major limitation of the previous model was that it failed to identify the most dominating factor deciding the health care availability. To overcome this problem, we have done another multinomial logistic regression analysis as we have already done in affordability index's multinomial logistic regression model with dichotomous independent variables.

The model for testing the probability of health care availability is as follows:

Prob (healthcare availability) = (ST, MPCE1, BUSINESS, FISHING, SESG_2)

The result showed that the most determining factor in deciding the low health care availability is the condition of being an ST household (Table 6.8). They showed 86 times the chance to have low health care availability relative to other groups The other major determining factor was the Socio-Economic group SESG II (Odds ratio-2.144) showing 2 times the chance to have low health care

availability. The graphical representation of the major determining factors in affecting health care availability are given in Fig.6.4.

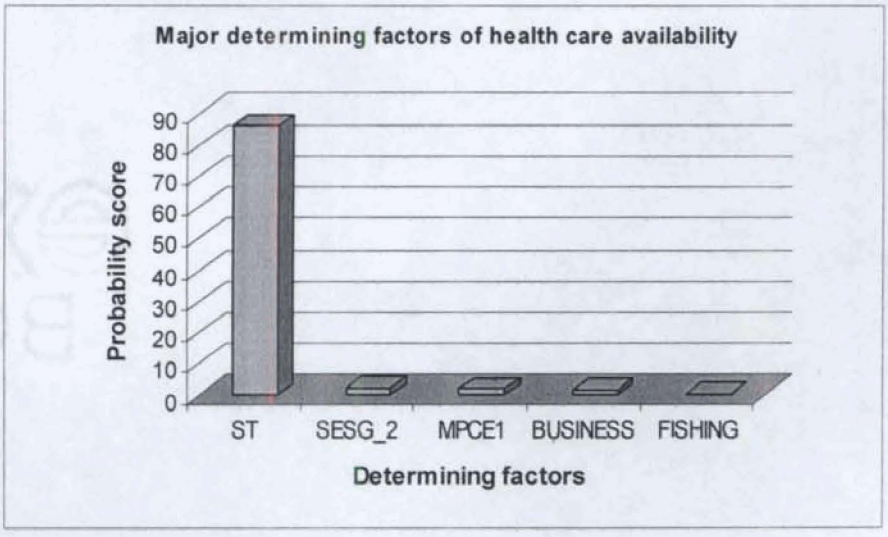
Table 6.8

Results of the multinomial logistic regression model for determining the factors affecting health care availability (Reference category = High health care availability)

Availability group	Variables	B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
						Lower Bound	Upper Bound
Low	Intercept	-0.671	0.155	0.000			
	ST	4.457	1.019	0.000	86.187	11.703	634.752
	MPCE1	0.616	0.294	0.036	1.851	1.041	3.293
	BUSINESS	0.546	0.387	0.158	1.726	0.809	3.682
	FISHING	-2.040	0.760	0.007	0.130	0.029	0.576
	SESG_2	0.763	0.281	0.007	2.144	1.237	3.717
Medium	Intercept	-0.076	0.132	0.565			
	ST	2.831	1.038	0.006	16.970	2.219	129.798
	MPCE1	0.127	0.286	0.657	1.135	0.648	1.988
	BUSINESS	-0.049	0.378	0.896	0.952	0.454	1.996
	FISHING	-0.251	0.359	0.484	0.778	0.385	1.571
	SESG_2	0.251	0.265	0.344	1.286	0.764	2.162

No of observations	= 600
-2 Log Likelihood intercept only	= 245.970
-2 Log Likelihood intercept final	= 87.723
Chi-square	= 158.247, p (0.000)
Cox & Snell Pseudo R-Square	= 0.232
Nagelkerke Pseudo R Square	= 0.261
McFadden Pseudo R-Square	= 0.120

Fig. 6.4



6.2.3 Health care acceptability

In order to measure the determinants of health care acceptability we have worked out the health care acceptability scores. The values ranges from 0 to 1. The average value was found to be 0.472. The t test and Kruskal-Wallis test showed that all the results are statistically significant (Table 6.9). Among the caste group, ST had an average score of 0.316 which is the lowest in that category, followed by 0.430 (Fig.6.5.-Panel1).

Table 6.9
Descriptive statistics of health care acceptability score among socio economic groups

Selected Variables	Description	Mean	Standard Deviation	T test	Mean difference	Kruskal Wallis Test: χ^2
Caste	ST	0.316	0.150	22.313	0.398	120.924*
	SC	0.430	0.184	99.428	0.676	
	OBC	0.522	0.194	94.771	0.712	
	Others	0.590	0.192	77.644	0.709	
Place of residence	Rural	0.445	0.202	73.322	0.641	26.415*
	Urban	0.542	0.196	104.075	0.664	
MPCE Quartile Group	0 –25	0.347	0.155	33.489	0.549	90.917*
	25 – 50	0.468	0.201	55.248	0.664	
	50 – 75	0.516	0.202	62.858	0.678	
	75 – 100	0.555	0.196	77.065	0.695	
Size of household	3 & below	0.448	0.212	46.894	0.644	9.018**
	4 – 5	0.489	0.204	70.238	0.650	
	6 – 7	0.437	0.184	40.997	0.650	
	8 & Above	0.498	0.216	28.838	0.632	
Type of household	Salary	0.629	0.202	42.790	0.703	116.153*
	Business	0.601	0.184	51.446	0.687	
	NRI	0.604	0.230	35.854	0.731	
	Cultivators	0.558	0.189	40.363	0.731	
	Fishing	0.436	0.165	56.642	0.749	
	Coolie/Forst.	0.401	0.179	63.292	0.606	
	Others	0.574	0.192	43.971	0.675	
SES Group	SES I	0.391	0.190	45.321	0.606	119.561*
	SES II	0.388	0.181	35.593	0.591	
	SES III	0.497	0.181	61.694	0.681	
	SES IV	0.610	0.182	92.750	0.708	
Total		0.472	0.205			

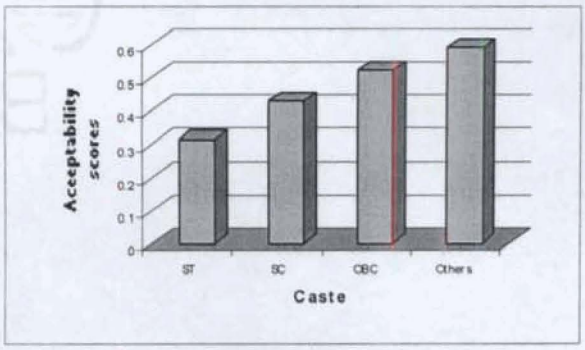
The acceptability was higher in urban area (Fig.6.5-Panel 2). Among the MPCE quartile group, MPCE and acceptability status showed a positive

relationship showing low acceptability in low MPCE group and vice versa (Fig.6.5-Panel 3). Size of household did not show any such pattern showing high acceptability was among 8 & above and low acceptability was reported in 6-7 group (Fig.6.5-Panel 4). The type of household showed that the lowest acceptability was among coolie/forest related households followed by fishing community (Fig.6.5-Panel 5). The lowest health care acceptability was reported in SES II in socio-economic status group followed by SES I (Fig.6.5-Panel 6).

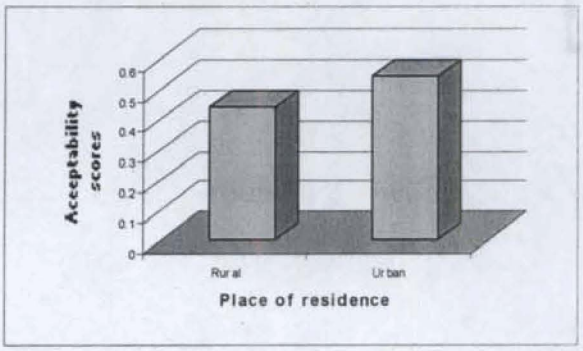
Fig. 6.5

Health care acceptability among socio-economic groups

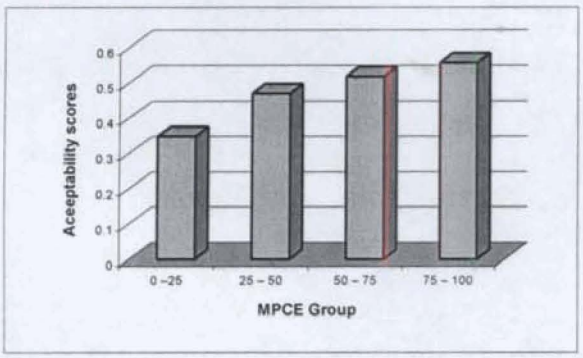
Panel 1: Caste



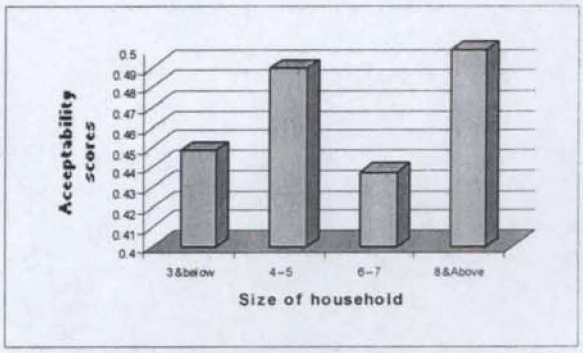
Panel 2: Place of residence



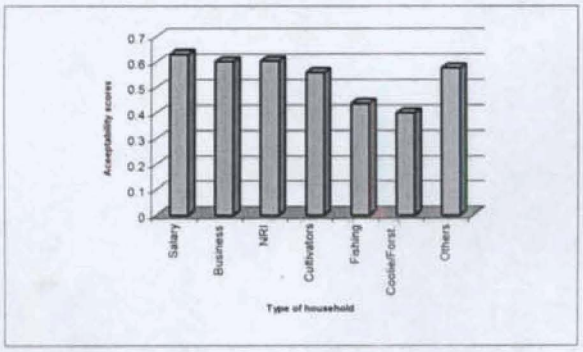
Panel 3: MPCE



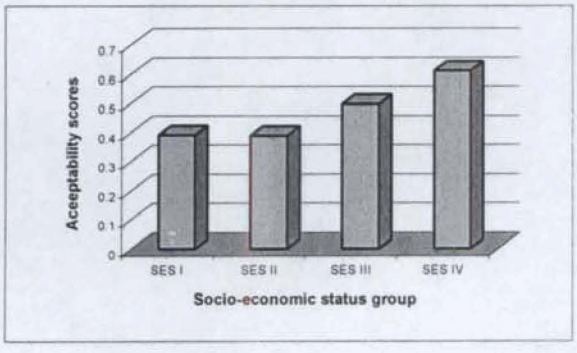
Panel 4: Size of household



Panel 5: Type of household



Panel 6: SES Group



6.2.3.2 Disparity in health care acceptability

Given the health care acceptability scores, the factors which determine it are more important. In the present section we explore various causative factors which determine the health care acceptability. Health care acceptability scores have been categorized into low, medium and high. The value of the scores ranged between 0 and 1. The scores below 0.37 were categorised into low acceptability, between 0.38 and 0.57 as medium and 0.58 above as high acceptability (Table 6.10).

Table 6.10
Health care acceptability among socio economic groups (Percentage)

Selected Variables	Description	Low	Medium	High	Total	Pearson Chi-Square
Caste	ST	71.0	23.0	6.0	100.0	129.568*
	SC	38.0	41.5	20.5	100.0	
	OBC	25.0	32.0	43.0	100.0	
	Others	14.8	26.6	58.6	100.0	
Place of residence	Rural	39.5	33.1	27.4	100.0	23.893*
	Urban	22.4	30.9	46.7	100.0	
MPCE Quartile Group	0 –25	61.1	29.5	9.4	100.0	86.349*
	25 – 50	33.1	34.4	32.5	100.0	
	50 – 75	26.8	35.6	37.6	100.0	
	75 – 100	18.5	30.5	51.0	100.0	
Size of household	3 & below	43.4	29.0	27.6	100.0	15.820**
	4 – 5	31.4	31.4	37.2	100.0	
	6 – 7	37.0	41.0	22.0	100.0	
	8 & Above	26.1	32.6	41.3	100.0	
Type of household	Salary	9.7	22.6	67.7	100.0	133.678*
	Business	8.5	36.2	55.3	100.0	
	NRI	24.0	4.0	72.0	100.0	
	Cultivators	23.1	23.1	53.8	100.0	
	Fishing	42.1	34.2	23.7	100.0	
	Coolie/Forest related	46.5	37.2	16.3	100.0	
	Others	15.7	25.8	58.4	100.0	
SES Group	SES I	51.0	31.8	17.2	100.0	120.944
	SES II	52.7	31.1	16.2	100.0	
	SES III	25.2	39.7	35.1	100.0	
	SES IV	10.7	27.3	62.0	100.0	
Total		34.8	32.5	32.7	100.0	

* significant at <1 per cent
** significant at <5 per cent

Pearson Chi-Square test showed that there exists strong association between the acceptability and socio-economic variables. Among the caste group, 71 per cent of ST group experienced low acceptability followed by SC group with 38 per cent. In rural area the share of low acceptability was higher when compared to urban area. MPCE and acceptability showed a positive relationship. The size of household did not show any such pattern. Among the type of household, coolie/forest related household experienced intensive low acceptability followed by fishing households. Further, low acceptability was higher in SES II and SES I groups among socio-economic status group.

6.2.3.3 Multinomial logistic regression model

As we discussed in the earlier section, we used multinomial logistic regression model in order to examine the various factors determining the health care acceptability.

The model for testing the probability of health care acceptability is as follows:

Prob (healthcare acceptability) = (Caste, Place of residence, SES group, Size of household, Type of household, SES Group).

Among the caste group ST households showed 10 times the chance to have low health care acceptability when compared to Forward caste household relative to high acceptability (Table 6.11). Among the MPCE group, 0-25 quartile group showed 3 time the chance to have low health care acceptability when compared to high MPCE group. Among the type of household, fishing community showed 5 times the chance to have low acceptability. In the case of socio-economic status

group, SES II showed 3 times the chance to low health care acceptability followed by SES I with 2 times.

Table 6.11
Multinomial logistic regression results showing the probability of health care acceptability
(Dependent variable - health care acceptability score; reference category- high health care acceptability)

Selected Variables	Description	Low		Medium	
		B	Exp(B)	B	Exp(B)
Caste	ST	2.343*	10.409	1.157**	3.179
	SC	1.175**	3.237	0.898**	2.454
	OBC	0.772**	2.165	0.422	1.524
	Others	0	.	0	.
Place of Residence	Rural	0.374	1.453	0.368	1.445
	Urban	0	.	0	.
MPCE Quartile Group	0 –25	1.333**	3.793	0.581	1.788
	25 – 50	0.109	1.116	-0.138	.871
	50 – 75	0.255	1.290	0.159	1.172
	75 – 100	0	.	0	.
Size of Household	3 & below	1.225*	3.403	0.405	1.499
	4 – 5	-0.006	.994	-0.256	.774
	6 – 7	0.783	2.188	0.733	2.082
	8 & Above	0	.	0	.
Type of Household	Salary	-0.166	.847	-0.221	.802
	Business	0.344	1.411	0.636	1.888
	NRI	0.946	2.575	-1.979	.138
	Cultivators	1.226***	3.407	0.115	1.122
	Fishing	1.622**	5.062	0.951	2.589
	Coolie/Forst.	1.510*	4.526	1.233*	3.431
	Others	0	.	0	.
SES Group	SES I	1.037**	2.821	0.124	1.132
	SES II	1.293**	3.645	0.337	1.401
	SES III	0.519	1.681	0.212	1.236
	SES IV	0	.	0	.
Intercept		-3.737*		-1.697**	

* significant at <1 per cent
** significant at <5 per cent
** significant at <10 per cent

No of observations	= 600
-2 Log Likelihood intercept only	= 1066.703
-2 Log Likelihood intercept final	= 807.476
Chi-square	= 259.227, p (0.000)
Cox & Snell Pseudo R-Square	= 0.351
Nagelkerke Pseudo R Square	= 0.395
McFadden Pseudo R-Square	= 0.197

6.2.4.4 Multinomial logistic regression model with Dichotomous independent variables

We have followed the same method discussed in health care affordability index with dichotomous independent variables in using multinomial logistic regression model.

The model for testing the probability of health care acceptability is as follows:

Prob (healthcare acceptability) = (ST, SC, OBC, MPCE1, SIZE_GR1, SIZE_GR3, FISHING, COOLIEF, SESG_1, SESG_2)

The result showed that the most determining factor in deciding the low health care acceptability is the condition of being an ST household. They showed 10 times the chance to have low health care acceptability relative to other group when compared to high health care acceptability (Table 6.12). The other major determining factor was the being the Fishing household followed by coolie household. The major determining factors in affecting health care acceptability has been shown in Fig.6.6

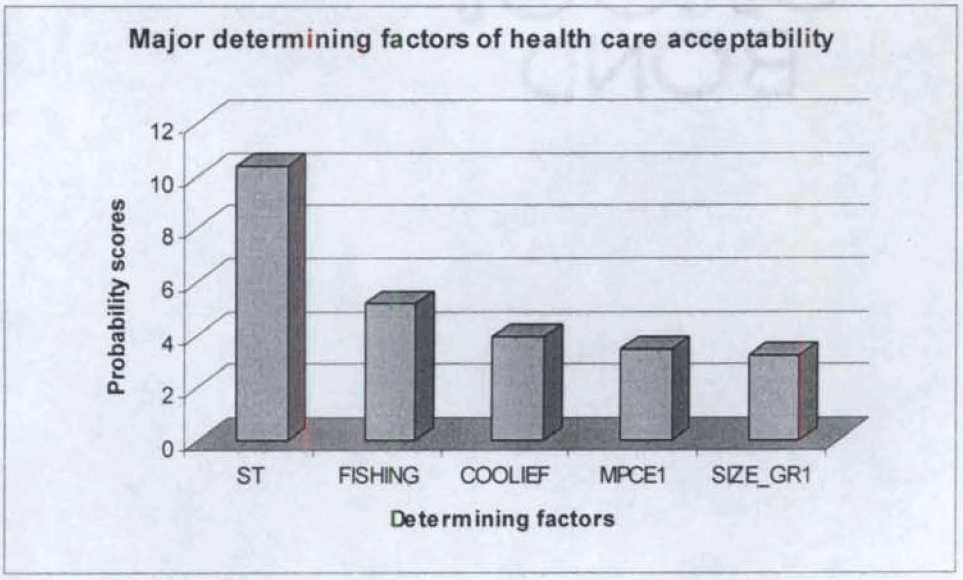
Table 6.12

Results of the multinomial logistic regression model for determining the factors affecting health care acceptability (Reference category = High health care acceptability)

Acceptability group	Variables	B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
						Lower Bound	Upper Bound
Low	Intercept	-2.717	0.350	0.000			
	ST	2.340	0.568	0.000	10.378	3.411	31.569
	SC	1.053	0.383	0.006	2.865	1.352	6.069
	OBC	0.704	0.370	0.057	2.021	0.979	4.173
	MPCE1	1.234	0.357	0.001	3.434	1.705	6.914
	SIZE_GR1	1.165	0.301	0.000	3.207	1.779	5.780
	SIZE_GR3	0.760	0.359	0.034	2.139	1.058	4.323
	FISHING	1.640	0.511	0.001	5.155	1.894	14.033
	COOLIEF	1.365	0.303	0.000	3.916	2.162	7.094
	SESG_1	0.657	0.337	0.051	1.929	0.996	3.737
	SESG_2	0.876	0.335	0.009	2.401	1.244	4.633
Medium	Intercept	-1.538	0.267	0.000			
	ST	1.196	0.566	0.035	3.306	1.090	10.028
	SC	0.842	0.332	0.011	2.321	1.212	4.445
	OBC	0.430	0.300	0.151	1.538	0.854	2.770
	MPCE1	0.632	0.361	0.080	1.881	0.927	3.818
	SIZE_GR1	0.558	0.285	0.051	1.746	0.998	3.056
	SIZE_GR3	0.872	0.322	0.007	2.393	1.272	4.500
	FISHING	1.108	0.493	0.025	3.029	1.151	7.967
	COOLIEF	1.269	0.266	0.000	3.557	2.111	5.995
	SESG_1	0.039	0.324	0.905	1.040	0.550	1.963
	SESG_2	0.165	0.323	0.610	1.179	0.626	2.222

No of observations	= 600
-2 Log Likelihood intercept only	= 650.283
-2 Log Likelihood intercept final	= 415.690
Chi-square	= 234.593, p (0.000)
Cox & Snell Pseudo R-Square	= 0.324
Nagelkerke Pseudo R Square	= 0.364
McFadden Pseudo R-Square	= 0.178

Fig 6.6



Since the accessibility index is a composite index of affordability, availability and acceptability indices we hypothesise that the variables which determine the above indices are also determining health care accessibility.

6.2.4.1 Health care accessibility

The health care accessibility scores are reported in Table 6.13 and Fig. 6.7. Our results give an average health care accessibility score of 0.486 for entire sample. Among the different socio-economic strata the accessibility scores vary significantly.

Table 6.13
Descriptive statistics of health care accessibility score among socio economic groups

Selected Variables	Description	Mean	Standard Deviation	T test	Mean difference	Kruskal Wallis Test: χ^2 (Asyp.sig.)
Caste	ST	0.324	0.095	34.177	-0.162	235.367*
	SC	0.470	0.086	77.269	-0.016	
	OBC	0.535	0.102	68.708	0.049	
	Others	0.573	0.105	61.566	0.087	
Place of Residence	Rural	0.470	0.129	76.114	-0.016	24.735*
	Urban	0.529	0.110	61.867	0.043	
MPCE Quartile Group	0 –25	0.378	0.116	39.819	-0.108	173.537*
	25 – 50	0.479	0.104	56.417	-0.007	
	50 – 75	0.519	0.101	62.661	0.033	
	75 – 100	0.569	0.101	69.135	0.083	
Size of Household	3 & below	0.481	0.133	43.717	-0.005	8.834*
	4 – 5	0.497	0.123	70.945	0.011	
	6 – 7	0.458	0.122	37.712	-0.028	
	8 & Above	0.494	0.136	24.681	0.008	
Type of Household	Salary	0.602	0.108	31.114	0.116	178.073*
	Business	0.583	0.088	45.506	0.097	
	NRI	0.599	0.112	26.815	0.113	
	Cultivators	0.575	0.100	29.246	0.089	
	Fishing	0.492	0.086	35.344	0.006	
	Coolie/Forst.	0.431	0.111	72.092	-0.055	
	Others	0.548	0.112	46.332	0.062	
SES Group	SES I	0.429	0.105	50.180	-0.057	193.424*
	SES II	0.416	0.125	40.648	-0.070	
	SES III	0.508	0.099	63.091	0.022	
	SES IV	0.593	0.090	80.548	0.107	
Total		0.486	0.127	94.079		

* significant at <1 per cent level.

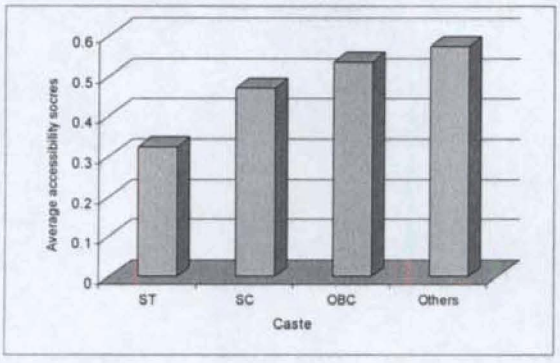
Across the caste groups, ST group reported low accessibility with 0.324 followed by SC group with 0.470 with the lowest SD with 0.086. As expected, high accessibility was reported among the category of Other groups (Fig.4.7, Panel 1). The rural urban classification shows that a high accessibility urban area (Fig.4.7, Panel 2). MPCE group analysis showed that when income status increases, the health care accessibility also increased (Fig.4.7, Panel 3). In the case of size of household, high accessibility was reported in 4-5 size group, but it did not show any relationship with the increase or decrease of the size of household and accessibility (Fig.4.7, Panel 4). The low accessibility was reported in coolie/forest related households followed by fishing households. The households having salary earning member reported highest accessibility (Fig. 4.7, Panel 5). The SES group and accessibility showed a positive relationship (Fig.4.7, Panel 6).

Within group variability of health care access are given by the standard deviation . The results shows that the lowest standard deviation was reported among Scheduled caste in the caste category and among the type of households it was among the fisihing households that high concentration of accessibility scores are reported. The t values shows that all the results are statistically significant. Here the highest mean difference was experienced in ST categories with a value of -0.162 and the positive difference was reported in Salaried households.

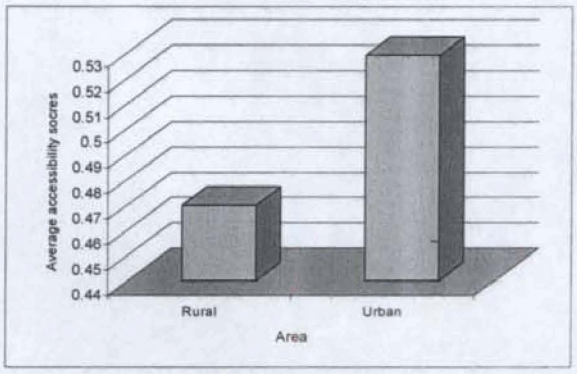
Fig. 6.7

Health care accessibility among socio-economic groups

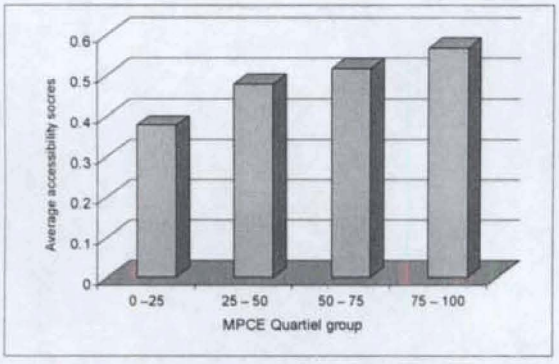
Panel 1: Caste



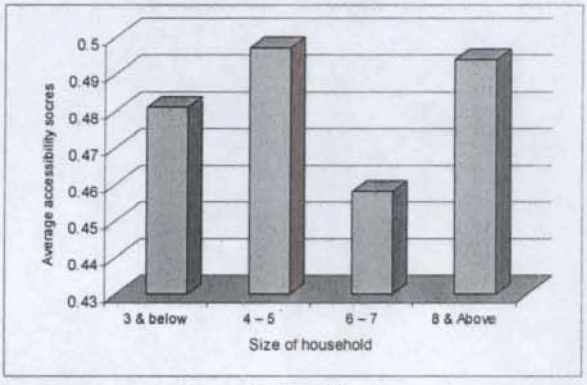
Panel 2: Place of residence



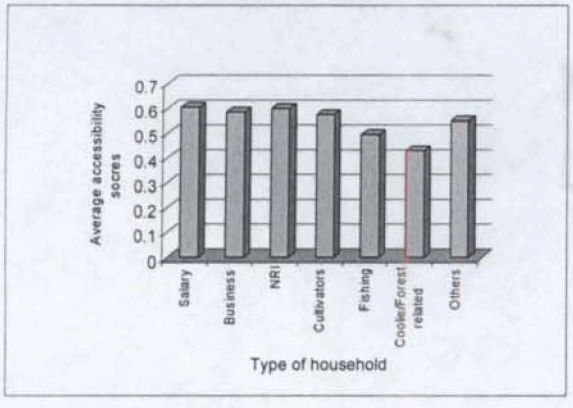
Panel 3: MPCE



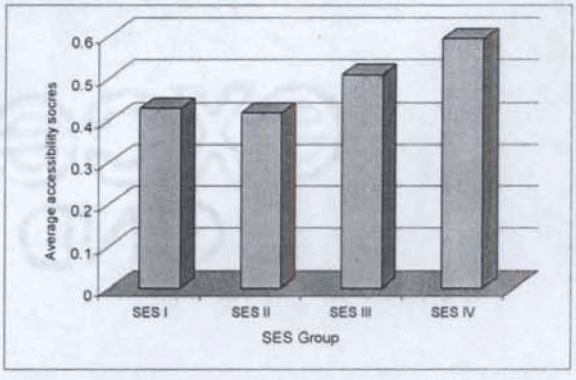
Panel 4: Size of household



Panel 5: Type of household



Panel 6: SES Group

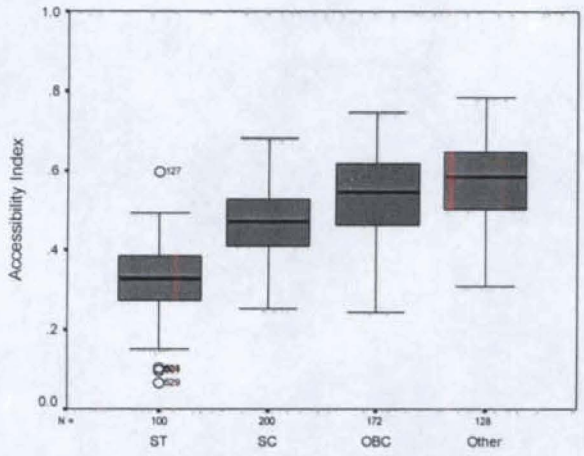


The variability and range of health care accessibility of different socio-economic groups have been presented through box plot diagrams (Fig.6.8).

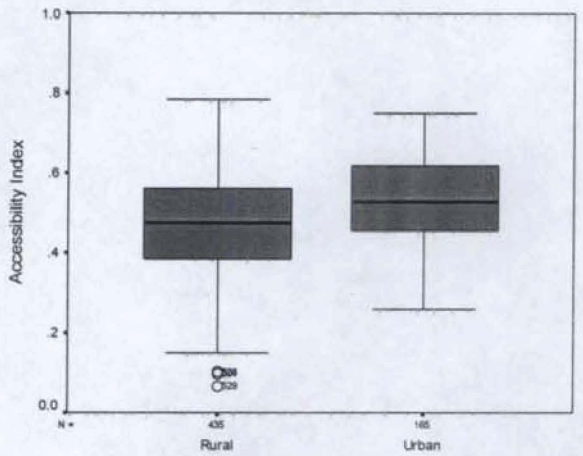
Fig. 6.8

Health care accessibility among socio-economic groups

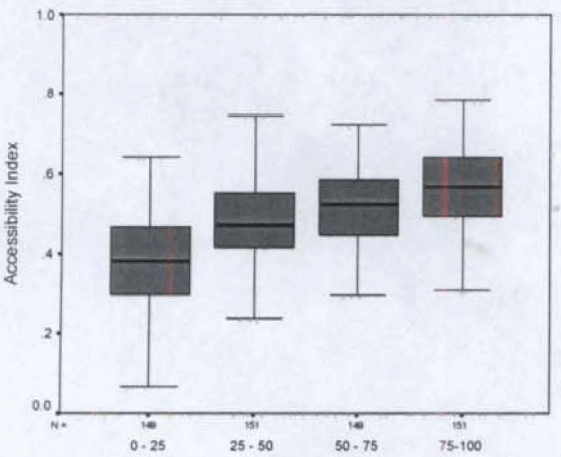
Panel 1: Caste



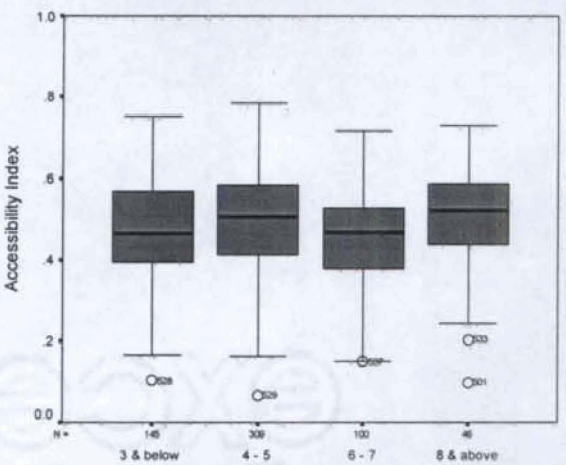
Panel 2: Place of residence



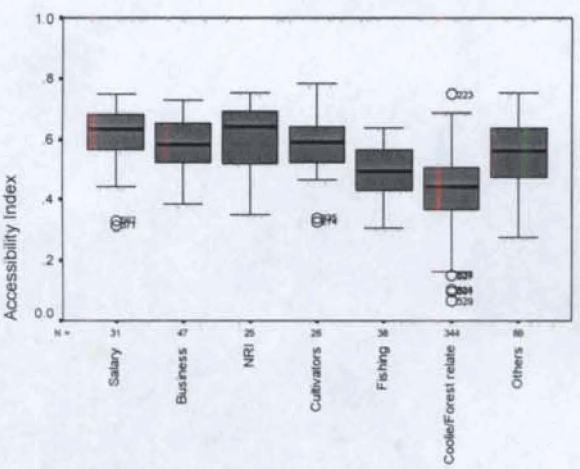
Panel 3: MPCE



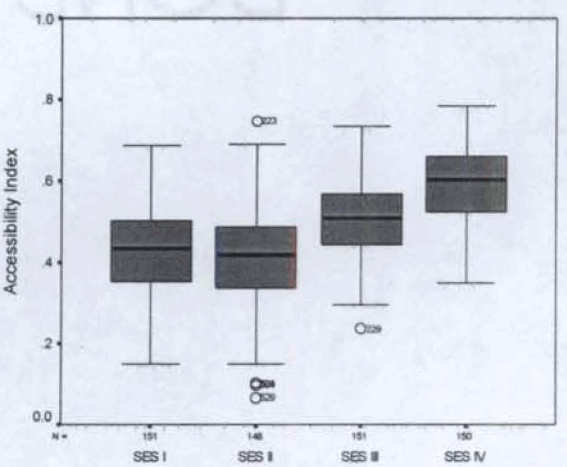
Panel 4: Size of household



Panel 5: Type of household



Panel 6: SES Group



Panel 1 of the figure shows that among the caste group, the average (central horizontal line of the box) is very low when compared to others and the upper range of the value is equal to even to the average of the SC category and below the average values of OBC and Other categories. The place of residence (Panel 2) shows that the range of value is higher among the rural areas, but the average value is below the urban values.

6.2.4.2 Disparity in health care accessibility

Given the health care accessibility scores, the factors which determine it are more important. In the present section we explore various causative factors which determines the health care accessibility (Table 6.14).

Table 6.14
Health care accessibility among socio economic groups (Percentage)

Selected Variables	Description	Low	Medium	High	Total	Pearson Chi-Square
Caste	ST	90.0	9.0	1.0	100.0	237.546*
	SC	37.0	45.5	17.5	100.0	
	OBC	18.6	30.2	51.2	100.0	
	Others	14.1	24.2	61.7	100.0	
Place of residence	Rural	40.7	29.4	29.9	100.0	19.077*
	Urban	22.4	33.3	44.2	100.0	
MPCE Quartile Group	0 –25	67.8	25.5	6.7	100.0	144.652*
	25 – 50	38.4	34.4	27.2	100.0	
	50 – 75	24.8	34.9	40.3	100.0	
	75 – 100	11.9	27.2	60.9	100.0	
Size of household	3 & below	42.8	26.9	30.3	100.0	16.239**
	4 – 5	32.7	28.2	39.2	100.0	
	6 – 7	39.0	39.0	22.0	100.0	
	8 & Above	26.1	39.1	34.8	100.0	
Type of household	Salary	6.5	12.9	80.6	100.0	172.705*
	Business	8.5	23.4	68.1	100.0	
	NRI	8.0	20.0	72.0	100.0	
	Cultivators	7.7	26.9	65.4	100.0	
	Fishing	36.8	26.3	36.8	100.0	
	Coolie/Forest related	50.6	35.5	14.0	100.0	
	Others	18.0	27.0	55.1	100.0	
SES Group	SES I	54.3	33.1	12.6	100.0	185.770*
	SES II	56.8	31.1	12.2	100.0	
	SES III	25.8	35.8	38.4	100.0	
	SES IV	6.0	22.0	72.0	100.0	
Total		35.7	30.5	33.8	100.0	

*significant at <1 per cent level; ** significant at <5 per cent level

Health care accessibility scores have been categorized into low, medium and high. The low accessibility group was categorized with scores 0.44 and below, medium accessibility with the scores between 0.45 and 0.54 and high accessibility with 0.55 and above. The percentage distribution of the accessibility scores categorized into low, medium and high are presented. 214 households (35.7 per cent) included in low health care accessibility, 183 households (30.5 per cent) included in medium and 203 households (33.8 per cent) belonged to high health care accessibility.

6.2.4.3 Multinomial logistic regression model

In order to estimate the degree of association with the health care accessibility and the its various causative factors, we have used a multinomial logistic regression model. In the multinomial logistic regression model we have tried to associate the health care accessibility scores with caste, place of residence, size of household, type of household, and SES group. We have assumed a linear relationship between the transformed outcome variable (health care accessibility scores) and our predictor variables (caste, place of residence, size of household, type of household, and SES group). The model for testing the probability of health care accessibility is as follows:

Prob (healthcare access) = (Caste, Place of residence, Size of household, Type of household, SES Group).

Among the caste group, ST households showed 81 times the chance to have low health care access relative to general group when compared to high health care access. While SC household showed 2 times the chance followed by OBC groups with 18 per cent more likely to have low health care access relative to general group (Table 6.15). The coolie/forest dependent households showed 4 times the chance to have low health care access relative to other households. Among the

Socio-economic status group, SES II group showed 11 times the chance to have low health care access relative to SES IV, followed by SES I group with 7 times the chance.

Table 6.15
Multinomial logistic regression results showing the probability of health care accessibility
(Dependent variable - health care accessibility score; reference category- high health care accessibility)

Selected Variables	Description	Low		Medium	
		B	Exp(B)	B	Exp(B)
Caste	ST	4.397*	81.183	1.916	6.795
	SC	1.040**	2.830	1.065**	2.900
	OBC	0.172	1.187	0.341	1.406
	Others	.	1.000	.	1.000
Place of residence	Rural	-0.104	0.901	-0.027	0.973
	Urban	.	1.000	.	1.000
Size of household	3 & below	0.480	1.616	-0.333	0.717
	4 – 5	-0.583	0.558	-0.859	0.424
	6 – 7	0.356	1.427	0.194	1.214
	8 & Above	0.000	1.000	.	1.000
Type of household	Salary	-1.542	0.214	-1.261**	0.283
	Business	0.225	1.253	0.072	1.075
	NRI	-0.143	0.866	-0.349	0.705
	Cultivators	-0.101	0.904	0.257	1.293
	Fishing	1.037	2.821	-0.003	0.997
	Coolie/Forst.	1.477*	4.381	1.086**	2.962
	Others	0.000	1.000	.	1.000
SES Group	SES I	2.040*	7.693	1.207**	3.343
	SES II	2.424*	11.290	1.341**	3.823
	SES III	1.176**	3.240	0.567	1.763
	SES IV	.	1.000	.	1.000
Intercept		-2.812*		-1.106**	

* indicates significance at 95 per cent confidence interval
** indicates significance at 90 per cent confidence interval

No of observations	= 600
-2 Log Likelihood intercept only	= 931.152
-2 Log Likelihood intercept final	= 555.440
Chi-square	= 375.712, p (0.000)
Cox & Snell Pseudo R-Square	= 0.465
Nagelkerke Pseudo R Square	= 0.524
McFadden Pseudo R-Square	= 0.286

With regard to medium health care accessibility, SC households showed 2 times the chance to have medium health care access relative to the general group when compared to high health care access. Coolie/forest related households showed 2 times the chance to have medium health care access relative to other employed households, while it was 28 per cent likely to have medium level of health care access in case of salaried people. Among the SES group, SES group showed 3.8 times the chance to have medium health care access followed by SES I with 3.3 times the chance.

The above analysis showed that among the socio economic variables Caste and economic status played determinant roles in determining health care accessibility. When the caste status increases, health care accessibility increases, same as in economic status.

6.2.4.4 Multinomial logistic regression model with Dichotomous independent variables

Here we have made an multinomial logistic regression model with dichotomous independent variables following methodology discussed in Section 6.2.4.3.

The model for testing the probability of health care accessibility is as follows:

Prob (health care accessibility) = (ST, SIZE_GR1, SIZE_GR3, FISHING, COOLIEF, SESG_1, SESG_2, SESG_3)

The result showed that the most determining factor in deciding the low health care accessibility is the condition of being an ST household (Table 6.16). ST household showed 39 times the chance to have low health care access relative to non_ST household when compared to high health care status. The other major determining factor was the Socio-Economic group SESG II, followed by the

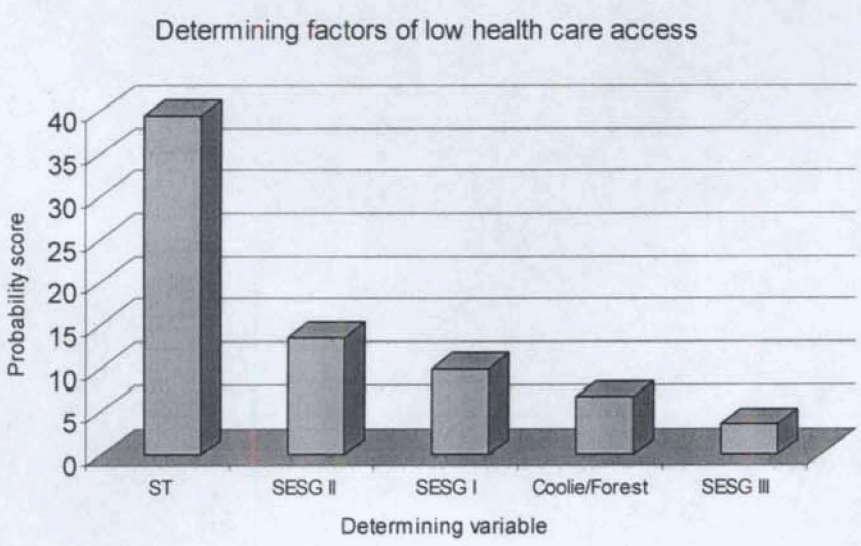
Coolie/forest dependent households. The five major determinants of the low health care accessibility have been shown in Fig.6.9

Table 6.16
Results of the multinomial logistic regression model for determining the factors affecting health care accessibility (Reference category = High health care accessibility)

Access Group	Variables	B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
						Lower Bound	Upper Bound
Low	Intercept	-3.329	0.398	0.000			
	ST	3.676	1.033	0.000	39.507	5.217	299.176
	SIZE_GR1	0.895	0.320	0.005	2.448	1.308	4.581
	SIZE_GR3	0.841	0.385	0.029	2.318	1.091	4.926
	FISHING	1.112	0.496	0.025	3.040	1.150	8.038
	COOLIEF	1.897	0.324	0.000	6.668	3.532	12.589
	SESG_1	2.300	0.483	0.000	9.977	3.869	25.728
	SESG_2	2.606	0.478	0.000	13.551	5.315	34.548
	SESG_3	1.286	0.436	0.003	3.619	1.539	8.511
Medium	Intercept	-1.702	0.242	0.000			
	ST	1.164	1.078	0.280	3.203	0.387	26.517
	SIZE_GR1	0.299	0.294	0.308	1.349	0.759	2.398
	SIZE_GR3	0.901	0.334	0.007	2.462	1.279	4.738
	FISHING	0.110	0.483	0.820	1.117	0.433	2.880
	COOLIEF	1.465	0.264	0.000	4.329	2.582	7.260
	SESG_1	1.464	0.374	0.000	4.325	2.077	9.007
	SESG_2	1.513	0.376	0.000	4.542	2.174	9.490
	SESG_3	0.658	0.300	0.028	1.931	1.073	3.477

No of observations	=	600
-2 Log Likelihood intercept only	=	565.227
-2 Log Likelihood intercept final	=	211.747
Chi-square	=	353.480, p (0.000)
Cox & Snell Pseudo R-Square	=	.445
Nagelkerke Pseudo R Square	=	.501
McFadden Pseudo R-Square	=	.269

Fig.6.9



Analysis of the disparity in healthcare affordability, availability and acceptability across different socio-economic groups shows that the availability and acceptability are poorest to the STs followed by the SESI, SESII, coolies, forestry related workers and fishermen. In the case of affordability, SESI and SESII are more vulnerable followed by the STs, coolies, forestry related workers and fishermen. Therefore, the health care accessibility in toto is also found to be much worse to STs, SESI, SESII, coolies, forestry related workers and fishermen.

We may note that about 75 per cent of the total SES I and SESII are SC/STs population; 80 per cent of the MPCE I comprised of SC/STs; and more than 80 per cent of the coolies and forest related workers are SC/STs (the relationship between caste and SES group, MPCE group and type of household group is shown in Table 6.17.

Hence, we may argue that major chunk of the SC/ST population are deprived of health care accessibility in Kerala when looked into any of the three indices – affordability, acceptability and availability

Table 6.17
Percentage distribution of caste across MPCE group, type of household and socio-economic status group

Selected variables	Description	ST	SC	OBC	Other	Total
MPCE Group	0 - 25	41.6	39.6	10.7	8.1	100.0
	25 - 50	13.9	39.1	29.8	17.2	100.0
	50 - 75	8.7	31.5	36.2	23.5	100.0
	75-100	2.6	23.2	37.7	36.4	100.0
Type of household	Salary	3.2	25.8	32.3	38.7	100.0
	Business		4.3	66.0	29.8	100.0
	NRI		8.0	52.0	40.0	100.0
	Cultivators		3.8	23.1	73.1	100.0
	Fishing		26.3	73.7		100.0
	Coolie/Forest related	27.0	45.9	16.9	10.2	100.0
	Others	6.7	21.3	29.2	42.7	100.0
Socio Economic Status Group	SES I	33.8	41.1	17.9	7.3	100.0
	SES II	27.7	43.2	20.3	8.8	100.0
	SES III	5.3	39.7	29.1	25.8	100.0
	SES IV		9.3	47.3	43.3	100.0
Total		16.7	33.3	28.7	21.3	100.0

Conclusion

The major objective of this chapter was to identify the factors determining health care accessibility. Our results indicate that it is a combination of health care affordability, availability and acceptability. The analysis of each variables using the multinomial logistic regression framework, indicates that the scheduled tribes are having the least accessibility in terms of health care. Various socio-economic factors like caste, place of residence, nature of employment do have a positive effect on health care accessibility. Being a member of ST and SC category increases the risk of health deprivation in terms of all the three indicators of health care accessibility. Analysis of the disparity in healthcare affordability, availability and acceptability across different socio-economic groups shows that the availability and acceptability are poorest to the STs followed by the SESI, SESII, coolies, forestry related workers and fishermen. In the case of affordability, SESI and SESII are more vulnerable followed by the STs, coolies, forestry related workers and fishermen. Therefore, the health care accessibility in toto is also found to be much worse to STs, SESI, SESII, coolies, forestry related workers and fishermen. However, we may note that about 75 per cent of the total SES I and SESII are SC/STs population; 80 per cent of the MPCE I comprised of SC/STs; and more than 80 per cent of the coolies and forest related workers are SC/STs. Hence, we may argue that major chunk of the SC/ST population are deprived of health care accessibility in Kerala when looked into any of the three indices – affordability, acceptability and availability.

CHAPTER VII
SUMMARY AND CONCLUSION

The main objectives of the present study were to look into the pattern of morbidity and hospitalisation in Kerala; to explore the important factors determining the health care accessibility and to examine the disparity in health care accessibility across different socio-economic groups of Kerala. The study made use of secondary data and conducted a primary survey to examine aspects of health care accessibility in the state of Kerala. The important findings of the study are summarised as follows:

7.1 Summary of Findings

The major findings from secondary data analysis especially NSSO data analysis are as follows:

- The morbidity rate was found to be highest in Kerala, with rural areas more prone (25.5 per cent) compared to rural India (8.8 per cent) in 2004. Similarly, in urban area also Kerala reported high morbidity rates (24.0 per cent) as against 9.9 per cent recorded from all India.

- A caste wise analysis in Kerala shows that SC population were more ailing health wise (27 per cent). In rural area, SC population reported maximum morbidity rate s of 27 per cent. While in urban area, Other category reported high morbidity rate (29 per cent)

- Gender wise comparison showed that SC women reported high levels of morbidity with a rate of 29 per cent while among males the category 'Others' recorded more ailments with a rate of 25 per cent. In rural area,

SC males (25 per cent) and females (30 per cent) suffered more morbidity when compared to other category.

- In rural area, the highest morbidity rate was reported in the lowest MPCE class, i.e, very poor class, with a rate of 30.4 per cent. But in urban area the highest morbidity rate was reported in the highest MPCE class with a rate of 32.4 per cent.

- Individuals above the age group of 60 reported more illness (57 per cent) compared to all other age groups. The pattern was similar for rural (58 per cent) and urban populations (55 per cent) also.

- An inverse relationship was seen between size of household and morbidity rate. When size of household increases, the morbidity decreases. The highest morbidity rate was reported (33.1%) in household size group of 3 & below.

- While comparing the employment structure highest morbidity was reported (26.3 per cent) in the category of casual labour/other labour, followed by self employed in agriculture (26.1 per cent).

- The major ailment reported was fever of unknown origin (15.9 per cent). Among ST population, 29 per cent suffered respiratory including ear/nose/throat ailments. Among SC population, 20 per cent reported fever of unknown origin.

- In rural Kerala, 87 per cent of ailments were treated, while in urban area it was reported to be 90 per cent. In rural Kerala, among the treated ailments, 37 per cent was treated in government source while remaining 63 per cent were treated through private sources. In urban Kerala, 22 per cent depended on government sources, while 78 per cent relied on private sources.

- The average total expenditure for the rural Kerala was Rs. 198, while it is 203 for urban Kerala. Loss of household income per treated persons was Rs. 72 for rural Kerala, while it is Rs. 83 for urban Kerala. The expenditure is much lower in Kerala compared to all India.

- In the case of hospitalization, in rural Kerala, 35 per cent treated in government hospital, while in rural area the rate of hospitalization in government hospital was 34 per cent.

- In rural Kerala, the percentage of receiving non-hospitalized treatment decreased from 37 per cent in 1986-87 to 32 per cent in 2004, with steep decline noticed during 1995-96 (28 per cent). But, in urban Kerala, a steady increase was seen from 22 per cent in 1986-87 to 28 per cent in 1995-96 which again increased to 33 per cent in 2004.

The major findings from primary data analysis were

- Among the sample population, the morbidity rate was reported to be 27.14 per cent. The rate was higher in urban area (30.3 per cent) compared to 30.3 per cent. Among caste group, ST households reported highest morbidity (28.73 per cent). The morbidity rate was higher in low household size. Highest MPCE quartile group and SES IV group reported highest morbidity.

- Among the total sample population of ailing persons, the major ailment affected was fever of unknown reason (28.25 per cent) followed by high/low BP with 9.86 per cent. For the ST population, the fever was followed by rheumatism, paralysis (7.30 per cent) and skin diseases (4.38 per cent). SC, OBC and general categories reported high/low BP as the other important ailment besides fever.

- The percentage share of monthly per capita health care expenditure is very high in ST category (20 per cent) followed by SC category (14.28 per cent). The share of health expenditure was higher in urban area (15.67 per cent) when compared to rural area (11.83). The daily wage households paid more for health care expenditure (14.87 per cent) than the other occupational groups of the study area.

- Among ST households, 80 per cent of the households faced the problem of infrastructure availability in terms of tarred road or improper subway connecting to the tarred road. This percentage was very low in other communities. ST households also faced the problem of getting bus service. Nearly 46 per cent of the ST households faced lack of accessibility to bus services for more than two hours.

- About 82.3 per cent of the households preferred allopathic medicine, while 9.8 per cent preferred ayurvedic and remaining 3.5 relied on homoepathy. The reason for their preference was the quick relief factor. The percentage use of ayurvedic treatment was higher in OBC group (14.5 per cent) followed by Other groups (9.8 pre cent). The preference of homoepathic treatment was higher in general households and also there was a tendency to use ayurvedic treatment among 13.2 per cent of households.

- Nearly 38 per cent of the household had PHC/CHC within 3km and 8 km of their vicinity. . Among the ST households 73 per cent were living beyond 8 km from the vicinity of nearest PHC/CHC.

- About 75 per cent of the total SES I and SESII are SC/STs population;

- 80 per cent of the MPCE I comprised of SC/STs;

- More than 80 per cent of the coolies and forest related workers are SC/STs

- The factors determining the accessibility among different caste showed that for all the caste groups most of the variable selected have positive impact. Only distance to PHC shows negative relatedness. Religion wise analysis also shows that most of the variables selected have positive impact.

- The factors determining availability shows that MPCE, distance to PHC and household size have positive impact in ST and conveyance to health care institutions have positive impact among SC group. Among the OBC category, MPCE, distance to PHCE and type of conveyance have positive impact. In general category PHC, MPCE and household size have positive impact.

- The major determining factors to acceptability among ST group are MPCE, female literacy, socio economic status and distance to PHC are determinant factors in deciding acceptability. Among SC groups, the use of traditional medicine and modern medicine taking with the advice of doctors have significant impact. Among OBC, monthly health expenditure has positive impact apart from above factors. Among general category, the main determining factors are MPCE, use of traditional medicines, treatment of drinking water, female literacy and distance to PHC.

- Analysis of the disparity in healthcare affordability, availability and acceptability across different socio-economic groups shows that the availability and acceptability are poorest for the STs followed by the SESI, SESII, coolies, forestry related and fishermen.

- In the case of affordability SESI and SESII are more vulnerable followed by the STs, coolies, forestry related and fishermen. Therefore, the health care accessibility is found to be much worse in these categories.

7.2 Conclusion

Results of analysis using NSSO survey showed that even with notable improvements in health and demographics indication, Kerala shows high morbidity rate compared to All India level both in urban and rural areas. Another interesting point noticible was higher morbidity seen among highest income groups. There exists urban-rural as well as gender wise difference in morbidity. Both in Kerala as well as India females are more morbid compared to their male counterparts. Morbidity is seen higher in rural Kerala while it was higher in urban India. The logistic regression model which was worked to find out the effect of selected background characteristics on reported health status and hospitalization showed that morbidity rate is more influenced by the socio-economic variables like caste, area, MPCE, household size, type of household, sex and age group, while the hospitalization is influenced by household size, type of household and sex.

While analyzing the primary data it was observed that highest morbidity among females, Scheduled Tribes, low income people and low SES group was quite evident. Fever of unknown origin, blood pressure, joint pains and diabetics are the more incurred ailments. It is also seen that the affordability of health care facilities to the backward communities and low socio-economic groups is less, through these percentage of health care expenditure is high. The availability of health care institutions in terms of vehicles, road connectivity and communication is also less among backward communities and low socio economic groups. Acceptability in terms of objectives elements like choices and preferences shows that government sector is more chosen than private sector and allopathic system is more preferred to ayurveda and homeo. But, the preferences to homeopathy is highest among the forward caste and high socio-economic groups for their

children and aged. Accessibility in terms of availability is less among backward communities and low socio-economic groups.

Analysis of the disparity in healthcare affordability, availability and acceptability across different socio-economic groups shows that the availability and acceptability are poorest to the STs followed by the SESI, SESII, coolies, forestry related workers and fishermen. In the case of affordability, SESI and SESII are more vulnerable followed by the STs, coolies, forestry related workers and fishermen. Therefore, the health care accessibility in toto is also found to be much worse to STs, SESI, SESII, coolies, forestry related workers and fishermen. However, we may note that about 75 per cent of the total SES I and SESII are SC/STs population; 80 per cent of the MPCE I comprised of SC/STs; and more than 80 per cent of the coolies and forest related workers are SC/STs.

Hence, we may argue that major chunk of the SC/ST population are deprived of health care accessibility in Kerala when looked into any of the three indices – affordability, acceptability and availability.

7.3 Policy Implication

The present study could establish the existence of disparity in health care accessibility across different socio-economic groups. The vulnerable groups are observed as the historically deprived populations such as the SCs and STs. Since the major reasons being the availability and affordability of health care, we may advocate for an active government intervention in enhancing the public health provisioning. This may include better transportation facilities to the interior areas of Kerala, where the Tribes and SC colonies are extended and a more geographical spread of health care institutions.

7.4 Areas for future research

The higher morbidity pattern in Kerala especially among the high income quartile suggests that there is likely to be high correlation between the changes in the consumption pattern and life style on the morbidity pattern. This calls for a detailed study on the nature and causes for the changing morbidity pattern in Kerala.

Our results show that the various government efforts for the welfare for Scheduled Caste and Scheduled tribes failed to the objective of providing basic health care facilities. This calls for further study on the causes for the government policy failure, especially in the provision of basic health care facility to the tribes.

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Appendix Tables of Chapter 4

Appendix 4.1

Estimated households by selected variables in NSSO 60th Round

Selected Variables	Description	Kerala		All India	
		No.	Percentage	No.	Percentage
Caste	ST	106357	1.5	16459957	8.3
	SC	768627	10.7	40065032	20.2
	OBC	3857628	53.6	78686091	39.6
	Others	2464880	34.2	63522154	32.0
Place of residence	Rural	5236007	72.7	143206618	72.0
	Urban	1961484	27.3	55564052	28.0
MPCE Quartile Group	0 -25	568881	7.9	56225696	28.3
	25 – 50	1470751	20.4	52816710	26.6
	50 – 75	2516213	35.0	49354957	24.8
	75 – 100	2641646	36.7	40361868	20.3
Size of household	3 & below	2389877	33.2	56532328	28.4
	4 – 5	3288746	45.7	78154371	39.3
	6 – 7	1032992	14.4	41316567	20.8
	8 & Above	485876	6.8	22767403	11.5
Type of household	Self employed in non-agriculture	1664412	23.1	42049077	21.2
	Agri.labour/regular wage/salary earners	1349720	18.8	61636610	31.0
	Casual labour/Other labour	1903116	26.5	22951354	11.6
	Self employed in agriculture	972960	13.5	49574612	25.0
	Others	1300216	18.1	22354734	11.3
Total		7190424	100.0	198566387	100.0

Source: Computed from NSSO unit level data

Appendix 4.2

Number of villages/blocks, households, persons, aged (60 years and above) persons surveyed, number of hospitalized and ailing persons surveyed and average household size for Kerala and India

Variables	Description	Kerala			India		
		Rural	Urban	Total	Rural	Urban	Total
Number of surveyed	Villages/blocks	184	100	284	4755	2668	7423
	Households	1839	990	2829	47302	26566	73868
	Persons	8636	4697	13333	250775	132563	383338
	Aged persons	1154	612	1766	22265	12566	34831
During last 365 days	Sample persons hospitalized	963	515	1478	18346	10690	29036
	Sample cases of hospitalisation	1211	623	1834	20066	11849	31915
Sample persons reporting ailment during last 15 days		2148	1061	3209	22871	13591	36462
Estimated (00)	Households	52360	19615	71975	1432066	555641	1987707
	Persons	232988	81492	314480	7150765	2438451	9589216
	Cases of hospitalisation during last 365 days	29660	8874	38534	178921	81363	260284
	Aged persons	26687	8672	35359	502670	161110	663779
	Persons reporting ailment during last 15 days	59480	19610	79090	630970	242560	873530

Source: NSSO Report No. 50, p.A-2 – A6

Appendix 4.3

Estimated population covered in Kerala and India in NSSO round

Selected Variables	Description	Male	Percentage	Female	Percentage	Total
Caste	ST	215069	47.6	236425	52.4	451494
	SC	1624669	48.0	1761755	52.0	3386424
	OBC	8268135	46.4	9556166	53.6	17824301
	Others	4811056	49.2	4974727	50.8	9785783
Place of residence	Rural	11053832	47.4	12244926	52.6	23298758
	Urban	3865097	47.4	4284148	52.6	8149245
MPCE Quartile Group	0 -25	1516144	46.5	1745347	53.5	3261491
	25 - 50	3651615	48.1	3936017	51.9	7587632
	50 - 75	5413739	47.1	6083047	52.9	11496786
	75 - 100	4337431	47.7	4764663	52.3	9102094
Size of household	3 & below	2616995	46.4	3022120	53.6	5639115
	4 - 5	6969642	48.0	7564146	52.0	14533788
	6 - 7	3130176	47.7	3429513	52.3	6559689
	8 & Above	2202116	46.7	2513294	53.3	4715410
Type of household	Self employed in non-agriculture	3797976	48.9	3972468	51.1	7770444
	Agri.labour/regular wage/salary earners	2627752	48.4	2806574	51.6	5434326
	Casual labour/Other labour	4401540	48.0	4766253	52.0	9167793
	Self employed in agriculture	1907517	47.7	2094180	52.3	4001697
	Others	2176066	43.1	2869767	56.9	5045833
Total		14910851	47.5	16509242	52.5	31420093

Source: Computed from NSSO unit level data

Appendix 4.4

No. of persons received as inpatient of a hospital during the last 365 days

Selected Variables	Description	Rural		Urban		Total	
		No.	%	No.	%	No.	%
Caste	ST	40786	1.4%	797	.1%	41583	1.1%
	SC	304855	10.1%	70692	7.6%	375547	9.5%
	OBC	1644120	54.5%	600612	64.4%	2244732	56.8%
	Others	1028408	34.1%	260598	27.9%	1289006	32.6%
MPCE Quartile Group	0 -25	298495	9.9%	49924	5.4%	348419	8.8%
	25 - 50	795372	26.4%	165201	17.7%	960573	24.3%
	50 - 75	1171823	38.8%	334290	35.8%	1506113	38.1%
	75 - 100	752479	24.9%	383284	41.1%	1135763	28.7%
Size of household	3 & below	694960	23.0%	159502	17.1%	854462	21.6%
	4 - 5	1248965	41.4%	479319	51.4%	1728284	43.7%
	6 - 7	685785	22.7%	174691	18.7%	860476	21.8%
	8 & Above	388459	12.9%	119186	12.8%	507645	12.8%
Type of household	Self employed in non-agriculture	551372	18.3%	323367	34.8%	874739	22.2%
	Agri.labour/regular wage/salary earners	427939	14.2%	240141	25.8%	668080	16.9%
	Casual labour/Other labour	979962	32.5%	275505	29.6%	1255467	31.8%
	Self employed in agriculture	578309	19.2%	0	.0%	578309	14.7%
	Others	475827	15.8%	90652	9.8%	566479	14.4%
Age (years)	0 - 4	335282	11.2%	88428	9.5%	423710	10.8%
	5 - 14	354973	11.8%	74050	7.9%	429023	10.9%
	15 - 34	627346	20.9%	211412	22.7%	838758	21.3%
	35 - 59	909173	30.2%	319474	34.3%	1228647	31.2%
	60 & above	779368	25.9%	239335	25.7%	1018703	25.9%
Total		3018169	100.0%	932699	100.0%	3950868	100.0%

Source: Computed from NSSO unit level data

Appendix 4.5

Type of hospital of medical treatment received as inpatient of a hospital during the last 365 days

Selected Variables	Description	Type of hospital							
		Public hospital (incl. PHC/sub centre/CHC)		Public dispensary (incl. CGHS/ESI)		Private hospital		Total	
		No.	%	No.	%	No.	%	No.	%
Caste	ST	20811	50.0	0	.0	20772	50.0	41583	100.0
	SC	229596	61.1	11426	3.0	134525	35.8	375547	100.0
	OBC	781174	34.8	38856	1.7	1424702	63.5	2244732	100.0
	Others	311099	24.1	5043	.4	972865	75.5	1289007	100.0
Place of residence	Rural	1032394	34.2	42933	1.4	1942842	64.4	3018169	100.0
	Urban	310285	33.3	12391	1.3	610023	65.4	932699	100.0
MPCE Quartile Group	0 -25	169718	48.7	3616	1.0	175085	50.3	348419	100.0
	25 - 50	388867	40.5	20266	2.1	551439	57.4	960572	100.0
	50 - 75	536590	35.6	21907	1.5	947615	62.9	1506112	100.0
	75 - 100	247504	21.8	9535	.8	878725	77.4	1135764	100.0
Size of household	3 & below	271436	31.8	11025	1.3	572002	66.9	854463	100.0
	4 - 5	643036	37.2	35860	2.1	1049388	60.7	1728284	100.0
	6 - 7	295040	34.3	4527	.5	560909	65.2	860476	100.0
	8 & Above	133167	26.2	3912	.8	370565	73.0	507644	100.0
Type of household	Self employed in non-agriculture	266825	30.5	10316	1.2	597598	68.3	874739	100.0
	Agri.labour/regular wage/salary earners	281963	42.2	8849	1.3	377267	56.5	668079	100.0
	Casual labour/Other labour	534114	42.5	18407	1.5	702945	56.0	1255466	100.0
	Self employed in agriculture	116345	20.1	2602	.4	459362	79.4	578309	100.0
	Others	138672	24.5	15149	2.7	412658	72.8	566479	100.0
Age (years)	0 - 4	87501	20.7	9732	2.3	326476	77.1	423709	100.0
	5 - 14	167566	39.1	0	.0	261457	60.9	429023	100.0
	15 - 34	282200	33.6	4343	.5	552214	65.8	838757	100.0
	35 - 59	453973	36.9	29634	2.4	745039	60.6	1228646	100.0
	60 & above	351438	34.5	11614	1.1	655651	64.4	1018703	100.0
Total		1342680	34.0	55325	1.4	2552864	64.6	3950869	100.0

Source: Computed from NSSO unit level data

Appendix 4.6

Average hospitalisation cost (Rs.) during 365 days in Kerala

Selected Variables	Description	Rural	Urban	Total
Caste	ST			
	SC	4976.50	582.49	4069.31
	OBC	12460.01	9822.59	11218.97
	Others	5279.70	22135.61	10861.05
MPCE Quartile Group	0 -25	5644.10	500.00	5228.87
	25 - 50	3754.37	11354.09	4930.64
	50 - 75	9773.48	6911.80	8865.56
	75 - 100	12698.87	16953.55	15458.23
Size of household	3 & below	10688.88	29614.70	15699.12
	4 - 5	8439.98	10441.40	9226.83
	6 - 7	6738.34	11713.69	9607.40
	8 & Above	6439.56	6230.79	6394.82
Type of household	Self employed in non-agriculture	2461.19	10742.70	6920.84
	Agri.labour/regular wage/salary earners	23604.73	13372.51	16988.30
	Casual labour/Other labour	4186.22	8114.25	5467.13
	Self employed in agriculture	4841.76		4841.76
	Others	15217.84	32035.12	18266.24
Age (years)	0 - 4	2854.45	11379.47	6797.85
	5 - 14	4440.82	1896.29	3885.57
	15 - 34	10816.73	4990.73	8674.95
	35 - 59	10008.81	14156.51	12324.27
	60 & above	9643.48	27240.97	14197.26
Total		8618.48	12895.69	10297.69

Source: Computed from NSSO unit level data

Appendix 4.7

Number of days of ailment by caste groups in Kerala

	Below 5 days		5 - 10		10 & Above		Total	
CASTE	No	%	No	%	No	%	No	%
ST	34406	32.0%	20722	19.3%	52493	48.8%	107621	100.0%
SC	193925	20.3%	234924	24.6%	524325	55.0%	953174	100.0%
OBC	963570	20.8%	748656	16.2%	2922063	63.1%	4634289	100.0%
Others	482200	16.9%	457998	16.1%	1907306	67.0%	2847504	100.0%
Total	1674101	19.6%	1462300	17.1%	5406187	63.3%	8542588	100.0%

Source: Computed from NSSO unit level data

Appendix 4.8

Number of days of ailment by selected variables in Kerala

Independent variables	Attributes	Below 5 days	5 - 10	10 & Above	Total
Caste	ST	32.0%	19.3%	48.8%	100.0%
	SC	20.3%	24.6%	55.0%	100.0%
	OBC	20.8%	16.2%	63.1%	100.0%
	Others	16.9%	16.1%	67.0%	100.0%
Area	Rural	20.3%	16.7%	63.1%	100.0%
	Urban	17.6%	18.4%	64.0%	100.0%
MPCE Quartile Group	0 - 25	19.7%	18.4%	61.9%	100.0%
	25 - 50	19.9%	19.4%	60.7%	100.0%
	50 - 75	19.1%	16.5%	64.3%	100.0%
	75 - 100	19.6%	14.4%	65.9%	100.0%
Household size	3 & below	15.8%	14.5%	69.7%	100.0%
	4 - 5	21.9%	17.6%	60.5%	100.0%
	6 - 7	19.1%	16.5%	64.5%	100.0%
	8 & Above	19.4%	22.3%	58.2%	100.0%
Type of household	Self employed in non-agriculture	20.9%	16.3%	62.8%	100.0%
	Agri.labour/ regular wage/ salary earners	25.1%	18.7%	56.2%	100.0%
	Casual labour/ Other labour	19.8%	20.9%	59.3%	100.0%
	Self employed in agriculture	12.3%	14.6%	73.1%	100.0%
	Others	17.7%	11.6%	70.7%	100.0%
Sex	Male	22.1%	17.7%	60.2%	100.0%
	Female	17.6%	16.6%	65.8%	100.0%
Age (years)	0 - 4	34.6%	39.7%	25.7%	100.0%
	5 - 14	42.5%	28.3%	29.2%	100.0%
	15 - 34	30.9%	28.1%	40.9%	100.0%
	35 - 59	16.0%	12.8%	71.2%	100.0%
	60 & above	4.2%	5.2%	90.7%	100.0%
Total		19.6%	17.1%	63.3%	100.0%

Source: Computed from NSSO unit level data

Appendix 4.9

Number of days of confined to bed by selected variables in Kerala

Independent variables	Attributes	Nil	1 - 5	5 - 10	10 & Above	Total
Caste	ST	82.8%	10.7%	3.6%	2.9%	100.0%
	SC	87.7%	7.6%	1.6%	3.1%	100.0%
	OBC	87.9%	6.6%	2.7%	2.8%	100.0%
	Others	89.9%	6.2%	1.2%	2.8%	100.0%
Area	Rural	87.8%	7.3%	2.1%	2.8%	100.0%
	Urban	90.7%	4.6%	1.9%	2.8%	100.0%
MPCE Quartile Group	0 - 25	87.4%	7.3%	2.3%	3.0%	100.0%
	25 - 50	87.0%	7.0%	2.4%	3.6%	100.0%
	50 - 75	88.5%	7.2%	2.6%	1.6%	100.0%
	75 - 100	90.7%	5.4%	1.0%	2.9%	100.0%
Household size	3 & below	91.7%	4.5%	1.3%	2.5%	100.0%
	4 - 5	87.9%	7.8%	2.2%	2.1%	100.0%
	6 - 7	87.3%	5.8%	2.5%	4.4%	100.0%
	8 & Above	85.9%	8.2%	2.4%	3.5%	100.0%
Type of household	Self employed in non-agriculture	88.8%	6.7%	2.2%	2.3%	100.0%
	Agri.labour/ regular wage/ salary earners	86.9%	6.9%	2.3%	3.9%	100.0%
	Casual labour/ Other labour	87.3%	7.4%	2.4%	2.9%	100.0%
	Self employed in agriculture	89.4%	7.5%	.5%	2.5%	100.0%
	Others	91.0%	4.2%	2.2%	2.6%	100.0%
Sex	Male	86.9%	7.6%	2.3%	3.2%	100.0%
	Female	89.8%	5.9%	1.8%	2.5%	100.0%
Age (years)	0 - 4	88.0%	8.0%	2.2%	1.9%	100.0%
	5 - 14	85.5%	12.1%	2.4%	.0%	100.0%
	15 - 34	84.7%	10.8%	2.1%	2.4%	100.0%
	35 - 59	89.7%	5.9%	2.1%	2.3%	100.0%
	60 & above	90.5%	2.7%	1.9%	4.9%	100.0%
Total		88.5%	6.7%	2.1%	2.8%	100.0%

Source: Computed from NSSO unit level data

2.18

Appendix 4.1: List of SC, ST and OBC in Kerala State

LIST OF SCHEDULED CASTES IN THE KERALA STATE

(As amended by the Scheduled Castes and Sceduled Tribes Order (Amendment Act) 1976 and as amended by the Constitution (Sceduled castes) Orders (Second Amendment) Act, 2002 (Act 61 of 2002) vide Part VIII- Kerala- Schedule I notified in the Gazette of India, dated 18 December, 2002) and (As amended by the Scheduled Castes and Sceduled Tribes Orders (Amendment) Act 2002 (Act 10 of 2003) vide Part VII- Kerala- Second Schedule notified in the Gazette of India dated 8 January, 2003)

1. Adi Andhra
2. Adi Dravida
3. Adi Karnataka
4. Ajila
5. Arunthathiyar
6. Ayyanavar
7. Baira
8. Bakuda
9. Bathada
10. Bharathar (Other than Parathar, Paravan)
11. Chakkiliyan
12. Chamar,Muchi
13. Chandala
14. Cheruman
15. Domban
16. Gosangi
17. Hasla
18. Holeya
19. Kadaiyan
20. Kakkalan, Kakkan
21. Kalladi
22. Kanakkan, Padanna, Padannan
23. Kavara (Other than Telugu speaking or Tamil speaking Balija, Kavarai, Gavara, Gavari, Gavarai Naidu, Balija Naidu, Gajalu Balija or Valai Chetty)
24. Koosa
25. Kootan, Koodan
26. Kudumban
27. Kuruvan, Sidhanar, Kuravar, Kuruva, Sidhana
28. Maila
29. Malayan (In the areas comprising the Malabar District as specified by sub section (2)

of section 5 of the State Re-organisation Act, 1956 (37 of 1956)
30. Mannan, Pathiyan, Perumannan, Vannan, Velan
31. Moger (Other than Mogeyar)
32. Mundala
33. Nalakeyava
34. Nalkadaya
35. Nayadi
36. Pallan
37. Palluvan
38. Pambada
39. Panan
40. Paraiyan, Parayan, Sambavar, Sambavan, Sambava, Paraya, Paraiya, Parayar
41. Pulayan, Cheramar, Pulaya, Pulayar, Cherama, Cheraman, Wayanad Pulayan, Wayanadan Pulayan, Matha, Matha Pulayan
42. Puthirai Vannan
43. Reneyar
44. Samagara
45. Samban
46. Semman, Chemman, Chemmar
47. Thandan
48. Thotti
49. Vallon
50. Valluvan
51. Vedan
52. Vettuvan, Pulaya Vettuvan (In the areas of erstwhile Cochin States only)
53. Nerian

LIST OF SCHEDULED TRIBES IN THE KERALA STATE

(As amended by the Scheduled Castes and Sceduled Tribes Order (Amendment Act) 1976 and as amended by the Constitution (Sceduled castes) Orders (Second Amendment) Act, 2002 (Act 61 of 2002) vide Part VIII- Kerala- Schedule I notified in the Gazette of India, dated 18 December, 2002) and (As amended by the Scheduled Castes and Sceduled Tribes Orders (Amendment) Act 2002 (Act 10 of 2003) vide Part VII- Kerala- Second Schedule notified in the Gazette of India dated 8 January, 2003)

1. Adiyan
2. Aranda (Arandan)
3. Eravallan
4. Hill Pulaya(Mala Pulayan, Kurumba Pulayan, Karavazhi Pulayan, Pamba Pulayan)
5. Irular,Irulan
6. Kadar (Wayanad Kadar)

7. Kanikkaran,Kanikar
8. Karimpalan
9. Kattunayakan
10. Kochuvelan
11. Koraga
12. Kudiya,Melakudi
13. Kurichchan (Kurichiyan)
14. Kurumans (Mullu Kuruman, Mulla Kuruman, Mala Kuruman)
15. Kurumbas (Kurumbar, Kurumban)
16. Mahamalasar
17. Malai Arayan (Mala Arayan)
18. Malai Pandaran
19. Malai Vedan (Mala Vedan)
20. Malakkuravan
21. Malasar
22. Malayan, Nattu Malayan, Konga Malayan (Excluding the areas comprising the Kasaragod, Kannur, Wayanad and Kozhikode Districts)
23. Mavilan
24. Malayarayar
25. Mannan (to be spelt in Malayalam script in parenthisis)
26. Muthuvan,Mudugar,Muduvan
27. Palleyan, Palliyan, Paliyar, Palliya
28. Paniyan
29. Ulladan, Ullatan
30. Uraly
31. Mala Vettuvan (in Kasaragod and Kannur Districts)
32. Ten Kurumban, Jenu Kurumban
33. Thachenadan, Thachenadan, Moopan
34. Cholanaickan
35. Malapanickar 36. Vettakuruman

LIST OF OTHER BACKWARD CLASSES IN KERALA STATE

I Through out the State

1. Agasa
2. Ambalakkaran
3. Anglo Indian

4. Aremahrati
5. Arya
6. Bandari
7. Billava
8. Chakkala
9. Chavalakkaran
10. Chetties (Kottar Chetties,Parakka Chetties,Elur Chetties,Attingal Chetties,Pudukkada Chetties,Iraniel Chetties, Sri Pandara Chetties, Telugu Chetties, Udiyankulangara Chetties, Peroorkada Chetties, Sadhu Chetties, 24 Mana Chetties, Wayanadan Chetties, Kalavara Chetties and 24 Mana Telugu Chetties)
11. Devadiga
12. Devanga
13. Dheevara (Arayan,Valan, Nulayan,Mukkuvan,Arayavathi,Valinjiar,Paniakkal,Mukaya,Bovi ,Mukayar and Mukaveeran)
14. Ezhava and Thiyya
15. Ezhavathi
16. Ezhuthachan
17. Ganika
18. Gatti
19. Gowda
20. Hegde
21. Jogi
22. Kadupattan
23. Kaikolan
24. Kolasari, Kalasi Panicker
25. Kalari Kurup or Kalari Panicker
26. Viswakaramas including Asari Chaptegra, Kallassary,Kalthachan,Kammala,Kamsala, Kannan,Karuvan,Kitaran,Kollan,Malayala Kammala, Moosari,Pandikammala,Pandithattan,Perumkolllan,Thachan,Thattan, Vilkurup,Villasan,Viswabrahmanan or Viswabrahmanar and Viswakarmala
27. Kannadiyans
28. Kanisu or Kaniyar Panicker ,Kani or Kaniyan (Ganaka) or Kanisan or Kamnan
29. Kavuthiyan
30. Kavudiyaru
31. Koteyar
32. Krishnanvaka
33. Kerala Mudali
34. Kudumbis
35. Kusavan(Kulala,Kulala Nair,Andhra Nair or Anthuru Nair)
36. Kumbarans

37. Kuruba
38. Latin Catholics
39. Madivalas
40. Maravans
41. Maruthuvar
42. Muslim or Mappila
43. Nadar (Hindu)
44. Naikkans
45. Odans
46. Scheduled Castes Converted to Christianity
47. Pandithars
48. Panniyar
49. Pattariyas
50. Peruvannan (Varanavar)
51. Pulluvan
52. Rajapur
53. Chakravar,Sakravar(Kavathi)
54. Sourashtras
55. Saliya, Chaliya (Chaliyan)
56. Senai Thalavan (Elavaniar)
57. S.I.U.C
58. Thachar
59. Tholkollans
60. Vaduvans,Vadugans,Vadukkars and Vaduka (Vadukans)
61. Velaans (Velaan, Velaar)
62. Vanian (Vanika,Vanika Vaisya,Vanibha Chetty,Vaniya Chettty,Ayiravar, Nagarathar and Vaniyan)
63. Vaniar
64. Vakkaliga
65. Veerasaivas (Yogis and Yogeeswara, Poopandaram/ Malapandaram and Jangam)
66. Veluthedathu Nair (Veluthedan and Vannathan)
67. Vilakkithala Nair (Vilakithalavan) 68. Yadavas (Kolaya, Ayar, Mayar, Maniyani and Iruman)

69. Kongu Navithan, Vettuva Navithan and Aduthon
70. Moopar or Kallan Mooppan or Kallan Mooppar.

II In Malabar District

1. Boyan
2. Ganjan Reddis
3. Visanavan

III. Throughout the State except Malabar District

1.Kammara
2.Malayan
3.Malayekandi
4.Reddiars

IV Throuth out the State except Kasaragod Taluk Malabar District

1.Marati

Explanation :- Malabar District shall mean the Malabar District referred to in sub-section (2) of section 5 of the State Reorganisation Act,1956.

Appendix 4.2: Construction of SES group by using Principal Component Analysis

We used 25 variables in Principal Component Analysis to create Socio Economic Group. These variables were from household asset, drinking water, hygienic and social variables. We calculated socio-economic group score by using weighted index of the four major components and we categorised into four socio-economic groups on quartile basis. The details of PCA analysis have been shown below. These types of analyses of grouping the socio-economic groups by using PCA technique were also seen in Filmer and Pritchett ()[1]and Wamani et al. (2007)[2].

The details of PCA analysis have been shown in the following tables.

Score coefficient of first principal component of type of household asset variables

Variable	Variable description	Values
TABLE	Table	1-own; 0-else
COT_BED	Cot/Bed	1-own; 0-else
CLOK_WAT	Clock/watch	1-own; 0-else
TAPE	Tape	1-own; 0-else
FAN	Fan	1-own; 0-else
CTV	Colour TV	1-own; 0-else
CABLE	Cable	1-own; 0-else
VCP_VCD	VCP/VCD	1-own; 0-else
COOKER	Cooker	1-own; 0-else
GRINDER	Grinder	1-own; 0-else
REFRI	Refrigerator	1-own; 0-else
V_CLEAN	Vacuum cleaner	1-own; 0-else
W_MACH	Washing machine	1-own; 0-else
PHONE	Telephone	1-own; 0-else
BIKE	Bike	1-own; 0-else
PUMP	Pump	1-own; 0-else
ROOF	Type of roof	1-Grass/leaves; 2-Sheet; 3-Tiles; 4-Concrete
FLOOR	Type of floor	1-Soil; 2-Cement; 3-Mosaic; 4-marble; 5-Ceramic tiles
PL_AREA	Plinth area	In square feet
ROOMS	Number of rooms	In numbers
NBPL	BPL family	1-BPL family; 0-else
NDRINK_W	Source of drinking water	0-River; 1-public well, public tap, neighbouring well
NLATRINE	Type of latrine	0-open pit, own land, river canal; 1-non-septric latrine; 2-septic latrine
NSEP_KIT	Separate kitchen	1-having separate kitchen; 0-else
FEDU_SHA	Female education	1-share of the number of adult females who completed education of 7 years and more to the total number of adult female in the household; 0-else

[1] Deon Filmer and Lant Pritchett (). *Estimating Wealth Effects without Expenditure Data—or Tears: An Application to Educational Enrollments in States of India.*

[2] Henry wamani, Anne Nordrehaug Astrom, Stefan Peterson, James K. Tumwine and Thorkid Tylleskar (2007). "Boys are more stunted than girls in Sub-Saharan Africa: A meta analysis of 16 demographic and health surveys", *BMC Pediatrics*, 2007, 7 (17).

Component Score Coefficient Matrix

	Component			
	1	2	3	4
ROOF	-.174	.356	-.052	.063
FLOOR	-.045	.156	-.074	.127
PL_AREA	-.029	.109	-.010	.130
ROOMS	-.032	.188	.002	.030
NBPL	.117	.010	-.022	-.017
NDRINK_W	.002	.137	.061	-.081
NLATRINE	-.086	.361	-.100	-.029
NSEP_KIT	-.083	.375	-.028	-.153
FEDU_SHA	-.014	.055	.074	.022
TABLE	-.114	.029	.354	-.045
COT_BED	-.127	-.054	.426	.008
CLOK_WAT	-.132	-.125	.457	.038
TAPE	.074	-.081	.146	-.016
FAN	.141	.032	.004	-.119
CTV	.259	-.004	-.090	-.185
CABLE	.287	-.026	-.163	-.134
VCP_VCD	.053	-.107	-.002	.189
COOKER	.193	-.081	.022	-.070
GRINDER	.239	-.154	.011	-.056
REFRI	.093	-.072	-.095	.212
V_CLEAN	-.215	-.021	.061	.436
W_MACH	-.117	-.024	-.034	.398
PHONE	.215	-.031	-.112	-.036
BIKE	.080	-.121	.027	.101
PUMP	.101	-.061	-.035	.112

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
ROOF	3.15	.89	600
FLOOR	2.05	.95	600
PL_AREA	594.48	515.42	600
ROOMS	3.40	1.64	600
NBPL	.3417	.4747	600
NDRINK_W	1.9050	.9955	600
NLATRINE	1.2283	.6508	600
NSEP_KIT	.7667	.4233	600
FEDU_SHA	47.5944	41.8321	600
TABLE	.66	.47	600
COT_BED	.56	.50	600
CLOK_WAT	.67	.47	600
TAPE	.34	.47	600
FAN	.42	.49	600
CTV	.49	.50	600
CABLE	.37	.48	600
VCP_VCD	.14	.35	600
COOKER	.37	.48	600
GRINDER	.30	.46	600
REFRI	.15	.36	600
V_CLEAN	2.33E-02	.15	600
W_MACH	4.83E-02	.21	600
PHONE	.27	.45	600
BIKE	9.67E-02	.30	600
PUMP	.18	.38	600

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.946
Bartlett's Test of Sphericity	Approx. Chi-Square	7345.811
	df	300
	Sig.	.000

Communalities

	Initial	Extraction
ROOF	1.000	.550
FLOOR	1.000	.467
PL_AREA	1.000	.635
ROOMS	1.000	.681
NBPL	1.000	.500
NDRINK_W	1.000	.426
NLATRINE	1.000	.632
NSEP_KIT	1.000	.605
FEDU_SHA	1.000	.309
TABLE	1.000	.661
COT_BED	1.000	.749
CLOK_WAT	1.000	.665
TAPE	1.000	.494
FAN	1.000	.509
CTV	1.000	.608
CABLE	1.000	.607
VCP_VCD	1.000	.454
COOKER	1.000	.646
GRINDER	1.000	.678
REFRI	1.000	.710
V_CLEAN	1.000	.543
W_MACH	1.000	.609
PHONE	1.000	.633
BIKE	1.000	.290
PUMP	1.000	.545

Extraction Method: Principal Component Analysis.

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Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.024	40.096	40.096	10.024	40.096	40.096	5.328	21.310	21.310
2	1.730	6.920	47.016	1.730	6.920	47.016	3.301	13.202	34.513
3	1.360	5.438	52.455	1.360	5.438	52.455	2.811	11.244	45.757
4	1.092	4.369	56.824	1.092	4.369	56.824	2.767	11.066	56.824
5	.914	3.656	60.479						
6	.842	3.367	63.846						
7	.792	3.166	67.012						
8	.712	2.846	69.859						
9	.696	2.783	72.642						
10	.650	2.601	75.243						
11	.605	2.421	77.664						
12	.580	2.320	79.984						
13	.538	2.151	82.136						
14	.504	2.018	84.153						
15	.491	1.965	86.118						
16	.484	1.937	88.055						
17	.448	1.791	89.846						
18	.442	1.769	91.615						
19	.425	1.699	93.314						
20	.375	1.500	94.813						
21	.322	1.287	96.100						
22	.286	1.142	97.243						
23	.263	1.053	98.295						
24	.239	.955	99.250						
25	.187	.750	100.000						

Extraction Method: Principal Component Analysis.

Component Score Covariance Matrix

Component	1	2	3	4
1	1.000	3.130E-16	.000	.000
2	3.130E-16	1.000	.000	1.295E-16
3	.000	.000	1.000	1.353E-16
4	.000	1.295E-16	1.353E-16	1.000

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Component Scores.

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KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.946
Bartlett's Test of Sphericity	Approx. Chi-Square	7345.811
	df	300
	Sig.	.000

Communalities

	Initial	Extraction
ROOF	1.000	.550
FLOOR	1.000	.467
PL_AREA	1.000	.635
ROOMS	1.000	.681
NBPL	1.000	.500
NDRINK_W	1.000	.426
NLATRINE	1.000	.632
NSEP_KIT	1.000	.605
FEDU_SHA	1.000	.309
TABLE	1.000	.661
COT_BED	1.000	.749
CLOK_WAT	1.000	.665
TAPE	1.000	.494
FAN	1.000	.509
CTV	1.000	.608
CABLE	1.000	.607
VCP_VCD	1.000	.454
COOKER	1.000	.646
GRINDER	1.000	.678
REFRI	1.000	.710
V_CLEAN	1.000	.543
W_MACH	1.000	.609
PHONE	1.000	.633
BIKE	1.000	.290
PUMP	1.000	.545

Extraction Method: Principal Component Analysis.

Appendix Tables for Chapter 5.

Appendix 5.2
Visit of health personals to household during last 12 months

Selected Variables	Description	Household visit	No household visit	Total
Caste	ST	89.0	11.0	100.0
	SC	53.5	46.5	100.0
	OBC	64.5	35.5	100.0
	Others	66.4	33.6	100.0
Place of residence	Rural	71.3	28.7	100.0
	Urban	49.7	50.3	100.0
MPCE Quartile Group	0 -25	66.4	33.6	100.0
	25 - 50	65.6	34.4	100.0
	50 - 75	67.1	32.9	100.0
	75 - 100	62.3	37.7	100.0
Size of household	3 & below	62.1	37.9	100.0
	4 - 5	65.4	34.6	100.0
	6 - 7	72.0	28.0	100.0
	8 & Above	60.9	39.1	100.0
Type of household	Salary	48.4	51.6	100.0
	Business	55.3	44.7	100.0
	NRI	76.0	24.0	100.0
	Cultivators	76.9	23.1	100.0
	Fishing	65.8	34.2	100.0
	Coolie/Forest related	66.6	33.4	100.0
	Others	65.2	34.8	100.0
SES Group	SES I	68.2	31.8	100.0
	SES II	63.1	36.9	100.0
	SES III	67.1	32.9	100.0
	SES IV	57.9	42.1	100.0
Total		65.3	34.7	100.0

Appendix 5.3

Percentage Distribution of households by Different matters talked about by health personnel

Selected Variables	Description	Family planning	Breast feeding	Immunisation	Nutrition	Disease prevention	Treatment of health problem
Caste	ST	6.74	1.12	22.47	32.58	50.56	49.44
	SC	11.21	1.87	46.73	5.61	26.17	21.50
	OBC	10.81	4.50	60.36	13.51	23.42	6.31
	Others	3.53	0.00	61.18	5.88	25.88	9.41
Place of residence	Rural	8.39	2.26	45.16	17.42	33.87	21.94
	Urban	8.54	1.22	59.76	1.22	19.51	17.07
MPCE Quartile Group	0 -25	8.08	1.01	36.36	19.19	38.38	34.34
	25 - 50	12.12	2.02	46.46	14.14	24.24	22.22
	50 - 75	6.00	0.00	56.00	12.00	32.00	12.00
	75 - 100	7.45	5.32	54.26	10.64	28.72	14.89
Size of household	3 & below	7.78	1.11	58.89	7.78	26.67	21.11
	4 - 5	8.91	1.98	44.06	15.84	33.17	22.28
	6 - 7	6.94	0.00	44.44	13.89	30.56	22.22
	8 & Above	10.71	10.71	53.57	21.43	28.57	7.14
Type of household	Salary	0.00	6.67	66.67	6.67	26.67	6.67
	Business	11.54	7.69	57.69	15.38	26.92	3.85
	NRI	0.00	0.00	89.47	5.26	15.79	5.26
	Cultivators	0.00	5.00	65.00	10.00	30.00	0.00
	Fishing	16.00	0.00	56.00	36.00	12.00	16.00
	Coolie/Forest related	10.92	0.44	36.68	13.54	37.12	29.69
	Others	1.72	0.00	62.07	12.07	22.41	12.07
SES Group	SES I	5.17	1.72	18.97	31.03	46.55	43.10
	SES II	13.86	1.98	41.58	16.83	32.67	26.73
	SES III	7.00	1.50	57.00	6.50	26.50	14.00
	SES IV	6.06	6.06	66.67	21.21	24.24	6.06
Total		8.42	2.04	48.21	14.03	30.87	20.92

Appendix 5.4

Percentage distribution of households where health personnel visited and type of services

Selected Variables	Description	Immunization	Family planning advice	Others	Total
Caste	ST	94.4	1.1	4.5	100.0
	SC	96.3	1.9	1.9	100.0
	OBC	90.1	4.5	5.4	100.0
	Others	97.6	1.2	1.2	100.0
Place of residence	Rural	94.5	2.3	3.2	100.0
	Urban	93.9	2.4	3.7	100.0
MPCE Quartile Group	0 -25	94.9	2.0	3.0	100.0
	25 - 50	89.9	3.0	7.1	100.0
	50 - 75	97.0	2.0	1.0	100.0
	75 - 100	95.7	2.1	2.1	100.0
Size of household	3 & below	94.4	2.2	3.3	100.0
	4 - 5	93.1	3.0	4.0	100.0
	6 - 7	97.2		2.8	100.0
	8 & Above	96.4	3.6		100.0
Type of household	Salary	93.3	6.7		100.0
	Business	92.3	3.8	3.8	100.0
	NRI	100.0			100.0
	Cultivators	100.0			100.0
	Fishing	84.0	4.0	12.0	100.0
	Coolie/Forest related	95.6	1.7	2.6	100.0
	Others	91.4	3.4	5.2	100.0
SES Group	SES I	100.0			100.0
	SES II	89.1	4.0	6.9	100.0
	SES III	94.5	2.5	3.0	100.0
	SES IV	100.0			100.0
Total		94.4	2.3	3.3	100.0

Appendix 5.5
Distribution of households with children by reasons for preference of system of medicine for children

Reasons for preference	Allopathic		Ayurvedic		Homepathic		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Quick remedy	206	70.8	3	21.4	1	6.3	210	65.4
Accessibility	14	4.8					14	4.4
Availability	11	3.8					11	3.4
Affordability	3	1.0					3	.9
By custom	14	4.8					14	4.4
More concern/faith	3	1.0	1	7.1			4	1.2
No side effect	1	.3	5	35.7	10	62.5	16	5.0
Conveneyance	5	1.7			4	25.0	9	2.8
No other alternative	31	10.7					31	9.7
Not known about other	3	1.0					3	.9
Particular disease			5	35.7	1	6.3	6	1.9
Total	291	100.0	14	100.0	16	100.0	321	100.0

Appendix 5.6
Distribution of households with children by reasons by caste

Reasons for preference	ST		SC		OBC		Other		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Quick remedy	26	39.4	71	68.9	67	74.4	46	74.2	210	65.4
Accessibility	5	7.6	4	3.9	4	4.4	1	1.6	14	4.4
Availability	4	6.1	6	5.8	1	1.1			11	3.4
Affordability	1	1.5	1	1.0			1	1.6	3	.9
By custom	2	3.0	7	6.8	3	3.3	2	3.2	14	4.4
More concern/faith			2	1.9	1	1.1	1	1.6	4	1.2
No side effect	1	1.5	2	1.9	6	6.7	7	11.3	16	5.0
Conveneyance			2	1.9	5	5.6	2	3.2	9	2.8
No other alternative	25	37.9	4	3.9			2	3.2	31	9.7
Not known about other	2	3.0	1	1.0					3	.9
Particular disease			3	2.9	3	3.3			6	1.9
Total	66	100.0	103	100.0	90	100.0	62	100.0	321	100.0

Appendix 5.7
Distribution of households with old aged by reasons for preference of system of medicine for old aged

Reasons for preference	Allopathic		Ayurvedic		Homepathic		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Quick remedy	129	67.5	7	17.9	1	12.5	137	57.6
Accessibility	7	3.7			1	12.5	8	3.4
Availability	13	6.8					13	5.5
Affordability	5	2.6					5	2.1
By custom	10	5.2	2	5.1			12	5.0
More concern/faith			1	2.6			1	.4
No side effect			9	23.1	4	50.0	13	5.5
Convenience	6	3.1			1	12.5	7	2.9
No other alternative	15	7.9					15	6.3
Not known about other	2	1.0					2	.8
Particular disease	2	1.0	17	43.6			19	8.0
More effective	2	1.0	3	7.7	1	12.5	6	2.5
Total	191	100.0	39	100.0	8	100.0	238	100.0

Sch.No: [ ][ ][ ]

GPS No. [ ][ ][ ][ ]

DEPARTMENT OF ECONOMICS, UNIVERSITY OF CALICUT

A Survey Schedule for the Study of

HEALTH CARE ACCESSIBILITY AND SOCIO ECONOMIC GROUPS: A STUDY OF KERALA

I. GENERAL INFORMATION

1. District: [ ] Block: [ ] Revenue Village: [ ]
2. Pancyayat/Municipality [ ] Ward No: [ ] H.No: [ ]
3. House name: [ ] Name of the head of household: [ ]
4. Religion: [ ] *(1) Hindu (2) Muslim (3) Christian (4) Other (Specify)*
5. Caste: [ ] Caste Category [ ] *(1) ST (2) SC (3) OBC (4) OEC (5) Forward*
6. Main Source of income: [ ]
7. Area of land (Cents): Dry Land [ ] Wet Land [ ] Total [ ]
8. Annual Income: Wage/Salaried [ ] Cultivation [ ] Others [ ] Total [ ]
9. Type of House Roof [ ] *(1) Grass/leaves (2) Sheet (3) Tiles (4) Concrete (5)Others (specify)*
   Walls [ ] *(1) Leaves (2) Mud (3)Wood/sheet (4)Tiles/stone (5)Cement brick*
   Flooring [ ] *(1) Soil (2)Cement (3) Mosaic (4)Marble (5) Ceramic tiles (6) Others*
   Plinth area (in square feet): [ ] No. of rooms: [ ]
   Electrification: [ ] *(1) Electrified (2) Not Electrified*
10. Ownership: [ ] *(1) Own (2) Rented (3) Shared (4) Others*
    If rented, do you have your own house?: [ ] *(1) Yes (2) No*
11. Place of staying: [ ] *(1) Scattered (2) Housing Colony (3) SC/ST Colony (4) Lashshamveedu Colony (5) Quarters (5) Slum Dwellers (6) Others - specify*
12. Is this a BPL household? [ ] *(1) Yes (2) No*

II. HOUSEHOLD WATER AVAILABILITY, HYGIENE AND HOUSEHOLD ENERGY

1. Where do you get water: Drinking [ ] Bath [ ] Other Purposes [ ]
   (1) Own well (2) Own pond (3) Public well (4) Public tap (5) Public pond (6) River (7) Back water (8) Others
2. What is the distance to the source of drinking water (meters)? [ ]
3. What is the quality of water? [ ] *(1) Clean (2) Muddy/dirty (3) Brackish/saline*
4. Drinking water treatment: [ ] *(1) No treatment (2) Boiling (3) Filter (4) Cloth screen (5) Any disinfectant*
5. Latrine facility: [ ] *(1) Septic latrine (2) Non-septic latrine (3) Open pit (4) Own land (5) River Canal (6) Others*
6. How many latrines are there in your house? Common [ ] Attached [ ]
7. Do you have bath rooms? [ ] *(1) Yes (2) No*
8. Waste Disposal: For Plastic [ ] For Non-Plastic [ ] Waste water [ ]
   (1) Burn (2) Covering under earth (3) Thrown out in own compound (4) Thrown out in public places (5) Disposed by local bodies (6) To kitchen garden (7) To roadside open drainage (8) To open tanks (9) To Closed tanks (10) To sewerage (11) No arrangement (12) Others - specify
9. Does the household have a separate kitchen? [ ] *(1) Yes (2) No*
10. Use of main stove/ Chula: [ ]
    (1) Ordinary chulha with wood (2) Smokeless chulha (3) Kerosene stove (4) Gas stove (5) Electric stove (6) Other
11. If it is ordinary chulha, type of materials used: [ ]
    (1) Coconut leaves/parts (2) Other agricultural wastes (3) Wood (4) Others (specify)

12. Do you feel smoke as a problem? ☐ *(1) Yes (2) No*

13. The method for lighting: ☐ *(1) Kerosene (2) Electricity (3) Solar (4) Biogas (5) Others*

14. Premises sprayed with any insecticide? ☐ *(1) Yes (2) No*

15. Animal shed in the same premises? ☐ *(1) Yes (2) No*

III. HOUSEHOLD ASSETS (Use √)

Mattress	Electric Fan	Grinder	Tractor	Jeep/trucker
Chair	B/W TV	Refrigerator	Cycle	Bus
Table	Colour T V	Vacuum Cleaner	Scooter	Bullock cart
Cot/Bed	Cable T V	Washing Machine	Bike	Thresher
Clock/Watch	Dish Antenna	Microwave Oven	Car	Pump set:
Radio	VCP/VCD	Sewing machine	Tempo	Gold
Tape Recorder	Pressure cooker	Telephone	Lorry	Computer

IV. DETAILS REGARDING MEMBERS OF THE HOUSEHOLD

1	2	3	4	5	6	7	8	9	10
Sl. No	Name	Relation to head	Age	Sex	Marital status	Age at Marriage	General education	Activity	Monthly Income
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

3. (1) Head (2) Spouse of the head (3) Son/Daughter (4) Son/Daughter in-laws (5) Grand child (6) Father/Mother in law (7) Brother/Sister/in-laws (8) Other
5. (1) Male (2) Female
6. (1) Married (2) Unmarried (3) Widow/Widower (4) Divorced (5) Separated

V. HEALTH DETAILS OF HOUSEHOLD MEMBERS

1	2	3	4	5	6	7	8	9	10
Sl. No	Any illness in last 30 days?	If yes, type of illness	No. of hospitalisation during last 1 year, if any	Type of Physically challenged, if any	Any enduring illness?	If yes, type of illness	Intoxi-cants, if any	Any insurance facility?	If yes, annual premium
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

5. (1) Physical (2) Mental (3) Nil
8. (1) Tobacco (2) Alchohol (3) Pan (4) Masala (5) Snuff (6) Ganja (7) Charas (8) Opium (9) Others –specify (10) Nil
9. (1) Life insurance (2) Medical insurance (3) Accident insurance (4) Others-specify (5) Nil

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VI. MONTHLY CONSUMPTION EXPENDITURE

Items	Rs.	Items	Rs.	Items	Rs.
Rice, wheat		Milk & milk products		Fuel, light	
Tubers		Meat		Entertainment	
Pulses		Fish		News paper	
Edible oil		Eggs		Telephone	
Sugar		Liquor		Cosmetics	
Vegetables		Tobacco		Rent	
Fruits and nuts		Pan		Conveyance	
Salt, spices, beverages		Health tonics		Health Care	
Food from outside		Sanitary and Cleaning		Others (specify)	

Expenditure on other items the previous Year

Items	Rs.	Items	Rs.	Items	Rs.
Life insurance		Clothing and footwear		Furniture	
Medical Insurance		Education		House repair	
Accident Insurance		Durable goods		Others (specify)	

Way of Seeking Medical Treatment

No.	Particulars	1	2	3	4	5
1	Name (Sl.No.) of ailing person					
2	Way of seeking medical treatment					

1 Patient ⇒ Without a doctor
2 Patient ⇒ Medical Shop
3 Patient ⇒ Government Hospital
4 Patient ⇒ Private Hospital
5 Patient ⇒ Private Practioner ⇒Government Hospital
6 Patient ⇒ Private Practioner ⇒ Private Hospital
7 Patient ⇒ Private Practioner ⇒ Private Clinic ⇒ Private Practioner ⇒ Medical Shop
8 Patient ⇒ Private Practioner ⇒ Private Clinic ⇒ Private Practioner ⇒ Government Hospital
9 Patient ⇒ Private Practioner ⇒ Private Clinic ⇒ Private Practioner ⇒ Private Hospital
10 Others - specify

VII. HEALTH AND ILLNESS

1. What are the common illnesses suffered by the family? [ ]
2. What are the common diseases suffered by children in the family? [ ]
3. What is the general system of treatment in the family? [ ]
   (1) Allopathic (2) Ayurvedic (3) Homoeopathic (4) Sidha (5) Unani (6) Others - specify
4. What is the general system of treatment followed by the parents of the respondent? [ ]
   (1) Allopathic (2) Ayurvedic (3) Homoepathic (4) Sidha (5) Unani (6) Others - specify
5. Is there any change in the system of medicine followed by the respondent and the parents of the respondent ? *(1) Yes (2) No* [ ]
6. If the answer is 'Yes', what is the reason for the change? [ ]
   (1) Duration of healing (2) Cost of treatment (3) Facility is not available (4) Lack of confidence (5) Facility inadequate (6) Others - specify
8. Way of taking food: [ ] *(1) All together (2) Male and female members separately (3) Others*
9. Do you wash your hands before having food? [ ]
   (1) Systematically/Always (2) Most of the time (3) Sometimes (4) Rarely

VIII. MORBIDITY HISTORY OF THE HOUSEHOLD DURING LAST 30 DAYS

No.	Particulars	1	2	3	4	5
1	Name (Sl.No.) of ailing person					
2	Name of ailment					
3	Co-existing ailments					
4	Duration of ailment in the reference period					
5	Whether treated					
6	If not treated, reasons					
7	If treated, system of treatment					
8	Agency of treatment					
9	If it is private hospital clinic, reasons for not using public facility					
10	Recommended number of days for treatment					
11	Actually taken number of days for treatment					
12	Kind of Treatment					
13	Expenditure on treatment					
14	Whether recommended for hospitalisation?					
15	Was there any situation in which recommended for hospitalisation, but was not hospitalised?					
16	If yes, reasons for not hospitalised					
17	Present ailment status					
18	Date of beginning the ailment					
19	Date of recovering from the ailment					

6 (1) No medical facility available in neighbourhood; (2) Facility available but no treatment owing to lack of confidence; (3) Long waiting; (4) Lack of time; (5) Financial reasons; (6) Ailment not considered serious; (7) - Others - specify

7 (1) Allopathic (2) Ayurvedic (3) Homoepathic (4) Sidha (5) Unani (6) Naturopathy (7) Others - specify

8 (1) Self (2) Doctor (3) Nurse/ANM/Paramedical personnel (4) Medical Store (5) Traditional healer (6) Government Doctor's Residence (7) Residence of other doctors (8) Clinic/Hospital (9) Others - specify

9 (1) Facility is far away (2) Doctors not available (3) Medicine not available (4) Facility inadequate (5) Inconvenient timing (6) Bribery (7) Lack of friendliness (8) Lack of hygiene (9) Others – specify

12 (1) Bedridden at home (2) Bedridden at Hospital (3) Medication without rest (4) Others-specify

16 (1) Financial problem (2) No bystander (3) No other members in family to take care of (4) Not considered as important (5) Farness of the hospital (6) Others

17 (1) Started before 1 month but continuing; (2) Started before 1 month but cured; (3) Started within 1 month but continuing; (4) Started within one month but cured

IX. DETAILS OF MEDICAL TREATMENT (DURING LAST 30 DAYS)

	Particulars	1	2	3	4	5
1	Name (Sl.No.) of ailing person					
2	System of treatment					
3	Agency of treatment					
4	Duration of Hospitalisation (days)					
5	Direct Medical Expenditure (Rs.) (Expenses on diagnostic services, medicine, surgery, etc.)					
6	Expenditure on Accommodation (Rs.)					
7	Expenditure on Transport (Rs.)					
8	Has the ailing person been not able to go for work due to illness on any day within the reference period?					
9	If yes, number of days not able to go for work due to illness within the reference period					
10	Has any member in the household other than the person who fell ill been not able to go for work due to the ailment of the person					
11	Number of days not able to go for work within the reference period					

8 (1) Allopathic (2) Ayurvedic (3) Homoepathic (4) Sidha (5) Unani (6) Naturopathy (7) Others – specify

3 (1) PHC/CHC (2) Government Taluk hospital/Government District Hospital (3) Government Medical College Hospital (4) Government Super Specialty Hospital (5) Small private hospital (6) Super specialty private hospital (7) Others – specify

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X. HOSPITALIZATION DURING THE LAST ONE YEAR

No.	Particulars	1	2	3	4	5
1	Name (Sl.No.) of the person hospitalised					
2	Name of ailment					
3	System of treatment					
4	Type of hospital					
5	Duration of stay in hospital (Days)					
6	Expenditure on Medicine (Rs.)					
7	Doctor's fee (Rs.)					
8	Expenditure on Surgery (Rs.)					
9	Other treatment (Rs.)					
10	Room rent/bed charges (Rs.)					
11	Transport cost (Rs.)					
12	Lodging and hotel expense of escorts (Rs.)					
13	Miscellaneous expenses (Rs.)					
14	Bystander in the hospital					
15	If bystander is a paid servant/home nurse, amount paid to them					
16	Continuation of treatment after getting discharged from hospital					
17	Source of treatment after getting discharged from hospital					

3. (1) Allopathic (2) Ayurvedic (3) Homoepathic (4) Sidha (5) Unani (6) Others - specify

4. (1) PHC/CHC (2) Government Taluk hospital/Government District Hospital (3) Government Medical College Hospital (4) Government Super Specialty Hospital (5) Small private hospital (6) Super specialty private hospital (7) Others – specify

14. (1) paid servant/home servant (2) Household member (3) Friends and relatives

17. (1) Government doctor's residence (2) Residence of other doctors (3) PHC/CHC (4) Taluk/district hospital (5) Government medical college hospital (6) Small private clinic/hospital (7) Super specialty private hospital

XI. ACCESS TO HEALTH CARE INSTITUTIONS

No.	Particulars	1	2	3	4	5
1	Name (Sl.No.) of ailing person					
2	Name of ailment					
3	Type of institution					
4	Distance (in meters)					
5	Type of Transport					
6	Time of Transport (in Minutes)					
7	Type of service they provide					
8	Consultation Fees (Rs.)					
9	Attitude of staff					
10	Seeing the same doctor					
11	Duration of waiting for consultation (Minutes)					
12	Physical condition					
13	Free availability of medicine					
14	If yes, approximate value					

2. (1) PHC (2) CHC (3) Private hospital (4) Private practioner (5) Ayurveda public (6) Ayurveda private (7) Homeo public (8) Homeo private (9) Others - specify

5. (1) By walk (2) Own vehicle (3) By Bus (4) Hired Car (5) Others-specify 7. (1) Excellent (2) Good (3) No opinion (4) Bad (5) Very bad

9. (1) Excellent (2) Good (3) No opinion (4) Bad (5) Very bad 10. (1) Always (2) Often (3) Rarely (4) Never (5) First Visit

12. (1) Excellent (2) Good (3) No opinion (4) Bad (5) Very bad 13. (1) All (2) Some (3) None

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XII. TRANSPORT AND COMMUNICATION FACILITIES

1. What is the distance to the tarred road (in meters)? [ ]

2. Connection from house to road: [ ] *(1) Path (2) Kutcha road (3) Pucca road (4) No proper connection*

3. What is the time taken to reach a bus stop (minutes)? [ ]

4. What is the frequency of bus service to the next town? [ ]
(1) Less than one hour (2) Every hour (3) Once in two hours(4) More than two hours

5. What is the time taken to reach a point to catch a jeep/auto/any vehicle other than a bus? [ ]

6. Type of conveyance to health care institution: [ ] *(1) Own vehicle (2) Rented vehicle (3) Bus (4) By walk (5) Others*

7. Type of communication Facility: [ ] ***(1) Own Telephone (2) Neighbour's Telephone (3) Nearby Telephone booth (4) Others***

8. Distance to the nearest Telephone booth (in meters): [ ]

XIII. SOURCE OF FINANCING FOR MEDICAL EXPENDITURE

No.	Particulars	For the Last 3 Months					For the Last 1 year				
		1	2	3	4	5	1	2	3	4	5
1	Name (Sl.No)										
2	From current income (Rs.)										
3	From past savings (Rs.)										
4	By mortgaging land (Rs.)										
5	By mortgaging ornaments (Rs.)										
6	Other borrowing with interest (Rs.)										
7	Other borrowing without interest (Rs.)										
8	By sale of ornaments (Rs.)										
9	By sale of land (Rs.)										
10	By sale of livestock (Rs.)										
11	By sale of other physical assets (Rs.)										
12	As contributions by friends/relatives (Rs.)										
13	Others – specify (Rs.)										
14	Has any amount been received/ to be received as reimbursement?										
15	If yes, Employer (Government)										
16	(Private)										
17	Medical insurance										
18	Others, specify										
19	Is there any prevailing indebtedness on account of treatment?										
20	If yes, amount (Rs.)										
21	Interest (Rs.)										
22	Consequences of indebtedness from health										

22. (1) Loss of permanent income asset (2) Loss of educational opportunities (3) Suicides (4) Others-specify

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Distance to Health Care Institutions in Meters

Institutions	Allopathy				Homoe		Ayurveda		Others
	PHC	CHC	Pvt.	Pvt. Practioner	Pub.	Pvt.	Pub.	Pvt.	
Distance (in meters)									

XIV. PARTICULARS OF PREGNANCY DURING LAST ONE YEAR

No.	Particulars	1	2	3	4	5
1	Name (Sl.No.)					
2	Status of pregnancy					
3	Whether registered for pre-natal care					
4	During pregnancy did she receive tetanus toxoid?					
5	During pregnancy did she receive IFA?					
6	Place of delivery					
7	If delivery was not in the hospital, reasons for not going					
8	Sex of the baby (1-Male; 2-Female)					
9	Did you know the sex of the baby before delivery?					
10	Birth weight of the child (Kg.)					
11	Cost of delivery (Hospital charges)					
12	Cost of delivery (Other charges)					
13	Source of finance					
14	Registered for post natal care					

2. (1) Currently pregnant (2) Delivered live birth (3) Delivered still birth (4) Had induced abortion (5) Had spontaneous abortion (6) Had MTP
3. (1) Hospital/PHC/Maternity home (2) With doctor (3) With Auxiliary nurse/LHV (4) No
6. (1) Home (2) Private hospital (3) Public Hospital (4) Others – specify
7. (1) Non availability (distance) (2) Preference (attitude of officials) (3) Expensive (4) Quality of service preferred
10. (1) Current income (2) Past savings (3) Mortgaging land (4) Mortgaging ornaments (5) Other borrowing (6) Sale of ornaments (7) Sale of land (8) Sale of livestock (9) Sale of other physical assets (10) Contributions by friends and relatives (11) Reimbursements by government employer (12) Reimbursements by private employer (13) Insurance agencies (14) Others

XV. PARTICULARS OF CHILD CARE (0-4 YEARS)

No.	Particulars	1	2	3	4	5
1	Name (Sl.No.) of Child					
2	Whether BCG taken					
3	Source of BCG taken					
4	Whether DPT taken					
5	Source of DPT (same code of No.3)					
6	Whether OPV taken (same code of No.4)					
7	Source of OPV (Same code of No.3)					
8	Whether measles vaccine taken					
9	Whether the child registered for paediatric care					
10	Infant feeding practices					
11	Age of introduction of breast feed supplement					

2. (1) At birth (2) Within 3 months (3) After 3 months (4) No
3. (1) Govt. agency by free of cost (2) Govt. agency by payment (3) Private agency by free of cost (4) Private agency by payment (5) Not received
4. (1) Three doses before 1 year and booster does within 3 years (2) 1-3 doses before 1 year (3) No
8. (1) Taken before 12 months (2) Between 12 to 24 months (3) After 24 months (4) No
9. (1) In hospital (2) With doctor (3) With auxiliary nurse/LHV (4) No
10. (1) Breast fed (2) Bottle fed (3) Both
11. (1) Less than 3 months (2) 4-6 months (3) After 6 months

xxx

XVI. PARTICULARS OF OLD AGE CARE (60 YEARS AND ABOVE)

No.	Particulars	1	2	3	4	5
1	Name (Sl.No.)					
2	No. of sons					
3	No. of daughters					
4	If ever economically active					
5	State of economic independence					
6	Living arrangement					
7	Whether having disability					
8	Chronic ailments					

5. (1) Pension only (2) Pension with other benefits (3) No pension but other benefits (4) Still going for work (5) No benefits
6. (1) Living alone as an inmate of old age home (2) Living alone not as inmate of old age home (3) Living with spouse only (4) Living with spouse and other members (5) Without spouse but with children (6) With spouse but with other relatives (7) Living alone
7. (1) Visual (2) Hearing (3) Speech (4) Locomotor (5) Amnesia/sensibility (6) Others (7) Nil
8. (1) Cough (2) Piles (3) Problems of joints (4) high/low B.P (5) Heart disease (6) urinary problems (7) Diabetics (8) Cancer (9) Others -specify

XVII. RECENT DEATH HISTORY (DEATHS THAT OCCURRED SINCE JUNE 2000)

No.	Particulars	1	2	3	4	5
1	Name of the deceased					
2	Sex					
3	Relationship to the head of the household					
4	Month and year of death					
5	Age at death					
6	Cause of death					
7	Place of death					
8	Medical attention before death					
9	If the deceased a pregnant woman, time of death					

2. (1) Male (2) Female
3. (1) Head (2) Spouse of the head (3) Son/Daughter (4) Son/Daughter in-laws (5) Grand child (6) Father/Mother in law (7) Brother/Sister/in-laws (8) Other relatives
7. (1) Government hospital (2) Private hospital (3) In the course of journey (4) Home (5) Outside Kerala (6) Others - specify
8. (1) Government hospital (2) Private hospital (3) Registered medical practioner (4) Other medical practitioner (5) No medical treatment
9. (1) During pregnancy (2) During delivery (3)During abortion (4) Within 42 days after delivery/abortion

XVIII. AFFORDABILITY, AVAILABILITY AND ACCEPTABILITY TO HEALTH CARE

Affordability

1. If a death occurred in your family, would you find the money needed for the funeral? ☐
   (1) Very easily (2) Easily (3) No opinion (4) With difficulty (5) With great difficulty
2. If a member of your family were to become seriously ill, would you find the money needed for the necessary health care services? ☐
   (1) Very easily (2) Easily (3) No opinion (4) With difficulty (5) With great difficulty
3. If somebody in your family had to be hospitalized for a surgery, would you find the money needed to pay for his/her care? ☐
   (1) Very easily (2) Easily (3) No opinion (4) With difficulty (5) With great difficulty

Availability

1. Any health personnel visited your home in last 12 months? [ ] (1)Yes (2) No
2. If yes, who visited? [ ]

   (1) Government Doctor; (2) Public Helath Nurse; (3) Anganawadi Worker; (4) Village Health Guide (6) Other Public Sector Health Worker (7) NGO (Doctor/Worker) (8) Private Doctor; (9) Private Nurse (10) Traditional Healer (11) Other Private Sector Health Worker; (12) Others- specify
3. Number of times of their visit in last 12 months [ ]
4. During these visits, what were the different matters talked about? [ ]

   (1) Family planning; (2) Breast feeding; (3) Immunization; (4) Nutrition; (5) Disease prevention; (6) Treatment of health problem; (7) Others-specify
5. What type of services did you receive during this visit? [ ]

   (1) Immunization; (2) Family Planning devices (pills/condoms) (3) Family Planning Advice; (4) Others-specify
6. During the visit did the staff spend enough time with you? [ ] (1)Yes (2) No
7. How was the behaviour of the staff? [ ] *(1) Nicely; (2) Somewhat nicely; (3) Not nicely*

Acceptability

1. What type of medicine do you prefer for (a) Children: [ ] (b) Old aged [ ]

   (1) Allopathic (2) Ayurvedic (3) Homoepathic (4) Sidha (5) Unani (6) Others - specify
2. Reasons for the preference for that preference for children: [ ]
3. Reasons for the preference for that preference for old aged: [ ]
4. Who adopted family planning method? [ ] (1) Husband (2) Wife (3) Nil
5. Food you took last day? –Morning [ ] Lunch [ ] Supper [ ]
6. Special food during the illness [ ]
7. Have you used any modern medicines without consulting a health professional? [ ] (1) Yes (2) No
8. Have you used any modern medicines that you or a family member stored in the household in case of need? [ ] (1) Yes (2) No
9. Have you used traditional medicines? [ ] (1) Yes (2) No
10. Whether the household solicited aid by applying or by their own willingness from external agencies? [ ] (1) Yes (2) No
11. If yes, source [ ] *(1) Friends (2) Religious institutions (3) NGOs (4) Political Parties (5) Others- specify*
12. What is the expectation of the ideal health care facility (in order of preference of 1,2,3…)*

    Better treatment [ ] Less fees [ ] Nearness [ ] Hygienic [ ] Behaviour of the providers [ ]
13. Who is taking the decisions regarding health care? [ ]

    (1) Husband (2) Wife (3) Father (4) Mother (5) In-Laws (6) Other relatives (7) Friends (8) Children (9) Others
14. Is there any tendency for female members to consult only to lady doctors? [ ] (1)Yes (2) No
15. If yes, (a) reasons for preference [ ] (b) Type of disease: [ ]

Awareness

1. Whether aware of need for (Use √):

   (a) Immunisation of children? [ ] (b) Idolised salt? [ ]

   (c) Immunisation of pregnant women? [ ] (d) ORS for severe diarrhoea? [ ]
2. What are the reasons for Dengue fever? [ ] (1) Adis Mosquito (2) Mosquito (3) Others (4) Not known
3. List any three reasons for heart attack:

   Cholesterol [ ] *Blood pressure* [ ] *Diabetics* [ ] *Smoking* [ ] *Lack of exercise* [ ] *Obesity* [ ] *Not known* [ ]

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4. Have you heard about AIDS? [ ] (1)Yes (2) No

5. Do you know what are the reasons for AIDS? [ ] (1)Yes (2) No

6. Do you think your food pattern has any role in determining your health? [ ] (1)Yes (2) No

7. Have you made any changes in your food habits in the recent times from this point of view? [ ] (1)Yes (2) No

8. If yes, what are the changes? [ ]

9. Did you involve in the activities of any community organizations? [ ] (1)Yes (2) No

10. Does your family usually use services from local public administrations? [ ] (1)Yes (2) No

11. Have you ever had any bad experience/s due to non- availability of health related facilities? [ ] (1)Yes (2) No

12. If yes, did you bother to complain about this? [ ] (1)Yes (2) No

13. If yes, whom did you complain to? [ ]
(1) Local authorities (2) Higher authorities (3) Local Political leaders (4) Others

14. Have you ever participated in any movement- political or non- political- for availing more health related facilities for your area? [ ] (1)Yes (2) No

15. If yes, (a) when occurred? [ ] (b) How? [ ] (c) Results [ ]

XIX. CULTURAL ASPECTS

1. Do you recognize any changes that has taken place in your customs / rituals / mores/ other cultural spheres as a result of exposure to the modern medical practices? ☐ (1)Yes (2) No

If yes, what changes have occurred?

- ☐ Birth rituals and practices: . . . . . .
- ☐ Child- rearing practices: . . . . . .
- ☐ Attitudes to hospitalization: . . . . . .
- ☐ Preference for traditional medical practices: . . . . . .
- ☐ Marriage rituals (especially the age of both-male and female and system of cross/ parallel cousin marriage): . . . . . .
- ☐ Preference between sons and daughters and preferred/average number of children: . . . . . .
- ☐ Death rituals: . . . . . .
- ☐ Others – specify: . . . . . .

Attitude of the Respondent [ ]

(1) Capable and Cooperative *(2) Capable but non-cooperative*
(3) Non-capable but co-operative *(4) Non-capable and non-cooperative*

REMARKS