PHYSICAL ACCESSIBILITY TO GOVERNMENT HEALTH FACILITIES AND HEALTH OUTCOMES: A STUDY OF SELECTED STATES BASED ON NFHS-2, 1998-99

Dissertation Submitted to the Jawaharlal Nehru University
in Partial Fulfilment of the Requirements
for the Award of the Degree of

MASTER OF PHILOSOPHY

KANWALJEET VIRDI

CENTRE FOR THE STUDY OF REGIONAL DEVELOPMENT
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI
2004

जवाहरलाल नेहरू विश्वविद्यालय
JAWAHARLAL NEHRU UNIVERSITY
Centre for the Study of Regional Development
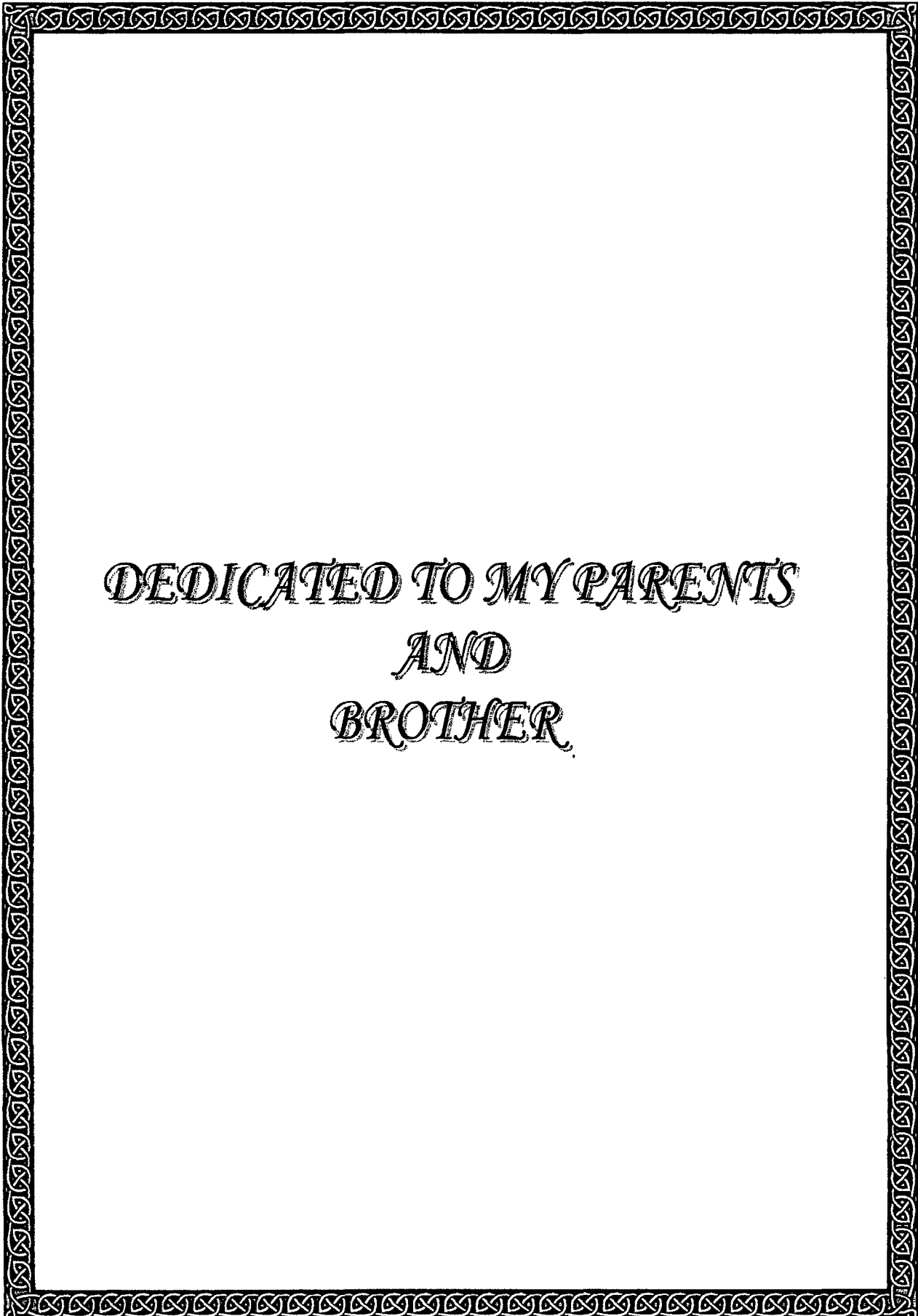School of Social Sciences
New Delhi-110067

CERTIFICATE

I, **Kanwaljeet Virdi**, certify that the dissertation entitled "PHYSICAL ACCESSIBILITY TO GOVERNMENT HEALTH FACILITIES AND HEALTH OUTCOMES: A STUDY OF SELECTED STATES BASED ON NFHS-2, 1998-99" for the degree of MASTER OF PHILOSOPHY is my bonafide work and may be placed before the examiners for evaluation.

(KANWALJEET VIRDI)

Forwarded by

(PROF. ASLAM MAHMOOD)
CHAIRPERSON & SUPERVISOR

DEDICATED TO MY PARENTS

AND

BROTHER

CONTENTS

ACKNOWLEDGEMENT

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION:

The recognition of the role played by health in human well-being has led to it being declared a fundamental human right. This implies that the state has a responsibility for the health of its people. It is an important asset of a healthy community and a healthy community is the foundation of a strong nation. Health is an important determinant of economic and social development because disease creates vicious circle by depleting human energy, leading to low productivity and earning capacity, deteriorating quality and quantity of consumption and standard of living. Hence, health is regarded as a social capital of the nation, and, therefore, a nation ought to give adequate attention to the health care of its people.[1]

Health is one of the basic prerogatives of the welfare state. Health, in its most basic sense means the absence of illness, but it is the function of several factors such as good nutritional intake, clean living environment, maintenance of hygiene and sanitation, education level and the provision of proper health care facilities. Health is thus not only a bio-physical status but also a social status. This is the reason why WHO defines health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'. Twaddle states that '...to the extent that we must talk about normal health within the context of group and cultural definition, rather than perfect health or any other fixed definition, health becomes a social norm.'[2] Whatever the cultural context, health has been universally recognized as a social goal. But while health is regarded as desired universally, it does not necessarily get the same priority in all contexts.

---

[1] Kamble, N.D. (1984): *Rural Health*, Ashish Publishing House, New Delhi.
[2] Twaddle, A.C. (1974): 'The Concept of Health Status', *Social Science and Medicine*, vol. 8(1), pp. 29.

The conditions of health are linked with almost every aspect of life in a society. The fact that improved health has an independent value for individuals reflect the importance of health facilities in a country's level of living. They value their health and allocate a substantial portion of their resources for obtaining health facilities. It is a very important determinant of mortality and fertility, and consequently, affects the growth rate of population. Recognizing the significance of health vis-à-vis the process of socio-economic development, the states in independent India assumed the responsibility of raising the level of nutrition and improvement of health status of people. To attain this objective, health planning has been made an integral part of the overall socio-economic development planning.[3]

The availability of health care services is a major factor in determining not only the level of well being but also the question of one's survival. It is the prerogative of the State to ensure equal access to health facilities for all its citizens, in order to ensure their well being. Hence, provision of health care facilities forms one of the most important health policy concerns of the State. Health centers have therefore been established to meet the basic health needs of communities residing in well-defined geographical areas.[4]

This is all the more a vital issue in developing countries where, in spite of the greater need due to poverty and ignorance, resource constraints are the source of inadequate provision of even basic health facilities to the people. Pressured by concerns of economic growth, funds are constantly diverted from social sectors such as health and education towards other sectors, and this leads to further sector-specific resource crunch. India, among the developing countries, presents a unique case in terms of its population size, characterized by extreme heterogeneity in respect of its physical, economic, social and cultural conditions. India's population according to the 2001 census stands at 1027 million. The public health investment has been one of the

---

[3] C. Montoyo-Aguilar, (1995): Health Planning in India, WHO, Geneva, pp. 1.
[4] Dutt, P.R. (1963): *Rural Health Services in India, Primary Health Center*, Central Health Education Bureau, Ministry of Health and Family Planning, Govt. of India, New Delhi.

lowest in the world, and as a percentage of GDP it has declined from 1.3 percent in 1990 to 0.9 percent in 1999.

Health, therefore, remains a neglected sector, especially in the face of the economic problems faced by the country when budgetary allocations of health and other social sectors are cut in order to divert funds to other sectors, which are given higher priority in economic development.

The birth of the billionth Indian at the start of the new millennium signals a need to critically examine India's population policies and programmes. Although the country has recorded significant declines in fertility and mortality during the post-independence period, the demographic goals of replacement level fertility, low mortality, and low infant and child mortality are far from being realized. The total fertility rate has declined. The crude birth rate has come down to 26.1 and the crude death rate to 8.7 per thousand population and the life expectancy has increased to 70 years. But despite the achievements in the demographic indicators, the health care delivery system in India has come to be criticized for not being sensitive to the minimum health needs of the population. India still cannot boast of a health services system that caters to the underprivileged and deprived sections of the society.

During the past few decades, Indian health and family welfare programme has grown manifold. There has been a considerable increase in the infrastructure in terms of men and material. However, the achievements in reducing infant and maternal mortality and promotion of contraception particularly in rural areas are not impressive and are not in proportion to quantum of inputs pumped into the programme.

Primary health care has been officially recognized as the universal solution for improving world health since the Alma Ata Conference in 1978 (WHO/UNICEF, 1978). However, limited physical access to primary health care continues to be a major impediment to achieving the goal of 'Health for All'. Primary health care, as the source of first resort care, is an important constituent of the health care system. It

3

is regarded as the key to attaining an acceptable level of health for all as means of removing widespread inequities in health services, more particularly in the backward areas be it rural or urban. Its organization and efficient operation are basic for implementing national health development actions.[5]

Inspired by the Alma Ata Declaration in 1978, country after country the world over embraced primary health care as explicit priority and this has resulted in both significant and quantifiable improvements in people's health status. Prior to the Declaration the initiation in this regard had already been taken by India in the form of various committees set up from time to time to review the health status of India and to come up with recommendations for achieving health for all. The first such committee was set up prior to Independence in 1943 and was called the Health Survey and Development Committee, popularly known as the Bhore Committee, after its Chairman. The Committee submitted its report in 1946 and laid emphasis on the necessity to integrate public and curative health services with an outreach to the rural areas through the Primary Health Centers (PHCs) and Sub Centers (SCs). Emphasis was laid on nutrition, health education, maternal and child health, communicable diseases, environmental hygiene and medical research.

The health system in India is in a hierarchical form with the Sub Centers as the peripheral outpost of the existing health delivery system in rural areas. They are being established on the basis of one SC for every 5000 population in general and one for every 3000 population in hilly, tribal and backward areas. Above these are the Primary Health Centres, which acts as the kingpin of the health services in rural India. The concept implies delivery of integrated health services through an appropriate institutional framework to the smallest unit of population possible. It was taken up as an integral part of the Community Development Programme (CDP) launched in October 1952. The PHC was intended to be the nucleus for all health activities in an area, providing integrated preventive and curative health care. Above the PHC are the

---

[5] Basu, S. (1990): 'Health Scenario and Health Problems of Tribal Population in India,' *Seminar on Continuity and Change in Tribal Society*, Indian Institute of Advanced Study, Shimla.

Community Health Centers, Dispensaries and Hospitals each covering a specific number of population. The national norms for each of these health care facilities have been listed in table 1.1 which, keeping in view that most of the tribal population is concentrated in remote areas, are relaxed as under:

Table 1.1 National Norms of Rural Health Infrastructure

CENTER	POPULATION NORMS	
	PLAIN AREA	HILL/TRIBAL AREA
SUB CENTER	5000	3000
PRIMARY HEALTH CENTER	30000	20000
COMMUNITY HEALTH CENTER	120000	80000

Source: Rural Health Statistics, 2002.

One of the pre-requisites for good health is access to health care. Access to medical care is a concern that has generated considerable interest and research in a number of disciplines and professions over the recent decades. Although exact definitions of access to health care vary, access is generally taken to refer to the extent to which an appropriate package of health care services can be obtained by individuals in a given location.[6]

Much previous research on access has focused on one dimension: geographic or physical access, but access is a multi-dimensional construct consisting of five key elements.

- *Geographic or physical accessibility* is the extent to which health care services and supply points are located so that a large proportion of the target population can reach them with an acceptable level of effort.

---

[6] Bertrand, J.P. et al. (1995): 'Access, Quality of Care and Medical Barriers in Family Planning Programs', *International Family Planning Perspectives*, 21(2), pp 64-69.

- *Economic accessibility* is the extent to which the costs of reaching service delivery or supply points and obtaining the services are within the economic means of a large majority of the target population.

- *Administrative accessibility* represents the extent to which unnecessary rules and regulations that inhibit service utilization are eliminated. Examples include restricted clinic hours or limitations on the distribution of services during clinic hours.

- *Cognitive accessibility* denotes the extent to which potential clients are aware of the location of service or supply points and of the services available at these locations.

- *Psychosocial accessibility* represents the extent to which potential clients are unconstrained by psychological, attitudinal or social factors in seeking services.

In short, the concept of access to health care facilities and services provided is a broader term than mere physical accessibility; it includes other elements or dimensions external to the facility itself, but our main focus in this study is on physical accessibility to various health facilities provided in the rural areas. Physical access determines whether the individual makes contact with the facilities that are providing the various services.

Certain programmes and policies have successfully increased the geographic availability of medical care for many communities. Nevertheless, distance to medical care remains highly variable, an inevitable consequence of dispersed populations and medical services. Closer medical care is highly valued by the patients and their families. A hospital or a physician located within one's own community saves travel time and offers a sense of security.

Distance, whether from a town, an educational facility or a health facility seems to play a prominent role in the various decision making processes of the family in the utilization of the best available health care and in improving their health status.

Physical access to health care, health services, and health status have been matters of great concern to consumers, providers and planners for many years. Yet our knowledge of these matters and the factors associated with them is limited. From the health policy point of view, an adequate knowledge of these matters would be of value in any effort to promote physical access to health care, proper health services and health status.

A number of factors determine physical access to health care, including distance from health facility, availability of transportation, and the condition of roads. The distance separating potential patients from the nearest health facility is an important barrier to its use, particularly in rural areas. The greater the distance the less the services are used.[7] Long distances can be actual obstacles to reaching health facilities, and they can be a disincentive even in trying to seek care.[8] In developing countries, the effect of distance in service use becomes stronger when combined with the lack of transportation and with poor roads, which contribute towards indirect costs of visits.

Only a few studies have examined the relationship between distance to medical care and the use of health care services. In general, these studies have examined the effect of distance on patient's utilization of medical facilities. Though physical accessibility has been regarded as being important not much work has been done in this regard especially in the Indian context. It is, however, important to know whether accessibility is the major reason for the under-use of these facilities, so that the construction of basic health units for the rural population can be planned appropriately. This study is thus an attempt to fill this gap and attempts to examine how access variables influence the utilization of family and maternal and child health services.

---

[7] Stock, R., (1983): 'Distance and the Utilization of Health Facilities in Rural Nigeria', *Social Science and Medicine*, vol. 17, pp. 563-70.

[8] Rahaman, M., et. al, (1982): 'A Diarrhoea Clinic in Rural Bangladesh: Influence of Distance, Age, and Sex on Attendance and Diarrhoeal Mortality', *American Journal of Public Health*, vol. 72, pp. 1124-28.

1.2 OBJECTIVES

In this research, the main objective of the study is to see the effect of distance to a health facility on health outcomes. The main objectives are:

- ➤ To examine if distance to a health facility affects the health outcomes. Health outcomes are measured in terms of immunization, treatment for fever, antenatal care and safe delivery.

- ➤ To examine how does distance affect utilization at different levels of socio-economic development

- ➤ To study the impact of distance on health utilization for different types of health facilities, that is, Sub Center, Primary Health Center and Community Health Center.

1.3 HYPOTHESES

- ➤ As the distance to a health facility increases there is a decline in the utilization of the health facility and hence a decline in the health outcomes.

- ➤ At high levels of development distance to a health facility is not a factor in the utilization of services.

- ➤ The area adjoining higher levels of health facility have better health outcomes compared with lower level health facilities.

1.4 STUDY AREA

The selection of the study area is based on the performance of the health system in the different states and for this complete immunization is considered. In this way, two states in each category of high, medium and low level of achievement of complete immunization are selected. These states are Tamil Nadu and Himachal Pradesh in the category of high level of complete immunization, West Bengal and Gujarat as states with medium performance in complete immunization and finally Bihar and Rajasthan as states achieving a low level of complete immunization. Table 1.2 shows the level of complete immunization in the study states and the rest of India and this has also been depicted in map1.

Table 1.2 Level of Complete Immunization in the States of India

Sl. No.	States	Complete Immunization
	INDIA	**42.0**
1	Delhi	69.8
2	Haryana	62.7
3	**Himachal Pradesh**	**83.4**
4	Jammu & Kashmir	56.7
5	Punjab	72.1
6	**Rajasthan**	**17.3**
7	Madhya Pradesh	22.4
8	Uttar Pradesh	21.2
9	**Bihar**	**11.0**
10	Orissa	43.7
11	**West Bengal**	**43.8**
12	Arunachal Pradesh	20.5
13	Assam	17.0
14	Manipur	42.3
15	Meghalaya	14.3
16	Mizoram	59.6
17	Nagaland	14.1
18	Sikkim	47.4
19	Goa	82.6
20	**Gujarat**	**53.0**
21	Maharashtra	78.4
22	Andhra Pradesh	58.7
23	Karnataka	60.0
24	Kerala	79.7
25	**Tamil Nadu**	**88.0**

Source: NFHS 2, 1998-99

INDIA
PERCENTAGE OF CHILDREN AGED 12-23 MONTHS
IMMUNIZED, 1998-99

N
W — E
S
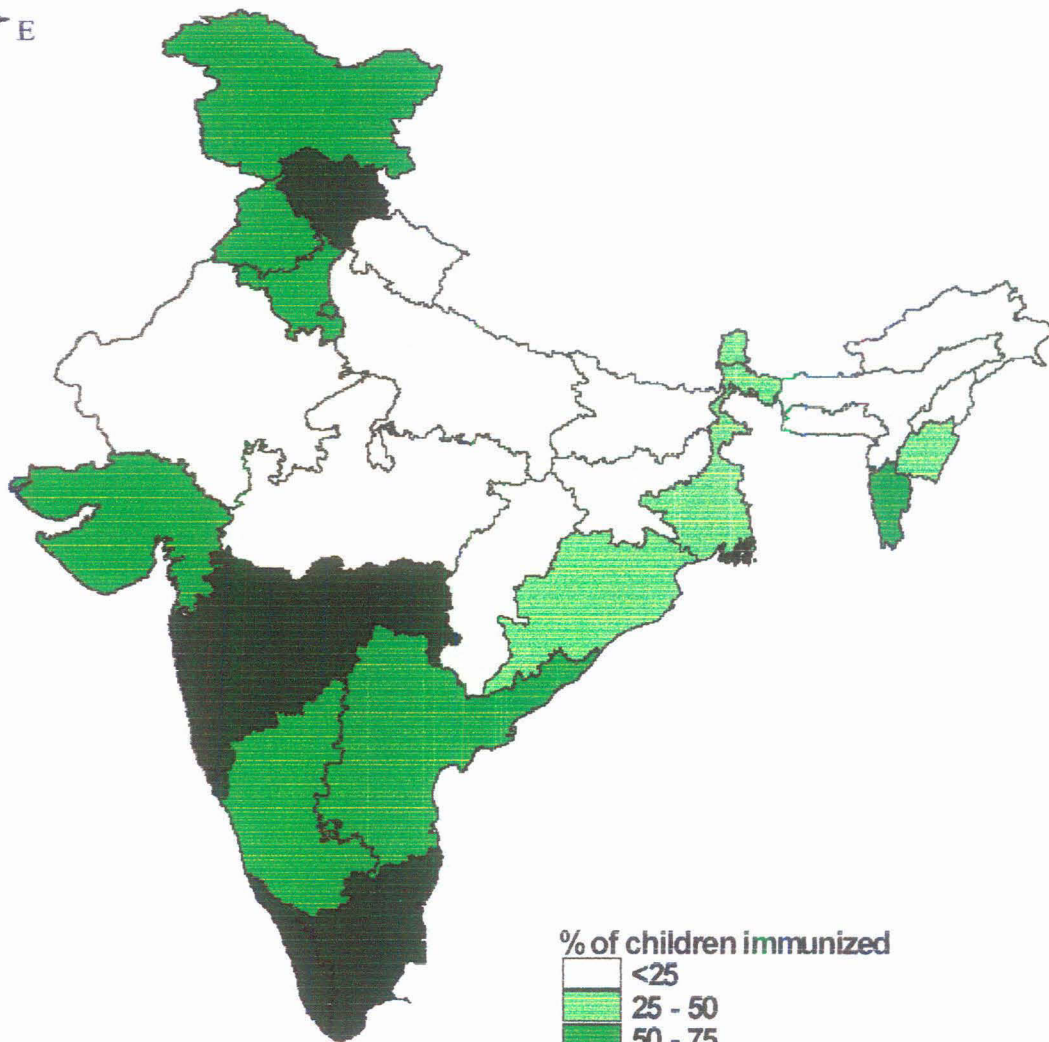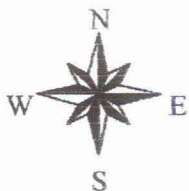
% of children immunized
<25
25 - 50
50 - 75
> 75

INDIA
LOCATION MAP OF STUDY STATES

N

W   E

S

Study States

Selected State
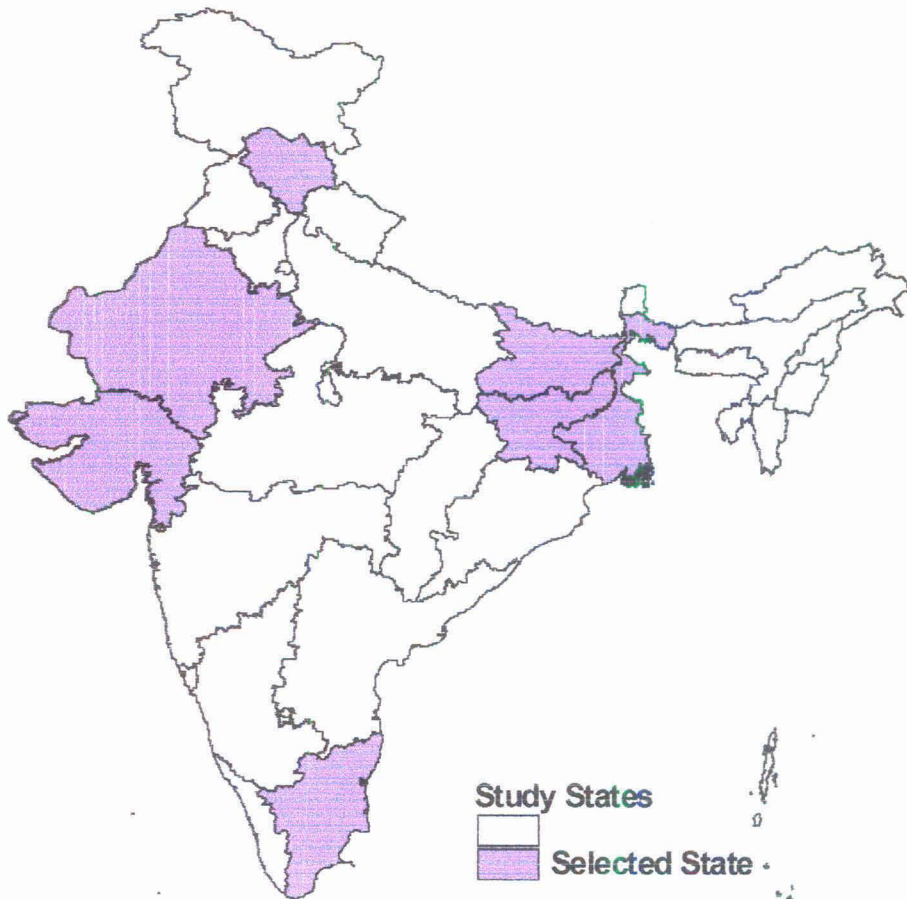
1.4.1 SOCIO-ECONOMIC AND DEMOGRAPHIC CONDITIONS IN THE STUDY STATES

Before analyzing the health care conditions in the different study states it is important to know the socio-economic and demographic conditions prevailing in these states. Table 1.3 gives the detailed information of the background characteristics of the six study states. Bihar, Rajasthan and Gujarat have relatively high birth and death rates. The infant mortality rate (IMR) a sensitive indicator of health status as well as of overall socio-economic development has reduced significantly at the all India level but the states of Bihar, Rajasthan and Gujarat show relatively high infant mortality rates. The fertility rates are also high in these states, Gujarat's somewhat lower fertility rate appears to be an exception in this generalization. Female literacy is very low in Bihar and Rajasthan, showing a lesser attention towards the females compared to the other four states.

Table 1.3 Socio - economic and Demographic Indicators

Indicators	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
Population (mil)	82.9	56.5	50.6	80.2	6.1	62.1
Crude Birth Rate	28.1	29.9	24.3	20.8	19.9	21.4
Total Fertility Rate	3.49	3.78	2.7	2.29	2.14	2.2
Crude Death Rate	11.3	10.2	8.0	8.4	8.3	10.7
Infant Mortality Rate	72.9	80.4	62.6	48.7	34.4	48.2
Under-five Mortality Rate	105.1	114.9	85.1	67.6	42.2	63.3
% Literate females age 7+	33.57	44.34	58.6	60.2	68.08	64.55
% Rural	86.0	76.6	62.6	72.0	90.2	56.0
Population/PHC	45024	25847	31666	45749	18154	24282
Population /SC	7178	4359	4358	7105	2650	4016

Source: NFHS 2, 1998-99.
Census of India, 2001.
Rural Health Statistics, 2002.

The availability of public sector health infrastructure in these states, such as availability of Primary Health Centers and Sub Centers is more or less at par with the national average.

1.5 ORGANIZATION OF THE STUDY

As stated earlier, the focus of the study is on the analysis of how distance from health facilities affects the various health outcomes. The following is the scheme of chapters followed in the study.

The whole study starts with the introduction of the idea behind the work, the objectives, hypotheses, study area and their background characteristics, which are presented in the first chapter.

The second chapter deals with a comprehensive review of literature regarding the research carried out showing the relationship between distance and health. It takes into account the different studies and issues raised by the scholars who have worked in this context. It includes studies on distance to health facilities, utilization of the facilities available and the health outcomes.

In the third chapter, a conceptual framework of the study undertaken has been presented which gives a general picture of the whole study. The selection of variables has been discussed in great detail. The nature and source of the data has also been presented and its handling has also been dealt.

On the basis of the conceptual framework developed, the fourth chapter analyses that how distance from a health center affects the various health outcomes with the help of some statistical techniques as frequencies and cross tabulations. The chapter represents the analyses based on the results of the logit regression which is used to study the relationship between the predictor and the response variables included, controlling for other predictor variables to bring out the individual impact of distance on the utilization of health facilities.

The concluding chapter summarizes the findings of the study and suggests some policy implications to improve physical accessibility to health facilities.

CHAPTER II

A REVIEW OF LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

In the field of research on health care utilization and outcomes, distance from health care facility has emerged as one of the most important factor influencing utilization of the facility, and thus reflecting on the final outcome or performance of the system as a whole. Significant research has been carried out in this regard in the Western countries, and it is an emerging field of research in developing countries as well. This development has been, however, comparatively recent. Presented in this chapter is a comprehensive review of literature relating to aspects of evaluating health outcomes and utilization of health services, specifically studies on distance as a determinant of access to health care services in this broader context. The studies in this review have been grouped into sections on the basis of the regions of origin of the studies, within which the reviews have been arranged by broad sub themes in chronological order.

2.1 CONCEPTUAL AND THEORETICAL STUDIES

Distance as a determinant of access and utilization of health care facilities was first studied in the USA, especially as an important tool in spatial planning of hospitals and other health centers. The concept of physical access has been comprehensively outlined by Chen[1] who stresses on the significance of studies of physical access to health care, health service use and health status from the health policy and planning point of view. Physical access is one of the two components of access, the other being financial access. Chen's variable for physical access, though, is the time taken to reach a health facility, and not the absolute distance in terms of km/miles travelled by the user.

---

[1] Chen, M.K. (1982): 'Health Care Services and Health Status in a Rural Setting: The Utility of Some Predictors', *Inquiry*, vol. 19, pp 257-261.

In a comprehensive review article, Shannon et al.[2] have traced the development of interest in the concept of distance as a major factor affecting health care utilization in the late 1920s. The existence of a problem is demonstrated by the aerial approach that for a set of areas the distribution of health facilities is unequal with respect to population. They discuss the general use of distance as an important concept in the field of economics, sociology and geography, Von Thunen's Industrial Location Theory, Distance Decay Effect, Central Place Theory and the Gravity model. In the field of medical care research distance was first noticed as affecting utilization of physician services in 1927[3]. Since then several studies followed, especially on cross-country distances and physician visits. Studies shifted from mere presentation of frequency distributions of spatial patterns to functional relations such as delineation of 'medical service areas' through quantitative indices, mathematical expression of distance through hyperbolic functions, which vary with purpose of visits, types of providers and distribution of different types of providers in relation to each other. A further development was the use of rational models in the form of economic demand function, which added a consideration of socioeconomic characteristics in the analysis. Distance was clubbed with transport cost as well. All studies discussed, however, related only to America and European nations.

In a comment on access, quality of care and medical barriers in family planning programs, Bertrand et al.[4] point out that in the 1970s and 1980s the thrust in research was on access to family planning services as that would lead to increased utilization of services. But in later years the importance of quality of care was also realized. As per the authors access plays a key role in determining whether an interested individual makes contact with the family planning service[5]. Five types of accessibility were identified – geographical, economic, administrative, cognitive and

---

[2] Shannon, G.W. & R.L. Bashshur (1969): 'The Concept of Distance as a Factor in Accessibility and Utilization of Health Care', *Medical Care Review*, vol. 26, pp. 143-161.
[3] Ibid.
[4] Bertrand, J.P. et al. (1995): 'Access, Quality of Care and Medical Barriers in Family Planning Programs', *International Family Planning Perspectives*, 21(2), pp. 64-69.
[5] Ibid.

psychosocial accessibility. Quality of care and medical barriers can affect access, and improving quality can help improve access as well.

Aday and Andersen[6] developed a framework for the study of access to medical care in the US. Accessibility was categorized into two types – socioeconomic and geographical, also called the 'friction of space', which is a function of time and distance required to be covered to reach the treatment source. The article provides a very useful outline of the characteristics of health care delivery system, population at risk and the utilization of health care services.

Fiedler[7] presents a review of literature on access to rural primary care in the US. Initial studies on rural health care reported access as a problem of doctor shortage, and later to problems in the quality of care provided. Distance was one of the major explanatory variables of entry into the health care system and differentials in utilization. Increasing distance was also related to rising information costs, which would reduce access by limiting the patient's awareness of the availability of health care services. Availability of transportation and travel time are other important components of distance.

2.2 STUDIES IN DEVELOPED COUNTRIES

Studies specific to the role of distance in access to health care are more numerous for Western countries as compared to other nations. Distance was explored as a factor affecting access to health service by Weiss and Greenlick[8]. They examined the effect of social class and distribution on contacts with medical care system in Portland. This was based on the assumption that different social classes would show

[6] Aday, Lu Ann & R. Andersen, (1974): 'A Framework of the Study of Access to Medical Care', *Health Services Research*, Fall, pp. 208-220.
[7] Fiedler, J.L. (1981): 'A Review of the Literature on Access and Utilization of Medical Care with Special Emphasis on Rural Primary Care', *Social Science and Medicine*, vol. 15C, pp. 129-142.
[8] Weiss, J.E. & M.R. Greenlick, (1970): 'Determinants of Medical Care Utilization: The Effect of Social Class and Distance on Contacts with the Medical Care System', *Medical Care*, VIII (6), pp. 456-462.

different reactions to distance from a source, based on their perception of a distance barrier. The study found greater utilization by the middle classes as compared to working classes as distance from the facility increased. The working classes perceived the distance barrier to a greater extent than the middle classes.

Under the influence of the quantitative and model-building approach prevailing in spatial analysis at that period, studies also focused on the role of distance decay effect, and made an effort towards building spatial interaction models between patients and providers, and service areas of facilities. Girt[9], using data from rural Newfoundland, developed a model of spatial interaction between a patient and his/her General Medical Practitioner (GMP) in a rural environment. Distance is the major operating variable in the model as it structures perceptions of the health care process and ergo consulting behavior. The model is based on the hypotheses that dependence on physician and readiness to consult increases with distance, while there is discouragement to consult because of problems of travel with increasing distance. Thirdly, the probability of individual's consulting for given illnesses would vary with distance. Upon testing the hypotheses on the actual health seeking behavior of the sample population it was found that the readiness to consult a physician is greater in settlements closer to the health center. The individual's dependence on physician increased with the distance they lived from him. The probability of consulting at least once for a disease increased with distance while the probability of a second visit declined. The hypotheses were thus, positively tested in the survey and confirmed the model built by the author.

Bosanac, Parkinson and Hall[10] stressed on the use of travel time information as a measure of geographical accessibility, along with information on socioeconomic and demographic characteristics of population. A travel time standard of maximum of 30 min to reach health center was then used to measure the accessibility of all the

[9] Girt, J.L. (1973): 'Distance to General Medical Practice and its Effect on Revealed Ill-Health in a Rural Environment', *Canadian Geographer*, vol. 17, pp. 154-166.
[10] Bosanac, E.M., R.C. Parkinson & D.S. Hall, (1976): 'Geographic Access to Hospital Care: A 30-Minute Travel Time Standard', *Medical Care*, XIV (7), pp. 616-624.

people of West Virginia to a health center using computed database. This 30 min travel time standard has been adopted by several US states for health planning purposes. The results of the study showed 90% of the persons having access to a health center within 30 min travel time.

In a study of the utilization of the emergency services in a hospital in Toronto[11], the authors focused on how distance from the facility affected the decision to visit the facility. The results of this study also confirmed the geographical theory of distance decay since visits declined with distance from the hospital.

Knox[12] analyzed the accessibility of primary care to urban patients in the city of Aberdeen in Scotland. He found the General Practitioners (GPs) and surgery practices clustered in the traditional middle class neighbourhoods of the city, and extending towards the more prosperous suburban localities. The poorer neighbourhoods, though accounting for maximum morbidity, did not have GPs. This highlights the disparity in service provision in urban areas in UK.

Joseph and Bantock[13] stress on the importance of physical accessibility citing the persistence of distance decay effects in utilization patterns of most health services. In rural health care delivery in Canada, the low density and high dispersion of population makes physical accessibility all the more important, especially since quality of services is comparable. There is need to measure potential physical accessibility in order to identify the more disadvantaged regions and take necessary action to correct it. Potential accessibility refers to location of population relative to that of physicians. This is similar to measuring catchment area of the physician/service.

---

[11] Ingram, D.R., D.R. Clarke & R.A. Murdie, (1978): 'Distance and the Decision to Visit an Emergency Department', *Social Science and Medicine*, vol.12, pp. 55-62.
[12] Knox, P.L., (1979): 'The Accessibility of Primary Care to Urban Patients: A Geographical Analysis', *Journal of the Royal College of General Practitioners*, vol. 29, pp. 160-168.
[13] Joseph, A.E. & P.R. Bantock, (1982): 'Measuring Potential Physical Accessibility to General Practitioners in Rural Areas: A Method and Case Study', *Social Science and Medicine*, vol. 16, pp. 85-90.

A more specific analysis was of distance behaviour of hospital patients by Mayer[14], locating such studies in the analytical context of spatial interaction theory. Sensitivity of patients to distance was found to vary with the nature of illness they suffered from and the type of treatment required. Patients with more common conditions showed greater distance sensitivity than patients with more complicated problems requiring specialized treatment facility. In terms of hospital services, highly centralized services such as cardiac bypass surgery exhibit lower distance sensitivity while localized services exhibit greater distance sensitivity.

In a methodological paper, Thouez, Bodson and Joseph[15] present two methods for measuring geographic accessibility of medical services in rural areas. The first model measures potential spatial accessibility and is based on the gravity model and postulates that potential access is a positive function of number of physicians within travel range of a community and a negative function of distances from those same physicians. The second measure is of potential spatial effectiveness to assess quantitatively the effectiveness of the overall pattern of health centers in a region. It takes into account the supply side and demand side of health services in a region in an exponential equation. The models were then used on empirical data from Quebec province to illustrate their applicability.

Yet another study based in rural Alabama[16] explored the factors influencing the distance travelled by women to obtain obstetrics care for two time periods – 1983 and 1988. The interesting finding was that most decisions to travel farther were voluntary, since they bypassed a closer facility providing similar care. Better quality of care was the consideration in these cases as larger hospitals with more specialized care attracted more patients. Another interesting finding was that with increase in income in rural areas, distance travelled also increased considerably, in spite of

---

[14] Mayer, J.D. (1983): 'The Distance Behavior of Hospital Patients: A Disaggregated Analysis', *Social Science and Medicine*, vol. 17 (12), pp. 819-827.

[15] Thouez, J.M., P. Bodson & A.E. Joseph, (1988): 'Some Methods for Measuring the Geographic Accessibility of Medical Services in Rural Regions', *Medical Care*, 26 (1), pp. 34-44.
[16] Bronstein, J.M. & M.A. Morrisey, (1990): 'Determinants of Rural Travel Distance for Obstetrics Care', *Medical Care*, 28(9), pp. 853-865.

availability of rural hospitals providing similar facilities located nearer to home. This shows that rural hospitals were perceived inferior in economic sense as compared to urban hospitals, which were the preferred sources.

Goodman et al.[17] raise questions about whether distance from residence to hospital influenced the likelihood of hospitalization. Three places – Maine, New Hampshire and Vermont – were studied for hospitalizations and mortality. Hospitalization rates of residents staying closer to hospitals were higher than those staying further away, showing a greater tendency to use hospitalization due to closer proximity to source.

Distance as a barrier to provision of care to elderly relatives is another aspect of distance influencing health, as analyzed by Joseph and Hallman[18]. Data on 1149 respondents with eldercare responsibilities revealed significant distance decay effect in the average weekly number of hours devoted to eldercare. This is, however, the pattern among male caregivers only. Women caregivers are willing to travel farther and more often than men caregivers. Thus the contrast between gender geographies is clear – women make a longer 'journey to care' while men make a longer 'journey to work'.

A study by Mooney et al.[19] on utilization of Veteran's Association (VA) hospitals by Veterans shows that utilization of VA hospitals declines with increasing distance only up to 15 miles, after which it is insensitive to further increase in distance. Older veterans are less sensitive to distance than younger ones, probably because of the better services offered which are more specific to their needs as compared to other sources.

---

[17] Goodman, D.C. et al., (1997): 'The Distance to Community Medical Care and the Likelihood of Hospitalization: Is Closer always Better?', *American Journal of Public Health*, 87 (7), pp. 1144-1150.
[18] Joseph, A.E. & B.C. Hallman, (1998): 'Over the Hill and Far Away: Distance as a Barrier to the Provision to Elderly Relatives', *Social Science and Medicine*, vol. 46 (6), pp. 631-639.
[19] Mooney, C. et al., (2000):'Is Travel Distance a Barrier to Veterans' Use of VA Hospitals for Medical Surgical Care?', *Social Science and Medicine*, vol.50 pp. 1743-1755.

Nemet and Bailey[20] discuss distance and utilization among rural elderly in rural Vermont. The authors develop a theoretical and empirical strategy to link utilization to 'experience of place'. Orleans County in Vermont is a high-poverty-low-medical-services region of the US. A mail survey of 390 persons above 65 years of age belonging to low and middle-income groups was conducted. The results revealed that people who had to cover longer distances to reach their physicians travelled less frequently than those who had to cover shorter distances. Other components strongly affecting utilization were attitudinal propensity to seek care, regular source of care and presence of chronic illness.

2.3 STUDIES IN DEVELOPING COUNTRIES OTHER THAN INDIA

Several studies emerged on utilization of health services in developing countries in the late 1980s. They were based on similar pattern as the studies in Western countries, though the subject of focus was shifted towards aspects such as primary care, antenatal care, role of community health workers, contraceptive use and immunization. These were the more important areas of concern in these countries.

In a study of patterns and determinants of prenatal care in Philippines[21] travel time to facility was taken as a measure of physical accessibility. Utilization of various kinds of health providers was studied for both rural and urban areas. It was found that for rural mothers, increase in travel time to a facility reduced its likelihood of being visited more frequently. In urban areas, on the other hand, effect of travel time was minimal. On the whole the important factors affecting utilization by type of source for prenatal care were the availability of prenatal care insurance (which increased the utilization of private services) and education of women, distance being a significant factor in rural areas only.

[20] Nemet, G.F. & A.J. Bailey, (2000): 'Distance and Health Care Utilization among the Rural Elderly', *Social Science and Medicine*, vol.50, pp. 1197-1208.
[21] Wong, E.L. et al., (1987): 'Accessibility, Quality of Care and Prenatal Care Use in the Philippines', *Social Science and Medicine*, vol. 24 (11), pp. 927-944.
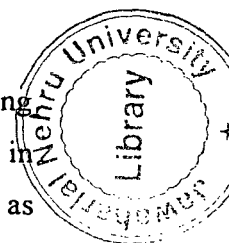
One study by Amin et al.[22] was on rural Bangladesh, investigating the utilization of community health care services. The study was based on data from two household surveys conducted in 1976 and 1987. Distance from health center was taken as one of the variables affecting utilization. Proximity to main governmental health centers promoted use of formal modern health services to a larger extent in 1987 than in 1976.

Another study in the African nation of Burkina Faso by Sauerborn et al.[23] analyzed the utilization of Community Health Workers (CHWs) through a household survey. Availability, distance and cost of travel and drugs were important service related determinants. The presence of professional health infrastructure in a village increased its utilization greatly at the cost of family and healer. The utilization of CHWs was, however, uniformly low, but this was related to other factors such as lack of community participation, narrow selection of tasks, short training, low motivation and gender of CHW and lastly ethnic, economic and educational factors.

A second study using the same data by Nougtara et al.[24] speaks about the utilization of MCH services in the surveyed population. The result showed that access to PHCs did not imply utilization since creation of a network of CHWs had not significantly improved utilization of MCH care by target groups. However, availability of health center within the village significantly affected utilization of MCH services.

In a Vietnam based study Swenson et al.[25] used data from surveys on health and contraceptive use to analyze the influence of selected individual and community

---

[22] Amin, R. et al., (1989): 'Community Health Services and Health Care Utilization in Rural Bangladesh', Social Science and Medicine, vol. 29 (12), pp. 1343-1349.
[23] Sauerborn, R. et al., (1989): 'Low Utilization of Community Health Workers: Results from a Household Interview Survey in Burkina Faso', Social Science and Medicine, 29 (10), pp. 1163-1174.
[24] Nougtara, A. et al., (1989): 'Assessment of MCH Services Offered by Professional and Community Health Workers in the District of Solenzo, Burkina Faso. I. Utilization of MCH Services', Journal of Tropical Pediatrics, vol.35, pp. 2-9.
[25] Swenson, I.E. et al., (1993): 'Factors Related to the Utilization of Prenatal Care in Vietnam', Journal of Tropical Medicine and Hygiene, vol. 96, pp. 76-85.

characteristics on the utilization of prenatal care in Vietnam, with a specific analysis of the impact of availability of health services and other development characteristics of the city on utilization of prenatal care conducted on a rural sub sample. Distance to source was one of the variables considered apart from others such as education of women, birth order, use of contraceptives, community, and region etc. The strong influence of public transport, in spite of the insignificant relation between distance to source among rural women suggested that connectivity increased utilization regardless of distance. If women have means to get to the service they will do so. Thus availability as well as accessibility are important determinants of utilization.

Fosu[26] carried out an inter-country analysis of user-related factors that influence utilization of medical facilities for treating child morbidity in sub-Saharan Africa. It was found that a high proportion (40-60%) of children in sub Saharan African countries were not taken to medical facilities when ill, in spite of being less than 5 km from source. This indicates that other factors also play a major role in influencing health care. These factors as identified in the study were age at delivery, mother's education, religion, age of child, knowledge of modern methods of contraception and residence.

Shreshtha and Ittiravivongs[27] investigated utilization of health centers in rural areas of Thailand through a sample survey of 206 households. The sample was divided into two groups – high and low utilization groups. No significant relationship between distance and utilization could be obtained, since most (80%) households were situated within 3 km of the health centers.

[26] Fosu, G.B. (1994): 'Childhood Morbidity and Health Services Utilization: Cross-National Comparisons of User Related Factors from DHS Data', *Social Science and Medicine*, 38 (9), pp. 1209-1220.
[27] Shreshtha, D.R. & A. Ittiravivongs, (1994): 'Factors Affecting Utilization of Health Centers in a Rural Area of Chon Buri Province, Thailand', *South East Asian Journal of tropical Medicine and Public Health*, 25 (2), pp. 361-367.

In an exercise on measurement of cost effectiveness of health services using sample data from Burkina Faso and Niger, Barlow and Dioup[28] have used distance as an important input variable. Cost effectiveness analysis is one of the most popular methods of analysis in health economics and is a vital tool for evaluating efficiency of health care systems which have to provide the most optimum level of services within the given budget constraints. Distance, as measured by time taken to reach a facility has been used as a variable representing price of health care, along with user charge and child care costs. These price variables are expected to affect health-seeking behaviour of the women in the study area. Results of the multivariate analysis confirmed that longer travel time leads to less care, since there is greater reluctance on the part of women seeking prenatal care to travel longer distances.

In a study on rural Guatemala, Annis[29] reported on the physical access and utilization of health services. Most health posts were located in regional or local markets regularly visited by the rural population to meet their needs and sell their products. Data on 1800 actual patients collected from 50 health posts showed that 80 percent of the users lived within 9km of the posts. Two thirds of the visitors travelled 15 min or less to reach the posts. Utilization declined steeply with distance. The problem of underutilization of health posts was the result of understaffing and poor quality of services rather than distance as a hindrance.

A study on utilization of a diarrhoea clinic in rural Bangladesh[30] by age, sex and distance revealed that 90 percent of the cases came from within 1 mile of the clinic. Utilization again declined steeply with distance, more sharply for females than for males. The reasons for this were social, as women were not allowed to travel too long distances even if for treatment, and more preference was given to treatment of males than females.

[28] Barlow, R. & S. Diop, (1995): 'Increasing the Utilization of Cost Effective Health Services through Changes in Demand', *Health Policy and Planning*, 10 (3), pp. 284-295.
[29] Annis, S. (1981): 'Physical Access and Utilization of Health Services in Rural Guatemala', *Social Science and Medicine*, vol. 15D, pp. 515-523.
[30] Mujibur Rahaman, M. et al., (1982): 'A Diarrhea Clinic in Rural Bangladesh: Influence of Distance, Age and Sex on Attendance and Diarrheal Mortality', *American Journal of Public Health*, 72 (10), pp. 1124-1128.

Another study based in Nigeria by Ayeni, Rushton and McNulty[31] reports that disparities in rural areas are the result of inadequate and geographically imbalanced coverage by health centers. The focus of the study is on optimal location of existing facilities to improve coverage. The location of all settlements was geocoded and distance from any settlement to any service site was computed for two time periods – 1979 and 1982. Results showed that in spite of increase in the number of facilities, locational efficiency remained low. Computation of alternative locations showed that utilization efficiency of the same centers, if located differently, could have improved by 12-16 percent.

In a study based in rural Nigeria, Stock[32] uses the distance decay model to examine the role of distance in influencing utilization of health care facilities in Hadejia area. The simple negative exponential model was used to analyze the distance-utilization relationships. Utilization declined exponentially with distance from health center. Factors affecting the rate of decline included level of service, gender (spatial mobility of females is much less than that of males), age (traveling for children is dependant on care givers, and for aged it is a significant barrier), season and nature of illness.

In a study of Kasongo, Zaire[33], the influence of the coverage of a health center network on rates of hospitalization have been analyzed by measuring hospitalization rates in two areas – one covered by health centers and the other not covered by health centers. Among the covered population, those within range of the center (within 40-50 km) showed much lower hospitalization rates than in non-covered areas. This was

[31] Ayeni, B., G. Rushton & M.L. McNulty, (1987): 'Improving the Geographical Accessibility of Health Care in Rural Areas: A Nigerian Case Study', *Social Science and Medicine*, vol. 25 (10), pp. 1083-1094.

[32] Stock, R. (1983): 'Distance and the Utilization of Health Facilities in Rural Nigeria', *Social Science and Medicine*, vol. 17 (9), pp. 563-570.

[33] Lerberghe, W.V. & K. Pangu, (1988): 'Comprehensive can be Effective: The Influence of Coverage with a Health Center Network on the Hospitalization Patterns in the Rural Area of Kasongo, Zaire', *Social Science and Medicine*, vol. 26 (9), pp. 949-955.

because of the treatment received at the health centers, which prevented hospitalizations. Hospitalization rates for the diseases selectively targeted by the health centers were reduced by 86 percent in covered areas, which is 29 percent of coverage related reduction.

Working on urban areas of developing societies, Fosu[34] reported on a survey of 1500 households in Accra, Ghana. The study pertained to utilization of health centers. Knowledge about location of health centers and perceived accessibility were significant inputs. Use of clinic facilities was most prevalent among the 3 services covered, the other 2 being drug vendors and traditional healers. The need variables were not important determinants of individual use of health services. The poorer the health status, greater the use of the facility. Persons who had visited the facility once previously were the most likely to visit it again.

Another study on Ghana was carried out by Oppong and Hodgson[35] in the Suhum district to measure spatial accessibility to health care facilities. Using location-allocation models the authors showrd that substantial improvements in accessibility can be achieved with better locational network than the existing one, without having to add to the number of centers. Location-allocation models emerge in this sense as valuable tools in spatial planning of services.

A research report by Noorali, Luby and Rahbar[36] reported on the effect of distance on utilization of health services based on a survey of utilization of 14 government health centers in Thatta district of Pakistan. Only children below 5 years of age suffering from common acute ailments of fever, diarrhoea and upper respiratory infections were surveyed. It was found that those living less than 4 km from the facility were no more likely to use the facility than those living more than 4

[34] Fosu, G.B. (1989): 'Access to Health Care in Urban Areas of Developing Societies', *Journal of health and Social Behavior*, vol.30 (December), pp. 398-411.
[35] Oppong, J.R. & M.J. Hodgson, (1994): 'Spatial Accessibility to Health Care Facilities in Suhum District, Ghana', *Professional* Geographer, 46 (2), pp. 199-209.
[36] Noorali, R., S. Luby & M.H. Rahbar, (1999): 'Does Use of a Government Service Depend on Distance from the Health Facility?', *Health Policy and Planning*, 14 (2), pp. 191-197.

km away. This shows that distance was not significantly influencing utilization. Proximity to private facility influenced the use of government facility, as in such cases people were 40 percent less likely to visit the government facility, also the cost of treatment was another major reason. Only those who could not afford private treatment visited the government facility.

Perry and Gesler[37] carried out a study on physical access to primary health care in Andean Bolivia using GIS technology in the rugged mountainous terrain to actually map the location of the health centers. The mapping was done along with location of settlements of varying population size, main paths, 5 km buffer zones of health centers and zones of 1-hour walking distance from the centers. It showed that the area with relatively flat topography and presence of NGO had greatest access to primary health care. In other more rugged areas not only geographical accessibility but also understaffing and poor supervision inhibits access to health centers. Based on the available information the authors then suggest an alternative model of location of health centers to maximize availability and utilization.

Acharya and Cleland[38] raise questions about whether access or quality is the more important aspect influencing utilization of MCH services in rural Nepal. Access was measured in terms of travel time to the nearest health post and coverage by outreach workers. Quality of services, measured by the overall Quality Index showed very strong relationship with utilization. In comparison the effects of travel time were found to be modest. The authors concluded that qualitative improvement of the existing health centers was more important than increasing their numbers in order to improve coverage and utilization.

[37] Perry, B. & W. Gesler, (2000): 'Physical Access to Primary Health Care in Andean Bolivia', *Social Science and Medicine*, vol.50 pp. 1177-1188.
[38] Acharya, L.B. & J. Cleland, (2000): 'Maternal and Child Health Services in Rural Nepal: Does Access or Quality Matter?', *Health Policy and Planning*, 15(2), pp. 223-229.

Paul and Rumsey[39] carried out a study on utilization of health facilities and Trained Birth Attendants for childbirth in rural Bangladesh through a sample survey of 39 villages. While factors such as economic status, occupation, paternal and maternal education, maternal age, birth order and delivery complications emerged as significantly affecting utilization of health facility and Trained Birth Attendants, distance did not show a statistically significant relationship with the same.

Accessibility was related to contraceptive use in a study based in Vietnam by Thang and Anh[40]. The study showed that 84 percent women in the country lived within 1 km of at least one source of family welfare services as per 1997. Data from Vietnam National Demographic and Health Survey, 1997, showed that accessibility to health services had a major influence on visits to such services. Access to any source of family planning also reduced use of traditional sources in favor of modern sources. Accessibility to source as well as to information about family planning methods was vital in increasing its usage among women.

Seiber and Bertrand[41] studied the differential use of contraception between two ethnic groups – the Mayans and Ladinos in Guatemala. The focus was on differences in the supply side factors to explore the far lower demand for family planning among the Mayans. The two groups did not differ significantly in terms of mean distance to closest facility offering such services. Physical access did not emerge as a significant variable affecting utilization of source. In this situation socio-cultural factors such as linguistic differences were found to be the important variables affecting utilization.

---

[39] Paul, B.K. & D.J. Rumsey, (2002): 'Utilization of health Facilities and trained Birth Attendants for Childbirth in Rural Bangladesh: An Empirical Study', *Social Science and Medicine*, vol.54, pp. 1755-1765.
[40] Thang, N.M. & D.N. Anh, (2002): 'Accessibility and Use of Contraceptives in Vietnam', *International Family Planning Perspectives*, 28(4), pp. 214-219.
[41] Seiber, J. & J.T. Bertrand, (2002): 'Access as a Factor in Differential Contraceptive Use between Mayans and Ladinos in Guatemala', *Health Policy and Planning*, 17(2), pp. 167-177.

2.4 STUDIES IN INDIA

Distance emerged as an important factor affecting utilization in several studies on evaluation of health centers. But it remained a constituent, and not the focus of the studies. They were more comprehensive in nature, covering several aspects of utilization and accessibility to health care. Rao et al.[42] in one such early study evaluating six selected Primary Health Centers (PHCs) in Tamil Nadu used a combination of interviews, sample surveys, collection of statistical information and observational surveys in their analysis. Apart from variations in effort in the Sub Center (SC) areas, distance from health center was also analyzed as influencing utilization of health services. In case of both SCs and PHCs utilization was found to increase substantially with declining distance from source.

Rao and Richard[43], in an analysis of socioeconomic and demographic correlates of medical care and health practices in a rural sample from North Arcot district in Tamil Nadu, state that distance from a town plays a prominent role in utilization of health services in rural areas. Decision to seek treatment was postponed much more among those living close to town, declining with increasing distance. This happened because such people were assured of reaching the health center in case the disease turned serious. Those living further away, on the other hand, were more insecure about their illness, hence sought treatment sooner than others.

Khan et al.[44] carried out a detailed study of a PHC in a tribal area of Bihar to investigate the reasons for underutilization of health services. The daily turnout of patients in this PHC was quite low at 25-27 patients a day. About half of the total patients that visited the HPC during the eight days of the observation came from a distance of up to 1km. The proportion of patients declined with increasing distance from the PHC. The main catchment area of the PHC was, in fact, within 3 km as it

[42] Rao, P.S.S. et al., (1972): 'Methods of Evaluating Health Centers', *British Journal of Preventive and Social Medicine*, vol. 26, pp. 46-52.

[43] Rao, P.S.S. & J. Richard, (1984): 'Socioeconomic and Demographic Correlates of Medical Care and Health Practices', *Journal of Biosocial Science*, vol. 16, pp 343-355.

[44] Khan, M.E. et al., (1987): 'Reasons for Underutilization of Health Services – A Case Study of a PHC in a Tribal Area of Bihar', *Demography India*, XVI(2), pp. 177-195.

accounted for 75 percent of the patients. Other factors which influenced utilization were economic status of patients, caste/tribal status and poor quality of services offered including absence of doctors, irregular supply of medicines poor extension work.

In a comparative study of Bihar and Kerala[45] regarding the functioning of the health and family welfare program, the authors attempted to account for the differential performance of the program in the two states. Data from a survey by ICMR in 1982-83 has been used for the analysis. Distance of the source from residence was one of the input variables. About 48 percent of respondents in Kerala depended entirely on government sources as compared to 30 percent in Bihar. The major reason for non-utilization of PHCs in both states was inaccessibility due to distance, more so in Kerala. The other prominent reasons were lack of medicines and lack of transportation, non-availability and corruption of staff.

In another such study based on ICMR survey data on UP[46], the authors analyzed the role of familial values in influencing the use of contraception and utilization of MCH services in rural UP. 23.5 percent of respondents gave 'PHC is far off' as one of the reasons for non-utilization. The most important reasons, though, were non-availability of drugs, lack of proper facilities and availability of private doctors at lower cost as compared to PHC doctors who charged a fee for their consultation.

Gupta[47] also cites inaccessibility as one of the main reasons for low utilization of health centers in his appraisal of the health and family welfare program in

[45] Khan, M.E. & C.V.S. Prasad, (1988): 'Functioning of Health and Family Welfare Program – A Comparative Study of Bihar and Kerala' in M.E. Khan et al (eds.), *Performance of Health and Family Welfare Program in India*, Himalaya Publishing House, Bombay, Nagpur, Delhi, pp. 1-38.
[46] Khan, M.E. & R.B. Gupta, (1988): 'Familial Values, Contraception and Utilization of MCH services in Rural UP' in M.E. Khan et al., (eds.), *Performance of Health and Family Welfare Program in India*, Himalaya Publishing House, Bombay, Nagpur, Delhi, pp. 94-121.
[47] Gupta, R.N. (1988): 'Health and Family Welfare Program in Rajasthan: An Appraisal', in M.E. Khan et al (eds.), *Performance of Health and Family Welfare Program in India*, Himalaya Publishing House, Bombay, Nagpur, Delhi, pp. 188-209.

Rajasthan. The distance of the PHCs is far not only from the villages but also from the SCs. Accessibility is poor and costly also in terms of transportation cost or lack of transportation facilities altogether. All other reasons for low utilization are similar to those mentioned in earlier studies as well.

The impact of availability of health center on utilization was the focus of a study of 600 married women in a rural area of Haryana[48]. The study related to the utilization of maternity care and pregnancy outcomes. Out of the four villages selected, one had a PHC, one had a SC and the other two, though not having any health center, were located within 5 km of the health center. All villages thus had a similar status of access to health centers. There was a high utilization of modern maternity care methods in the PHC village, though knowledge regarding antenatal care was uniformly poor in all the selected villages. Respondents in the PHC and SC villages showed a greater preference for Modern Birth Attendant rather than Traditional Birth Attendant. On the whole awareness and availability of modern maternity services had a positive influence on health seeking behavior of pregnant women and the pregnancy outcomes.

Das, Mishra and Saha[49] have studied the effect of community access on the use of health and family welfare services in rural India based on NFHS data. The community access variables included in the study were distance to health facilities, family welfare/health worker visit, and availability of all-weather road and presence of media /educational activity. Four northern states-Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan – were included in the study. The results showed that distance from nearest health facility and availability of all-weather road has a greater effect on contraceptive knowledge than use. The latter is more influenced by health workers' visits to the village. Distance also did not have a significant effect on vaccination of children or treatment of chronic illness. On the whole community

[48] Kumar, R. et al., (1997): 'Impact of Health Center Availability on Utilization of Maternity Care and Pregnancy Outcome in a Rural Area of Haryana', *Journal of the Indian Medical Association*, 95(8), pp. 448-450.
[49] Das, N.P., V.K. Mishra and P.K. Saha, (2001): *Does Community Access Affect the Use of Health and Family Welfare Services in Rural India?*, NFHS Subject Reports, Number 18, IIPS, Mumbai

access showed little effect on use of preventive and curative health services as well as family planning methods. The factors, which did influence this significantly, were household living standard, women's education, women's exposure to mass media and son preference. Household and individual level and socioeconomic and demographic factors are thus more important as compared to physical access variables in this regard.

Thus, it is revealed in the above review that there is a paucity of studies in India with their exclusive focus on distance as a determining variable in health care utilization and outcomes. It forms a significant part of such studies, though not the focal aspect. The current study in this context attempts to fill this gap and is thus a work focusing on the role which distance to health care plays in the access, utilization of heath facility and outcome. The analysis includes not only an exploration of the extent to which distance plays a determining role in health care utilization, but also its differential manifestation across selected regions. The study, therefore, is unique in the field of studies on health care utilization in India.

CHAPTER III

CONCEPTUAL FRAMEWORK

CHAPTER 3

CONCEPTUAL FRAMEWORK

Based on the review of literature presented in the preceding chapter, a conceptual framework has been developed to analyse the effect of distance on the utilization of services which, in this case are various child and maternal health services such as, immunization, treatment for fever, antenatal care and safe delivery provided by the various health facilities in the rural areas of the selected states. A conceptual framework is a useful tool for analysis because it helps in understanding the relationship between key concepts that are to be empirically examined.

Accessibility of the health facilities to the population as has been mentioned earlier is an important variable in the utilization rates of the services provided by these facilities. However, access is not to be equated with the use of services. Utilization of services is the evidence that access has been achieved. Accessibility in this study refers to the potential user's ability to physically reach service providers.

As seen from the literature review on accessibility, 'access' undoubtedly provides valuable knowledge concerning the role of distance from service facilities in the determination of patterns of medical care utilization. Distance-decay effects (whereby rates of use of a facility decrease with increasing distance from its location) have been detected for various types of medical care and in various countries.[1] Ensuring physical accessibility or the potential for provider/consumer links to be formed is a key concern. Physical distance between provider and consumer has been recognized as an important barrier to care for several decades and studies have shown that people will not travel farther than 5 km to basic preventive and curative care.[2]

---

[1] Joseph, A.E., and Phillips, D.R. (1984): 'Accessibility and Utilization: Geographical Perspectives on Health Care Delivery', Harper and Row, London.

[2] Stock, R. (1983): 'Distance and Utilization of Health Facilities in Rural Nigeria', *Social Science and Medicine*, vol. 17, pp. 563-570.

The term access, physical or otherwise, remains an ill-defined concept despite a profusion of attempts to define it. Davis[3] notes that there are two components of physical access - financial and physical:

- *Financial access* pertains to the presence or absence of financial barriers to care, whereas,

- *Physical access* refers to the presence or absence of physical barriers, such as lack of transportation to the site of care, inability to make an appointment with the physician, or inconvenient location of a health facility.

In general the most under-serviced population are in the rural areas and especially in the case of India where 72.22 percent of the population reside in rural areas according to the 2001 census. Such areas are characterized by low resource base and low incomes which make it uneconomical to provide tertiary and usually even secondary care and hence, primary care becomes all the more important with its various health centers. The very nature of rurality - a dispersed population and a scattered pattern of small service centers – endows considerable importance upon the spatial dimension of access to medical care in rural areas. Patients are frequently forced to journey considerable distances for medical care often well beyond reasonable travel limits. Limited physical access to primary health care is a major factor contributing to poor health of population in rural areas, particularly in mountain areas with rugged topography, harsh climates and extensive socio-economic barriers.

Apart from the characteristic dispersed population of the rural areas and their relative backwardness, the rural infrastructure in itself is not well developed. The absence of all-weather roads poses a problem for travel especially during rainy seasons. To aggravate this problem is the absence of proper transportation, the main

---

[3] Chen, M.K. (1982): 'Health Care Services and Health Status in a Rural Setting: The Utility of Some Predictors', *Inquiry*, vol. 19, pp. 257-261.

source being bullock carts, bicycles etc., which hinders the utilization of health centers located far away especially during cases of emergency and also increases the travel time. Distance, from the patient's home is thus an important explanatory variable in influencing utilization. Increasing distance is not only a hindrance for seeking health care but is also associated with rising information costs, which would furthermore reduce access by limiting the patient's awareness of availability of various health care services. The information regarding a number of schemes and programmes on vaccination, maternal care etc., brought out by the Government of India from time to time does not reach the villagers due to the distance between them and the health centers.

The frictional effect of distance applies unequally to different age and sex categories in the population. It is greater for females than for males in a typical patriarchal setup, where females face the dual disadvantage of not just discrimination in treatment choices but also restrictions on freedom to move for longer distances from their homes. Frictional effect for aged persons is greater than for younger persons. This is so because the aged, with their physical and financial dependence on kin, are unable to travel unescorted for longer distances to seek health care. They depend on the whims of their caregivers, who may or may not consider it feasible to take an elderly relative to a far off health center, especially if the family has more pressing financial concerns.

3.1 AN OVERVIEW OF PRIMARY HEALTH CARE IN INDIA

The health care system is intended to deliver the health care services. It consists of an organizational structure which sustains a network of institutions for providing services, training, education, research and evaluation: which enables various types of personnel to make certain forms of medical technology available and accessible to the population.

Sub centers: The sub center is the peripheral outpost of the existing health delivery system in rural areas. They are being established on the basis of one sub center for

every 5000 population in general and one for every 3000 population in hilly, tribal and backward areas. As of date, 137,311 have been functioning in the country. Each sub center is manned by one male and one female multipurpose health worker. At present the functions of a sub center are limited to mother and child health care, family planning and immunization.

Primary Health Centers: The concept of Primary Health Center is not new to India. As mentioned in the earlier chapter it was the Bhore Committee in 1946 that gave the concept of a Primary Health Center as a basic health unit to provide, as close to the people as possible, an integrated curative and preventive health care to the rural population, with emphasis on preventive and promotive aspects of health care. The health planners in India have visualized the primary health center and its sub centers as the proper infrastructure to provide health services to the rural population. The number of PHCs established since then has increased from 725 during the First Five Year Plan to 22842 at present. One PHC covers a population of 30,000 in general and a population of 20,000 in hilly, tribal and backward areas, and each PHC having six sub centers below it. The functions of the PHC in India covers all the eight 'essential' elements of primary health care as outlined by the Alma Ata Declaration, these are, medical care, MCH including family planning, safe water supply and basic sanitation, prevention and control of locally endemic diseases, collection and reporting of vital statistics, education about health, National Health Programmes as relevant, referral services, training of health guides, health workers, local dais and health assistants and basic laboratory services.

Community Health Centres: As of date, 3043 community health centers (CHCs) have been established by upgrading the primary health center, each CHC covers a population of 1,20000 in general and 80,000 for hilly, tribal and backward areas and each CHC has four PHCs below it. These centers specialize in surgery, medicine, obstetrics and gynaecology, and paediatrics with Xray and laboratory facilities.

A look at the following tables gives an idea about the situation of Primary Health Care in India. The tables depict the number of health centers functioning, the average population covered, the classification of the health centers by population and the average area and the radial distance covered.

Table 3.1 Number of Sub Centers, PHCs and CHCs
Functioning

States	Sub Centers	PHCs	CHCs
Bihar	10337	1648	101
Gujarat	7274	1001	242
Himachal Pradesh	2069	302	65
Rajasthan	9926	1674	263
Tamil Nadu	8682	1436	72
West Bengal	8126	1262	99
INDIA	**137311**	**22842**	**3043**

Source: Rural Health Statistics, 2002.

Table 3.1 shows the number of SCs, PHCs and CHCs functioning in the six study states of Bihar, Gujarat, Himachal Pradesh, Rajasthan, Tamil Nadu and West Bengal. It is seen from the table that Bihar has the highest number of sub centers (10337) out of India's total of 137311, whereas, Himachal Pradesh has the least, 2069 sub centers. In the rest of the states the sub centers are in the range of 7000 to 10000. While as regards PHCs the highest number is recorded in Rajasthan (1674) and the lowest in Himachal Pradesh (302). Himachal Pradesh also has the lowest number of CHCs amongst the study states, which could be due to the population norms established for the hilly, tribal and backward areas, while on the other hand Rajasthan again shows the highest number of CHCs, overall depicting a better health infrastructure.

After looking at the number of the health centers functioning in the different states it becomes important to look at the classification of these states according to the average population covered by the different health centers.

Table 3.2 Classification of States According to Average Population
Covered By a Sub Center

Population Covered (Range)	States	Average Population (2001)
Less than 3000	Himachal Pradesh	2650
3000 - 5000	Tamil Nadu	4016
	Gujarat	4358
	Rajasthan	4359
5000 - 7000	,	
Above 7000	West Bengal	7105
	Bihar	7178

Source: Rural Health Statistics, 2002.

Table 3.2 shows the classification of the study states according to the average population covered by a sub center. According to the national norms for rural health infrastructure, a SC should ideally serve a population of 5000 in general and 3000 in hilly, tribal and backward areas. At the all India level, the coverage of average population by a SC is 5401, however among the study states this average varies from 2650 people in Himachal Pradesh to 7178 people in Bihar. Himachal Pradesh, Tamil Nadu, Gujarat and Rajasthan has an average population covered by a SC somewhat near the national norms indicating that these states have an adequate number of sub centers in respect to its population. On the other side in West Bengal and Bihar a SC covers an average population of more than 7000 indicating high pressure on the available facilities that a SC offers. Moreover, it is a reflection of the overall high population pressure in these states.

In Tamil Nadu, Gujarat and Rajasthan the situation is far much as a suitable number of people are covered, hence not much pressure is there on the SCs. In West Bengal the pressure on the SCs is high and the state as it is does not have an adequate number of SCs in accordance to the population as seen from table 3.1 above.

Table 3.3 Classification of States According to Average Population

Covered by a Primary Health Center

Population Covered (Range)	States	Average Population (2001)
Less than 10000		
10000 - 20000	Himachal Pradesh	18154
20000 - 30000	Tamil Nadu	24282
	Rajasthan	25847
30000 - 40000	Gujarat	31666
40000 - 50000	Bihar	45024
	West Bengal	45749

Source: Rural Health Statistics, 2002.

As evident from table 3.3 the four states of Himachal Pradesh, Tamil Nadu, Rajasthan and Gujarat are near to the national norms of the average population served by a PHC which is 30,000 in general and 20,000 in hilly, tribal and backward areas. Bihar and West Bengal again as in the case of SCs show the lack of the availability of PHCs.

Table 3.4 Classification of States According to Average Population
Covered By a Community Health Center

Population Covered (Range)	States	Average Population (2001)
Less than 1 lakh	Himachal Pradesh	0.84
More than 1 lakh & Less than 3 lakhs	Gujarat	1.31
	Rajasthan	1.65
3 – 5 lakhs	Tamil Nadu	4.84
5 – 7 lakhs	West Bengal	5.83
	Bihar	7.35

Source: Rural Health Statistics, 2002.

As seen from table 3.4, the states of Himachal Pradesh, Gujarat and Rajasthan again conform to the national norms of population of 1.2lakhs covered by a CHC in general and 80,000 in hilly, tribal and backward areas. Bihar and West Bengal are

continuing the same trend of lack of availability of CHCs as in the case of SCs and PHCs and this pressure is much higher in case of CHC as they cover an average population of 5.83 lakhs and 7.35 lakhs respectively. Tamil Nadu, however, shows a diversion from the general trend of conforming to the national average population in the case of a SC and PHC as here it shows an increased pressure on the CHC serving an average population of 4.84 lakhs.

Table 3.5 Rural Primary Health Care Structure and Average Rural
Population Covered

States	Average Rural Population (2001) covered by a		
	SC	PHC	CHC (in lakhs)
Bihar	7178	45024	7.35
Gujarat	4258	31666	1.31
Himachal Pradesh	2650	18154	0.84
Rajasthan	4359	25847	1.65
Tamil Nadu	4016	24282	4.84
West Bengal	7105	45749	5.83
All India	5408	32469	2.44

Source: Rural Health Statistics, 2002.

Table 3.5 gives the average rural population covered by the rural primary health care structure, which have been discussed in the tables above.

Table 3.6 Average Rural Area and Average Radial Distance Covered by
Primary Health Care Institutions

States	Average Rural Area (sq km) Covered by a			Average Radial Distance (kms) Covered by a		
	SC	PHC	CHC	SC	PHC	CHC
Bihar	11.50	77.02	1149.55	1.91	4.95	19.13
Gujarat	26.24	190.70	788.79	2.89	7.79	15.84
Himachal Pradesh	26.78	183.45	852.35	2.92	7.64	16.47
Rajasthan	33.99	201.54	1282.79	3.29	8.01	20.20
Tamil Nadu	14.27	86.27	1720.58	2.13	5.24	23.40
West Bengal	10.54	67.89	865.39	1.83	4.65	16.59
All India	23.38	140.52	1054.84	2.73	6.69	18.32

Source: Rural Health Statistics, 2002.

Here in table 3.6 we can see the average rural area and the average rural distance covered by the Primary Health Care Institutions. In Bihar, Tamil Nadu and

West Bengal the SCs are located within close proximity showing a better coverage. In Rajasthan the SCs cover more area thereby posing difficulty for the population in accessing it. With regards to PHCs, it is Bihar, Tamil Nadu and West Bengal that have these health centers within accessible range.

As for the radial distance, the SCs are within close proximity in Bihar and Tamil Nadu. The PHCs and CHCs are also within reach in these states. In the other states also the coverage is quite satisfactory.

3.2 SOCIO-ECONOMIC AND DEMOGRAPHIC VARIABLES:

Health care utilization and outcomes are affected not just by distance but also by several other socio-economic factors, which gain relevance in the Indian setup. The dynamics of rural society affects the extent to which people are able to reach the centers or seek redressal for their problems. Interaction between caste groups, the level of literacy of the people, especially the women, and the level of awareness among them also play a major role. Economic aspects such as the capacity of the household to bear the costs of health care, their overall standard of living and income levels also affect their health outcomes apart from distance. Among the various socio-economic aspects, caste/tribe status, religion, educational status of women, their age, standard of living and level of exposure to mass media have been included as other determining variables in the analysis.

CASTE/TRIBE:

Indian society represents a unique socio-economic hierarchy in the form of the Caste System and the various tribal groups. Officially, the low castes and service castes, as well as the tribal groups, those who have suffered from institutional exploitation and marginalization, have been grouped as Scheduled Castes, Scheduled Tribes and Other Backward Classes in order to qualify for the constitutional safeguards provided to them in the form of various measures of positive discrimination in order to help them overcome the historical disadvantages they have

faced. This stratification of the Indian society still plays a major hindering role in equal access to health centers and thus forms a major underlying factor affecting the health seeking behaviour of the people. This holds true also in case of maternal and child health care also.

Grover et al.,[4] in their RCH survey of Faridabad, Haryana, have shown that the higher caste women received the Antenatal Care, Tetanus Toxoid and Iron and Folic Acid package more frequently than women of the scheduled caste and other backward classes. Caste also acts as a hurdle to the utilization of the available health care services. Quite often scheduled castes are denied of health facilities due to lack of accessibility to the health centers.

Apart from these direct impacts, caste also affects the educational and economic status respectively and they are also characterized by a low standard of living, which in turn affects their health seeking behaviour, through differentials in awareness.

RELIGION:

Another important social indicator apart from caste and tribe is religion. India represents a unique diversity in religious persuasions and faiths with the major religious groups being Hindus, Muslims, Christians, Sikhs and Buddhists. The religious communities of India exhibit substantial differentials in their socio-economic and demographic profiles. The attitudes of these religious communities towards various health measures differ hence creating a difference in their health seeking behaviour.

In the strict Muslim society, for example, cultural guidelines restrict the spatial mobility of females. Hence travelling presents a social barrier as well as a

---

[4] Grover, Deepak, Reena Singh, K. C. Kaishtha, R. Gawari, S. Singh and G. Singh, (2001): "RCH – The Role of ANM", paper presented at 24th Annual Conference of IASP, Visakhapatnam.

Fig: 2.1 A Framework for Analysis of Impact of Physical Accessibility on Health Care Utilization

PHYSICAL ACCESSIBILITY

Distance to Health Facility

Health Utilization

BACKGROUND CHARACTERISTICS

Caste/Tribe

Religion

Educational Status of Woman

Age of Woman

Standard of Living

Exposure to Mass Media
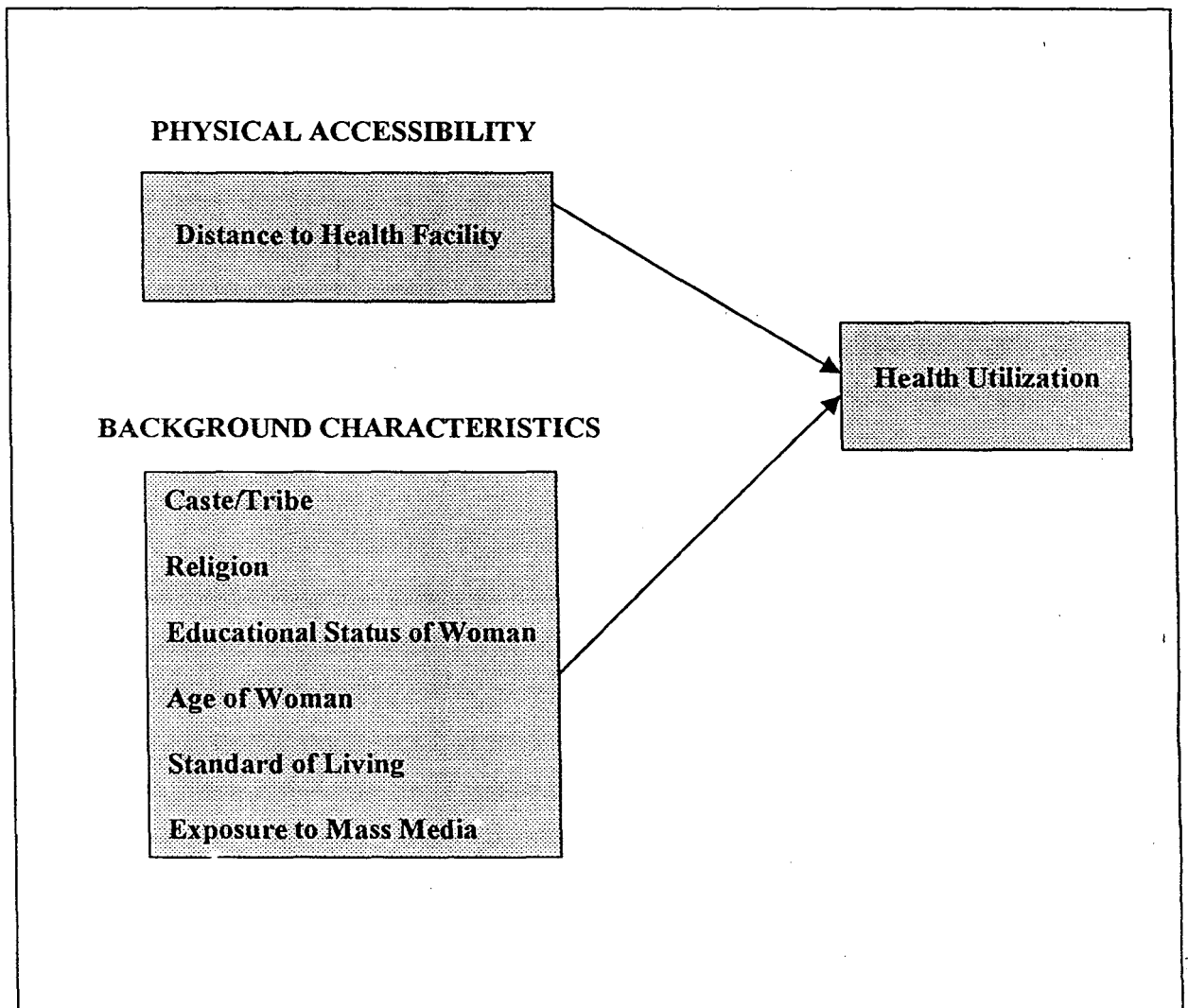
physical barrier thereby affecting the health seeking behaviour. In certain religious groups, adolescent girls and young adult women are not expected to move freely.

Furthermore, a male child in certain religious societies is considered more valuable than a female child: these cultural traits explain the differences in the attainment of health care.

EDUCATIONAL STATUS OF WOMAN:

A woman's educational status is considered to be an important indicator to measure the level of development of the society. An educated woman is found to enjoy better status and has the power of decision-making hence giving her autonomy in the society as well as in the family. Through education a woman is more exposed to the happenings of the outside world and this makes her aware of the necessity of undergoing required maternal care. An educated woman avails the maternal care services more frequently than the illiterate counterpart.

The educated women are more exposed to the newspapers and other media; therefore they are in a better position to gather information about the various medical facilities available. This awareness also makes her in a better position to take care of her children especially during times of illness. Education makes her realize the benefit of the medical facilities available and hence help her seek them at the right moment. She is better able to communicate her problems to the medical staff and get the right treatment done.

AGE OF WOMAN:

Age of woman plays an important role in her decision to avail various maternal and child health services being rendered by the health facilities. Younger women are more adaptable to the new services available, due to modern outlook as compared to women of the older age group. The latter are more traditional and thus prefer to follow conventional methods of treatment for various diseases, which affect the health of both the mother and the child.

The woman's age also affects her reproductive health in many ways. Maternal age may affect the frequency of complications during pregnancy and child birth. This is so because woman's age may be related to her attitude about health care provisions as has been evident in Guatemala.[5] Adolescent girls (15-19years) and older women (35 years above) are more likely to experience maternal morbidity and mortality than women in the intervening ages.

STANDARD OF LIVING:

The standard of living level is mainly influenced by the income of the family and has a direct impact on the education and work status of the family. A couple with a higher standard of living is in a better position to use the health care facilities than those with a lower standard of living. Higher income families would also have better exposure to mass media and greater knowledge about the various health care facilities available and would be more spontaneous to seek them.

EXPOSURE TO MASS MEDIA:

Mass media is one of the major sources of information about various family planning methods and maternal and child health care practices. Exposure to mass media is associated with increase in awareness and knowledge of and attitude and intention to utilize the medical facilities available.

3.3 NATURE AND SOURCE OF DATA

The analysis is based on data from India's 1998-99 National Family Health Survey (NFHS-2). International Institute of Population Sciences (IIPS) and ORC-Macro conducted this survey in two phases (phase-1 in 1998 and phase-2 in 1999).[6] The NFHS2 covered a representative sample of 89,199 ever-married women of the age group of 15-49 years residing in 91,196 households in all over India. This sample

---

[5] Annis, S. (1981): 'Physical Access and Utilization of Health Services in Rural Guatemala', *Social Science and Medicine*, vol. 15D, pp. 515-523.
[6] IIPS and ORC-Macro, 2000.

45

population represents 99 per cent of population living in India and 26 states including Delhi.

NFHS-2 has used three types of questionnaires, *(1). Household Questionnaire, (2). Woman's Questionnaire and, (3). Village Questionnaire.* The household questionnaire provides basic demographic and socio-economic information on household. The woman's questionnaire administered to the ever-married woman of reproductive age (15-49 years) obtains data on the socio-economic and demographic characteristics, reproductive history, quality care, contraceptive behaviour, antenatal, natal and postnatal care, immunization and health, fertility preference, status of women, husband's background and woman's work, knowledge about AIDS and so on. The village questionnaire collected information on various amenities available in sampled villages, such as, electricity, water, transportation, and education and health facilities.

The NFHS-2 has published descriptive reports for all these aforesaid issues with extensive tabulation and graphs for each state and at the all India level separately. Besides, NFHS-2 has made the household, individual and village level data available to the researchers.

For the purpose of analysis in this study variables from two different files - the Woman's Questionnaire and the Village Questionnaire have been used and the data in these two data sets have been merged using the required programming designed specially to merge the NFHS files to get the final data. By merging these two files we can see the relationship between physical accessibility to health facilities and health outcomes.

3.4 MEASUREMENT OF VARIABLES:

The measurement of the dependent and the predictor variables are explained in this section:

3.4.1 Dependent Variables:

The dependent or the response variables in this study are the various maternal and child health services provided by the different health care facilities such as immunization, treatment for fever, antenatal care and safe delivery. These are considered to be the "health outcomes", the utilization of which depends on the physical distance from the health facilities.

(i) Immunization (Y_1):

Immunization is a major focus of the child survival programmes throughout the world. The vaccination of children against six potentially deadly but preventable diseases (tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis and measles) has been the cornerstone of the child health care system in India. As part of the National Health Policy, 2002, the National Immunization Programme is being implemented on a priority basis. The analysis of immunization coverage in this study focuses on children who were between 12- 23 months of age at the time of survey. This age group is chosen for the analysis because both the international and the Government of India guidelines specify that children should be fully immunized by the time they complete their first year of life.

The NFHS information on the immunization coverage is derived from the vaccination cards, if available, and from the mother's memory, if she could not show a card. Each mother was asked whether she had a vaccination card for each child born since January 1995. If the card was available, the interviewer copied the date for each vaccination from the card. If the mother could not produce the vaccination card she was asked whether the child had received any vaccinations. If the child had received vaccination the mother was asked whether the child had received one or more vaccinations against each of the six diseases. For DPT and polio the information was received on the number of injections or oral doses given. For analysis in this study polio has been excluded and only partial immunization is considered since the intensive efforts against polio eradication has led to a wider coverage of areas including the backward areas and this as a whole might distort the impact of distance

47

on the other immunization programmes. Therefore, children aged 12 to 23 months who have received some of the recommended immunizations, that is, one dose each of BCG and measles, and three doses each of DPT are considered. This has been classified as:

$Y_1 =$ 1 = Had partial immunization

0 = Did not have partial immunization

(ii) Treatment for fever (Y_2):

Mothers of children born during the three years preceding the survey were asked if their children suffered from fever during the two weeks preceding the survey, and if so, the type of treatment given. Accuracy of all these measures is affected by the reliability of the mother's recall of when the disease episode occurred. The two-week recall period is thought to be the most suitable for ensuring that there will be an adequate number of cases to analyse and that recall errors will not be too serious.

$Y_2 =$ 1 = Had treatment for fever

0 = Did not have treatment for fever

(iii) Antenatal Care (Y_3):

Antenatal care is named as one of the four pillars of the Safe Motherhood Initiative,[7]. It is the pregnancy related health care provided by a doctor or a health worker in a medical facility or at home. All pregnant women should receive antenatal care as it helps to reduce maternal morbidity and mortality as it includes important dietary advice and the provision of iron and folic acid tablets to pregnant women. Moreover, antenatal care along with improved nutritional status can reduce the incidence of low birth weight babies, perinatal, neonatal and infant mortality. Antenatal care consists of various components, which are:

---

[7] Bloom., S.S. et al., (1997): ' Dose Antenatal Care make a Difference to Safe Delivery? A study in urban Uttar Pradesh, India', *Health Policy and Planning*, vol.14 (1): pp. 38-48

- First antenatal check-up: a woman should receive her first pregnancy related check-up within three months of the pregnancy confirmation.

- Antenatal visits for pregnancy: a woman should receive at least three pregnancy related check-up provided by a doctor or a health worker in a health facility or at home.

- Iron and folic acid tablets: a woman should have had the required number of iron and folic acid tablets during the pregnancy period.

- Received enough tablets: she should not only consume the tablets but should be given enough supply of these for three months.

- Received tetanus toxoid vaccine: often infection is the cause of perinatal and neonatal mortality, therefore to prevent pregnant woman from such infections she should be given tetanus toxoid injections.

- Number of times given: a woman should receive two doses of tetanus toxoid injections during the period of pregnancy.

For the case of analysis those women who have had any form of antenatal care are considered and are classified as:

$$Y_3 = \quad 1 = \quad \text{Had antenatal care}$$
$$0 = \quad \text{Did not have antenatal care}$$

(iv) Safe Delivery (Y_4):

Assistance during delivery is more important than the place of delivery. If a professional health practitioner attends the birth then it increases the survival chances of both the mother and the child. Also the presence of a health professional prevents the practice of some unhygienic practices which otherwise are likely to be performed by the household members. Here for the analysis a delivery is considered to be safe if it is assisted by any of the health professional, that is, a doctor, a nurse or a midwife, auxiliary midwife, trained birth attendant, CS health professional or other health professional. This has been classified as:

$Y_4 =$ 1 =   Had safe delivery

        0 =   Did not have safe delivery

3.4.2 Independent Variables:

The independent or the predictor variables are those that have a profound influence on the dependent variables. A change in these will cause a corresponding change in the response variables. Physical accessibility or distance is the sole independent variable in this study. Other predictor variables, such as, socio-economic and demographic variables discussed in this section also have an impact on the utilization of the services provided by the health facilities. They have been included to provide controls for them and bring out the sole impact of distance on the utilization of the health services and their corresponding health outcomes.

(i) Distance (X_1):

In this study distance is the main predictor or the independent variable as has been explained earlier. An attempt has been made to look at how to the various health facilities affects the health outcomes. The health facilities taken are sub center, primary health center and community health center. The distance to all these health facilities have been classified into categories of, facility present within the village, 1 to 5 km, 6 to 10 km and above 10 km. The facility present in the village is taken as the reference category.

$X_{1a} =$ 1 -   1 to 5 km

        0 -   Facility Present

$X_{1b} =$ 1 -   6 to 10 km

        0 -   Facility Present

$X_{1c} =$ 1 -   Above 10 km

        0 -   Facility Present

(ii) Caste/Tribe of women (X_2):

Based on the caste and tribe of the women they have been classified as:

X_{2a} = 1 - Scheduled Caste

0 - Others

X_{2b} = 1 - Scheduled Tribe

0 - Others

X_{2c} = 1 - Other Backward Classes

0 - Others

(iii) Religion of women (X_3):

The major religious groups being Hindus and Muslims, the other religious groups being a minority have been clubbed together and Hindus have been taken as the reference category. They are coded as follows:

X_{3a} = 1 - Muslims

0 - Hindus

X_{3b} = 1 - Others

0 - Hindus

(iv) Educational Level of Woman (X_4):

On the basis of the educational level attained women have been classified as illiterate, literate but not middle school complete, middle school complete but not high school complete, high school complete and above. For all the three levels of education the illiterate women have been taken as the reference category and the coding scheme for this variable is as follows:

X_{4a} = 1 - Literate but not middle school

0 - Illiterate

X_{4b} = 1 - Middle school complete but not high school

0 - Illiterate

$X_{4c} =$ 1 - High school complete and above

       0 - Illiterate

(v) Age of Woman (X_5):

Based on age women have been grouped into different categories. The reference category has been taken as age group of 15 -19 years.

$X_{5a} =$ 1 - 20 - 24 years

       0 - 15 - 19 years

$X_{5b} =$ 1 - 25 - 29 years

       0 - 15 - 19 years

$X_{5c} =$ 1 - 30 - 34 years

       0 - 15 - 19 years

$X_{5d} =$ 1 - 35 - 39 years

       0 - 15 - 19 years

$X_{5e} =$ 1 - 40 - 44 years

       0 - 15 - 19 years

$X_{5f} =$ 1 - 45 - 49 years

       0 - 15 - 19 years

(vi) Standard of Living (X_6):

A standard of living index determines the economic condition of the household of the women respondents. Based on this women have been categorized as belonging to low, medium and high standard of living households. The low standard of living households have been taken as the reference for the other two groups:

$X_{6a} =$ 1 - Medium standard of living households

       0 - Low standard of living households

$X_{6b} =$ 1 - High standard of living households

       0 - Low standard of living households

3.5 METHODOLOGY:

The hypotheses that have been developed following the various objectives of the study are empirically tested using certain multivariate statistical techniques. The different variables used for the analysis of the study in question are taken from two different files (Women's file and the Village file) and for arriving at the required variables the two files have been merged using appropriate programming for the purpose.

The dependent variables in this study are dichotomous and their distribution is skewed, stepwise regression has not been used for the multivariate analysis. The use of stepwise regression analysis in this situation suffers from the following shortcomings:[8]

(i)   The estimated probability can assume impossible values.

(ii)   The fit of the line (R^2) tends to be very poor. This is because the response variable can assume only two values, 0 and 1, the C values tend not to cluster closely about the regression line.

(iii)   The linearity assumption is seriously violated. According to this assumption the expected value of the predictor variable (X) falls on the regression line. But this is not possible for parts of the line for which $P < 0$ or $P > 1$. In these regions, the observed points are either all above the line or all below the line.

(iv)   The homoscedasticity assumption is seriously violated. The variance of the dependent variables (Y) tends to be much higher in the middle range of the predictor variable (X) than at the two extremes, where the values of Y are usually mostly zeros and ones. In this situation, the equal variance assumption is untenable.

(v)   Because the linearity and homoscedasticity assumptions are seriously violated, the usual procedures for hypothesis testing are invalid.

---

[8] Retherford, D., and Choe, M.K., (1993): 'Statistical Models for Causal Analysis', John Wiley and Sons, Inc. New York.

It is for these reasons that the linear probability model is seldom used and the Logistic Regression, more commonly called *logit regression*, is used in this study to find out the relationship between the response and the predictor variables.

In a logit regression model, a sigmoid curve is used to fit the observed points which resembles an elongated 'S' or inverted 'S' laid on its side. Since the tail of the sigmoid curve level off before reaching $P = 0$ or $P = 1$, the impossible values of P (P < 0 and P > 1) observed in a probit model are avoided. The basic form of a logistic function is:

$$P = \frac{1}{1 + e^{-z}} \qquad (1)$$

Where P is the estimated probability (here the probability of utilizing the services), z is the predictor variable and e is the base of the natural logarithm ($e = 2.7183$). The predictor variables has the largest effect on P when $P = 0.5$ and P becomes smaller in absolute magnitude as P approaches 0 or 1.

The quantity $\frac{P}{1-P}$ is called the odds and the quantity $\log [\frac{P}{1-P}]$ is called the logit of P. Simplifying equation (1) we get

$$\log z = \frac{P}{1-P} \qquad (2)$$

$$\text{or logit } P = z \qquad (3)$$

The multivariate logistic function involving k predictor variables ($X_1, X_2, X_3 , ..., X_k$) is given by

$$P = \frac{1}{1 + e^{-(b_0 + b_1 X_1 + b_2 X_2 + ... + b_k X_k)}} \qquad (4)$$

and logit $P = b_0 + b_1X_1 + b_2X_2 + \ldots \ldots + b_kX_k$

The coefficient b_1 represents the addictive effect of one unit change in predictor variable X_i on the log odds of utilization.

The quantity e^{b_i} is called the odds ratio which represents the multiplicative effect of one unit change in the predictor variable X_i on the odds of service utilization. The odds ratio is more easily understandable than 'b' as a measure of effect.

In the next chapter on the basis of the conceptual framework developed a detailed analysis has been carried out to bring out the impact of physical accessibility on the health care utilization.

CHAPTER IV

AN ANALYSIS OF HEALTH CARE UTILIZATION BY DISTANCE TO HEALTH FACILTIES

CHAPTER 4

AN ANALYSIS OF HEALTH CARE UTILIZATION BY DISTANCE TO HEALTH FACILITIES

4.1 INTRODUCTION

India has entered the twenty first century with a billion people, the majority of whom lack even the basic amenities necessary for a healthy and dignified existence. With nearly 17 percent of the global population, India has made considerable progress in social and economic development in recent decades, as improvements in indicators such as life expectancy, infant mortality and literacy demonstrates. However, improvements in women's health, particularly in the north, have lagged behind gains in other areas. India is one of the few countries where males significantly outnumber females. Maternal mortality rates in rural areas are among the world's highest, which persist up to the age of 30 years – a symptom of bias against females. Females experience more episodes of illness than males and are less likely to receive medical treatment before the illness is well advanced. Though biologically strong, women suffer from greater morbidity and mortality due to the bias against them in the patriarchal Indian set up. Because the nutritional status of women and girls is compromised by unequal access to food, by heavy work demands, and by special nutritional needs (such as for iron), females are particularly susceptible to illness, particularly anemia. Women, especially poor women, are often trapped in a cycle of ill health exacerbated by frequent child bearing and hard physical labour.

The United Nations International Conference on Population and Development in Cairo (1994) affirmed the need to focus on women's welfare as the cornerstone of national population policy, and recognized that childbearing patterns in a society are inextricably linked with women's status and welfare.

Another important aspect of health, apart from women's health is child health, which is evident from a fairly high infant and child mortality. Infant and child mortality rates are invariably higher than overall mortality in all the countries, irrespective of whether the overall levels of mortality are high or low. Because of the unacceptably high infant mortality rates, one of the goals of the National Population Policy (NNP) is to immunize all children against common childhood diseases. But the task to improve the status of maternal and child health is rendered more difficult by a relatively rapid rate of population growth that results in the addition of nearly 20 million to the population every year.

Recent research carried out in the Western countries and some of the developing countries has emerged with important findings reflecting the importance of distance in the overall utilization of the services especially in the rural areas. Apart from a wide range of socio-economic and demographic factors affecting ones behaviour for seeking medical care, distance seems to have a significant impact on this behaviour. Joseph and Bantock[1] citing the persistence of distance decay effects in the utilization patterns of most health services in the rural areas have stressed the importance of physical accessibility.

It is with this background in mind and on the basis of the conceptual framework developed in the third chapter and also keeping in view the objectives of the study, an attempt has now been made to analyse the role played by distance in the utilization of health facilities in the six study states with the help of certain bivariate and multivariate statistical techniques. The chapter has been divided into two major sections – the first dealing with the percentage distribution of primary health facilities in the study states and look at the percentages of villages and ever married women covered by the different health facilities at varying distances in the different states. Secondly and finally, the relationship between distance and utilization has been

---

[1] Joseph, A.E. & P.R. Bantock, (1982): 'Measuring Potential Physical Accessibility to General Practitioners in Rural Areas: A Method and Case Study', *Social Science and Medicine*, vol. 16, pp, 85-90.

analysed using logistic regression to understand the influence of the predictor variable on the health care utilization.

4.2 COVERAGE OF HEALTH FACILITIES BY DISTANCE

Distance as a determinant of access and utilization of health care facilities has emerged as one of the important factors, reflecting on the performance of the health care system as a whole. In this section we have a look at the coverage of the health facilities by distance.

Table 4.1 shows the average number of villages covered by a Sub Centre (SC), a Primary Health Centre (PHC) and a Community Health Centre (CHC) in the different states chosen for the study. A glance at the table shows an overall satisfactory situation as far as coverage of villages by health facilities is concerned. The highest number of villages covered by a SC is 8.22 in Himachal Pradesh and the lowest in Tamil Nadu with an average number of villages covered by a SC being 1.82. The high number covered in Himachal Pradesh could be due to the separate norms established for the hilly and tribal areas. On an average, at the all India level, 4.46 villages are covered by a SC. Bihar and West Bengal fairly conforming to the national average (Rural Health Statistics, 2002), whereas Gujarat and Rajasthan stand below the national average.

Table 4.1 Average Number of Villages Covered

States	Average Number of Villages covered by a			Number of SCs per PHC	Number of PHCs per CHC
	SC	PHC	CHC		
Bihar	4.56	30.56	456.17	o.70	14.93
Gujarat	2.48	18.01	74.5	7.27	4.14
Himachal Pradesh	8.22	56.28	261.49	6.85	4.65
Rajasthan	3.82	22.63	144.06	5.93	6.37
Tamil Nadu	1.82	11.02	219.75	6.05	19.94
West Bengal	4.67	30.04	382.93	6.44	12.75
All India	4.46	26.81	201.27	6.01	7.51

Source: Rural Health Statistics, 2002.

In the case of PHC again a similar picture is observed with Himachal Pradesh having the highest coverage of 56.28 villages per PHC, which can again be due to the norms. This is far above the national average of 26.81 villages covered on an average by a PHC. Tamil Nadu has the lowest coverage of 11.02 villages. Rest of the states of Bihar, Rajasthan and Gujarat present a fairly good picture.

As regards the CHC, Bihar is the best performing state with 456.17 villages covered by a CHC on an average. The states of Himachal Pradesh, West Bengal and Tamil Nadu show a good coverage of villages by a CHC. Gujarat has the lowest coverage with only three fourths of the villages covered by a CHC on an average. Overall, Himachal Pradesh presents a satisfactory picture as far as the coverage of villages is concerned at the primary health care level even if the national norms regarding location are considered. Rest of the states are fairly near the national average.

Looking at the number of SCs per PHC and the number of PHCs per CHC from table 4.1, it is clearly evident especially in the number of SCs per PHC that almost all the study states except Rajasthan are above the national average of 6.01 SCs per PHC and the national norms established stating that each PHC should have six SCs below it. Gujarat on an average has 7.27 SCs per PHC whereas Rajasthan has 5.93 SCs per PHC and the rest of the states have more than six SCs per PHC.

According to the national norms, each CHC should have four PHCs below it, but the achievements regarding this have been far higher with 7.51 PHCs per CHC at the all India level. The states of Bihar, Tamil Nadu and West Bengal have a much higher number of PHCs per CHC. The rest of the states of Gujarat, Himachal Pradesh and Rajasthan also have a good number of PHCs per CHC. Thus it is seen that, the primary health care structure in the six study states is at par with the established national standards.

But despite the presence of a well-knit network of SCs, PHCs and CHCs, the existing primary health care infrastructure is not being accessed by rural population which may be evident from the health standards of the same. Now, it becomes imperative to examine whether these facilities are optimally located so that they are availed by the majority of the rural population. The following discussions bring out the importance of distance in analyzing the location of the health care facilities and its impact on the overall utilization of the facilities.

Table 4.2 shows the percentage distribution of villages by distance to the health facility (SC, PHC and CHC), in the different study states. In all the states, except for the state of Bihar, and Himachal Pradesh, approximately, half of the total number of villages have a SC within the village itself, which also accounts for the highest percentage when seen across different categories of distance (1 to 5, 6 to10 and above 10 km).

Table 4.2 Percentage of Villages by Distance to Health Facility

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present	26.9	47.9	50.9	55.4	37.7	65.7
1 – 5	50.0	36.9	43.5	26.1	47.2	33.3
6 – 10	14.0	9.2	3.7	13.0	10.4	4.4
Above 10	9.1	6.0	1.9	5.4	4.7	5.6
PRIMARY HEALTH CENTER						
Facility Present	14.0	9.2	6.5	14.1	8.5	18.9
1 – 5	37.6	21.7	45.4	27.2	33.0	31.1
6 – 10	26.9	26.3	28.7	33.7	29.2	32.2
Above 10	21.5	42.9	19.4	25.0	29.2	17.8
COMMUNITY HEALTH CENTER						
Facility Present	12.4	4.1	7.4	7.6	3.8	31.1
1 – 5	21.9	6.9	18.5	8.7	23.8	7.8
6 – 10	19.0	18.9	25.9	27.2	24.8	11.1
Above 10	46.7	70.0	48.1	56.5	47.6	50.0
Total Villages	242	217	92	108	106	90

Source: Computed from NFHS 2, 98 – 99.

Very few villages have a SC beyond 10 km in all the states indicating the presence of the facility within close proximity. In all the six states of Bihar, Rajasthan, Gujarat, West Bengal, Himachal Pradesh and Tamil Nadu 80 to 90 percent of the villages have a SC located in the village or within the distance of 5 km.

A lower coverage of villages is seen in the case of PHC and CHC. With regard to PHC a somewhat different picture is observed. Only about 6-15 percent of the villages in all the states have a PHC within the village itself. Nearly 60 percent of the villages in all the states have a PHC located between 1-10km. In Rajasthan 40 percent of the villages have a PHC beyond 10km making accessibility to a PHC difficult.

A CHC providing specialized care is the most inaccessible health care facility. More than 50 percent of the villages have a CHC beyond 10km. Only Tamil Nadu has a good percentage of villages (31.1 percent) with a CHC located in the village itself. About 70-75 percent of the villages on an average have a CHC located beyond 6km.

Having looked at the distribution of villages by distance to health facility we now bring out the situation at the individual level. Hence, we look at the distribution of population which in this case is ever-married women by distance to health facility (SC, PHC, CHC). This will be depicted by percentage of ever-married women within a comfortable range of accessing the various health facilities.

Table 4.3 shows that in all the states except the state of Bihar more than 50 percent of the ever-married women have a sub center in the village itself. In Bihar only 30 percent of the women have a SC in the village. In Gujarat and Tamil Nadu nearly 90 percent of the ever-married women have a SC either in the village itself or within an accessible distance of 5km. A SC is better located in most of the study states, i.e., within the reach of the ever-married women. Only Bihar presents a somewhat different picture.

A fairly similar trend is seen as regards PHC in all the states except Gujarat where the facility is equally accessible to the ever-married women across all the categories of distance. It is only in Gujarat where nearly half of the total ever-married women have a PHC between 1 to 5km.

Table 4.3 Percentage of Ever-Married Women by Distance to Health Facility

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present	29.3	55.8	55.4	61.3	47.5	55.9
1 – 5	50.1	31.9	40.7	21.8	36.0	34.2
6 – 10	11.9	7.7	3.4	12.6	9.4	3.2
Above 10	8.7	4.6	0.5	4.3	7.2	6.7
PRIMARY HEALTH CENTER						
Facility Present	16.9	10.3	8.9	13.8	13.8	18.6
1 – 5	38.9	22.0	48.9	26.4	26.4	31.6
6 – 10	25.7	29.3	23.7	35.5	35.5	33.2
Above 10	18.5	38.4	18.5	24.3	24.3	16.7
COMMUNITY HEALTH CENTER						
Facility Present	12.9	3.5	8.6	6.4	5.5	32.5
1 – 5	23.8	7.9	17.9	8.1	18.1	8.8
6 – 10	19.9	19.9	27.1	27.0	31.2	12.4
Above 10	43.4	68.7	46.4	58.5	45.2	46.3
Ever Married Women	7024	6813	3845	4408	3012	4674

Source: Computed from NFHS 2, 98 – 99.

When we look at the distribution of ever married women by a CHC it is evident that majority of the women have to travel beyond 10km to access the facility. Nearly half of the total ever-married women in all the states except Rajasthan have a CHC located beyond 10km. In Rajasthan about 70 percent of the women have a CHC beyond 10km and only 3.5 percent have the facility within the village. With regards to CHC Tamil Nadu is a better performing state with about 33 percent of ever-married women having a CHC within the village itself. In the rest of the states only 5-13 percent of the women have the facility within the village.

Thus, though the overall coverage of the villages in the study states is satisfactory but the coverage by distance gives a dismal picture. The percentage of

villages covered by distance is not very satisfactory. Also a very few percentage of the ever-married women are in close proximity of the health centers, making the health centers all the more inaccessible to them

4.3 HEALTH CARE UTILIZATION

As mentioned earlier in the conceptual framework and the introductory section of this chapter, the effect of distance to the health facilities have been measured through various maternal and child health care utilization indicators which include immunization of children aged between 12-23 months, treatment for fever, and maternal care measured through antenatal care and safe delivery. In this section we first of all make an attempt to look at the overall performance of the study states with regard to the above-mentioned health outcomes and then try to examine the effect of distance on these outcomes on the result of bivariate analysis.

4.3.1 AN OVERVIEW OF HEALTH OUTCOMES

Before looking into the impact of distance on the utilization of the health care facilities and the corresponding outcomes we look at the situation of the various health outcomes selected for the study in the different states.

Table 4.4 Percentage Distribution of Health Outcomes in the Study States

States	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
Immunization	39.1	52.3	83.2	75.2	94.0	92.6
Treatment for Fever	20.9	16.0	15.5	27.0	21.6	19.9
Antenatal Care	65.1	62.0	85.1	92.3	89.6	93.3
Safe Delivery	20.6	29.6	41.6	35.9	37.2	77.9

Source: Computed from NFHS 2, 98 – 99.

Table 4.4 gives an overview of the situation of health outcomes under study in the six states of Bihar, Rajasthan, Gujarat, West Bengal, Himachal Pradesh and Tamil Nadu. As regards immunization Himachal Pradesh and Tamil Nadu stand out from the rest of the states with over 90 percent of the children between 12-23 months of age being partially immunized. More than three fourths of the children are partially

immunized in the states of Gujarat and West Bengal. Even in Rajasthan 50 percent of the children are immunized for either measles or BCG or DPT. The worst performing state is Bihar where only 40 percent children are immunized (fig: 4.1).

Fig: 4.1 Percentage of children aged 12-23 months immunized, 1998-99
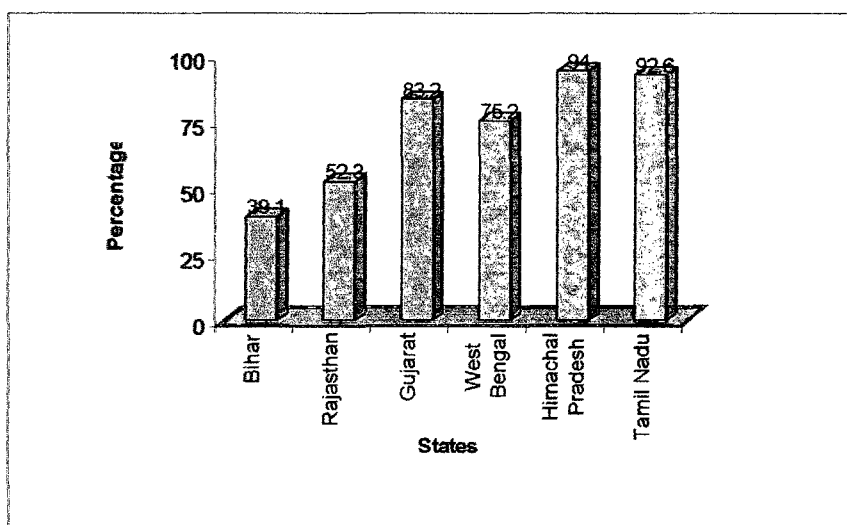
A glance at the figures for treatment of fever reveals a similar situation in all the six states where on an average 15 to 25 percent of the children have been treated for fever. Among these states the situation in West Bengal is slightly better with 27 percent of the children being treated for fever. In Bihar, Himachal Pradesh and Tamil Nadu about 20 percent of the children received treatment for fever (fig:4.2). Gujarat and Rajasthan show a poor performance (15 percent) in respect to treatment for fever.

The table also brings out the situation of antenatal care in the study states. Nearly 90 percent of the women received antenatal care in terms of visits to doctor, consuming folic acid tablets and getting tetanus toxoid injections in the three states of West Bengal, Himachal Pradesh and Tamil Nadu, the best performing state being Tamil Nadu (93.3 percent). Though in the other three states of Bihar, Rajasthan and Gujarat also more than two thirds of the women received antenatal care but it is far less than West Bengal, Himachal Pradesh and Tamil Nadu, Gujarat still being in a better position with 85 percent of ever married women receiving antenatal care (fig: 4.3).

64

Fig: 4.2 Percentage of children treated for fever,1998-99
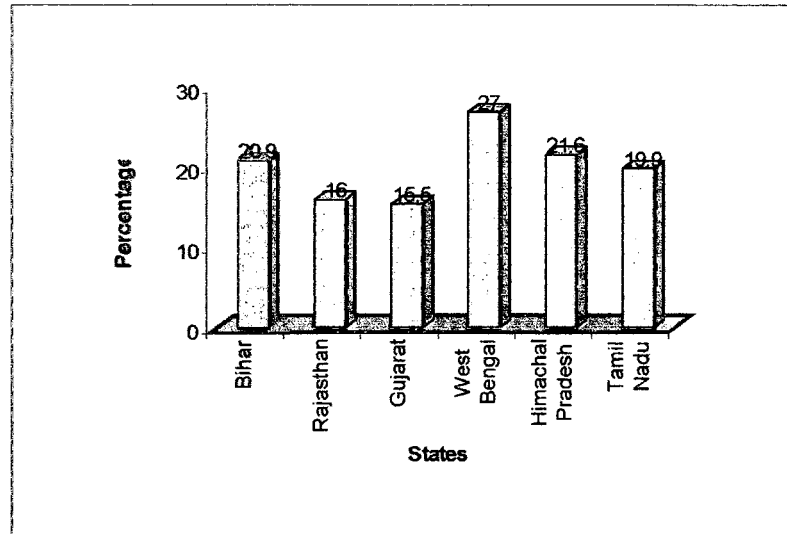
Fig: 4.3 Percentage of births during three years preceding the survey for which mothers received any type of antenatal care, 1998-99
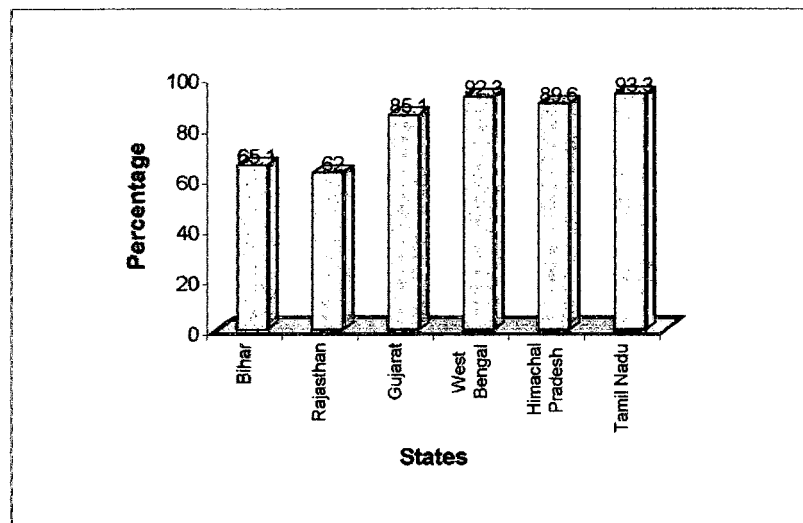
The situation of safe delivery is somewhat skewed, as seen from table 4.4, with Bihar on the one hand where only 20.6 percent of ever married women have a safe delivery attended by a doctor or any other health professional and Tamil Nadu on the other with the highest percentage (77.9 percent) of women having a safe delivery among the six states. In the remaining four states of Rajasthan, Gujarat, West Bengal

and Himachal Pradesh only about 30-40 percent of the women have a safe delivery showing a poor performance in most of the states leading to high maternal mortality.

Fig: 4.4 Percentage of births during three years preceding the survey attended by a health personnel,1998-99
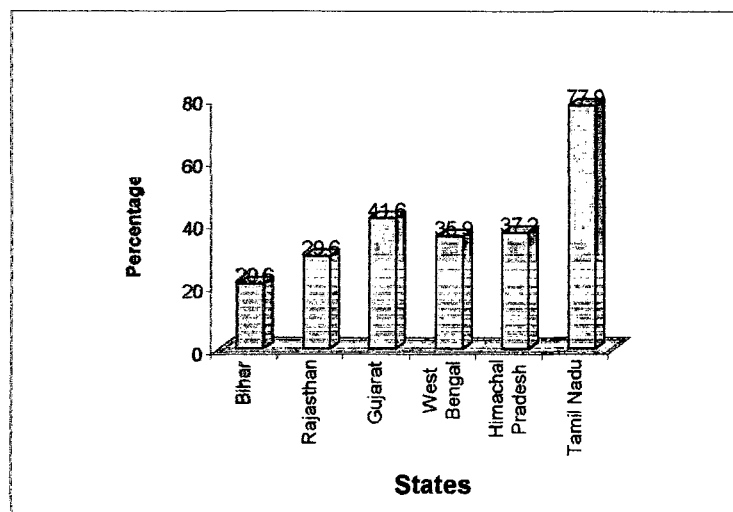
4.3.2 UTILIZATION OF HEALTH CARE BY DISTANCE

This is the situation regarding the four health outcomes in the study states. Now we make an effort to analyze the main objective of the study which is to look at the effect of distance on the health outcomes through the cross tabulations. First of all we take a look at the utilization of child health care in terms of immunization and treatment of fever and in the next section we analyse the maternal health care outcomes according to distance.

4.3.2 (a) CHILD CARE UTILIZATION

To analyse the child care utilization the indicators taken are partial immunization and treatment for fever as affected by the distance to the different primary health care facilities.

IMMUNIZATION

One in every three rural Indian children is severely stunted and nearly two in five have not had all of the recommended vaccinations. Since one of the demographic goal of the National Population Policy is to immunize all children against vaccine preventable diseases (tuberculosis, measles, whooping cough, diphtheria and polio) we examine the impact of distance on the immunization level in the study states. The examination is based on partial immunization, which excludes polio for reasons cited in the earlier chapter on conceptual framework.

Table 4.5 shows whether or not distance has any effect in getting the child immunized at three different levels of primary health care. In the case of the SC in almost all the states a similar trend is observed. In general the utilization of the facility, i.e., SC, show a decreasing trend with increase in distance especially in the states of Bihar and Rajasthan. In Bihar the utilization has decreased from about 45 percent when the SC is in the village to about 25 percent when it is located 6 to10km further. The same is the case with Rajasthan. In the rest of the states too a decline in the utilization is observed if the facility is in the village and between 1 to 5km. Beyond 5km the number of cases are also very few and hence not a clear picture can be observed.

Going to the higher order facility of primary health care, that is, PHC, again in Bihar there is a clear decline in the percentage of children getting immunized, as there is increase in the distance. The decline is from 43 percent if the facility is within the village to about 35 percent if it is located beyond 10km. Rajasthan and Himachal Pradesh also reveal a similar trend. Distance does not seem to make a profound influence on the utilization of the service in the three states of Gujarat, West Bengal and Tamil Nadu.

Table 4.5 Level of Immunization by Distance to Health Facilities

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present	44.9	54.3	82.7	78.9	93.7	92.4
1 – 5	39.4	50.9	76.0	70.5	93.8	93.6
6 – 10	26.1	42.0	90.6	75.0	100.0	100.0
Above 10	33.3	57.2	100.0	100.0	90.0	87.0
PRIMARY HEALTH CENTER						
Facility Present	42.7	58.7	82.9	76.5	100.0	93.9
1 – 5	39.1	52.2	81.8	73.0	96.3	90.0
6 – 10	39.4	47.9	88.2	76.9	89.2	94.4
Above 10	35.7	54.0	78.0	79.2	93.3	93.5
COMMUNITY HEALTH CENTER						
Facility Present	40.4	69.2	92.9	82.4	90.0	89.0
1 – 5	42.1	46.7	100.0	75.0	97.7	100.0
6 – 10	33.8	58.8	90.5	73.4	93.8	96.3
Above 10	39.3	50.6	77.5	75.4	92.9	92.5

Source: Computed from NFHS 2, 98 – 99.

A CHC being of the highest order in the hierarchy of primary health care also shows some decline in the service utilization with an increase in distance except in the case of Tamil Nadu. Fewer children are immunized as distance increases from CHC. This can be seen in the states of West Bengal and Gujarat. In Tamil Nadu again distance does not seem to cause much effect. In the case of Bihar and Rajasthan too the distribution is somewhat skewed.

TREATMENT FOR FEVER

The other child health indicator taken is treatment for fever. Here children who have suffered from fever two weeks preceding the survey are taken into consideration.

As revealed from table 4.6 the treatment seeking behaviour for fever in Bihar showed a decline with the SC being located at a greater distance. The decline is from 65 percent with the facility in the village to 55 percent with the facility beyond 10km. Not a very smooth trend, though, can be seen in the rest of the states. In West Bengal

and Rajasthan too some decline is observed but in Tamil Nadu again the effect of distance in utilization of the service is negated with almost an equal number of children seeking treatment form a SC located at varying distances.

Table 4.6 Treatment for Fever by Distance to Health Facilities

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present	63.1	55.1	64.8	67.7	92.5	80.6
1 – 5	65.5	60.7	63.8	68.8	89.3	79.0
6 – 10	62.6	51.1	73.7	66.7	94.7	80.0
Above 10	55.7	50.0	100.0	00.0	100.0	90.0
PRIMARY HEALTH CENTER						
Facility Present	60.0	63.4	56.5	73.9	95.5	69.4
1 – 5	70.2	59.3	66.7	74.7	93.4	80.3
6 – 10	65.3	54.6	73.8	59.5	91.7	86.0
Above 10	51.2	54.0	61.5	57.6	89.5	83.9
COMMUNITY HEALTH CENTER						
Facility Present	59.5	73.9	63.6	80.8	90.0	76.7
1 – 5	70.7	63.0	66.7	71.4	92.9	78.6
6 – 10	63.9	63.8	70.2	70.0	93.0	88.0
Above 10	60.6	52.8	64.9	62.6	92.1	81.4

Source: Computed from NFHS 2, 98 – 99.

When we look at the utilization of a PHC with regard to treatment for fever a clear decline is observed in the states of Rajasthan and Himachal Pradesh. The facility seems to be less utilized when it is beyond 10km than when it is present within the village in these two states. The decline is from 63 percent to 54 percent and from 96 percent to 90 percent in Rajasthan and Himachal Pradesh respectively. In the rest of the states of Bihar, Gujarat, West Bengal and Tamil Nadu distance does not seem to cause much difference in seeking treatment for fever.

Table 4.6 shows a clear decline in the percentage of children taken to a CHC for seeking treatment for fever in the states of Rajasthan and West Bengal. In Rajasthan only 53percent of the children are treated for fever if the facility is located beyond 10km than when it is located within the village (74 percent). In West Bengal also about 81 percent of the children received treatment in the health center if it is

located within the village and about 62 percent when located further. In the case of CHC again distance has no effect in Tamil Nadu. In the other three states of Himachal Pradesh, Gujarat and Bihar and equal number of children seek treatment for fever irrespective of distance.

4.3.2 (b) MATERNAL CARE UTILIZATION

The International Conference on Population and Development (ICPD) held in Cairo in 1994 reiterated the need for appropriate health care services that will enable women to go safely through pregnancy and childbirth and produce a healthy infant. Maternal care includes care during pregnancy and should begin from the early stages of pregnancy. Women can get antenatal care services either by visiting a health center where such services are available or from health workers during their domiciliary visits. Safe delivery is promoted primarily through encouraging all families to seek the care of skilled birth attendants for all births because all pregnant women are at risk of life-threatening complications, many of which are unpreventable and unpredictable.

ANTENATAL CARE

Here we look at the effect of distance on the utilization of maternal care services provided by a SC, PHC and CHC. One of the components of maternal care being antenatal care.

Table 4.7 shows the percentage of women who received antenatal care in a SC or a PHC or a CHC according to distance. There is marked decline in the percentage of women getting antenatal care with distance in the state of Bihar. Here 71 percent of the women get some antenatal care in the form of visits to doctor, iron and folic acid tablets or tetanus toxoid injections, if the facility is within the village and it declines to about 52 percent if it is outside the village. But distance in Tamil Nadu shows no barrier with regards to the attainment of antenatal care; where above 90 percent of the women seek antenatal care irrespective of distance. A marked decline in the

utilization of service is seen in Himachal Pradesh also. A decline of about 50 percent is observed in West Bengal if the facility is located beyond 10km.

In the rest of the states though a decline is observed, it is not prominent enough to derive at any conclusion.

Table 4.7 Antenatal Care by Distance to Health Facilities

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present	70.9	65.0	84.1	92.0	92.5	92.1
1 – 5	67.0	60.0	85.6	92.5	91.7	94.5
6 – 10	52.6	48.7	87.6	100.0	73.0	100.0
Above 10	51.7	62.8	88.9	50.0	81.3	94.0
PRIMARY HEALTH CENTER						
Facility Present	70.2	75.4	91.3	90.0	96.5	94.2
1 – 5	68.3	66.9	80.0	94.3	97.0	89.4
6 – 10	61.8	58.3	87.8	93.0	85.2	96.0
Above 10	58.1	58.5	83.2	87.0	79.9	94.4
COMMUNITY HEALTH CENTER						
Facility Present	65.6	67.8	88.7	95.6	97.3	95.1
1 – 5	69.8	59.3	88.1	97.2	95.9	90.9
6 – 10	64.2	69.5	84.0	93.0	87.6	93.5
Above 10	62.7	59.9	84.8	89.3	87.5	92.5

Source: Computed from NFHS 2, 98 – 99.

Considering the PHC in table 4.7 a decline in service utilization is observed in almost all the states except Tamil Nadu. In Bihar, the trend is the same as in the case of the SC. Rajasthan, Gujarat and Himachal Pradesh also show decline in the percentage of women getting antenatal care with increase in the distance. For instance in Rajasthan three fourth of the women get antenatal care if the health center is in the village and only 58 percent get some type of antenatal care if it is located outside the village. At the CHC level, though a decline is observed but it is not prominent across all the states. In Gujarat some decline is observed from 89 percent when a CHC is in the village to 85 percent when it is beyond 10 km. In Himachal Pradesh also 10 percent decline from 97 percent to 87 percent when the facility is in the village and 10 km further respectively. In the other states of Bihar, Rajasthan and West Bengal some

71

decline is evident. Tamil Nadu as has been the case earlier shows no impact of distance on the utilization of antenatal care.

SAFE DELIVERY

Another component of maternal health is safe delivery, which in rural areas assumes all the more importance since most of the deliveries take place in the homes itself with untrained attendants. While assistance at delivery is associated with lower maternal mortality, the broader concept of "skilled attendance" has been developed to describe the presence of a skilled provider within a supportive environment. It is defined as the process by which a woman is provided with adequate care during labour, delivery, the postpartum and immediate newborn periods. In order for this process to take place, the attendant must have the necessary skills and must be supported by an enabling environment that includes adequate supplies, equipment and infrastructure. Here we consider a delivery to be safe if it is assisted by any kind of health professional and look at the impact of distance on the behaviour pattern of women in having a safe delivery.

Table 4.8: Safe Delivery by Distance to Health Facilities

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present	24.1	31.2	43.5	36.2	41.2	77.0
1 – 5	21.7	28.7	38.7	44.0	35.7	84.4
6 – 10	16.1	22.2	41.0	55.6	22.2	79.2
Above 10	8.5	29.2	30.6	25.0	37.5	52.0
PRIMARY HEALTH CENTER						
Facility Present	19.7	48.8	53.9	27.1	61.6	75.5
1 – 5	26.6	35.2	39.5	36.3	39.6	78.0
6 – 10	16.8	24.7	41.4	40.6	26.7	80.6
Above 10	13.8	25.0	37.1	31.5	34.0	75.2
COMMUNITY HEALTH CENTER						
Facility Present	16.0	48.3	56.6	45.6	56.8	77.8
1 – 5	29.7	39.2	46.3	38.3	41.3	80.3
6 – 10	26.4	34.8	41.3	42.1	33.0	81.7
Above 10	14.1	26.0	39.4	29.5	36.0	76.6

Source: Computed from NFHS 2, 98 – 99.

Table 4.8 brings out the effect of distance on the behaviour of the women in having a safe delivery. A clear decline in the percentage of women having safe delivery for births during three years preceding the survey is observed in all the states. Though the overall situation of safe delivery is poor in Bihar the decline is very sharp as the distance is increasing, fewer women (8.5 percent) have a safe delivery the facility is at a greater distance. In all the states roughly 10 to 15 percent decline is observed in the percentage of women having a safe delivery if a SC is located within the village and if it is located beyond 10 km.

The decline is even more prominent in some of the sates at the PHC level especially in Rajasthan and Gujarat. In Gujarat about 54 percent of the women have a safe delivery if they are in the village having a PHC and about 37 percent have a safe delivery if they are residing 10 or more km away from a PHC. In Rajasthan also 49 percent women have a safe delivery if they are in close proximity of the PHC and only about 25 percent travel beyond 10 km to have a safe delivery. In the rest of the states the trend is more or less the same.

The location of a CHC does not seem to make much impact on the women in having a safe delivery in almost all the states. The pattern observed is not smooth enough to arrive at any conclusion.

SUMMARY

Thus after having a closer look at the situation of the various health outcomes in the study states with regards to the impact of distance we can say that as far as the coverage of the villages and the population is concerned the situation is quite satisfactory. A fairly good number of Sub Centers, Primary Health Centers and Community Health Centers are present in almost all the states, which again indicates a good coverage. But though the coverage is satisfactory the health outcomes especially antenatal care and safe delivery do not reveal a satisfactory condition in some of the states like Bihar and Rajasthan.

The results of the bivariate analysis prove the fact that distance does play a role in the health seeking behaviour of the population. Immunization and treatment for fever are not much affected by the distance. It is only the maternal care indicators taken that show an impact of distance in their utilization. The first two being catered to by the private providers do not show the influence of distance to a great extent since in this study we are only concerned with the public health care providers. On the other hand, antenatal care and safe delivery are mostly attended by the public health sector.

Again the findings reveal that it is the lesser developed states like Bihar and Rajasthan that show the impact of distance on the health care utilization. Other developed states especially Tamil Nadu have less impact of distance in service utilization.

Though the impact of distance is observed, the influence of other factors is not controlled. Other socio-economic and demographic factors like caste, religion, educational level, standard of living, exposure to mass media etc., also affect the treatment seeking behaviour. Therefore in the next section we make an attempt to analyse the individual effect of distance on service utilization.

4.4 LOGIT REGRESSION ANALYSIS

In this section we discuss the results of the logit regression analysis. Though the bivariate analysis discussed in the previous section, throws light on the relationship between physical accessibility and the utilization of health facilities, it does not control for the influence of the other predictor variables, as discussed in the conceptual framework, for instance, religion, caste, education, age of the mother, standard of living and exposure to mass media. These predictor variables along with distance influence the behaviour pattern of the women in seeking certain services provided in the different health care facilities. Moreover, as mentioned in the third

chapter, we have selected the logistic regression for analyzing the sole influence of distance on health care utilization as the response variables are dichotomous and their distribution is skewed.

The results of the logistic regression analysis for distance and health outcomes (immunization, treatment for fever, antenatal care and safe delivery) are presented in tabular form in tables 4.9, 4.10, 4.11 and 4.12. The exponential parameter in the table exp(b) is called the odds ratio. It represents a proportional increase if the odds is greater than 1.0 or decrease if it is less than 1.0 for odds of utilizing the health facility compared with the reference category which in this case is facility present in the village. Thus, here the sole effect of distance is analysed. Here we are presenting the odds ratio only for distance from an SC, PHC and CHC since our basic objective is to analyse the impact of distance on the utilization of services. For the purpose of completeness we have presented the entire outputs in the appendix. The purpose to include the other variables was only to control for them as has been discussed in the chapter of conceptual framework.

IMMUNIZATION

Table 4.9 shows the odds ratio for the effect of distance on the level of attainment of immunization in the different study states. Though a decline in immunization levels with distance is observed in almost all the states, this decline is prominent in few states. In Bihar when we at the SC level we find that, children aged 12-23 months, residing 6 to 10 km from a SC are 57 percent (odds ratio 0.430) less likely to be taken for immunization when compared with children residing in a village having a SC and this is statistically significant at 1 percent level of confidence. Similar is the case with Rajasthan where children are 54 percent (odds ratio 0.463) less likely to be immunized when a SC is located 6 to 10 km further than when located in the village, which is again statistically significant. In Bihar and Rajasthan children are 20 percent and 10 percent less likely to be immunized if a SC is located further than 10 km. The respective odds ratio being 0.804 and 0.915. In West Bengal too children are 14 percent (odds ratio 0.867) less likely to be partially immunized for

DPT, BCG and measles when a SC is 6 to 10 km further, than children residing in the village with a SC.

Table 4.9 Results of the Logistic Regression Analysis for Immunization

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present[1]						
1 – 5	0.849	0.778	0.486	0.632	0.593	1.327
6 – 10	0.430**	0.463*	3.501	0.867	4460.148	3029.781
Above 10	0.804	0.915	3839.765	647.901	1.609	2.283
PRIMARY HEALTH CENTER						
Facility Present[1]						
1 – 5	0.795	0.842	1.265	0.475	0.000	0.257
6 – 10	0.805	0.738	1.806	0.781	0.000	0.273
Above 10	0.698	0.976	0.799	0.763	0.000	1.346
COMMUNITY HEALTH CENTER						
Facility Present[1]						
1 – 5	0.955	0.389*	968.968	0.445	22.712*	2167.206
6 – 10	0.682	0.663	0.348	0.427	8.342	10.948
Above 10	0.998	0.522	0.130*	0.404	4.586	2.797*

Source: Computed from tables AI to AVI
    1: Reference category
    * Significant at 5 per cent level of confidence
    ** Significant at 1 per cent level of confidence

The location of the PHC also seems to have an effect on the utilization of the service with increase in distance. In Bihar, again the effect of distance seems to be more profound where children are 30 percent (odds ratio 0.698) less likely to go for immunization with a PHC beyond 10 km than when located in the village. In the case of Rajasthan, Gujarat and West Bengal also, distance seem to cause some effect on the likelihood of using the service provided in the facility if it is located beyond the accessible range. In Rajasthan about 27 percent (odds ratio 0.738) less likelihood is there for children being immunized if a PHC is located 6 to 10 km than when it is in very close proximity. In West Bengal also children are approximately 22 per cent and 24 per cent less likely to get immunization when a PHC is between 6 to 10 km and beyond 10 km than when present within the village. The respective odds ratio being

0.781 and 0.763. The location of a SC in Tamil Nadu does not seem to cause much influence on the utilization of the facility but in the case of PHC a profound influence is seen when it is located between 1 to 5km or 6 to 10 km. Here children are 75 percent and 73 percent less likely to be immunized when the facility is between 1 to 5 km and 6 to 10 km than when present in the village. The odds ratio for 1 to 5 km and 6 to 10 km being 0.257 and 0.273 respectively.

Considering the effect of distance in the case of higher order facility, which is a CHC it is seen that in Rajasthan children are 61 per cent less likely to be immunized (odds ratio 0.389) when it is located between 1 to 5 km than when located in the village, and this is statistically significant. Here again, 34 percent (odds ratio 0.663) and 48 percent (odds ratio 0.522) less likelihood is there for children being immunized when a CHC is located between 6 to 10 km and beyond 10 km respectively than when located in the village. In Gujarat there is 65 percent (odds ratio 0.348) less likelihood get immunized when it is located between 6 to 10 km and about 87 percent (odds ratio 0.130) less likely when it is beyond 10 km, which is statistically significant. In West Bengal, at all the three categories of distance a marked decline in the likelihood of using the facility is seen. The likelihood of children getting immunized is less by 55 percent (odds ratio 0.445), 57 percent (odds ratio 0.427) and 60 percent (odds ratio 0.404) for a CHC located at 1 to 5 km, 6 to 10 km and beyond 10 km respectively than when the facility is located within the village. In the states of Himachal Pradesh and Tamil Nadu distance does not seem to cause an influence on the utilization of the service.

Overall it is seen that distance seem to have an impact in the states that are comparatively less developed than the states like West Bengal and Tamil Nadu where an improved accessibility distorts the impact of distance.

TREATMENT FOR FEVER

The relationship between distance and the utilization of the different health facilities for the treatment of fever, as in the case of immunization does not seem to be very significant, though there is some decline in the utilization of the service in some of the states. Other states also show some decline but the decline is not statistically significant as evident from table 4.10.

Table 4.10 Results of the Logistic Regression Analysis for Treatment of Fever

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present[1]						
1 – 5	1.053	1.196	0.953	1.074	0.760	1.306
6 – 10	1.034	0.864	2.057	0.982	1.173	0.980
Above 10	0.939	0.889	4566.881	0.000	1223.255	3.596
PRIMARY HEALTH CENTER						
Facility Present[1]						
1– 5	1.417*	0.919	1.601	1.013	1.714	1.721
6 – 10	1.197	0.884	2.461	0.558	2.644	2.741*
Above 10	0.702	0.799	1.284	0.377	1.083	3.417
COMMUNITY HEALTH CENTER						
Facility Present[1]						
1 – 5	1.499*	0.759	0.834	0.526	4.368	1.290
6 – 10	1.213	0.844	1.252	0.560	6.782	1.927
Above 10	1.122	0.541	0.791	0.349*	2.887	1.086

Source: Computed from tables AI to AVI
    1: Reference category
    * Significant at 5 per cent level of confidence
    ** Significant at 1 per cent level of confidence

At the SC level in Rajasthan children are 11 percent (odds ratio 0.889) less likely to be treated for fever if the SC is located beyond 10 km as compared to children having the facility in the village. In the rest of the states distance does not seem to influence the treatment seeking behaviour for fever.

Again looking from table 4.10 in most of the states distance does not have much impact on the treatment-seeking pattern for fever. It is only in Bihar, West

Bengal and Rajasthan that some decline is observed. In Rajasthan especially, children are nearly 20 percent (odds ratio 0.799) less likely to be treated for fever if the facility, that is, a PHC in this case is located beyond 10 km compared to when it is located in the village and 12 per cent less likely when it is located between 6 to 10 km. In West Bengal, distance to PHC has a great impact on the service utilization. About 45 percent (odds ratio 0.558) less likelihood is there for the children being taken to a PHC located between 6 to 10 km and 63 percent (odds ratio 0.377) less likely when it is located beyond 10 km as compared to the location of a PHC within the village. In the rest of the states more or less a similar pattern is observed with distance having less influence on the treatment seeking behaviour.

For a CHC again, a clear decline in the likelihood for treatment of fever is seen in the two states of Rajasthan and West Bengal. In Rajasthan about one fourth less likelihood is seen among children to utilize a CHC for the treatment of fever than children with a CHC in the village. The odds ratio of this is 0.759. Children when compared to those having a CHC within the village are half as likely to use the facility when it is beyond 10 km. In West Bengal children are 65 percent (odds ratio 0.349) less likely to use the CHC when it is located beyond 10 km and this is statistically significant at 1 percent level of confidence. The odds ratio being 0.526 and 0.560 for distances between 1 to 5 km and 6 to 10 km respectively. In Gujarat children are 20 percent (odds ratio 0.791) less likely to avail the treatment when a CHC is located above 10 km than when it is present in the village.

ANTENATAL CARE

Coming to the utilization of maternal care we first of all look at the utilization of antenatal care. A significant decline is observed in the percentage of women utilizing the service with an increase in the distance (table 4.11), as regards the SC especially in the three states of Bihar, Rajasthan and Himachal Pradesh. In Bihar about slightly more than half of the women are less likely to go for any type of antenatal care if the SC is located 6 to 10 km than when it is located in the village. The odds ratio being 0.476 and it is highly significant. Again a very significant

79

decline of 48 percent (odds ratio 0.541) in availing antenatal care is observed among women if the SC is located further than 10km. Women with a SC between 1 to 5 km are also 15 percent (odds ratio 0.858) less likely to have some antenatal care than the women who have a SC in the village. In Rajasthan also the propensity to use the service significantly decline with increase in the distance. About one fourth of women (odds ratio 0.748) are less likely to have antenatal care when the SC is between 1 to 5 km and 47 percent (odds ratio 0.525) less likely when the SC is between 6 to 10 km. About 14 percent are less likely when it is even beyond 10 km or so. And this is highly significant. In Himachal Pradesh also, women are 75 percent (odds ratio 0.256) show a less likelihood in getting antenatal care when the SC is located between 6 to 10 km and about 36 percent are less likely to use the facility when it is beyond 10 km when compared to women having the facility in the village.

Table 4.11 Results of the Logistic Regression Analysis for Antenatal care

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present[1]						
1 – 5	0.858	0.748**	1.123	1.176	0.923	1.633
6 – 10	0.476**	0.525**	1.316	653.551	0.256**	3067.702
Above 10	0.541**	0.860	1.644	0.031**	0.642	1.435
PRIMARY HEALTH CENTER						
Facility Present[1]						
1 – 5	0.851	0.724*	0.513*	1.624	1.258	0.466
6 – 10	0.654**	0.576**	0.815	1.410	0.235*	1.376
Above 10	0.628**	0.555**	0.660	0.654	0.202*	1.092
COMMUNITY HEALTH CENTER						
Facility Present[1]						
1 – 5	1.085	0.819	0.699	1.764	1.203	0.390
6 – 10	0.874	1.246	0.594	0.645	0.328	0.663
Above 10	0.927	0.899	0.717	0.399	0.341*	0.452

Source: Computed from tables AI to AVI

    1: Reference category

    * Significant at 5 per cent level of confidence

    ** Significant at 1 per cent level of confidence

As regards the PHC, we can see from table 4.11 that in most of the study states significant decline is observed when the facility is not located within close proximity. In Bihar, women are, 35 percent (odds ratio 0.654) less likely to have some sort of antenatal care when it is between 6 to 10 km than when it is in the village. This is statistically significant. Women show 37 percent (odds ratio 0.628) less likelihood to use a PHC when they are residing 10 km away and this is highly significant. In Rajasthan also, women are 25 percent (odds ratio 0.748) less likely to have antenatal care if the PHC is between 1 to 5 km and 42 percent (odds ratio 0.576) less likely if it is between 6 to 10 km and 45 percent less likely if it is beyond 10 km when compared to the presence of a PHC in the village. And all these are statistically significant. Gujarat also shows a similar trend where women are half (odds ratio 0.513) as likely to get antenatal care if the PHC is not located in the village and this shows a significant result. In Gujarat women residing 6 to 10 km and beyond 10 km are 20 percent and 34 percent less likely to receive antenatal care respectively when compared to women residing in the village with a PHC. The respective odds ratio is 0.815 and 0.660. In Himachal Pradesh highly significant decline of 76 percent is seen in the likelihood of women having antenatal care if a PHC is between 6 to 10 km. The odds ratio being 0.235. And women are 80 percent (odds ratio 0.202) less likely to get antenatal care when the PHC is beyond 10 km. This is also statistically significant.

A CHC being far inaccessible than the SC or PHC show marked declines in its utilization with increasing distance. In Bihar women are 13 percent less likely to go for antenatal care if it is between 6 to 10 km. In Gujarat, a decline is very prominent with increasing distance, women are 30 percent less likely to avail the service if it is located between 1 to 5 km, 40 percent (odds ratio 0.594) less likely when located between 6 to 10 km and 30 percent (odds ratio 0.717) when it is beyond 10 km. Tamil Nadu, as seen earlier also does not seem to have much impact of distance on the utilization of services but in the case of CHC a decline in the utilization of the service is observed. Women are 60 percent (odds ratio 0.390) less likely to utilize the CHC when it is located between 1 to 5 km. If a CHC is located even beyond 10 km, women

are 55 percent (odds ratio 0.452) less likely to use the facility when compared to women who reside in a village having a CHC, and this is statistically significant.

Thus distance seems to have a great impact on the utilization of antenatal care services, again in the lesser developed states like Bihar and Rajasthan.

SAFE DELIVERY

In Bihar women residing 1 to 5 km away from a SC are 10 percent (odds ratio 0.899) less likely to have a safe delivery compared with women residing in a village having a SC. Similarly, women residing 6 to 10 km and more than 10 km from a SC are 27 percent and 60 percent les likely to have a safe delivery. The corresponding odds ratio being 0.725 and 0.406 respectively which is statistically highly significant. In Rajasthan women residing between 1 to 5 km away from a SC are 25 per cent less likely to have a safe delivery. The odds ratio of which is 0.748. Women in Rajasthan are 37 percent (odds ratio 0.6290) less likely to go for safe delivery when the SC is 6 to 10 km further from their place of residence which is also significant (table 4.12).

Table 4.12 Results of the Logistic Regression Analysis for Safe Delivery

Distance	Bihar	Rajasthan	Gujarat	West Bengal	Himachal Pradesh	Tamil Nadu
SUB CENTER						
Facility Present[1]						
1 – 5	0.899	0.848	0.747	0.785	0.830	1.683*
6 – 10	0.725*	0.629*	0.935	2.060	0.474*	1.565
Above 10	0.406**	0.908	0.628	0.520	1.179	0.226**
PRIMARY HEALTH CENTER						
Facility Present[1]						
1 – 5	1.432*	0.600**	0.704	0.948	0.489*	1.347
6 – 10	0.836	0.402**	0.670	1.186	0.280**	1.506
Above 10	0.748	0.404**	0.567*	0.709	0.534**	1.025
COMMUNITY HEALTH CENTER						
Facility Present[1]						
1 – 5	2.072**	0.799	0.437*	0.580	0.940	1.156
6 – 10	1.916**	0.613*	0.339**	0.745	0.754	1.534
Above 10	0.933	0.448**	0.393**	0.430**	0.946	0.901

Source: Computed from tables AI to AVI   * Significant at 5 per cent level of confidence
1: Reference category   ** Significant at 1 per cent level of confidence

In Gujarat women residing further than 10 km from a SC are 47 percent (odds ratio 0.628) less likely to have a safe delivery. In West Bengal the corresponding percentage for 10 km and above is 48 percent (odds ratio 0.520) and in Tamil Nadu for the same category it is 77 percent (odds ratio 0.226) and this is statistically highly significant. In Himachal Pradesh women residing 6 to 10 km away from a SC show 53 percent (odds ratio 0.474) less likelihood to have a safe delivery than women who reside in the village with a SC.

Table 4.12 also shows the situation in a PHC. In Rajasthan highly significant declines are seen in the likelihood of women have a safe delivery if a PHC is located further from their residence. Here women who reside 1 to 5 km away from a PHC are 40 percent (odds ratio 0.600) less likely to have a safe delivery, showing a highly significant result. The decline becomes further prominent with increasing distance, where women residing 6 to 10 km and beyond 10 km from a PHC are less likely to have safe delivery than women who reside in the village having a PHC. The respective odds ratios are 0.402 and 0.404, which are also statistically highly significant. In Gujarat women are 30 percent (odds ratio 0.704) less likely to have a safe delivery when they are residing 1 to 5 km away from a PHC and 43 percent when they are residing beyond 10 km from a PHC, this shows a high significance statistically. Himachal Pradesh also shows marked declines in the percentage of women having a safe delivery. About 51 percent (odds ratio 0.480), 72 percent (odds ratio 0.280) and 47 percent (odds ratio 0.534) less likelihood is seen among women residing 1 to 5, 6 to 10 and beyond 10 km respectively are les likely to use the facility for safe delivery than women residing in the village having a PHC. And these are statistically highly significant.

In a CHC, especially in Rajasthan and Gujarat the impact of distance is highly significant. In Rajasthan women are 39 percent less likely to have a safe delivery when the facility is located between 6 to 10 km than the women residing in the village. The odds ratio of the same being 0.613 which is statistically significant. About 56 percent (odds ratio 0.448) less likelihood is observed among the women of

Rajasthan to have a safe delivery when the facility is beyond 10km. This is highly significant at 1 percent level of confidence.

In Gujarat also a prominent decline is observed. About 57 percent less likelihood is seen among women residing 1 to 5 km from the health facility to have a safe delivery than the women residing in the village having a facility. This is statistically significant. A less likelihood of 66 percent (odds ratio 0.339) and 61 percent (odds ratio 0.393) is seen among women to have a safe delivery when they are residing 6 to 10km and beyond 10 km respectively. And these are highly significant. In the other states though a decline is there with increasing distance it is not very significant.

SUMMARY

It is seen from the results of the logistic regression analysis that distance does have an impact on the utilization of the services even when the other predictor variables are controlled.

As in the bivariate analysis, distance shows a profound impact on the utilization especially in the maternal health care indicators. A highly significant relationship is found among distance and maternal health care especially in the less developed states of Bihar, Rajasthan and Gujarat. Tamil Nadu as has the case been earlier shows very less impact on the utilization of these services. Distance has a very significant influence in the case of safe delivery. Immunization and treatment of fever does not show a very significant impact of distance.

Overall it may be concluded that physical accessibility does play a prominent role in the treatment seeking behaviour of the women in this case and it is all the more prominent in the less developed states where poor accessibility has always posed a hindrance in service utilization.

CHAPTER V

SUMMARY AND CONCLUSION

CHAPTER 5

SUMMARY AND CONCLUSION

Access in any form plays an important role in the utilization of medical care facilities. Historically, improving access has been widely accepted as a primary strategy for increasing the utilization of medical care especially in the rural areas. But the focus on the physical accessibility as a determining variable in the utilization of health care and corresponding health outcomes has been neglected. Though in the Western world there has been some significant research on access and utilization in terms of distance to source, physical access has not achieved the attention it deserved in India. There is a paucity of research on this aspect, in spite of the fact that it is one of the primary factors affecting health utilization especially in rural areas. This study has therefore, been an attempt to fill this gap and bring out the individual effect of distance on health care utilization and outcomes.

The specific focus of the study was on the role played by distance on the utilization of different health facilities present in the rural areas under the Primary Health Care, and its impact on the health outcomes in the form of maternal and child health care. It also attempted to analyse how physical access affects utilization of health services at different levels of socio-economic development. Finally, it has examined the impact of distance on utilization for different types of health facilities, i.e., Sub Center, Primary Health Center and Community Health Center.

In the chapter on conceptual framework the different variables undertaken for the study have been discussed and the justification for the inclusion of the same is provided. The methodology of logistic regression has also been discussed at length, which has been included to provide statistical controls for a number of potentially confounding socio-economic and demographic variables.

It has been argued that physical access to health care facilities forms a key to their utilization, particularly in regions that are characterized by medium and low levels of social and economic development whereas at higher levels of such development the effect of distance is not prominently evident. Hence, the states of Bihar, Rajasthan, Gujarat, West Bengal, Himachal Pradesh and Tamil Nadu selected for the study conform to the different levels of development based on the immunization levels in these states.

The results show that though the coverage of villages and the population, which, here are the ever-married women, through the different health centers, is quite satisfactory yet the health outcomes in the study states do not satisfactorily correspond to this. The health situation in most of the states is quite unsatisfactory. This is seen in the less developed states of Bihar and Rajasthan especially with regards to antenatal care and safe delivery.

The findings of the study also reveals that distance has strong impact on the utilization and outcome of health care in the states that are less developed socially and economically. In Bihar and Rajasthan a decline with distance is observed in the utilization of maternal and child health care, especially maternal care - antenatal care and safe delivery. The states of Gujarat, Rajasthan and Himachal Pradesh also fairly conform to the hypothesis. It is in Tamil Nadu alone that the impact of distance on the utilization of these services does not show a profound impact. As is well known, the coverage of the health services in Tamil Nadu is near universal and even the remote areas have also been covered by some form of health services. Further, the public transportation system in the state is also well developed and a large number of buses run which have linked all the villages to the urban centers.[1] The improved access to urban centers facilitates the utilization of health services by people residing in far-flung areas. In contrast, in states where the health outcomes are poor such as the

---

[1] Ramasundaram S, (1995): 'Causes for the Rapid Fertility Decline in Tamil Nadu: A Policy Planner's Perspective', *Demography India*, vol.24 (1), pp.13-21.

northern states, the coverage of health services is restricted to the immediate vicinity of the health centers and the distance decay effect is profound.

The study also reveals that wherever distance shows an impact on the utilization of services the impact is more on maternal health care than on child health care. Maternal health care measured through antenatal care and safe delivery shows a marked decline in utilization with increasing distance especially in the less developed states of Bihar and Rajasthan. Traditionally, in rural India pregnancy is considered a natural state rather than a condition requiring some kind of medical care and attention. Hence, such kind of perceptions and beliefs constitute the 'lay health culture' which has substantial effects on the utilization of the services provided and distance plays the role of an intervening factor in the attainment of maternal care. This is more prominent in states where poverty and illiteracy are widespread.

In the case of child health care, that is, immunization and treatment for fever, the study finds that distance has less impact. This could be attributed to the fact that in case of immunization the Universal Immunization Programme (UIP) initiated in 1985 has had immense success since then. The programme has a wide coverage even in the backward states, and essential care at the community level is being implemented in all the districts of the country. And since one of the goals of the National Population Policy is to immunize all children by the year 2010 the programme has been intensified further with an even wider coverage.

As for the treatment for fever, the private health care providers who provide most of the curative health care probably distorts the distance decay effect found in the case of other health care services such as antenatal care. Mahal et al.,[2] found that the share of the private sector in the out patient care is around 82 percent whereas that of public is only 18 percent which clearly explains why distance does not have much impact on the attainment of medical care for the treatment of fever, since the study

---

[2] Mahal, et al., (2000): *Who Benefits from Public Health Spending in India*, NCAER.

only focused on the public health care facilities. On the other hand 50 percent of the antenatal care is provided by the public health sector and 40 percent by the private.

The findings also show better health outcomes in villages which have a PHC or a CHC compared with villages which have a SC. Studies have shown that a large fraction of sub-centers are not functional because of lack of proper buildings and resident health workers. For instance, a study by Iyer et al.,[3] reports that one half of all the SCs operate from either makeshift or rented accommodations. Again the non-residence of the health workers in the health facilities further constraints their utilization. Verma and Roy[4] in their study reported that only about 11 percent of the health workers reside in the staff quarters. All these factors together contribute to the low effectiveness of SC's in improving the health outcomes of the population in their service areas.

This study has mainly focused on the public health care facilities. However, as part of future research the role of private health care facilities can be taken into consideration. A major goal of this study has been to bring to the notice of programme managers and policy makers the potential effects of improved physical accessibility on the attainment of proper child and maternal care in the rural areas through the Primary Health Care.

---

[3] Iyer, A, and A., Jesani, (1999): Barriers to Quality of Care: The Experience of Auxiliary Nurse Midwives in Rural Maharashtra, in M.A.,Koeing and M.E., Khan (eds), *Improving Quality of Care in India's Family Welfare Programme: The Challenge Ahead*, The Population Council, New York, pp.210-237.
[4] Verma, R.K., and T.K., Roy, (1999): Accessing the Quality of Family Planning Service Providers in Four Indian States, in M.A.,Koeing and M.E., Khan (eds), *Improving Quality of Care in India's Family Welfare Programme: The Challenge Ahead*,The Population Council, New York , pp.210-237.

BIBLIOGRAPHY

BIBLIOGRAPHY

Acharya, L.B. & J. Cleland, (2000): 'Maternal and Child Health Services in Rural Nepal: Does Access or Quality Matter?', *Health Policy and Planning*, vol. 15(2), pp. 223-229.

Aday, Lu Ann & R. Andersen, (1974): 'A Framework of the Study of Access to Medical Care', *Health Services Research*, Fall, pp. 208-220.

Amin, R. et al., (1989): 'Community Health Services and Health Care Utilization in Rural Bangladesh', *Social Science and Medicine*, vol. 29 (12), pp. 1343-1349.

Annis, S. (1981): 'Physical Access and Utilization of Health Services in Rural Guatemala', *Social Science and Medicine*, vol. 15D, pp. 515-523.

Ayeni, B., G. Rushton & M.L. McNulty, (1987): 'Improving the Geographical Accessibility of Health Care in Rural Areas: A Nigerian Case Study', *Social Science and Medicine*, vol. 25 (10), pp. 1083-1094.

Bailey, W.R., A. Lee & H.H. Wynter, (1987): 'Distance and Continuation Rates in a Family Planning Clinic: A Case Study from Jamaica', *Social and Economic Studies*, Vol. 36(3), Sept., pp. 203-17.

Banerji, D. (1985): *Health and Family Planning Services in India*, Lok Prakash Publishers, New Delhi.

Barlow, R. & S. Diop, (1995): 'Increasing the Utilization of Cost Effective Health Services through Changes in Demand', *Health Policy and Planning*, 10 (3), pp. 284-295.

Basu, S. (1990), 'Health Scenario and Health Problems of Tribal Population in India.' *Seminar on Continuity and Change in Tribal Society*, Indian Institute of Advanced Study, Shimla.

Bertrand, J.P. et al., (1995), 'Access, Quality of Care and Medical Barriers in Family Planning Programs', *International Family Planning Perspectives*, vol. 21(2), pp. 64-69.

Bhende, A and T.K Kanitkar, (1993): *'Principles of Population Studies'*, Himalaya Publishing House, Delhi.

Bloom, S.S. et al., (1997): ' Dose Antenatal Care make a Difference to Safe Delivery? A study in urban Uttar Pradesh, India', *Health Policy and Planning*, vol.14 (1): pp. 38-48.

Bosanac, E.M., R.C. Parkinson & D.S. Hall, (1976): 'Geographic Access to Hospital Care: A 30-Minute Travel Time Standard', *Medical Care*, XIV (7), pp. 616-624.

Bronstein, J.M. & M.A. Morrisey, (1990): 'Determinants of Rural Travel Distance for Obstetrics Care', *Medical Care*, 28(9), pp. 853-865.

C. Montoyo-Aguilar, (1995), *Health Planning in India*, WHO, Geneva, pp.1.

Chen, M.K. (1982): 'Health Care Services and Health Status in a Rural Setting: The Utility of Some Predictors', *Inquiry*, vol. 19, pp. 257-261.

Das, N.P., V.K. Mishra and P.K. Saha, (2001): *Does Community Access Affect the Use of Health and Family Welfare Services in Rural India?*, NFHS Subject Reports, Number 18, IIPS, Mumbai.

Dawn, C.S. (1994): 'How Effective is Antenatal Care in India', *Journal of Obstetrics, Gynaecology and Family Welfare*, vol. 1(1), July, pp. 9-10.

Dutt, P.R. (1963), *Rural Health Services in India- Primary Health Center*, Central Health Education Bureau. Ministry of Health and Family Planning, Govt. of India, New Delhi.

Fiedler, J.L. (1981): 'A Review of the Literature on Access and Utilization of Medical Care with Special Emphasis on Rural Primary Care', *Social Science and Medicine*, vol. 15C, pp. 129-142.

Fosu, G.B. (1989): 'Access to Health Care in Urban Areas of Developing Societies', *Journal of Health and Social Behavior*, vol.30 (December), pp. 398-411.

Fosu, G.B. (1994): 'Childhood Morbidity and Health Services Utilization: Cross-National Comparisons of User Related Factors from DHS Data', *Social Science and Medicine*, 38 (9), pp. 1209-1220.

Girt, J.L. (1973): 'Distance to General Medical Practice and its Effect on Revealed Ill-Health in a Rural Environment', *Canadian Geographer*, vol.17, pp. 154-166.

Goodman, D.C. et al (1997): 'The Distance to Community Medical Care and the Likelihood of Hospitalization: Is Closer always Better?', *American Journal of Public Health*, vol. 87 (7), pp. 1144-1150.

Grover, Deepak, Reena Singh, K. C. Kaishtha, R. Gawari, S. Singh and G. Singh, (2001), *RCH – The Role of ANM*, paper presented at 24th Annual Conference of IASP, Visakhapatnam.

Gupta, R.N. (1988): 'Health and Family Welfare Program in Rajasthan: An Appraisal', in M.E. Khan et al (eds.), *Performance of Health and Family Welfare Program in India*, Himalaya Publishing House, Bombay, Nagpur, Delhi, pp. 188-209.

Ingram, D.R., D.R. Clarke & R.A. Murdie, (1978): 'Distance and the Decision to Visit an Emergency Department', *Social Science and Medicine*, vol.12, pp. 55-62.

Iyer, A., & A. Jesani, (1999): Barriers to Quality of Care: The Experience of Auxiliary Nurse Midwives in Rural Maharashtra, in M.E. Khan (eds.), *Improving Quality of Care in India's Family Welfare Programme: The Challenge Ahead*, The Population Council, New York, pp. 210-237.

Joseph, A.E. & B.C. Hallman, (1998): 'Over the Hill and Far Away: Distance as a Barrier to the Provision to Elderly Relatives', *Social Science and Medicine*, vol. 46 (6), pp. 631-639.

Joseph, A.E. & P.R. Bantock, (1982): 'Measuring Potential Physical Accessibility to General Practitioners in Rural Areas: A Method and Case Study', *Social Science and Medicine*, vol. 16, pp. 85-90.

Joseph, A.E., and Phillips, D.R., (1984), *Accessibility and Utilization: Geographical Perspectives on Health Care Delivery*, Harper and Row, London.

Kamble, N.D. (1984): *Rural Health*, Ashish Publishing House, New Delhi.

Khan, M.E. & C.V.S. Prasad, (1988): 'Functioning of Health and Family Welfare Program – A Comparative Study of Bihar and Kerala' in M.E. Khan et al (eds.), *Performance of Health and Family Welfare Program in India*, Himalaya Publishing House, Bombay, Nagpur, Delhi, pp. 1-38.

Khan, M.E. & R.B. Gupta, (1988): 'Familial Values, Contraception and Utilization of MCH services in Rural UP' in M.E. Khan et al (eds.), *Performance of Health and Family Welfare Program in India*, Himalaya Publishing House, Bombay, Nagpur, Delhi, pp. 94-121.

Khan, M.E. et al., (1987): 'Reasons for Underutilization of Health Services – A Case Study of a PHC in a Tribal Area of Bihar', *Demography India*, XVI(2), pp. 177-195.

Knox, P.L. (1979): 'The Accessibility of Primary Care to Urban Patients: A Geographical Analysis', *Journal of the Royal College of General Practitioners*, vol. 29, pp. 160-168.

Kumar, R. et al., (1997): 'Impact of Health Center Availability on Utilization of Maternity Care and Pregnancy Outcome in a Rural Area of Haryana', *Journal of the Indian Medical Association*, vol. 95(8), pp. 448-450.

Lerberghe, W.V. & K. Pangu, (1988): 'Comprehensive can be Effective: The Influence of Coverage with a Health Center Network on the Hospitalization Patterns in the Rural Area of Kasongo, Zaire', *Social Science and Medicine*, vol. 26 (9), pp. 949-955.

Mayer, J.D. (1983): 'The Distance Behavior of Hospital Patients: A Disaggregated Analysis', *Social Science and Medicine*, vol. 17 (12), pp. 819-827.

Mooney, C. et al., (2000):'Is Travel Distance a Barrier to Veterans' Use of VA Hospitals for Medical Surgical Care?', *Social Science and Medicine*, vol.50 pp. 1743-1755.

Mujibur Rahaman, M. et al., (1982): 'A Diarrhea Clinic in Rural Bangladesh: Influence of Distance, Age and Sex on Attendance and Diarrheal Mortality', *American Journal of Public Health*, vol.72 (10), pp. 1124-1128.

Nemet, G.F. & A.J. Bailey, (2000): 'Distance and Health Care Utilization among the Rural Elderly', *Social Science and Medicine*, vol.50, pp. 1197-1208.

Noorali, R., S. Luby & M.H. Rahbar, (1999): 'Does Use of a Government Service Depend on Distance from the Health Facility?', *Health Policy and Planning*, vol.14 (2), pp.191-197.

Nougtara, A. et al., (1989): 'Assessment of MCH Services Offered by Professional and Community Health Workers in the District of Solenzo, Burkina Faso. I. Utilization of MCH Services', *Journal of Tropical Pediatrics*, vol.35, pp. 2-9.

Oppong, J.R. & M.J. Hodgson, (1994): 'Spatial Accessibility to Health Care Facilities in Suhum District, Ghana', *Professional Geographer*, 46 (2), pp. 199-209.

Park, S.E. & K. Park, (1991): *Textbook of Preventive and Social Medicine*, Banarsidas Bhanot Publishers, Jabalpur.

Paul, B.K. & D.J. Rumsey, (2002): 'Utilization of health Facilities and trained Birth Attendants for Childbirth in Rural Bangladesh: An Empirical Study', *Social Science and Medicine*, vol.54, pp. 1755-1765.

Perry, B. & W. Gesler, (2000): 'Physical Access to Primary Health Care in Andean Bolivia', *Social Science and Medicine*, vol.50 pp. 1177-1188.

Rahaman, M., et al., (1982): 'A Diarrhoea Clinic in Rural Bangladesh: Influence of Distance, Age, and Sex on Attendance and Diarrhoeal Mortality', *American Journal of Public Health*, vol. 72, pp. 1124-28.

Ramasundaram, S. (1995): 'Causes for the Rapid Fertility Decline in Tamil Nadu: A Policy Planner's Perspective', Demography India, vol. 24(1), pp. 13 – 21.

Rao, P.S.S. & J. Richard, (1984): 'Socioeconomic and Demographic Correlates of Medical Care and Health Practices', *Journal of Biosocial Science*, vol. 16, pp. 343-355.

Rao, P.S.S. et al., (1972): 'Methods of Evaluating Health Centers', *British Journal of Preventive and Social Medicine*, vol. 26, pp. 46-52.

Retherford, D., and Choe, M.K., (1993): *Statistical Models for Causal Analysis*, John Wiley and Sons, Inc. New York.

Sauerborn, R. et al., (1989): 'Low Utilization of Community Health Workers: Results from a Household Interview Survey in Burkina Faso', *Social Science and Medicine*, vol.29 (10), pp. 1163-1174.

Seiber, J. & J.T. Bertrand, (2002): 'Access as a Factor in Differential Contraceptive Use between Mayans and Ladinos in Guatemala', *Health Policy and Planning*, vol.17 (2), pp. 167-177.

Shannon, G.W. & J. Lovett, (1979): 'Travel for Primary Care: Expectation and Performance in a Rural Setting', *Journal of Community Health*, vol. 5, pp. 113-125.

Shannon, G.W. & R.L. Bashshur, (1969): 'The Concept of Distance as a Factor in Accessibility and Utilization of Health Care', *Medical Care Review*, vol. 26, pp. 143-161.

Sharpston, N.J. (1972): 'Uneven Geographical Distribution of Medical Care: A Ghanian Case Study', *Journal of Development Studies*, vol. 8, pp. 205-22.

Shreshtha, D.R. & A. Ittiravivongs, (1994): 'Factors Affecting Utilization of Health Centers in a Rural Area of Chon Buri Province, Thailand', *South East Asian Journal of tropical Medicine and Public Health*, vol. 25 (2), pp. 361-367.

Stock, R. (1983): 'Distance and the Utilization of Health Facilities in Rural Nigeria', *Social Science and Medicine*, vol. 17 (9), pp. 563-570.

Swenson, I.E. et al., (1993): 'Factors Related to the Utilization of Prenatal Care in Vietnam', *Journal of Tropical Medicine and Hygiene*, vol. 96, pp. 76-85.

Thang, N.M. & D.N. Anh, (2002): 'Accessibility and Use of Contraceptives in Vietnam', *International Family Planning Perspectives*, 28(4), pp. 214-219.

Thouez, J.M., P. Bodson & A.E. Joseph, (1988): 'Some Methods for Measuring the Geographic Accessibility of Medical Services in Rural Regions', *Medical Care*, 26 (1), pp. 34-44.

Twaddle, A.C. (1974): 'The Concept of Health Status', *Social Science and Medicine*, vol. 8(1), pp. 29-34.

Verma, R.K. & T.K. Roy, (1999): Accessing the Quality of Family Planning Service Providers in Four Indian State, in M.E. Khan (eds.), *Improving Quality of Care in India's Family Welfare Programme: The Challenge Ahead*, The Population Council, New York pp. 169-182.

Visaria, P.V. & A. Gumber, (1996): 'Socio-economic Differentials in Patterns of Health Care Access and Utilization' in M. Dasgupta, L.C. Chen and T.N. Krishna ed., *Health, Poverty and Development in India*, Oxford University Press, New Delhi.

Weiss, J.E. & M.R. Greenlick, (1970): 'Determinants of Medical Care Utilization: The Effect of Social Class and Distance on Contacts with the Medical Care System', *Medical Care*, VIII (6), pp. 456-462.

Wong, E.L. et al., (1987): 'Accessibility, Quality of Care and Prenatal Care Use in the Philippines', *Social Science and Medicine*, vol. 24 (11), pp. 927-944.

Yesudian, C.A.K. (1988): *Health Services in Urban India*, Mittal Publications, Delhi.

APPENDICES

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BIHAR
Table AI.1
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			8.276	3	0.041	
1 - 5 km	-0.164	0.175	0.876	1	0.349	0.849
6 - 10 km	-0.844	0.294	8.241	1	0.004	0.43
Above 10 km	-0.219	0.324	0.457	1	0.499	0.804
Education			25.345	3	0	
Primary School	0.224	0.319	0.49	1	0.484	1.25
Middle School	1.224	0.269	20.753	1	0	3.402
High School +	2.347	0.799	8.64	1	0.003	10.459
Ethinicity			1.051	3	0.789	
Scheduled Caste	-0.255	0.277	0.85	1	0.356	0.775
Scheduled Tribe	-0.047	0.411	0.013	1	0.908	0.954
OBC	-0.18	0.233	0.597	1	0.44	0.835
Religion			1.3	2	0.522	
Muslims	-0.194	0.223	0.756	1	0.384	0.823
Others	-0.735	1.019	0.521	1	0.471	0.479
Age of Mother			5.683	6	0.46	
20 - 24	-0.125	0.23	0.297	1	0.586	0.882
25 - 29	-0.287	0.247	1.348	1	0.246	0.751
30 - 34	-0.236	0.299	0.624	1	0.43	0.789
35 - 39	-0.856	0.397	4.648	1	0.031	0.425
40 - 44	0.062	0.685	0.008	1	0.928	1.063
45 - 49	0.323	1.445	0.05	1	0.823	1.381
Standard of Living			4.673	2	0.097	
Medium SLI	0.389	0.186	4.398	1	0.036	1.476
High SLI	0.144	0.392	0.135	1	0.713	1.155
Exposure to Mass Media	0.505	0.221	5.238	1	0.022	1.657
Constant	0.121	0.459	0.069	1	0.793	1.128

Table AI.2
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			0.222	3	0.974	
1 - 5 km	0.052	0.167	0.096	1	0.756	1.053
6 - 10 km	0.034	0.263	0.017	1	0.897	1.034
Above 10 km	-0.062	0.291	0.046	1	0.83	0.939
Education			1.448	3	0.694	
Primary School	-0.222	0.317	0.491	1	0.483	0.801
Middle School	-0.179	0.275	0.425	1	0.515	0.836
High School +	-0.629	0.624	1.015	1	0.314	0.533
Ethinicity			10.411	3	0.015	
Scheduled Caste	0.026	0.262	0.01	1	0.922	1.026
Scheduled Tribe	-1.05	0.381	7.605	1	0.006	0.35
OBC	-0.187	0.226	0.687	1	0.407	0.829
Religion			3.935	2	0.14	
Muslims	0.422	0.22	3.68	1	0.055	1.525
Others	0.338	0.618	0.299	1	0.584	1.402
Age of Mother			5.466	5	0.362	
20 - 24	-0.038	0.24	0.025	1	0.875	0.963
25 - 29	-0.225	0.245	0.845	1	0.358	0.799
30 - 34	-0.479	0.285	2.813	1	0.094	0.62
35 - 39	0.152	0.38	0.16	1	0.689	1.164
40 - 44	-0.164	0.529	0.096	1	0.757	0.849
Standard of Living			20.699	2	0	
Medium SLI	0.793	0.18	19.314	1	0	2.209
High SLI	1.126	0.428	6.932	1	0.008	3.084
Exposure to Mass Media	-0.306	0.208	2.165	1	0.141	0.736
Constant	0.611	0.276	4.888	1	0.027	1.842

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BIHAR
Table AI.3
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			35.225	3	0	
1 - 5 km	-0.153	0.102	2.24	1	0.134	0.858
6 - 10 km	-0.742	0.144	26.694	1	0	0.476
Above 10 km	-0.614	0.163	14.207	1	0	0.541
Education			28.994	3	0	
Primary School	0.342	0.211	2.623	1	0.105	1.408
Middle School	0.968	0.191	25.76	1	0	2.632
High School +	1.252	0.551	5.164	1	0.023	3.496
Ethinicity			14.661	3	0.002	
Scheduled Caste	-0.532	0.164	10.487	1	0.001	0.587
Scheduled Tribe	-0.749	0.218	11.783	1	0.001	0.473
OBC	-0.365	0.142	6.644	1	0.01	0.694
Religion			0.331	2	0.848	
Muslims	-0.032	0.125	0.064	1	0.801	0.969
Others	-0.219	0.423	0.269	1	0.604	0.803
Age of Mother			12.341	6	0.055	
20 - 24	0.016	0.143	0.012	1	0.912	1.016
25 - 29	-0.164	0.145	1.282	1	0.257	0.849
30 - 34	-0.282	0.164	2.956	1	0.086	0.755
35 - 39	-0.483	0.204	5.591	1	0.018	0.617
40 - 44	-0.369	0.313	1.389	1	0.239	0.692
45 - 49	0.011	0.641	0	1	0.986	1.011
Standard of Living			11.731	2	0.003	
Medium SLI	0.355	0.104	11.724	1	0.001	1.426
High SLI	0.272	0.278	0.954	1	0.329	1.312
Exposure to Mass Media	0.601	0.142	17.993	1	0	1.824
Constant	1.091	0.225	23.44	1	0	2.978

Table AI.4
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			12.836	3	0.005	
1 - 5 km	-0.107	0.118	0.822	1	0.364	0.899
6 - 10 km	-0.322	0.187	2.952	1	0.086	0.725
Above 10 km	-0.902	0.268	11.353	1	0.001	0.406
Education			30.452	3	0	
Primary School	0.11	0.221	0.246	1	0.62	1.116
Middle School	0.722	0.155	21.769	1	0	2.058
High School +	1.357	0.347	15.278	1	0	3.886
Ethinicity			17.976	3	0	
Scheduled Caste	-0.43	0.179	5.757	1	0.016	0.65
Scheduled Tribe	-1.458	0.378	14.853	1	0	0.233
OBC	-0.396	0.143	7.713	1	0.005	0.673
Religion			9.674	2	0.008	
Muslims	-0.505	0.167	9.193	1	0.002	0.603
Others	0.407	0.598	0.463	1	0.496	1.502
Age of Mother			12.054	6	0.061	
20 - 24	0.055	0.165	0.11	1	0.74	1.056
25 - 29	-0.204	0.174	1.369	1	0.242	0.816
30 - 34	-0.234	0.208	1.264	1	0.261	0.792
35 - 39	-0.665	0.305	4.748	1	0.029	0.514
40 - 44	-0.837	0.549	2.324	1	0.127	0.433
45 - 49	0.076	0.81	0.009	1	0.926	1.079
Standard of Living			26.196	2	0	
Medium SLI	0.365	0.127	8.192	1	0.004	1.44
High SLI	1.129	0.222	25.899	1	0	3.092
Exposure to Mass Media	0.662	0.134	24.479	1	0	1.939
Constant	-1.09	0.259	17.674	1	0	0.336

APPENDIX I

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BIHAR

Table AI.5

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			2.001	3	0.572	
1 - 5 km	-0.229	0.22	1.085	1	0.298	0.795
6 - 10 km	-0.217	0.237	0.838	1	0.36	0.805
Above 10 km	-0.36	0.26	1.907	1	0.167	0.698
Education			22.833	3	0	
Primary School	0.248	0.316	0.614	1	0.433	1.281
Middle School	1.139	0.264	18.617	1	0	3.125
High School +	2.183	0.789	7.651	1	0.006	8.876
Ethinicity			0.94	3	0.816	
Scheduled Caste	-0.248	0.277	0.804	1	0.37	0.78
Scheduled Tribe	-0.06	0.414	0.021	1	0.884	0.941
OBC	-0.114	0.23	0.243	1	0.622	0.893
Religion			1.372	2	0.504	
Muslims	-0.219	0.223	0.968	1	0.325	0.803
Others	-0.615	0.995	0.383	1	0.536	0.54
Age of Mother			5.929	6	0.431	
20 - 24	-0.413	1.445	0.082	1	0.775	0.662
25 - 29	-0.567	1.437	0.156	1	0.693	0.567
30 - 34	-0.732	1.439	0.259	1	0.611	0.481
35 - 39	-0.662	1.448	0.209	1	0.647	0.516
40 - 44	-1.269	1.471	0.744	1	0.388	0.281
45 - 49	-0.288	1.574	0.034	1	0.855	0.75
Standard of Living	0.296	0.161	3.373	1	0.066	1.344
Exposure to Mass Media	0.471	0.218	4.684	1	0.03	1.602
Constant	-0.462	0.536	0.742	1	0.389	0.63

Table AI.6

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			12.357	3	0.006	
1 - 5 km	0.349	0.205	2.896	1	0.089	1.417
6 - 10 km	0.18	0.231	0.605	1	0.437	1.197
Above 10 km	-0.354	0.239	2.204	1	0.138	0.702
Education			2.666	3	0.446	
Primary School	-0.211	0.316	0.444	1	0.505	0.81
Middle School	-0.168	0.274	0.374	1	0.541	0.846
High School +	-0.914	0.587	2.429	1	0.119	0.401
Ethinicity			6.092	3	0.107	
Scheduled Caste	0.055	0.263	0.043	1	0.835	1.056
Scheduled Tribe	-0.765	0.386	3.931	1	0.047	0.465
OBC	-0.152	0.226	0.454	1	0.501	0.859
Religion			3.953	2	0.139	
Muslims	0.421	0.221	3.624	1	0.057	1.524
Others	0.395	0.632	0.391	1	0.532	1.484
Age of Mother			6.585	5	0.253	
20 - 24	0.173	0.534	0.105	1	0.745	1.189
25 - 29	0.132	0.507	0.068	1	0.794	1.141
30 - 34	-0.093	0.509	0.034	1	0.855	0.911
35 - 39	-0.354	0.527	0.451	1	0.502	0.702
40 - 44	0.315	0.586	0.289	1	0.591	1.371
Standard of Living	0.709	0.162	19.232	1	0	2.031
Exposure to Mass Media	-0.347	0.209	2.772	1	0.096	0.707
Constant	-0.607	0.386	2.472	1	0.116	0.545

Table Al.7

ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			16.081	3	0.001	
1 - 5 km	-0.162	0.128	1.6	1	0.206	0.851
6 - 10 km	-0.425	0.136	9.842	1	0.002	0.654
Above 10 km	-0.466	0.146	10.177	1	0.001	0.628
Education			28.901	3	0	
Primary School	0.345	0.211	2.683	1	0.101	1.412
Middle School	0.954	0.19	25.275	1	0	2.596
High School +	1.293	0.55	5.527	1	0.019	3.643
Ethinicity			14.494	3	0.002	
Scheduled Caste	-0.483	0.163	8.771	1	0.003	0.617
Scheduled Tribe	-0.745	0.22	11.507	1	0.001	0.475
OBC	-0.276	0.14	3.86	1	0.049	0.759
Religion			0.249	2	0.883	
Muslims	-0.047	0.124	0.147	1	0.702	0.954
Others	-0.135	0.418	0.104	1	0.747	0.874
Age of Mother			11.704	6	0.069	
20 - 24	0.011	0.142	0.006	1	0.94	1.011
25 - 29	-0.168	0.144	1.35	1	0.245	0.846
30 - 34	-0.29	0.163	3.153	1	0.076	0.749
35 - 39	-0.464	0.203	5.195	1	0.023	0.629
40 - 44	-0.296	0.311	0.905	1	0.341	0.744
45 - 49	0.102	0.635	0.026	1	0.872	1.108
Standard of Living			15.436	2	0	
Medium SLI	0.406	0.104	15.375	1	0	1.501
High SLI	0.35	0.277	1.598	1	0.206	1.419
Exposure to Mass Media	0.588	0.141	17.338	1	0	1.801
Constant	1.294	0.222	33.803	1	0	3.646

Table Al.8

SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			25.377	3	0	
1 - 5 km	0.36	0.151	5.722	1	0.017	1.433
6 - 10 km	-0.179	0.17	1.11	1	0.292	0.836
Above 10 km	-0.29	0.194	2.244	1	0.134	0.748
Education			30.104	3	0	
Primary School	0.091	0.223	0.166	1	0.683	1.095
Middle School	0.719	0.156	21.293	1	0	2.052
High School +	1.363	0.35	15.155	1	0	3.908
Ethinicity			15.983	3	0.001	
Scheduled Caste	-0.424	0.18	5.535	1	0.019	0.654
Scheduled Tribe	-1.38	0.38	13.159	1	0	0.252
OBC	-0.375	0.143	6.833	1	0.009	0.687
Religion			10.779	2	0.005	
Muslims	-0.533	0.168	10.097	1	0.001	0.587
Others	0.483	0.602	0.643	1	0.423	1.62
Age of Mother			11.46	6	0.075	
20 - 24	0.038	0.165	0.052	1	0.819	1.038
25 - 29	-0.225	0.174	1.66	1	0.198	0.799
30 - 34	-0.271	0.208	1.697	1	0.193	0.763
35 - 39	-0.631	0.306	4.263	1	0.039	0.532
40 - 44	-0.786	0.547	2.061	1	0.151	0.456
45 - 49	0.1	0.815	0.015	1	0.902	1.105
Standard of Living			28.569	2	0	
Medium SLI	0.413	0.128	10.331	1	0.001	1.511
High SLI	1.183	0.224	27.873	1	0	3.263
Exposure to Mass Media	0.643	0.135	22.706	1	0	1.901
Constant	-0.942	0.255	13.663	1	0	0.39

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BIHAR
Table AI.9
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			3.397	3	0.334	
1 - 5 km	-0.046	0.262	0.031	1	0.861	0.955
6 - 10 km	-0.382	0.278	1.884	1	0.17	0.682
Above 10 km	-0.002	0.243	0	1	0.994	0.998
Education			24.402	3	0	
Primary School	0.259	0.317	0.665	1	0.415	1.295
Middle School	1.199	0.267	20.194	1	0	3.315
High School +	2.274	0.796	8.155	1	0.004	9.719
Ethinicity			0.808	3	0.847	
Scheduled Caste	-0.247	0.277	0.798	1	0.372	0.781
Scheduled Tribe	-0.206	0.412	0.249	1	0.618	0.814
OBC	-0.162	0.232	0.487	1	0.485	0.85
Religion			1.503	2	0.472	
Muslims	-0.229	0.223	1.049	1	0.306	0.795
Others	-0.651	0.996	0.427	1	0.513	0.521
Age of Mother			5.701	6	0.457	
20 - 24	-0.124	0.229	0.291	1	0.589	0.884
25 - 29	-0.291	0.246	1.407	1	0.235	0.747
30 - 34	-0.214	0.296	0.524	1	0.469	0.807
35 - 39	-0.838	0.395	4.492	1	0.034	0.433
40 - 44	0.11	0.687	0.025	1	0.873	1.116
45 - 49	0.465	1.443	0.104	1	0.747	1.592
Standard of Living			4.776	2	0.092	
Medium SLI	0.4	0.185	4.677	1	0.031	1.491
High SLI	0.229	0.392	0.341	1	0.559	1.257
Exposure to Mass Media	0.512	0.22	5.385	1	0.02	1.668
Constant	0.238	0.447	0.283	1	0.594	1.269

Table AI.10

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			3.533	3	0.316	
1 - 5 km	0.405	0.241	2.826	1	0.093	1.499
6 - 10 km	0.193	0.258	0.561	1	0.454	1.213
Above 10 km	0.115	0.223	0.266	1	0.606	1.122
Education			1.769	3	0.622	
Primary School	-0.242	0.318	0.581	1	0.446	0.785
Middle School	-0.201	0.276	0.531	1	0.466	0.818
High School +	-0.7	0.626	1.249	1	0.264	0.497
Ethinicity			9.057	3	0.029	
Scheduled Caste	0.033	0.263	0.016	1	0.9	1.034
Scheduled Tribe	-0.982	0.382	6.615	1	0.01	0.375
OBC	-0.162	0.228	0.509	1	0.476	0.85
Religion			3.753	2	0.153	
Muslims	0.413	0.22	3.508	1	0.061	1.511
Others	0.336	0.62	0.293	1	0.588	1.399
Age of Mother			5.565	5	0.351	
20 - 24	-0.027	0.24	0.013	1	0.909	0.973
25 - 29	-0.216	0.245	0.772	1	0.38	0.806
30 - 34	-0.475	0.286	2.773	1	0.096	0.622
35 - 39	0.17	0.38	0.2	1	0.655	1.185
40 - 44	-0.178	0.53	0.113	1	0.737	0.837
Standard of Living			20.593	2	0	
Medium SLI	0.79	0.181	19.163	1	0	2.204
High SLI	1.132	0.43	6.942	1	0.008	3.103
Exposure to Mass Media	-0.297	0.209	2.014	1	0.156	0.743
Constant	0.603	0.271	4.944	1	0.026	1.828

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BIHAR
Table AI.11
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			3.183	3	0.364	
1 - 5 km	0.081	0.149	0.299	1	0.585	1.085
6 - 10 km	-0.134	0.151	0.791	1	0.374	0.874
Above 10 km	-0.076	0.135	0.315	1	0.574	0.927
Education			29.749	3	0	
Primary School	0.357	0.21	2.88	1	0.09	1.429
Middle School	0.965	0.189	25.96	1	0	2.625
High School +	1.311	0.549	5.698	1	0.017	3.711
Ethinicity			17.299	3	0.001	
Scheduled Caste	-0.491	0.163	9.138	1	0.003	0.612
Scheduled Tribe	-0.828	0.217	14.514	1	0	0.437
OBC	-0.288	0.14	4.245	1	0.039	0.749
Religion			0.227	2	0.893	
Muslims	-0.05	0.124	0.165	1	0.684	0.951
Others	-0.105	0.418	0.063	1	0.801	0.9
Age of Mother			11.344	6	0.078	
20 - 24	0.017	0.142	0.015	1	0.903	1.018
25 - 29	-0.157	0.144	1.192	1	0.275	0.854
30 - 34	-0.273	0.163	2.807	1	0.094	0.761
35 - 39	-0.456	0.203	5.043	1	0.025	0.634
40 - 44	-0.32	0.31	1.062	1	0.303	0.726
45 - 49	0.026	0.632	0.002	1	0.968	1.026
Standard of Living			12.737	2	0.002	
Medium SLI	0.366	0.103	12.717	1	0	1.443
High SLI	0.296	0.277	1.141	1	0.285	1.344
Exposure to Mass Media	0.614	0.141	18.957	1	0	1.848
Constant	1.285	0.224	32.995	1	0	3.614

Table AI.12
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			48.172	3	0	
1 - 5 km	0.728	0.185	15.505	1	0	2.072
6 - 10 km	0.65	0.191	11.626	1	0.001	1.916
Above 10 km	-0.069	0.183	0.143	1	0.705	0.933
Education			31.655	3	0	
Primary School	0.084	0.224	0.139	1	0.709	1.087
Middle School	0.7	0.157	19.926	1	0	2.014
High School +	1.506	0.349	18.63	1	0	4.51
Ethinicity			14.696	3	0.002	
Scheduled Caste	-0.465	0.181	6.614	1	0.01	0.628
Scheduled Tribe	-1.288	0.378	11.607	1	0.001	0.276
OBC	-0.341	0.144	5.601	1	0.018	0.711
Religion			9.73	2	0.008	
Muslims	-0.506	0.169	8.967	1	0.003	0.603
Others	0.513	0.604	0.72	1	0.396	1.67
Age of Mother			11.457	6	0.075	
20 - 24	0.049	0.166	0.087	1	0.768	1.05
25 - 29	-0.202	0.175	1.333	1	0.248	0.817
30 - 34	-0.233	0.209	1.246	1	0.264	0.792
35 - 39	-0.66	0.307	4.617	1	0.032	0.517
40 - 44	-0.825	0.55	2.247	1	0.134	0.438
45 - 49	0.068	0.825	0.007	1	0.934	1.07
Standard of Living			25.036	2	0	
Medium SLI	0.366	0.129	8.108	1	0.004	1.442
High SLI	1.118	0.225	24.68	1	0	3.058
Exposure to Mass Media	0.671	0.135	24.596	1	0	1.957
Constant	-0.815	0.258	10.007	1	0.002	0.443

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BIH RAJASTHAN
Table AII.1

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			6.384	3	0.094	
1 - 5 km	-0.251	0.179	1.967	1	0.161	0.778
6 - 10 km	-0.771	0.331	5.418	1	0.02	0.463
Above 10 km	-0.089	0.36	0.061	1	0.805	0.915
Education			15.437	3	0.001	
Primary School	0.639	0.295	4.678	1	0.031	1.894
Middle School	1.642	0.469	12.232	1	0	5.165
High School +	0.805	1.143	0.495	1	0.482	2.236
Ethinicity			4.617	2	0.099	
Scheduled Caste	-0.681	0.318	4.586	1	0.032	0.506
Scheduled Tribe	-0.219	0.739	0.088	1	0.767	0.803
OBC			2.359	3	0.501	
Religion	-0.232	0.22	1.121	1	0.29	0.793
Muslims	-0.325	0.236	1.906	1	0.167	0.722
Others	-0.071	0.214	0.11	1	0.74	0.931
Age of Mother			9.797	6	0.133	
20 - 24	0.386	0.311	1.54	1	0.215	1.471
25 - 29	0.573	0.322	3.175	1	0.075	1.774
30 - 34	0.05	0.347	0.021	1	0.884	1.052
35 - 39	0.337	0.392	0.741	1	0.389	1.401
40 - 44	-0.338	0.577	0.343	1	0.558	0.713
45 - 49	-1.178	1.166	1.02	1	0.313	0.308
Standard of Living			5.856	2	0.054	
Medium SLI	0.396	0.177	4.986	1	0.026	1.485
High SLI	0.607	0.344	3.11	1	0.078	1.834
Exposure to Mass Media	0.606	0.22	7.586	1	0.006	1.833
Constant	0.164	0.457	0.129	1	0.719	1.178

Table AII.2

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			1.63	3	0.653	
1 - 5 km	0.179	0.177	1.017	1	0.313	1.196
6 - 10 km	-0.146	0.334	0.19	1	0.663	0.864
Above 10 km	-0.117	0.374	0.099	1	0.753	0.889
Education			10.415	3	0.015	
Primary School	0.485	0.296	2.688	1	0.101	1.624
Middle School	0.961	0.38	6.402	1	0.011	2.614
High School +	1.965	1.067	3.392	1	0.066	7.134
Ethinicity			0.099	2	0.952	
Scheduled Caste	-0.015	0.342	0.002	1	0.964	0.985
Scheduled Tribe	-0.337	1.077	0.098	1	0.754	0.714
OBC			3.423	3	0.331	
Religion	0.031	0.233	0.018	1	0.894	1.031
Muslims	-0.369	0.235	2.458	1	0.117	0.691
Others	-0.041	0.221	0.035	1	0.853	0.96
Age of Mother			4.115	6	0.661	
20 - 24	0.324	0.296	1.193	1	0.275	1.382
25 - 29	0.337	0.312	1.169	1	0.28	1.401
30 - 34	0.428	0.334	1.644	1	0.2	1.534
35 - 39	-0.011	0.419	0.001	1	0.978	0.989
40 - 44	-0.276	0.549	0.252	1	0.616	0.759
45 - 49	0.334	1.448	0.053	1	0.817	1.397
Standard of Living	0.425	0.147	8.406	1	0.004	1.53
Exposure to Mass Media	0.033	0.217	0.023	1	0.881	1.033
Constant	-0.096	0.591	0.026	1	0.871	0.909

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS: RAJASTHAN
Table A II.3

ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			19.751	3	0	
1 - 5 km	-0.291	0.098	8.783	1	0.003	0.748
6 - 10 km	-0.644	0.166	15.032	1	0	0.525
Above 10 km	-0.15	0.217	0.478	1	0.489	0.86
Education			44.101	3	0	
Primary School	0.953	0.19	25.053	1	0	2.593
Middle School	1.337	0.283	22.298	1	0	3.809
High School +	5.162	3.942	1.715	1	0.19	174.532
Ethinicity			2.916	2	0.233	
Scheduled Caste	-0.071	0.172	0.172	1	0.678	0.931
Scheduled Tribe	1.067	0.65	2.692	1	0.101	2.907
OBC			11.273	3	0.01	
Religion	0.382	0.128	8.955	1	0.003	1.465
Muslims	-0.011	0.128	0.007	1	0.931	0.989
Others	0.061	0.12	0.261	1	0.61	1.063
Age of Mother			17.418	6	0.008	
20 - 24	0.132	0.173	0.581	1	0.446	1.141
25 - 29	0.031	0.175	0.032	1	0.857	1.032
30 - 34	0.166	0.19	0.764	1	0.382	1.181
35 - 39	-0.299	0.223	1.793	1	0.181	0.741
40 - 44	-0.378	0.317	1.427	1	0.232	0.685
45 - 49	-1.323	0.508	6.788	1	0.009	0.266
Standard of Living			28.796	2	0	
Medium SLI	0.339	0.098	12.057	1	0.001	1.404
High SLI	0.993	0.195	25.809	1	0	2.698
Exposure to Mass Media	0.488	0.128	14.607	1	0	1.63
Constant	2.445	1.019	5.763	1	0.016	11.532

Table AII.4

SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			6.923	3	0.074	
1 - 5 km	-0.165	0.105	2.495	1	0.114	0.848
6 - 10 km	-0.464	0.197	5.559	1	0.018	0.629
Above 10 km	-0.096	0.229	0.177	1	0.674	0.908
Education			34.756	3	0	
Primary School	0.535	0.157	11.623	1	0.001	1.707
Middle School	0.688	0.188	13.364	1	0	1.991
High School +	3.094	0.733	17.822	1	0	22.075
Ethinicity			0.091	2	0.956	
Scheduled Caste	0.016	0.188	0.008	1	0.93	1.017
Scheduled Tribe	-0.136	0.479	0.081	1	0.776	0.873
OBC			10.072	3	0.018	
Religion	-0.026	0.138	0.036	1	0.849	0.974
Muslims	-0.053	0.144	0.137	1	0.711	0.948
Others	0.322	0.122	6.902	1	0.009	1.38
Age of Mother			10.429	6	0.108	
20 - 24	-0.397	0.171	5.37	1	0.02	0.672
25 - 29	-0.376	0.175	4.623	1	0.032	0.686
30 - 34	-0.476	0.198	5.759	1	0.016	0.622
35 - 39	-0.562	0.246	5.221	1	0.022	0.57
40 - 44	-0.515	0.366	1.98	1	0.159	0.598
45 - 49	-1.57	0.757	4.302	1	0.038	0.208
Standard of Living			11.569	2	0.003	
Medium SLI	0.21	0.114	3.399	1	0.065	1.233
High SLI	0.581	0.171	11.566	1	0.001	1.788
Exposure to Mass Media	0.69	0.118	34.412	1	0	1.993
Constant	-0.023	0.288	0.006	1	0.937	0.977

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BIH   RAJASTHAN
Table AII.5

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			2.414	3	0.491	
1 - 5 km	-0.172	0.308	0.31	1	0.578	0.842
6 - 10 km	-0.304	0.298	1.041	1	0.308	0.738
Above 10 km	-0.025	0.289	0.007	1	0.932	0.976
Education			15.069	3	0.002	
Primary School	0.619	0.295	4.406	1	0.036	1.857
Middle School	1.634	0.469	12.128	1	0	5.127
High School +	0.756	1.142	0.438	1	0.508	2.129
Ethinicity			3.711	2	0.156	
Scheduled Caste	-0.607	0.318	3.651	1	0.056	0.545
Scheduled Tribe	-0.247	0.747	0.109	1	0.741	0.782
OBC			1.907	3	0.592	
Religion	-0.198	0.22	0.817	1	0.366	0.82
Muslims	-0.307	0.235	1.703	1	0.192	0.736
Others	-0.092	0.214	0.185	1	0.667	0.912
Age of Mother			8.831	6	0.183	
20 - 24	0.391	0.31	1.582	1	0.208	1.478
25 - 29	0.554	0.321	2.98	1	0.084	1.739
30 - 34	0.071	0.346	0.042	1	0.838	1.073
35 - 39	0.358	0.391	0.841	1	0.359	1.431
40 - 44	-0.322	0.578	0.311	1	0.577	0.724
45 - 49	-1.047	1.157	0.819	1	0.366	0.351
Standard of Living			5.367	2	0.068	
Medium SLI	0.382	0.177	4.674	1	0.031	1.466
High SLI	0.562	0.342	2.697	1	0.101	1.754
Exposure to Mass Media	0.622	0.219	8.047	1	0.005	1.862
Constant	0.338	0.443	0.583	1	0.445	1.402

Table AII.6

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			0.805	3	0.848	
1 - 5 km	-0.084	0.306	0.075	1	0.784	0.919
6 - 10 km	-0.123	0.302	0.166	1	0.683	0.884
Above 10 km	-0.224	0.295	0.578	1	0.447	0.799
Education			9.912	3	0.019	
Primary School	0.474	0.297	2.54	1	0.111	1.606
Middle School	0.976	0.389	6.308	1	0.012	2.654
High School +	1.895	1.066	3.162	1	0.075	6.654
Ethinicity			0.053	2	0.974	
Scheduled Caste	-0.003	0.342	0	1	0.994	0.997
Scheduled Tribe	-0.248	1.08	0.053	1	0.818	0.78
OBC			3.914	3	0.271	
Religion	0.016	0.235	0.005	1	0.946	1.016
Muslims	-0.403	0.235	2.939	1	0.086	0.669
Others	-0.062	0.222	0.077	1	0.781	0.94
Age of Mother			4.298	6	0.636	
20 - 24	0.317	0.298	1.131	1	0.288	1.373
25 - 29	0.336	0.31	1.175	1	0.278	1.4
30 - 34	0.434	0.334	1.683	1	0.194	1.543
35 - 39	-0.026	0.422	0.004	1	0.95	0.974
40 - 44	-0.291	0.549	0.281	1	0.596	0.747
45 - 49	0.413	1.446	0.082	1	0.775	1.511
Standard of Living			8.34	2	0.015	
Exposure to Mass Media	0.437	0.185	5.584	1	0.018	1.548
Constant	0.831	0.327	6.449	1	0.011	2.295
EX_MM(1)	0.032	0.218	0.022	1	0.883	1.033
Constant	0.884	0.518	2.906	1	0.088	2.42

DETAILED RESULTS OF THE LOGISTIC REGRESSION ANALYSIS : BI RAJASTHAN

Table AII.7

ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			15.095	3	0.002	
1 - 5 km	-0.322	0.184	3.074	1	0.08	0.724
6 - 10 km	-0.552	0.175	9.935	1	0.002	0.576
Above 10 km	-0.588	0.172	11.691	1	0.001	0.555
Education			41.295	3	0	
Primary School	0.929	0.19	23.811	1	0	2.531
Middle School	1.284	0.283	20.527	1	0	3.612
High School +	4.991	3.921	1.621	1	0.203	147.074
Ethinicity			3.415	2	0.181	
Scheduled Caste	-0.126	0.173	0.526	1	0.468	0.882
Scheduled Tribe	1.098	0.654	2.823	1	0.093	2.998
OBC			8.459	3	0.037	
Religion	0.318	0.128	6.135	1	0.013	1.374
Muslims	-0.028	0.128	0.048	1	0.827	0.973
Others	0.014	0.12	0.014	1	0.906	1.014
Age of Mother			16.501	6	0.011	
20 - 24	0.122	0.172	0.504	1	0.478	1.13
25 - 29	0.009	0.174	0.003	1	0.959	1.009
30 - 34	0.152	0.19	0.64	1	0.424	1.164
35 - 39	-0.323	0.223	2.09	1	0.148	0.724
40 - 44	-0.34	0.316	1.161	1	0.281	0.712
45 - 49	-1.274	0.509	6.26	1	0.012	0.28
Standard of Living			27.812	2	0	
Medium SLI	0.318	0.098	10.655	1	0.001	1.375
High SLI	0.986	0.195	25.478	1	0	2.681
Exposure to Mass Media	0.463	0.128	13.158	1	0	1.589
Constant	2.612	1.012	6.661	1	0.01	13.628

Table AII.8

SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			41.2	3	0	
1 - 5 km	-0.511	0.168	9.228	1	0.002	0.6
6 - 10 km	-0.908	0.165	30.149	1	0	0.403
Above 10 km	-0.906	0.16	32.134	1	0	0.404
Education			29.582	3	0	
Primary School	0.503	0.158	10.11	1	0.001	1.654
Middle School	0.613	0.191	10.35	1	0.001	1.846
High School +	2.96	0.747	15.686	1	0	19.29
Ethinicity			0.282	2	0.869	
Scheduled Caste	-0.091	0.192	0.226	1	0.634	0.913
Scheduled Tribe	-0.122	0.486	0.063	1	0.801	0.885
OBC			9.125	3	0.028	
Religion	-0.12	0.14	0.733	1	0.392	0.887
Muslims	-0.039	0.145	0.071	1	0.79	0.962
Others	0.275	0.124	4.958	1	0.026	1.317
Age of Mother			11.363	6	0.078	
20 - 24	-0.431	0.172	6.263	1	0.012	0.65
25 - 29	-0.407	0.176	5.332	1	0.021	0.666
30 - 34	-0.499	0.199	6.285	1	0.012	0.607
35 - 39	-0.615	0.248	6.14	1	0.013	0.541
40 - 44	-0.475	0.366	1.683	1	0.194	0.622
45 - 49	-1.599	0.765	4.371	1	0.037	0.202
Standard of Living			10.415	2	0.005	
Medium SLI	0.184	0.115	2.588	1	0.108	1.202
High SLI	0.557	0.173	10.404	1	0.001	1.745
Exposure to Mass Media	0.672	0.119	32.069	1	0	1.957
Constant	0.129	0.285	0.206	1	0.65	1.138

Table AII.9

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			4.933	3	0.177	
1 - 5 km	-0.945	0.517	3.349	1	0.067	0.389
6 - 10 km	-0.411	0.488	0.712	1	0.399	0.663
Above 10 km	-0.649	0.46	1.997	1	0.158	0.522
Education			14.912	3	-0.002	
Primary School	0.597	0.296	4.083	1	0.043	1.818
Middle School	1.634	0.469	12.121	1	0	5.125
High School +	0.886	1.139	0.604	1	0.437	2.425
Ethinicity			3.283	2	0.194	
Scheduled Caste	-0.575	0.32	3.227	1	0.072	0.563
Scheduled Tribe	-0.24	0.751	0.102	1	0.75	0.787
OBC			1.93	3	0.587	
Religion	-0.195	0.218	0.803	1	0.37	0.823
Muslims	-0.315	0.235	1.79	1	0.181	0.73
Others	-0.114	0.214	0.281	1	0.596	0.893
Age of Mother			8.749	6	0.188	
20 - 24	0.435	0.31	1.968	1	0.161	1.545
25 - 29	0.567	0.32	3.142	1	0.076	1.763
30 - 34	0.095	0.346	0.075	1	0.784	1.099
35 - 39	0.387	0.391	0.982	1	0.322	1.473
40 - 44	-0.207	0.579	0.128	1	0.721	0.813
45 - 49	-1.111	1.17	0.902	1	0.342	0.329
Standard of Living			5.265	2	0.072	
Medium SLI	0.381	0.177	4.618	1	0.032	1.464
High SLI	0.551	0.343	2.585	1	0.108	1.736
Exposure to Mass Media	0.636	0.22	8.333	1	0.004	1.888
Constant	0.476	0.456	1.089	1	0.297	1.61

Table AII.10

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			5.989	3	0.112	
1 - 5 km	-0.276	0.576	0.229	1	0.632	0.759
6 - 10 km	-0.169	0.533	0.101	1	0.751	0.844
Above 10 km	-0.614	0.508	1.458	1	0.227	0.541
Education			9.695	3	0.021	
Primary School	0.486	0.299	2.643	1	0.104	1.626
Middle School	0.956	0.388	6.06	1	0.014	2.602
High School +	1.875	1.066	3.095	1	0.079	6.52
Ethinicity			0.052	2	0.974	
Scheduled Caste	-0.046	0.354	0.017	1	0.896	0.955
Scheduled Tribe	-0.205	1.075	0.037	1	0.848	0.814
OBC			3.337	3	0.343	
Religion	0.006	0.235	0.001	1	0.98	1.006
Muslims	-0.38	0.236	2.6	1	0.107	0.684
Others	-0.092	0.223	0.171	1	0.679	0.912
Age of Mother			4.838	6	0.565	
20 - 24	0.283	0.299	0.899	1	0.343	1.327
25 - 29	0.307	0.313	0.967	1	0.326	1.36
30 - 34	0.449	0.335	1.791	1	0.181	1.566
35 - 39	-0.053	0.422	0.015	1	0.901	0.949
40 - 44	-0.402	0.555	0.525	1	0.469	0.669
45 - 49	0.463	1.445	0.102	1	0.749	1.588
Standard of Living			7.915	2	0.019	
Exposure to Mass Media	0.408	0.186	4.814	1	0.028	1.504
Constant	0.837	0.328	6.526	1	0.011	2.309
EX_MM(1)	0.018	0.219	0.007	1	0.933	1.019
Constant	1.075	0.533	4.068	1	0.044	2.93

DETAILED RESULT OF LOGISTIC REGRESSION ANALYSIS: LYSIS: RAJASTHAN
Table AII.11
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			8.923	3	0.03	
1 - 5 km	-0.199	0.291	0.467	1	0.494	0.819
6 - 10 km	0.22	0.267	0.68	1	0.41	1.246
Above 10 km	-0.107	0.252	0.18	1	0.671	0.899
Education			43.053	3	0	
Primary School	0.941	0.19	24.505	1	0	2.563
Middle School	1.323	0.283	21.825	1	0	3.753
High School +	5.061	3.961	1.632	1	0.201	157.72
Ethinicity			2.761	2	0.251	
Scheduled Caste	-0.022	0.174	0.017	1	0.898	0.978
Scheduled Tribe	1.078	0.652	2.73	1	0.098	2.939
OBC			11.037	3	0.012	
Religion	0.368	0.127	8.39	1	0.004	1.446
Muslims	-0.022	0.127	0.029	1	0.865	0.979
Others	0.037	0.119	0.097	1	0.755	1.038
Age of Mother			16.884	6	0.01	
20 - 24	0.122	0.172	0.5	1	0.48	1.129
25 - 29	-0.007	0.174	0.002	1	0.966	0.993
30 - 34	0.158	0.19	0.692	1	0.405	1.171
35 - 39	-0.317	0.223	2.029	1	0.154	0.728
40 - 44	-0.4	0.318	1.581	1	0.209	0.671
45 - 49	-1.239	0.509	5.911	1	0.015	0.29
Standard of Living			28.257	2	0	
Medium SLI	0.326	0.097	11.219	1	0.001	1.386
High SLI	0.989	0.195	25.682	1	0	2.688
Exposure to Mass Media	0.482	0.127	14.328	1	0	1.619
Constant	2.593	1.023	6.417	1	0.011	13.364

Table AII.12
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			24.116	3	0	
1 - 5 km	-0.224	0.275	0.662	1	0.416	0.799
6 - 10 km	-0.49	0.248	3.897	1	0.048	0.613
Above 10 km	-0.803	0.234	11.721	1	0.001	0.448
Education			31.431	3	0	
Primary School	0.502	0.158	10.11	1	0.001	1.651
Middle School	0.636	0.189	11.252	1	0.001	1.888
High School +	3.041	0.733	17.195	1	0	20.916
Ethinicity			0.178	2	0.915	
Scheduled Caste	-0.073	0.191	0.147	1	0.702	0.93
Scheduled Tribe	-0.091	0.48	0.036	1	0.849	0.913
OBC			6.957	3	0.073	
Religion	-0.041	0.139	0.088	1	0.767	0.96
Muslims	-0.034	0.145	0.054	1	0.817	0.967
Others	0.267	0.123	4.688	1	0.03	1.306
Age of Mother			11.029	6	0.087	
20 - 24	-0.44	0.172	6.526	1	0.011	0.644
25 - 29	-0.434	0.176	6.084	1	0.014	0.648
30 - 34	-0.492	0.199	6.118	1	0.013	0.611
35 - 39	-0.609	0.247	6.086	1	0.014	0.544
40 - 44	-0.596	0.368	2.626	1	0.105	0.551
45 - 49	-1.443	0.758	3.623	1	0.057	0.236
Standard of Living			10.925	2	0.004	
Medium SLI	0.185	0.114	2.623	1	0.105	1.203
High SLI	0.567	0.172	10.905	1	0.001	1.763
Exposure to Mass Media	0.698	0.118	34.938	1	0	2.01
Constant	0.339	0.288	1.386	1	0.239	1.403

APPENDIX III
DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: GUJARAT
Table AIII.1

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			5.854	3	0.119	
1 - 5 km	-0.722	0.498	2.101	1	0.147	0.486
6 - 10 km	1.253	0.782	2.57	1	0.109	3.501
Above 10 km	8.253	41.931	0.039	1	0.844	3839.765
Education			4.288	3	0.232	
Primary School	9.331	27.96	0.111	1	0.739	11277.94
Middle School	1.773	0.873	4.126	1	0.042	5.889
High School +	0.709	1.2	0.35	1	0.554	2.033
Religion			0.055	2	0.973	
Muslims	9.028	41.762	0.047	1	0.829	8333.029
Others	9.588	105.663	0.008	1	0.928	14595.28
Ethinicity			4.665	3	0.198	
Scheduled Caste	1.61	0.756	4.542	1	0.033	5.005
Scheduled Tribe	0.799	0.595	1.804	1	0.179	2.224
OBC	0.624	0.578	1.166	1	0.28	1.867
Age of Mother			2.594	6	0.858	
20 - 24	0.594	0.592	1.007	1	0.316	1.81
25 - 29	0.932	0.654	2.029	1	0.154	2.539
30 - 34	0.501	0.759	0.436	1	0.509	1.651
35 - 39	1.05	1.345	0.61	1	0.435	2.857
40 - 44	-0.473	1.71	0.077	1	0.782	0.623
45 - 49	10.756	164.262	0.004	1	0.948	46905.61
Standard of Living			17.532	2	0	
Medium SLI	1.717	0.446	14.788	1	0	5.568
High SLI	3.045	1.18	6.659	1	0.01	21.011
Exposure to Mass Media	-0.336	0.49	0.471	1	0.493	0.715
Constant	14.425	46.305	0.097	1	0.755	1838948

Table AIII.2

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			1.652	3	0.648	
1 - 5 km	-0.048	0.412	0.014	1	0.907	0.953
6 - 10 km	0.721	0.617	1.367	1	0.242	2.057
Above 10 km	8.427	22.296	0.143	1	0.705	4566.881
Education			6.995	3	0.072	
Primary School	-0.748	0.505	2.193	1	0.139	0.474
Middle School	0.853	0.517	2.721	1	0.099	2.347
High School +	0.878	0.708	1.536	1	0.215	2.406
Ethinicity			1.581	2	0.454	
Scheduled Caste	0.614	0.938	0.429	1	0.513	1.848
Scheduled Tribe	-1.428	1.355	1.11	1	0.292	0.24
OBC			2.733	3	0.435	
Religion	0.58	0.616	0.886	1	0.347	1.786
Muslims	-0.338	0.461	0.54	1	0.463	0.713
Others	-0.266	0.469	0.321	1	0.571	0.767
Age of Mother			0.616	6	0.996	
20 - 24	0.06	0.518	0.013	1	0.908	1.062
25 - 29	-0.024	0.541	0.002	1	0.965	0.976
30 - 34	0.175	0.715	0.06	1	0.807	1.191
35 - 39	-0.59	1.012	0.339	1	0.56	0.555
40 - 44	8.076	60.435	0.018	1	0.894	3216.798
45 - 49	7.415	60.435	0.015	1	0.902	1661.316
Standard of Living			3.282	2	0.194	
Medium SLI	-0.201	0.422	0.226	1	0.634	0.818
High SLI	-1.186	0.697	2.899	1	0.089	0.305
Exposure to Mass Media	0.798	0.429	3.469	1	0.063	2.222
Constant	4.667	13.433	0.121	1	0.728	106.326

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: GUJARAT
Table AIII.3
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			1.328	3	0.722	
1 - 5 km	0.116	0.265	0.192	1	0.661	1.123
6 - 10 km	0.274	0.344	0.635	1	0.425	1.316
Above 10 km	0.497	0.579	0.736	1	0.391	1.644
Education			7.201	3	0.066	
Primary School	0.302	0.296	1.042	1	0.307	1.353
Middle School	1.125	0.435	6.679	1	0.01	3.081
High School +	7.618	19.332	0.155	1	0.694	2033.506
Ethinicity			0.663	2	0.718	
Scheduled Caste	13.121	29.151	0.203	1	0.653	499137.4
Scheduled Tribe	-0.923	1.36	0.46	1	0.497	0.397
OBC			6.949	3	0.074	
Religion	-0.808	0.36	5.029	1	0.025	0.446
Muslims	-0.795	0.338	5.518	1	0.019	0.452
Others	-0.77	0.334	5.3	1	0.021	0.463
Age of Mother			3.417	6	0.755	
20 - 24	0.441	0.307	2.065	1	0.151	1.554
25 - 29	0.477	0.335	2.024	1	0.155	1.611
30 - 34	0.514	0.424	1.468	1	0.226	1.672
35 - 39	0.112	0.519	0.046	1	0.829	1.118
40 - 44	-0.129	0.894	0.021	1	0.886	0.879
45 - 49	-7.379	20.642	0.128	1	0.721	0.001
Standard of Living			5.357	2	0.069	
Medium SLI	0.332	0.222	2.235	1	0.135	1.394
High SLI	2.051	1.045	3.853	1	0.05	7.779
Exposure to Mass Media	0.415	0.245	2.875	1	0.09	1.514
Constant	7.304	9.291	0.618	1	0.432	1486.349

Table AIII.4
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Centre			3.097	3	0.377	
1 - 5 km	-0.292	0.197	2.193	1	0.139	0.747
6 - 10 km	-0.067	0.239	0.08	1	0.778	0.935
Above 10 km	-0.466	0.415	1.259	1	0.262	0.628
Education			31.869	3	0	
Primary School	0.498	0.214	5.417	1	0.02	1.646
Middle School	1.049	0.227	21.352	1	0	2.856
High School +	1.665	0.359	21.46	1	0	5.287
Ethinicity			0.142	2	0.932	
Scheduled Caste	0.061	0.374	0.026	1	0.871	1.062
Scheduled Tribe	0.348	1.009	0.119	1	0.73	1.417
OBC			14.068	3	0.003	
Religion	0.122	0.239	0.26	1	0.61	1.13
Muslims	-0.63	0.236	7.114	1	0.008	0.533
Others	0.18	0.213	0.72	1	0.396	1.198
Age of Mother			4.217	6	0.647	
20 - 24	0.151	0.257	0.344	1	0.557	1.163
25 - 29	-0.067	0.274	0.06	1	0.807	0.935
30 - 34	-0.186	0.347	0.286	1	0.593	0.831
35 - 39	-0.042	0.446	0.009	1	0.926	0.959
40 - 44	-0.945	1.106	0.73	1	0.393	0.389
45 - 49	1.111	1.071	1.074	1	0.3	3.036
Standard of Living			6.422	2	0.04	
Medium SLI	0.216	0.187	1.34	1	0.247	1.241
High SLI	0.774	0.307	6.36	1	0.012	2.168
Exposure to Mass Media	0.105	0.177	0.353	1	0.553	1.111
Constant	0.114	0.44	0.067	1	0.795	1.121

APPENDIX III
DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: GUJARAT
Table AIII.5
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			2.334	3	0.506	
1 - 5 km	0.235	0.66	0.127	1	0.722	1.265
6 - 10 km	0.591	0.662	0.796	1	0.372	1.806
Above 10 km	-0.224	0.679	0.109	1	0.741	0.799
Education			3.816	3	0.282	
Primary School	9.188	28.386	0.105	1	0.746	9776.666
Middle School	1.609	0.838	3.687	1	0.055	5
High School +	0.634	1.221	0.27	1	0.604	1.885
Ethinicity			0.047	2	0.977	
Scheduled Caste	8.358	42.967	0.038	1	0.846	4264.121
Scheduled Tribe	9.888	102.888	0.009	1	0.923	19700.34
OBC			3.71	3	0.295	
Religion	1.331	0.753	3.121	1	0.077	3.785
Muslims	0.59	0.575	1.054	1	0.305	1.804
Others	0.193	0.563	0.117	1	0.732	1.212
Age of Mother			2.523	6	0.866	
20 - 24	0.67	0.586	1.306	1	0.253	1.954
25 - 29	0.819	0.639	1.644	1	0.2	2.269
30 - 34	0.663	0.748	0.785	1	0.376	1.94
35 - 39	0.926	1.323	0.489	1	0.484	2.523
40 - 44	-0.678	1.629	0.173	1	0.677	0.508
45 - 49	11.042	164.263	0.005	1	0.946	62448.2
Standard of Living			17.66	2	0	
Medium SLI	1.744	0.443	15.51	1	0	5.72
High SLI	2.774	1.167	5.655	1	0.017	16.025
Exposure to Mass Media	-0.251	0.487	0.265	1	0.607	0.778
Constant	11.965	44.527	0.072	1	0.788	157177.5

Table AIII.6
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			3.395	3	0.335	
1 - 5 km	0.471	0.547	0.74	1	0.39	1.601
6 - 10 km	0.901	0.562	2.567	1	0.109	2.461
Above 10 km	0.25	0.566	0.196	1	0.658	1.284
Education			6.464	3	0.091	
Primary School	-0.766	0.486	2.485	1	0.115	0.465
Middle School	0.762	0.513	2.208	1	0.137	2.142
High School +	0.536	0.673	0.635	1	0.426	1.709
Religion			1.206	2	0.547	
Muslims	0.618	0.928	0.443	1	0.506	1.855
Others	-1.148	1.344	0.73	1	0.393	0.317
Ethinicity			1.673	3	0.643	
Scheduled Caste	0.572	0.617	0.858	1	0.354	1.772
Scheduled Tribe	-0.027	0.461	0.003	1	0.954	0.974
OBC	-0.196	0.462	0.181	1	0.671	0.822
Age of Mother			0.481	6	0.998	
20 - 24	-0.116	0.5	0.053	1	0.817	0.891
25 - 29	0.041	0.529	0.006	1	0.939	1.041
30 - 34	-0.247	0.706	0.122	1	0.727	0.781
35 - 39	-0.297	0.918	0.105	1	0.746	0.743
40 - 44	5.646	22.249	0.064	1	0.8	283.243
45 - 49	5.216	22.249	0.055	1	0.815	184.2
Standard of Living	-0.38	0.315	1.462	1	0.227	0.684
Exposure to Mass Media	0.727	0.423	2.955	1	0.086	2.069
Constant	2.326	4.562	0.26	1	0.61	10.235

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: GUJARAT
Table AIII.7
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			4.513	3	0.211	
1 - 5 km	-0.667	0.393	2.888	1	0.089	0.513
6 - 10 km	-0.205	0.395	0.27	1	0.603	0.815
Above 10 km	-0.416	0.405	1.052	1	0.305	0.66
Education			7.071	3	0.07	
Primary School	0.288	0.293	0.966	1	0.326	1.334
Middle School	1.116	0.436	6.565	1	0.01	3.052
High School +	7.503	19.362	0.15	1	0.698	1812.877
Ethinicity			0.777	2	0.678	
Scheduled Caste	13.131	29.12	0.203	1	0.652	504430.5
Scheduled Tribe	-1.036	1.367	0.574	1	0.449	0.355
OBC			6.539	3	0.088	
Religion	-0.754	0.361	4.364	1	0.037	0.47
Muslims	-0.783	0.333	5.513	1	0.019	0.457
Others	-0.752	0.336	5.007	1	0.025	0.471
Age of Mother			3.121	6	0.793	
20 - 24	0.393	0.311	1.594	1	0.207	1.481
25 - 29	0.385	0.339	1.289	1	0.256	1.469
30 - 34	0.422	0.426	0.984	1	0.321	1.526
35 - 39	-0.072	0.523	0.019	1	0.891	0.931
40 - 44	-0.263	0.893	0.087	1	0.768	0.769
45 - 49	-7.555	20.597	0.135	1	0.714	0.001
Standard of Living			5.477	2	0.065	
Medium SLI	0.33	0.223	2.197	1	0.138	1.391
High SLI	2.095	1.046	4.01	1	0.045	8.125
Exposure to Mass Media	0.347	0.244	2.018	1	0.155	1.415
Constant	7.12	9.29	0.587	1	0.443	1236.008

Table AIII.8
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			4.712	3	0.194	
1 - 5 km	-0.351	0.257	1.864	1	0.172	0.704
6 - 10 km	-0.4	0.243	2.704	1	0.1	0.67
Above 10 km	-0.567	0.264	4.612	1	0.032	0.567
Education			27.115	3	0	
Primary School	0.419	0.212	3.887	1	0.049	1.52
Middle School	0.956	0.225	18.074	1	0	2.6
High School +	1.539	0.359	18.362	1	0	4.658
Ethinicity			0.324	2	0.851	
Scheduled Caste	-0.035	0.373	0.009	1	0.926	0.966
Scheduled Tribe	0.576	1.031	0.312	1	0.576	1.779
OBC			16.936	3	0.001	
Religion	0.121	0.239	0.258	1	0.611	1.129
Muslims	-0.684	0.231	8.751	1	0.003	0.505
Others	0.178	0.213	0.705	1	0.401	1.195
Age of Mother			4.701	6	0.583	
20 - 24	0.189	0.258	0.538	1	0.463	1.208
25 - 29	-0.027	0.275	0.01	1	0.921	0.973
30 - 34	-0.141	0.348	0.164	1	0.686	0.869
35 - 39	0.018	0.446	0.002	1	0.968	1.018
40 - 44	-0.897	1.105	0.659	1	0.417	0.408
45 - 49	1.387	1.071	1.677	1	0.195	4.001
Standard of Living			7.471	2	0.024	
Medium SLI	0.238	0.186	1.629	1	0.202	1.268
High SLI	0.835	0.307	7.415	1	0.006	2.304
Exposure to Mass Media	0.124	0.177	0.489	1	0.484	1.132
Constant	0.328	0.432	0.577	1	0.448	1.388

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: GUJARAT
Table AIII.9
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			5.725	3	0.126	
1 - 5 km	6.876	34.796	0.039	1	0.843	968.986
6 - 10 km	-1.056	1.232	0.734	1	0.391	0.348
Above 10 km	-2.038	1.144	3.176	1	0.075	0.13
Education			3.19	3	0.363	
Primary School	9.397	27.557	0.116	1	0.733	12056.51
Middle School	1.519	0.866	3.078	1	0.079	4.569
High School +	0.373	1.221	0.093	1	0.76	1.452
Ethinicity			0.05	2	0.975	
Scheduled Caste	8.903	42.928	0.043	1	0.836	7355.494
Scheduled Tribe	9.053	109.529	0.007	1	0.934	8544.069
OBC			3.036	3	0.386	
Religion	1.338	0.774	2.984	1	0.084	3.81
Muslims	0.399	0.589	0.46	1	0.497	1.491
Others	0.341	0.565	0.364	1	0.546	1.406
Age of Mother			1.737	6	0.942	
20 - 24	0.279	0.605	0.213	1	0.644	1.322
25 - 29	0.651	0.668	0.95	1	0.33	1.917
30 - 34	0.218	0.768	0.081	1	0.776	1.243
35 - 39	1.023	1.333	0.588	1	0.443	2.78
40 - 44	-0.774	2.005	0.149	1	0.699	0.461
45 - 49	11.033	164.262	0.005	1	0.946	61859.74
Standard of Living			18.586	2	0	
Medium SLI	1.914	0.46	17.324	1	0	6.778
High SLI	2.604	1.21	4.631	1	0.031	13.515
Exposure to Mass Media	-0.311	0.498	0.39	1	0.532	0.732
Constant	14.519	47.031	0.095	1	0.758	2020495

Table AIII.10
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			1.364	3	0.714	
1 - 5 km	-0.181	0.98	0.034	1	0.853	0.834
6 - 10 km	0.225	0.773	0.085	1	0.771	1.252
Above 10 km	-0.235	0.75	0.098	1	0.754	0.791
Education			6.468	3	0.091	
Primary School	-0.845	0.496	2.904	1	0.088	0.429
Middle School	0.667	0.504	1.756	1	0.185	1.949
High School +	0.616	0.683	0.814	1	0.367	1.852
Ethinicity			1.843	2	0.398	
Scheduled Caste	0.65	0.927	0.492	1	0.483	1.915
Scheduled Tribe	-1.493	1.313	1.294	1	0.255	0.225
OBC			2.768	3	0.429	
Religion	0.609	0.611	0.992	1	0.319	1.838
Muslims	-0.283	0.46	0.377	1	0.539	0.754
Others	-0.349	0.468	0.555	1	0.456	0.706
Age of Mother			0.188	6	1	
20 - 24	-0.038	0.497	0.006	1	0.939	0.963
25 - 29	-0.053	0.523	0.01	1	0.919	0.948
30 - 34	0.041	0.701	0.003	1	0.953	1.042
35 - 39	-0.173	0.936	0.034	1	0.854	0.841
40 - 44	5.906	22.248	0.07	1	0.791	367.314
45 - 49	5.441	22.249	0.06	1	0.807	230.722
Standard of Living			2.061	2	0.357	
Exposure to Mass Media	-0.066	0.415	0.025	1	0.874	0.937
Constant	-0.84	0.652	1.659	1	0.198	0.432
EX_MM(1)	0.682	0.42	2.641	1	0.104	1.978
Constant	1.998	4.538	0.194	1	0.66	7.371

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: GUJARAT
Table AIII.11
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			1.273	3	0.736	
1 - 5 km	-0.358	0.615	0.338	1	0.561	0.699
6 - 10 km	-0.521	0.508	1.049	1	0.306	0.594
Above 10 km	-0.332	0.489	0.462	1	0.497	0.717
Education			7.925	3	0.048	
Primary School	0.348	0.295	1.392	1	0.238	1.416
Middle School	1.164	0.435	7.169	1	0.007	3.203
High School +	7.668	19.327	0.157	1	0.692	2139.82
Ethinicity			0.691	2	0.708	
Scheduled Caste	13.18	29.132	0.205	1	0.651	529827.8
Scheduled Tribe	-0.967	1.387	0.486	1	0.486	0.38
OBC			6.524	3	0.089	
Religion	-0.779	0.361	4.664	1	0.031	0.459
Muslims	-0.79	0.336	5.518	1	0.019	0.454
Others	-0.726	0.336	4.678	1	0.031	0.484
Age of Mother			3.082	6	0.798	
20 - 24	0.392	0.306	1.64	1	0.2	1.48
25 - 29	0.467	0.334	1.956	1	0.162	1.595
30 - 34	0.423	0.422	1.002	1	0.317	1.526
35 - 39	0.047	0.516	0.008	1	0.927	1.049
40 - 44	-0.15	0.892	0.028	1	0.866	0.86
45 - 49	-7.494	20.632	0.132	1	0.716	0.001
Standard of Living			5.266	2	0.072	
Medium SLI	0.327	0.223	2.145	1	0.143	1.387
High SLI	2.052	1.05	3.817	1	0.051	7.783
Exposure to Mass Media	0.391	0.243	2.601	1	0.107	1.479
Constant	7.232	9.285	0.607	1	0.436	1382.945

Table AIII.12
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			9.321	3	0.025	
1 - 5 km	-0.828	0.42	3.889	1	0.049	0.437
6 - 10 km	-1.081	0.357	9.149	1	0.002	0.339
Above 10 km	-0.935	0.339	7.605	1	0.006	0.393
Education			30.316	3	0	
Primary School	0.486	0.214	5.177	1	0.023	1.626
Middle School	0.974	0.226	18.484	1	0	2.648
High School +	1.688	0.361	21.877	1	0	5.407
Ethinicity			0.311	2	0.856	
Scheduled Caste	0.069	0.371	0.034	1	0.853	1.071
Scheduled Tribe	0.544	1.02	0.284	1	0.594	1.723
OBC			19.748	3	0	
Religion	0.098	0.239	0.169	1	0.681	1.103
Muslims	-0.751	0.237	10.014	1	0.002	0.472
Others	0.234	0.215	1.192	1	0.275	1.264
Age of Mother			4.533	6	0.605	
20 - 24	0.095	0.258	0.135	1	0.714	1.099
25 - 29	-0.06	0.273	0.048	1	0.827	0.942
30 - 34	-0.292	0.351	0.691	1	0.406	0.747
35 - 39	-0.002	0.444	0	1	0.997	0.998
40 - 44	-1.085	1.138	0.91	1	0.34	0.338
45 - 49	1.271	1.075	1.399	1	0.237	3.566
Standard of Living			6.674	2	0.036	
Medium SLI	0.251	0.188	1.781	1	0.182	1.285
High SLI	0.799	0.309	6.668	1	0.01	2.222
Exposure to Mass Media	0.122	0.178	0.471	1	0.492	1.13
Constant	0.501	0.443	1.28	1	0.258	1.65

APPENDIX IV
DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: WEST BENGAL
Table AIV.1
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			2.133	3	0.545	
1 - 5 km	-0.459	0.318	2.086	1	0.149	0.632
6 - 10 km	-0.143	0.906	0.025	1	0.875	0.867
Above 10 km	6.474	36.66	0.031	1	0.86	647.901
Education			9.285	3	0.026	
Primary School	0.612	0.378	2.616	1	0.106	1.844
Middle School	1.832	0.625	8.606	1	0.003	6.247
High School +	6.375	18.177	0.123	1	0.726	587.244
Ethinicity			2.559	2	0.278	
Scheduled Caste	-0.539	0.379	2.025	1	0.155	0.583
Scheduled Tribe	0.878	1.182	0.552	1	0.457	2.407
OBC			0.884	3	0.829	
Religion	0.399	0.443	0.811	1	0.368	1.49
Muslims	0.078	0.616	0.016	1	0.899	1.081
Others	-0.095	1.255	0.006	1	0.94	0.909
Age of Mother	0.067	0.353	0.036	1	0.849	1.069
Standard of Living	-0.237	0.132	3.228	1	0.072	0.789
Exposure to Mass Media	-0.366	0.307	1.427	1	0.232	0.693
Constant	6.021	10.262	0.344	1	0.557	412.027

Table AIV.2
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			0.107	3	0.991	
1 - 5 km	0.071	0.285	0.062	1	0.803	1.074
6 - 10 km	-0.018	0.675	0.001	1	0.979	0.982
Above 10 km	-8.43	42.318	0.04	1	0.842	0
Education			9.208	3	0.027	
Primary School	0.366	0.308	1.409	1	0.235	1.442
Middle School	1.338	0.442	9.161	1	0.002	3.812
High School +	7.626	34.885	0.048	1	0.827	2051.438
Ethinicity			0.154	2	0.926	
Scheduled Caste	0.024	0.344	0.005	1	0.944	1.024
Scheduled Tribe	7.535	19.518	0.149	1	0.699	1872.343
OBC			2.49	3	0.477	
Religion	-0.355	0.374	0.899	1	0.343	0.701
Muslims	-0.356	0.556	0.41	1	0.522	0.701
Others	1.164	1.144	1.036	1	0.309	3.204
Age of Mother	0.2?7	0.303	0.962	1	0.327	1.346
Standard of Living	-0.041	0.111	0.134	1	0.714	0.96
Exposure to Mass Media	0.008	0.27	0.001	1	0.976	1.008
Constant	3.349	15.192	0.049	1	0.826	28.484

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: WEST BENGAL
Table AIV.3
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			7.483	3	0.058	
1 - 5 km	0.162	0.307	0.277	1	0.598	1.176
6 - 10 km	6.482	18.326	0.125	1	0.724	653.551
Above 10 km	-3.475	1.365	6.484	1	0.011	0.031
Education			3.584	3	0.31	
Primary School	0.302	0.353	0.732	1	0.392	1.353
Middle School	1.195	0.653	3.353	1	0.067	3.304
High School +	5.217	24.319	0.046	1	0.83	184.313
Ethinicity			1.769	2	0.413	
Scheduled Caste	-0.511	0.386	1.754	1	0.185	0.6
Scheduled Tribe	-0.129	0.945	0.019	1	0.892	0.879
OBC			0.688	3	0.876	
Religion	-0.089	0.439	0.041	1	0.839	0.915
Muslims	-0.45	0.551	0.668	1	0.414	0.638
Others	-0.15	1.131	0.018	1	0.894	0.86
Age of Mother			17.64	6	0.007	
20 - 24	-0.155	0.498	0.098	1	0.755	0.856
25 - 29	-0.403	0.511	0.622	1	0.43	0.668
30 - 34	-1.201	0.525	5.239	1	0.022	0.301
35 - 39	-1.917	0.614	9.739	1	0.002	0.147
40 - 44	-1.042	1.203	0.75	1	0.387	0.353
45 - 49	7.044	70.451	0.01	1	0.92	1146.258
Standard of Living			0.748	2	0.688	
Medium SLI	0.277	0.363	0.584	1	0.445	1.319
High SLI	5.887	14.185	0.172	1	0.678	360.261
Exposure to Mass media	0.33	0.345	0.915	1	0.339	1.39
Constant	7.306	13.478	0.294	1	0.588	1489.207

Table AIV.4
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			5.172	3	0.16	
1 - 5 km	-0.242	0.184	1.738	1	0.187	0.785
6 - 10 km	0.723	0.467	2.397	1	0.122	2.06
Above 10 km	-0.654	1.313	0.248	1	0.619	0.52
Education			18.094	3	0	
Primary School	0.193	0.217	0.785	1	0.375	1.213
Middle School	0.894	0.25	12.783	1	0	2.445
High School +	3	1.123	7.14	1	0.008	20.087
Religion			54.56	2	0	
Muslims	-1.692	0.23	53.938	1	0	0.184
Others	0.488	0.614	0.632	1	0.427	1.629
Ethinicity			9.098	3	0.028	
Scheduled Caste	-0.276	0.216	1.624	1	0.203	0.759
Scheduled Tribe	-1.101	0.373	8.73	1	0.003	0.332
OBC	0.007	0.53	0	1	0.989	1.007
Age of Mother			16.051	6	0.013	
20 - 24	-0.46	0.243	3.602	1	0.058	0.631
25 - 29	-1.005	0.267	14.175	1	0	0.366
30 - 34	-0.774	0.348	4.939	1	0.026	0.461
35 - 39	-0.812	0.543	2.236	1	0.135	0.444
40 - 44	-5.113	8.81	0.337	1	0.562	0.006
45 - 49	-4.787	15.728	0.093	1	0.761	0.008
Standard of Living			7.797	2	0.02	
Medium SLI	0.502	0.199	6.347	1	0.012	1.651
High SLI	0.822	0.422	3.795	1	0.051	2.276
Exposure to Mass Media	-0.16	0.198	0.653	1	0.419	0.852
Constant	-0.975	2.62	0.139	1	0.71	0.377

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: WEST BENGAL
Table AIV.5

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			2.671	3	0.445	
1 - 5 km	-0.744	0.756	0.969	1	0.325	0.475
6 - 10 km	-0.248	0.786	0.099	1	0.753	0.781
Above 10 km	-0.271	0.841	0.104	1	0.748	0.763
Education			8.603	3	0.035	
Primary School	0.647	0.39	2.75	1	0.097	1.91
Middle School	1.753	0.631	7.724	1	0.005	5.77
High School +	6.255	17.827	0.123	1	0.726	520.482
Religion			2.866	2	0.239	
Muslims	-0.617	0.398	2.407	1	0.121	0.54
Others	0.827	1.21	0.467	1	0.494	2.286
Ethinicity			0.604	3	0.896	
Scheduled Caste	0.248	0.449	0.305	1	0.58	1.281
Scheduled Tribe	-0.191	0.626	0.093	1	0.76	0.826
OBC	-0.075	1.263	0.004	1	0.953	0.928
Age of Mother			4.803	6	0.569	
20 - 24	0.643	0.465	1.911	1	0.167	1.902
25 - 29	-0.086	0.459	0.035	1	0.852	0.918
30 - 34	-0.252	0.566	0.198	1	0.657	0.777
35 - 39	-0.093	0.792	0.014	1	0.907	0.911
40 - 44	-8.197	25.584	0.103	1	0.749	0
45 - 49	-8.01	36.666	0.048	1	0.827	0
Standard of Living			2.549	2	0.28	
Medium SLI	-0.568	0.359	2.512	1	0.113	0.566
High SLI	-0.588	0.99	0.353	1	0.553	0.555
Exposure to Mass Media	0.163	0.362	0.203	1	0.653	1.177
Constant	0.75	7.806	0.009	1	0.924	2.116

Table AIV.6

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			8.241	3	0.041	
1 - 5 km	0.013	0.565	0.001	1	0.981	1.013
6 - 10 km	-0.583	0.583	1.001	1	0.317	0.558
Above 10 km	-0.975	0.618	2.493	1	0.114	0.377
Education			10.563	3	0.014	
Primary School	0.46	0.322	2.042	1	0.153	1.584
Middle School	1.448	0.448	10.461	1	0.001	4.254
High School +	7.235	34.103	0.045	1	0.832	1387.442
Religion			0.309	2	0.857	
Muslims	0.132	0.361	0.135	1	0.714	1.142
Others	8.021	19.191	0.175	1	0.676	3044.838
Ethinicity			2.884	3	0.41	
Scheduled Caste	-0.169	0.386	0.193	1	0.661	0.844
Scheduled Tribe	-0.303	0.573	0.28	1	0.597	0.738
OBC	1.795	1.218	2.171	1	0.141	6.022
Age of Mother			2.808	6	0.833	
20 - 24	-0.337	0.401	0.706	1	0.401	0.714
25 - 29	-0.194	0.428	0.206	1	0.65	0.824
30 - 34	-0.891	0.595	2.247	1	0.134	0.41
35 - 39	-0.345	0.651	0.28	1	0.597	0.709
40 - 44	-1.062	1.303	0.664	1	0.415	0.346
45 - 49	7.185	42.732	0.028	1	0.866	1318.85
Standard of Living			2.44	2	0.295	
Medium SLI	-0.303	0.31	0.958	1	0.328	0.738
High SLI	1.152	1.119	1.06	1	0.303	3.164
Exposure to Mass Media	0.117	0.315	0.138	1	0.71	1.124
Constant	6.79	12.29	0.305	1	0.581	889.305

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: WEST BENGAL
Table AIV.7
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			7.153	3	0.067	
1 - 5 km	0.485	0.495	0.957	1	0.328	1.624
6 - 10 km	0.344	0.533	0.417	1	0.519	1.41
Above 10 km	-0.424	0.523	0.659	1	0.417	0.654
Education			5.063	3	0.167	
Primary School	0.377	0.351	1.155	1	0.282	1.458
Middle School	1.39	0.645	4.638	1	0.031	4.014
High School +	5.406	24.707	0.048	1	0.827	222.811
Ethinicity			1.106	2	0.575	
Scheduled Caste	-0.383	0.379	1.021	1	0.312	0.682
Scheduled Tribe	-0.29	0.888	0.107	1	0.744	0.748
OBC			0.148	3	0.986	
Religion	0.046	0.436	0.011	1	0.915	1.048
Muslims	-0.103	0.552	0.035	1	0.852	0.902
Others	0.305	1.142	0.071	1	0.789	1.357
Age of Mother			18.117	6	0.006	
20 - 24	-0.217	0.499	0.19	1	0.663	0.805
25 - 29	-0.542	0.509	1.135	1	0.287	0.581
30 - 34	-1.309	0.528	6.156	1	0.013	0.27
35 - 39	-1.989	0.621	10.246	1	0.001	0.137
40 - 44	-0.863	1.212	0.507	1	0.477	0.422
45 - 49	6.82	70.188	0.009	1	0.923	916.079
Standard of Living			0.263	2	0.877	
Medium SLI	0.108	0.346	0.097	1	0.756	1.114
High SLI	5.867	14.261	0.169	1	0.681	353.359
Exposure to Mass media	0.219	0.342	0.412	1	0.521	1.245
Constant	6.65	12.698	0.274	1	0.6	772.454

Table AIV.8
SAFE DELIVERY

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			3.744	3	0.291	
1 - 5 km	-0.053	0.349	0.023	1	0.88	0.948
6 - 10 km	0.17	0.371	0.211	1	0.646	1.186
Above 10 km	-0.344	0.393	0.768	1	0.381	0.709
Education			21.052	3	0	
Primary School	0.226	0.216	1.096	1	0.295	1.253
Middle School	0.961	0.246	15.305	1	0	2.614
High School +	3.185	1.119	8.101	1	0.004	24.163
Religion			51.749	2	0	
Muslims	-1.646	0.231	50.899	1	0	0.193
Others	0.452	0.601	0.565	1	0.452	1.571
Ethinicity			8.981	3	0.03	
Scheduled Caste	-0.239	0.217	1.214	1	0.27	0.787
Scheduled Tribe	-1.071	0.367	8.5	1	0.004	0.343
OBC	0.151	0.517	0.085	1	0.771	1.163
Age of Mother			16.442	6	0.012	
20 - 24	-0.482	0.243	3.946	1	0.047	0.617
25 - 29	-1.017	0.267	14.536	1	0	0.362
30 - 34	-0.801	0.348	5.307	1	0.021	0.449
35 - 39	-0.85	0.541	2.468	1	0.116	0.428
40 - 44	-5.144	8.777	0.343	1	0.558	0.006
45 - 49	-4.756	15.728	0.091	1	0.762	0.009
Standard of Living			6.843	2	0.033	
Medium SLI	0.468	0.197	5.645	1	0.018	1.597
High SLI	0.742	0.416	3.174	1	0.075	2.099
Exposure to Mass Media	-0.172	0.199	0.752	1	0.386	0.842
Constant	-0.97	2.599	0.139	1	0.709	0.379

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: WEST BENGAL
Table AIV.9

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			1.158	3	0.763	
1 - 5 km	-0.809	0.917	0.778	1	0.378	0.445
6 - 10 km	-0.85	0.864	0.97	1	0.325	0.427
Above 10 km	-0.905	0.843	1.154	1	0.283	0.404
Education			8.461	3	0.037	
Primary School	0.629	0.386	2.647	1	0.104	1.875
Middle School	1.737	0.628	7.642	1	0.006	5.679
High School +	6.212	17.853	0.121	1	0.728	498.713
Religion			2.359	2	0.307	
Muslims	-0.532	0.391	1.855	1	0.173	0.587
Others	0.856	1.206	0.504	1	0.478	2.354
Ethinicity			0.733	3	0.865	
Scheduled Caste	0.277	0.45	0.38	1	0.538	1.32
Scheduled Tribe	-0.228	0.64	0.127	1	0.721	0.796
OBC	0.017	1.273	0	1	0.989	1.017
Age of Mother			5.087	6	0.533	
20 - 24	0.669	0.465	2.065	1	0.151	1.952
25 - 29	-0.061	0.463	0.017	1	0.896	0.941
30 - 34	-0.261	0.567	0.212	1	0.645	0.77
35 - 39	-0.056	0.781	0.005	1	0.942	0.945
40 - 44	-8.009	25.644	0.098	1	0.755	0
45 - 49	-8.414	36.668	0.053	1	0.819	0
Standard of Living			3.157	2	0.206	
Medium SLI	-0.625	0.354	3.118	1	0.077	0.535
High SLI	-0.611	0.96	0.405	1	0.525	0.543
Exposure to Mass Media	0.096	0.359	0.071	1	0.79	1.1
Constant	0.703	7.813	0.008	1	0.928	2.02

Table AIV.10

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			4.91	3	0.178	
1 - 5 km	-0.643	0.674	0.909	1	0.34	0.526
6 - 10 km	-0.581	0.59	0.967	1	0.325	0.56
Above 10 km	-1.052	0.569	3.421	1	0.064	0.349
Education			10.885	3	0.012	
Primary School	0.564	0.319	3.119	1	0.077	1.757
Middle School	1.453	0.45	10.419	1	0.001	4.275
High School +	7.291	34.344	0.045	1	0.832	1467.086
Religion			0.315	2	0.854	
Muslims	0.134	0.358	0.141	1	0.707	1.144
Others	8.036	19.221	0.175	1	0.676	3090.984
Ethinicity			3.495	3	0.321	
Scheduled Caste	-0.284	0.382	0.554	1	0.457	0.753
Scheduled Tribe	-0.43	0.579	0.551	1	0.458	0.651
OBC	1.718	1.176	2.132	1	0.144	5.571
Age of Mother			3.948	6	0.684	
20 - 24	-0.407	0.401	1.027	1	0.311	0.666
25 - 29	-0.187	0.426	0.193	1	0.66	0.829
30 - 34	-0.885	0.58	2.323	1	0.127	0.413
35 - 39	-0.372	0.648	0.33	1	0.566	0.689
40 - 44	-1.786	1.328	1.81	1	0.178	0.168
45 - 49	7.066	42.438	0.028	1	0.868	1171.334
Standard of Living			2.194	2	0.334	
Medium SLI	-0.29	0.31	0.874	1	0.35	0.748
High SLI	1.072	1.117	0.923	1	0.337	2.922
Exposure to Mass Media	0.168	0.31	0.293	1	0.588	1.183
Constant	6.887	12.316	0.313	1	0.576	979.521

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: WEST BENGAL
Table AIV.11
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			8.807	3	0.032	
1 - 5 km	0.568	0.816	0.484	1	0.487	1.764
6 - 10 km	-0.439	0.674	0.423	1	0.515	0.645
Above 10 km	-0.919	0.636	2.089	1	0.148	0.399
Education			5.056	3	0.168	
Primary School	0.405	0.346	1.37	1	0.242	1.5
Middle School	1.361	0.645	4.453	1	0.035	3.898
High School +	5.076	24.42	0.043	1	0.835	160.186
Ethinicity			0.673	2	0.714	
Scheduled Caste	-0.283	0.378	0.559	1	0.454	0.754
Scheduled Tribe	-0.328	0.896	0.134	1	0.715	0.721
OBC			0.343	3	0.952	
Religion	0.136	0.436	0.098	1	0.755	1.146
Muslims	-0.134	0.564	0.057	1	0.812	0.875
Others	0.375	1.129	0.11	1	0.74	1.454
Age of Mother			17.836	6	0.007	
20 - 24	-0.248	0.498	0.248	1	0.618	0.78
25 - 29	-0.586	0.51	1.323	1	0.25	0.556
30 - 34	-1.343	0.528	6.473	1	0.011	0.261
35 - 39	-1.885	0.619	9.264	1	0.002	0.152
40 - 44	-1.954	1.266	2.381	1	0.123	0.142
45 - 49	6.505	70.243	0.009	1	0.926	668.676
Standard of Living			0.337	2	0.845	
Medium SLI	0.15	0.345	0.19	1	0.663	1.162
High SLI	5.601	14.385	0.152	1	0.697	270.643
Exposure to Mass media	0.308	0.336	0.84	1	0.359	1.361
Constant	6.762	12.679	0.284	1	0.594	864.681

Table AIV.12
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			11.116	3	0.011	
1 - 5 km	-0.546	0.35	2.435	1	0.119	0.58
6 - 10 km	-0.294	0.331	0.79	1	0.374	0.745
Above 10 km	-0.844	0.317	7.089	1	0.008	0.43
Education			21.041	3	0	
Primary School	0.278	0.218	1.623	1	0.203	1.32
Middle School	0.988	0.249	15.795	1	0	2.685
High School +	3.154	1.115	8.007	1	0.005	23.433
Religion			53.521	2	0	
Muslims	-1.66	0.229	52.694	1	0	0.19
Others	0.399	0.606	0.433	1	0.511	1.49
Ethinicity			8.68	3	0.034	
Scheduled Caste	-0.25	0.22	1.299	1	0.254	0.779
Scheduled Tribe	-1.052	0.372	7.988	1	0.005	0.349
OBC	0.205	0.523	0.154	1	0.695	1.228
Age of Mother			17.21	6	0.009	
20 - 24	-0.455	0.245	3.46	1	0.063	0.635
25 - 29	-1.047	0.269	15.088	1	0	0.351
30 - 34	-0.796	0.35	5.165	1	0.023	0.451
35 - 39	-0.775	0.544	2.032	1	0.154	0.461
40 - 44	-5.344	8.801	0.369	1	0.544	0.005
45 - 49	-5.146	15.7	0.107	1	0.743	0.006
Standard of Living			6.115	2	0.047	
Medium SLI	0.457	0.199	5.276	1	0.022	1.58
High SLI	0.671	0.423	2.509	1	0.113	1.955
Exposure to Mass Media	-0.207	0.2	1.064	1	0.302	0.813
Constant	-0.929	2.597	0.128	1	0.72	0.395

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: HIMACHAL PRADESH
Table AV.1
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			0.577	3	0.902	
1 - 5 km	-0.522	0.82	0.405	1	0.525	0.593
6 - 10 km	8.403	51.086	0.027	1	0.869	4460.148
Above 10 km	0.476	1.735	0.075	1	0.784	1.609
Education			4.585	3	0.205	
Primary School	0.639	1.053	0.368	1	0.544	1.894
Middle School	2.268	1.111	4.166	1	0.041	9.665
High School +	9.584	64.976	0.022	1	0.883	14535.79
Religion			0.007	2	0.996	
Muslims	-0.126	2.162	0.003	1	0.953	0.882
Others	7.365	121.403	0.004	1	0.952	1580.163
Ethinicity			3.163	3	0.367	
Scheduled Caste	2.294	1.434	2.557	1	0.11	9.913
Scheduled Tribe	-13.232	270.821	0.002	1	0.961	0
OBC	1.269	1.112	1.303	1	0.254	3.559
Age of Mother			6.495	5	0.261	
20 - 24	-9.418	94.471	0.01	1	0.921	0
25 - 29	-7.728	94.475	0.007	1	0.935	0
30 - 34	-10.125	94.476	0.011	1	0.915	0
35 - 39	0.726	146.182	0	1	0.996	2.067
40 - 44	-11.902	94.49	0.016	1	0.9	0
Standard of Living			0.591	2	0.744	
Medium SLI	-0.322	1.028	0.098	1	0.754	0.724
High SLI	-1.017	1.383	0.541	1	0.462	0.362
Exposure to Mass Media	1.094	0.911	1.442	1	0.23	2.986
Constant	8.658	85.105	0.01	1	0.919	5756.612

Table AV.2
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			0.225	3	0.973	
1 - 5 km	-0.275	0.741	0.138	1	0.711	0.76
6 - 10 km	0.159	1.239	0.017	1	0.898	1.173
Above 10 km	7.109	77.69	0.008	1	0.927	1223.255
Education			0.312	3	0.958	
Primary School	-0.362	1.681	0.046	1	0.829	0.696
Middle School	-0.65	1.236	0.276	1	0.599	0.522
High School +	-0.59	1.696	0.121	1	0.728	0.554
Religion			0.007	2	0.996	
Muslims	1.318	128.904	0	1	0.992	3.737
Others	8.053	96.111	0.007	1	0.933	3142.749
Ethinicity			2.083	2	0.353	
Scheduled Caste	1.327	1.126	1.389	1	0.239	3.769
Scheduled Tribe	0.935	0.948	0.973	1	0.324	2.548
Age of Mother			0.268	5	0.998	
20 - 24	-7.208	120.566	0.004	1	0.952	0.001
25 - 29	-7.549	120.565	0.004	1	0.95	0.001
30 - 34	-7.65	120.569	0.004	1	0.949	0
35 - 39	2.089	296.445	0	1	0.994	8.073
40 - 44	-14.662	241.875	0.004	1	0.952	0
Standard of Living			1.123	2	0.57	
Medium SLI	-7.803	68.931	0.013	1	0.91	0
High SLI	-6.976	68.935	0.01	1	0.919	0.001
Exposure to Mass Media	-8.399	43.802	0.037	1	0.848	0
Constant	15.949	73.213	0.047	1	0.828	8443204

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: HIMACHAL PRADESH
Table AV.3

ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			10.383	3	0.016	
1 - 5 km	-0.08	0.378	0.045	1	0.832	0.923
6 - 10 km	-1.361	0.444	9.401	1	0.002	0.256
Above 10 km	-0.442	0.936	0.223	1	0.636	0.642
Education			23.013	3	0	
Primary School	1.452	0.414	12.287	1	0	4.271
Middle School	1.828	0.451	16.401	1	0	6.219
High School +	6.34	13.076	0.235	1	0.628	566.785
Religion			1.216	2	0.544	
Muslims	0.467	1.069	0.19	1	0.663	1.595
Others	1.376	1.26	1.193	1	0.275	3.959
Ethinicity			4.422	3	0.219	
Scheduled Caste	0.353	0.391	0.817	1	0.366	1.424
Scheduled Tribe	2.408	1.326	3.3	1	0.069	11.112
OBC	0.516	0.505	1.043	1	0.307	1.675
Age of Mother			5.761	6	0.45	
20 - 24	0.577	0.763	0.573	1	0.449	1.781
25 - 29	0.919	0.783	1.378	1	0.24	2.508
30 - 34	0.244	0.856	0.081	1	0.776	1.276
35 - 39	0.649	0.988	0.432	1	0.511	1.914
40 - 44	-1.297	1.24	1.093	1	0.296	0.273
45 - 49	-8.302	99.634	0.007	1	0.934	0
Standard of Living			13.245	2	0.001	
Medium SLI	1.202	0.374	10.315	1	0.001	3.328
High SLI	2.815	1.097	6.581	1	0.01	16.694
Exposure to Mass Media	1.232	0.335	13.514	1	0	3.429
Constant	3.038	14.617	0.043	1	0.835	20.873

Table AV.4

SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			4.633	3	0.201	
1 - 5 km	-0.186	0.198	0.889	1	0.346	0.83
6 - 10 km	-0.747	0.375	3.958	1	0.047	0.474
Above 10 km	0.165	0.475	0.121	1	0.728	1.179
Education			33.207	3	0	
Primary School	1.159	0.339	11.66	1	0.001	3.187
Middle School	1.616	0.317	25.898	1	0	5.031
High School +	2.425	0.46	27.815	1	0	11.307
Religion			0.877	2	0.645	
Muslims	0.406	0.634	0.411	1	0.521	1.501
Others	0.427	0.528	0.655	1	0.418	1.533
Ethinicity			4.753	3	0.191	
Scheduled Caste	0.161	0.241	0.445	1	0.505	1.174
Scheduled Tribe	2.353	1.143	4.24	1	0.039	10.52
OBC	-0.056	0.231	0.059	1	0.808	0.945
Age of Mother			8.053	6	0.234	
20 - 24	-1.384	0.554	6.23	1	0.013	0.251
25 - 29	-1.216	0.56	4.71	1	0.03	0.297
30 - 34	-1.157	0.611	3.591	1	0.058	0.314
35 - 39	-0.512	0.773	0.439	1	0.508	0.599
40 - 44	-1.398	1.116	1.568	1	0.21	0.247
45 - 49	-3.581	13.517	0.07	1	0.791	0.028
Standard of Living			9.199	2	0.01	
Medium SLI	0.287	0.405	0.502	1	0.479	1.332
High SLI	0.937	0.453	4.279	1	0.039	2.553
Exposure to Mass Media	0.954	0.314	9.204	1	0.002	2.595
Constant	-0.209	1.973	0.011	1	0.915	0.811

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: HIMACHAL PRADESH
Table AV.5
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			0.692	3	0.875	
1 - 5 km	-7.832	45.966	0.029	1	0.865	0
6 - 10 km	-8.374	45.963	0.033	1	0.855	0
Above 10 km	-8.562	45.969	0.035	1	0.852	0
Education			4.15	3	0.246	
Primary School	0.576	0.99	0.338	1	0.561	1.778
Middle School	2.1	1.063	3.901	1	0.048	8.163
High School +	9.632	67.37	0.02	1	0.886	15241.2
Religion			0.077	2	0.962	
Muslims	-0.462	1.715	0.073	1	0.788	0.63
Others	7.422	115.941	0.004	1	0.949	1672.417
Ethinicity			3.052	3	0.384	
Scheduled Caste	2.072	1.41	2.161	1	0.142	7.943
Scheduled Tribe	-13.179	270.822	0.002	1	0.961	0
OBC	1.413	1.087	1.691	1	0.193	4.11
Age of Mother			6.693	5	0.245	
20 - 24	-9.147	86.29	0.011	1	0.916	0
25 - 29	-7.819	86.294	0.008	1	0.928	0
30 - 34	-10.252	86.296	0.014	1	0.905	0
35 - 39	0.278	142.338	0	1	0.998	1.32
40 - 44	-11.934	86.314	0.019	1	0.89	0
Standard of Living			0.734	2	0.693	
Medium SLI	-0.373	1.09	0.117	1	0.732	0.689
High SLI	-1.16	1.446	0.643	1	0.423	0.314
Exposure to Mass Media	0.621	0.938	0.439	1	0.507	1.862
Constant	8.272	84.001	0.01	1	0.922	3911.584

Table AV.6
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			1.003	3	0.801	
1 - 5 km	0.539	1.286	0.176	1	0.675	1.714
6 - 10 km	0.972	1.418	0.471	1	0.493	2.644
Above 10 km	0.079	1.34	0.004	1	0.953	1.083
Education			0.733	3	0.866	
Primary School	-0.016	1.642	0	1	0.992	0.984
Middle School	-0.763	1.22	0.391	1	0.532	0.466
High School +	-0.345	1.667	0.043	1	0.836	0.708
Religion			0.016	2	0.992	
Muslims	8.973	102.052	0.008	1	0.93	7888.835
Others	8.851	98.492	0.008	1	0.928	6979.852
Ethinicity			2.062	2	0.357	
Scheduled Caste	1.355	1.14	1.412	1	0.235	3.877
Scheduled Tribe	0.93	0.943	0.973	1	0.324	2.535
Age of Mother			0.279	5	0.998	
20 - 24	-7.142	119.763	0.004	1	0.952	0.001
25 - 29	-7.496	119.762	0.004	1	0.95	0.001
30 - 34	-7.585	119.767	0.004	1	0.95	0.001
35 - 39	1.384	296.12	0	1	0.996	3.992
40 - 44	-15.196	244.791	0.004	1	0.95	0
Standard of Living			1.187	2	0.552	
Medium SLI	-8.128	67.6	0.014	1	0.904	0
High SLI	-7.219	67.605	0.011	1	0.915	0.001
Exposure to Mass Media	-8.515	43.781	0.038	1	0.846	0
Constant	16.946	74.037	0.052	1	0.819	22880584

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: HIMACHAL PRADESH
Table AV.7

ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			16.589	3	0.001	
1 - 5 km	0.23	0.824	0.078	1	0.78	1.258
6 - 10 km	-1.447	0.756	3.662	1	0.056	0.235
Above 10 km	-1.601	0.78	4.218	1	0.04	0.202
Education			25.216	3	0	
Primary School	1.503	0.421	12.735	1	0	4.497
Middle School	1.977	0.455	18.86	1	0	7.218
High School +	6.345	12.771	0.247	1	0.619	569.422
Religion			0.148	2	0.928	
Muslims	0.219	0.683	0.103	1	0.749	1.244
Others	0.322	1.272	0.064	1	0.8	1.38
Ethinicity			2.735	3	0.434	
Scheduled Caste	0.095	0.403	0.056	1	0.813	1.1
Scheduled Tribe	2.021	1.244	2.637	1	0.104	7.543
OBC	0.21	0.518	0.165	1	0.685	1.234
Age of Mother			5.49	6	0.483	
20 - 24	0.625	0.777	0.647	1	0.421	1.868
25 - 29	0.809	0.794	1.037	1	0.308	2.246
30 - 34	0.388	0.866	0.201	1	0.654	1.474
35 - 39	0.615	0.99	0.385	1	0.535	1.849
40 - 44	-1.644	1.288	1.63	1	0.202	0.193
45 - 49	-7.372	99.635	0.005	1	0.941	0.001
Standard of Living			9.653	2	0.008	
Medium SLI	1.076	0.387	7.744	1	0.005	2.934
High SLI	2.377	1.104	4.636	1	0.031	10.768
Exposure to Mass Media	1.272	0.343	13.766	1	0	3.569
Constant	3.035	14.599	0.043	1	0.835	20.811

Table AV.8

SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			17.025	3	0.001	
1 - 5 km	-0.715	0.305	5.506	1	0.019	0.489
6 - 10 km	-1.272	0.323	15.523	1	0	0.28
Above 10 km	-0.628	0.344	3.324	1	0.068	0.534
Education			33.511	3	0	
Primary School	1.195	0.344	12.092	1	0.001	3.303
Middle School	1.684	0.318	28.121	1	0	5.388
High School +	2.347	0.461	25.937	1	0	10.459
Religion			0.733	2	0.693	
Muslims	0.458	0.557	0.675	1	0.411	1.581
Others	0.16	0.52	0.095	1	0.758	1.174
Ethinicity			5.7	3	0.127	
Scheduled Caste	0.103	0.243	0.178	1	0.673	1.108
Scheduled Tribe	2.688	1.183	5.161	1	0.023	14.707
OBC	-0.114	0.236	0.233	1	0.629	0.893
Age of Mother			9.895	6	0.129	
20 - 24	-1.429	0.543	6.913	1	0.009	0.24
25 - 29	-1.253	0.55	5.195	1	0.023	0.286
30 - 34	-1.217	0.605	4.052	1	0.044	0.296
35 - 39	-0.308	0.76	0.165	1	0.685	0.735
40 - 44	-1.355	1.119	1.468	1	0.226	0.258
45 - 49	-3.409	13.515	0.064	1	0.801	0.033
Standard of Living	0.495	0.196	6.367	1	0.012	1.641
Exposure to Mass Media	0.964	0.317	9.267	1	0.002	2.621
Constant	-1.508	2.012	0.561	1	0.454	0.221

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: HIMACHAL PRADESH
Table AV.9

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			3.43	3	0.33	
1 - 5 km	3.123	1.817	2.955	1	0.086	22.712
6 - 10 km	2.121	1.555	1.861	1	0.173	8.342
Above 10 km	1.523	1.493	1.041	1	0.308	4.586
Education			4.89	3	0.18	
Primary School	0.532	1.002	0.282	1	0.595	1.702
Middle School	2.488	1.175	4.481	1	0.034	12.037
High School +	9.651	38.934	0.061	1	0.804	15541.16
Religion			0.076	2	0.963	
Muslims	0.349	1.353	0.067	1	0.796	1.418
Others	7.092	74.949	0.009	1	0.925	1202.783
Ethinicity			3.989	3	0.263	
Scheduled Caste	2.345	1.346	3.038	1	0.081	10.435
Scheduled Tribe	-11.763	164.265	0.005	1	0.943	0
OBC	1.637	1.16	1.993	1	0.158	5.141
Age of Mother			6.829	5	0.234	
20 - 24	-8.922	57.068	0.024	1	0.876	0
25 - 29	-7.454	57.072	0.017	1	0.896	0.001
30 - 34	-9.504	57.074	0.028	1	0.868	0
35 - 39	-0.477	88.753	0	1	0.996	0.621
40 - 44	-12.292	57.105	0.046	1	0.83	0
Standard of Living			0.343	2	0.842	
Medium SLI	-0.263	1.074	0.06	1	0.806	0.768
High SLI	-0.834	1.491	0.313	1	0.576	0.434
Exposure to Mass Media	0.639	0.914	0.49	1	0.484	1.895
Constant	6.399	51.23	0.016	1	0.901	600.98

Table AV.10

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			1.749	3	0.626	
1 - 5 km	1.474	1.505	0.96	1	0.327	4.368
6 - 10 km	1.914	1.641	1.361	1	0.243	6.782
Above 10 km	1.06	1.47	0.52	1	0.471	2.887
Education			0.952	3	0.813	
Primary School	0.267	1.654	0.026	1	0.872	1.306
Middle School	-0.639	1.202	0.329	1	0.566	0.502
High School +	-0.209	1.696	0.015	1	0.902	0.812
Religion			0.017	2	0.992	
Muslims	8.577	100.905	0.007	1	0.932	5307.948
Others	9.471	97.971	0.009	1	0.923	12977.03
Ethinicity			0.971	2	0.615	
Scheduled Caste	1.075	1.132	0.902	1	0.342	2.931
Scheduled Tribe	0.429	1.006	0.182	1	0.67	1.536
Age of Mother			0.411	5	0.995	
20 - 24	-8.067	124.979	0.004	1	0.949	0
25 - 29	-8.384	124.979	0.005	1	0.947	0
30 - 34	-8.82	124.984	0.005	1	0.944	0
35 - 39	0.729	298.267	0	1	0.998	2.073
40 - 44	-7.637	237.424	0.001	1	0.974	0
Standard of Living	0.647	0.725	0.795	1	0.373	1.909
Exposure to Mass Media	-9.076	45.329	0.04	1	0.841	0
Constant	19.038	82.938	0.053	1	0.818	1.85E+08

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: HIMACHAL PRADESH
Table AV.11

ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			6.068	3	0.108	
1 - 5 km	0.185	1.336	0.019	1	0.89	1.203
6 - 10 km	-1.115	1.273	0.767	1	0.381	0.328
Above 10 km	-1.077	1.254	0.738	1	0.39	0.341
Education			26.393	3	0	
Primary School	1.471	0.413	12.662	1	0	4.354
Middle School	2.029	0.453	20.065	1	0	7.61
High School +	6.453	12.888	0.251	1	0.617	634.294
Religion			1.71	2	0.425	
Muslims	0.624	0.62	1.01	1	0.315	1.866
Others	1.157	1.358	0.726	1	0.394	3.18
Ethinicity			5.225	3	0.156	
Scheduled Caste	0.314	0.395	0.632	1	0.427	1.369
Scheduled Tribe	1.994	1.232	2.621	1	0.105	7.344
OBC	0.843	0.491	2.945	1	0.086	2.323
Age of Mother			6.619	6	0.358	
20 - 24	0.535	0.766	0.487	1	0.485	1.707
25 - 29	0.874	0.789	1.228	1	0.268	2.397
30 - 34	0.443	0.856	0.268	1	0.605	1.557
35 - 39	0.72	0.965	0.557	1	0.456	2.055
40 - 44	-1.796	1.27	2	1	0.157	0.166
45 - 49	-7.807	99.634	0.006	1	0.938	0
Standard of Living			12.056	2	0.002	
Medium SLI	1.152	0.373	9.542	1	0.002	3.165
High SLI	2.608	1.094	5.683	1	0.017	13.577
Exposure to Mass Media	1.166	0.336	12.044	1	0.001	3.208
Constant	3.567	14.606	0.06	1	0.807	35.41

Table AV.12

SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			1.345	3	0.719	
1 - 5 km	-0.062	0.457	0.018	1	0.892	0.94
6 - 10 km	-0.282	0.443	0.404	1	0.525	0.754
Above 10 km	-0.056	0.429	0.017	1	0.897	0.946
Education			34.104	3	0	
Primary School	1.154	0.339	11.619	1	0.001	3.171
Middle School	1.636	0.312	27.464	1	0	5.136
High School +	2.401	0.458	27.524	1	0	11.035
Religion			2.733	2	0.255	
Muslims	0.688	0.537	1.638	1	0.201	1.99
Others	0.56	0.526	1.133	1	0.287	1.75
Ethinicity			3.796	3	0.284	
Scheduled Caste	0.152	0.238	0.408	1	0.523	1.164
Scheduled Tribe	2.175	1.156	3.542	1	0.06	8.8
OBC	0.036	0.234	0.024	1	0.877	1.037
Age of Mother			8.472	6	0.206	
20 - 24	-1.393	0.553	6.348	1	0.012	0.248
25 - 29	-1.225	0.557	4.842	1	0.028	0.294
30 - 34	-1.152	0.609	3.577	1	0.059	0.316
35 - 39	-0.456	0.774	0.347	1	0.556	0.634
40 - 44	-1.376	1.109	1.539	1	0.215	0.253
45 - 49	-3.482	13.517	0.066	1	0.797	0.031
Standard of Living			9.712	2	0.008	
Exposure to Mass Media	0.297	0.405	0.538	1	0.463	1.346
Constant	0.965	0.453	4.55	1	0.033	2.626
EX_MM(1)	0.947	0.312	9.202	1	0.002	2.579
Constant	-0.007	1.973	0	1	0.997	0.993

APPENDIX VI
DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: TAMIL NADU
Table AVI.1
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			0.833	3	0.842	
1 - 5 km	0.283	0.666	0.181	1	0.671	1.327
6 - 10 km	8.016	27.428	0.085	1	0.77	3029.781
Above 10 km	0.825	0.994	0.689	1	0.406	2.283
Education			6.761	3	0.08	-
Primary School	2.095	0.873	5.762	1	0.016	8.128
Middle School	1.257	0.765	2.7	1	0.1	3.513
High School +	0.816	1.473	0.307	1	0.58	2.261
Religion			0.747	2	0.688	
Muslims	-1.105	1.311	0.711	1	0.399	0.331
Others	6.937	36.76	0.036	1	0.85	1030.004
Ethinicity			3.884	3	0.274	
Scheduled Caste	19.296	106.218	0.033	1	0.856	2.4E+08
Scheduled Tribe	16.897	106.222	0.025	1	0.874	21787417
OBC	18.127	106.215	0.029	1	0.864	74556957
Age of Mother			7.843	5	0.165	
20 - 24	0.852	0.94	0.821	1	0.365	2.344
25 - 29	-0.189	0.938	0.041	1	0.84	0.828
30 - 34	-0.714	1.136	0.395	1	0.53	0.49
35 - 39	-1.914	1.227	2.435	1	0.119	0.147
40 - 44	6.971	99.637	0.005	1	0.944	1065.214
Standard of Living			0.17	2	0.918	
Medium SLI	0.22	0.667	0.109	1	0.741	1.246
High SLI	0.505	1.498	0.114	1	0.736	1.657
Exposure to Mass Media	-1.103	0.758	2.117	1	0.146	0.332
Constant	3.193	30.873	0.011	1	0.918	24.36

Table AVI.2
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			1.399	3	0.706	
1 - 5 km	0.267	0.454	0.347	1	0.556	1.306
6 - 10 km	-0.02	1.255	0	1	0.987	0.98
Above 10 km	1.28	1.161	1.216	1	0.27	3.596
Education			0.687	3	0.876	
Primary School	0.404	0.532	0.575	1	0.448	1.497
Middle School	0.063	0.535	0.014	1	0.906	1.065
High School +	6.527	27.321	0.057	1	0.811	683.314
Religion			0.666	2	0.717	
Muslims	-0.114	1.241	0.008	1	0.927	0.892
Others	0.907	1.122	0.653	1	0.419	2.477
Ethinicity			3.136	3	0.371	
Scheduled Caste	0.878	102.566	0	1	0.993	2.406
Scheduled Tribe	-1.329	102.573	0	1	0.99	0.265
OBC	1.121	102.564	0	1	0.991	3.067
Age of Mother			2.904	5	0.715	
20 - 24	0.808	0.602	1.8	1	0.18	2.243
25 - 29	0.745	0.68	1.199	1	0.274	2.106
30 - 34	0.494	0.896	0.304	1	0.582	1.639
35 - 39	0.549	1.28	0.184	1	0.668	1.732
40 - 44	-0.872	1.558	0.313	1	0.576	0.418
Standard of Living			2.823	2	0.244	
Medium SLI	-0.789	0.477	2.733	1	0.098	0.454
High SLI	6.621	24.303	0.074	1	0.785	750.364
Exposure to Mass Media	-0.177	0.513	0.119	1	0.73	0.838
Constant	4.532	25.917	0.031	1	0.861	92.966

128

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: TAMIL NADU
Table AVI.3
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			1.898	3	0.594	
1 - 5 km	0.49	0.37	1.754	1	0.185	1.633
6 - 10 km	8.029	32.377	0.061	1	0.804	3067.702
Above 10 km	0.361	0.699	0.266	1	0.606	1.435
Education			7.805	3	0.05	
Primary School	0.231	0.352	0.429	1	0.512	1.26
Middle School	1.472	0.533	7.64	1	0.006	4.36
High School +	7.401	20.778	0.127	1	0.722	1638.059
Religion			0.519	2	0.771	
Muslims	-0.042	1.09	0.001	1	0.969	0.959
Others	0.913	1.271	0.517	1	0.472	2.493
Ethinicity			11.953	3	0.008	
Scheduled Caste	2.675	1.68	2.535	1	0.111	14.513
Scheduled Tribe	0.532	1.872	0.081	1	0.776	1.702
OBC	3.243	1.65	3.86	1	0.049	25.603
Age of Mother			5.815	6	0.444	
20 - 24	-0.169	0.597	0.08	1	0.777	0.844
25 - 29	-0.256	0.607	0.177	1	0.674	0.775
30 - 34	-1.013	0.689	2.161	1	0.142	0.363
35 - 39	-0.787	0.855	0.847	1	0.357	0.455
40 - 44	-2.411	1.561	2.386	1	0.122	0.09
45 - 49	7.464	164.262	0.002	1	0.964	1744.229
Standard of Living			0.454	2	0.797	
Medium SLI	-0.012	0.359	0.001	1	0.972	0.988
High SLI	0.857	1.308	0.429	1	0.513	2.355
Exposure to Mass Media	0.296	0.345	0.738	1	0.39	1.345
Constant	6.292	25.369	0.062	1	0.804	539.974

Table AVI.4
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Sub Center			26.513	3	0	
1 - 5 km	0.521	0.231	5.087	1	0.024	1.683
6 - 10 km	0.448	0.545	0.674	1	0.412	1.565
Above 10 km	-1.488	0.369	16.282	1	0	0.226
Education			19.054	3	0	
Primary School	0.568	0.234	5.895	1	0.015	1.765
Middle School	1.134	0.275	16.989	1	0	3.108
High School +	1.233	0.6	4.228	1	0.04	3.431
Religion			2.977	2	0.226	
Muslims	1.217	0.815	2.227	1	0.136	3.376
Others	0.564	0.648	0.757	1	0.384	1.757
Ethinicity			17.271	3	0.001	
Scheduled Caste	-5.296	12.373	0.183	1	0.669	0.005
Scheduled Tribe	-7.449	12.401	0.361	1	0.548	0.001
OBC	-4.612	12.371	0.139	1	0.709	0.01
Age of Mother			1.628	6	0.951	
20 - 24	0.141	0.323	0.19	1	0.663	1.151
25 - 29	-0.063	0.338	0.034	1	0.853	0.939
30 - 34	-0.021	0.443	0.002	1	0.963	0.979
35 - 39	-0.368	0.578	0.406	1	0.524	0.692
40 - 44	5.715	15.615	0.134	1	0.714	303.486
45 - 49	4.698	22.244	0.045	1	0.833	109.692
Standard of Living			3.483	2	0.175	
Medium SLI	0.216	0.221	0.951	1	0.329	1.241
High SLI	1.406	0.808	3.027	1	0.082	4.078
Exposure to Mass Media	0.558	0.221	6.346	1	0.012	1.746
Constant	4.056	4.977	0.664	1	0.415	57.753

APPENDIX VI
DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: TAMIL NADU
Table AVI.5

IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			4.103	3	0.251	
1 - 5 km	-1.357	1.004	1.828	1	0.176	0.257
6 - 10 km	-1.299	1.129	1.323	1	0.25	0.273
Above 10 km	0.297	1.127	0.069	1	0.792	1.346
Education			6.366	3	0.095	
Primary School	2.112	0.875	5.828	1	0.016	8.267
Middle School	1.071	0.788	1.848	1	0.174	2.919
High School +	0.456	1.413	0.104	1	0.747	1.578
Religion			2.169	2	0.338	
Muslims	-1.973	1.362	2.097	1	0.148	0.139
Others	5.825	21.83	0.071	1	0.79	338.532
Ethinicity			5.881	3	0.118	
Scheduled Caste	18.107	64.296	0.079	1	0.778	73094331
Scheduled Tribe	14.912	64.295	0.054	1	0.817	2993404
OBC	16.615	64.291	0.067	1	0.796	16434297
Age of Mother			7.523	5	0.185	
20 - 24	1.326	1.012	1.716	1	0.19	3.768
25 - 29	0.34	0.952	0.128	1	0.721	1.405
30 - 34	-0.237	1.169	0.041	1	0.839	0.789
35 - 39	-1.582	1.239	1.629	1	0.202	0.206
40 - 44	5.632	60.442	0.009	1	0.926	279.204
Standard of Living			1.059	2	0.589	
Medium SLI	0.667	0.695	0.921	1	0.337	1.948
High SLI	0.896	1.442	0.387	1	0.534	2.451
Exposure to Mass Media	-1.219	0.744	2.688	1	0.101	0.295
Constant	0.793	18.267	0.002	1	0.965	2.209

Table AVI.6

TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			3.62	3	0.305	
1 - 5 km	0.543	0.553	0.965	1	0.326	1.721
6 - 10 km	1.008	0.609	2.739	1	0.098	2.741
Above 10 km	1.229	0.81	2.299	1	0.129	3.417
Education			0.33	3	0.954	
Primary School	0.276	0.542	0.26	1	0.61	1.318
Middle School	0.061	0.528	0.013	1	0.908	1.063
High School +	6.476	26.972	0.058	1	0.81	649.434
Religion			0.331	2	0.847	
Muslims	-0.177	1.324	0.018	1	0.894	0.838
Others	0.624	1.14	0.299	1	0.584	1.866
Ethinicity			4.575	3	0.206	
Scheduled Caste	-1.219	102.47	0	1	0.991	0.296
Scheduled Tribe	-3.806	102.478	0.001	1	0.97	0.022
OBC	-0.849	102.469	0	1	0.993	0.428
Age of Mother			0.95	5	0.966	
20 - 24	0.321	0.638	0.254	1	0.615	1.379
25 - 29	0.293	0.709	0.171	1	0.68	1.34
30 - 34	0.251	0.896	0.078	1	0.779	1.285
35 - 39	-0.058	1.322	0.002	1	0.965	0.944
40 - 44	-0.955	1.536	0.386	1	0.534	0.385
Standard of Living			3.173	2	0.205	
Medium SLI	-0.856	0.488	3.079	1	0.079	0.425
High SLI	6.639	23.923	0.077	1	0.781	764.596
Exposure to Mass Media	-0.141	0.523	0.073	1	0.788	0.869
Constant	4.699	25.89	0.033	1	0.856	109.863

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: TAMIL NADU

Table AVI.7

ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			8.654	3	0.034	
1 - 5 km	-0.764	0.477	2.562	1	0.109	0.466
6 - 10 km	0.319	0.559	0.326	1	0.568	1.376
Above 10 km	0.088	0.615	0.02	1	0.886	1.092
Education			7.586	3	0.055	
Primary School	0.105	0.353	0.089	1	0.766	1.111
Middle School	1.424	0.536	7.054	1	0.008	4.154
High School +	6.43	12.449	0.267	1	0.606	620.132
Religion			0.158	2	0.924	
Muslims	-0.021	1.089	0	1	0.984	0.979
Others	0.512	1.291	0.157	1	0.691	1.669
Ethinicity			12.324	3	0.006	
Scheduled Caste	2.485	1.687	2.171	1	0.141	12.004
Scheduled Tribe	0.256	1.845	0.019	1	0.89	1.292
OBC	3.074	1.646	3.49	1	0.062	21.638
Age of Mother			4.462	6	0.614	
20 - 24	-0.196	0.599	0.107	1	0.743	0.822
25 - 29	-0.317	0.609	0.27	1	0.603	0.728
30 - 34	-0.883	0.685	1.662	1	0.197	0.414
35 - 39	-0.784	0.859	0.832	1	0.362	0.457
40 - 44	-2.335	1.579	2.187	1	0.139	0.097
45 - 49	6.276	99.633	0.004	1	0.95	531.518
Standard of Living			0.529	2	0.767	
Medium SLI	-0.082	0.367	0.05	1	0.824	0.922
High SLI	0.876	1.349	0.422	1	0.516	2.402
Exposure to Mass Media	0.324	0.344	0.887	1	0.346	1.383
Constant	3.971	14.583	0.074	1	0.785	53.059

Table AVI.8

SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Primary Health Center			2.888	3	0.409	
1 - 5 km	0.298	0.279	1.138	1	0.286	1.347
6 - 10 km	0.409	0.288	2.015	1	0.156	1.506
Above 10 km	0.024	0.324	0.006	1	0.94	1.025
Education			23.036	3	0	
Primary School	0.631	0.23	7.562	1	0.006	1.88
Middle School	1.211	0.269	20.224	1	0	3.357
High School +	1.334	0.583	5.231	1	0.022	3.795
Religion			1.984	2	0.371	
Muslims	0.88	0.769	1.31	1	0.252	2.411
Others	0.544	0.647	0.708	1	0.4	1.723
Ethinicity			14.763	3	0.002	
Scheduled Caste	-4.81	12.527	0.147	1	0.701	0.008
Scheduled Tribe	-6.504	12.562	0.268	1	0.605	0.001
OBC	-4.128	12.525	0.109	1	0.742	0.016
Age of Mother			2.559	6	0.862	
20 - 24	0.408	0.31	1.734	1	0.188	1.504
25 - 29	0.227	0.323	0.491	1	0.483	1.254
30 - 34	0.259	0.425	0.372	1	0.542	1.296
35 - 39	-0.054	0.557	0.009	1	0.922	0.947
40 - 44	6.204	15.726	0.156	1	0.693	494.841
45 - 49	5.301	22.243	0.057	1	0.812	200.437
Standard of Living			3	2	0.223	
Medium SLI	0.117	0.216	0.292	1	0.589	1.124
High SLI	1.348	0.786	2.941	1	0.086	3.85
Exposure to Mass Media	0.472	0.217	4.726	1	0.03	1.603
Constant	4.159	5.013	0.688	1	0.407	64.008

DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: TAMIL NADU
Table AVI.9
IMMUNIZATION

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			3.917	3	0.271	
1 - 5 km	7.681	29.653	0.067	1	0.796	2167.206
6 - 10 km	2.393	1.505	2.527	1	0.112	10.948
Above 10 km	1.028	0.623	2.729	1	0.099	2.797
Education			4.691	3	0.196	
Primary School	1.761	0.854	4.257	1	0.039	5.818
Middle School	0.854	0.767	1.238	1	0.266	2.348
High School +	0.449	1.413	0.101	1	0.751	1.567
Religion			1.167	2	0.558	
Muslims	-1.326	1.235	1.153	1	0.283	0.266
Others	7.116	60.743	0.014	1	0.907	1232.121
Ethinicity			3.424	3	0.331	
Scheduled Caste	20.667	175.143	0.014	1	0.906	9.45E+08
Scheduled Tribe	18.71	175.149	0.011	1	0.915	1.34E+08
OBC	19.401	175.141	0.012	1	0.912	2.67E+08
Age of Mother			8.493	5	0.131	
20 - 24	0.582	0.938	0.384	1	0.535	1.789
25 - 29	-0.219	0.946	0.054	1	0.817	0.803
30 - 34	-0.976	1.144	0.727	1	0.394	0.377
35 - 39	-2.58	1.299	3.946	1	0.047	0.076
40 - 44	8.748	164.264	0.003	1	0.958	6296.295
Standard of Living			0.863	2	0.649	
Medium SLI	0.642	0.701	0.839	1	0.36	1.9
High SLI	0.687	1.476	0.217	1	0.642	1.987
Exposure to Mass Media	-0.869	0.747	1.355	1	0.244	0.419
Constant	3.154	50.17	0.004	1	0.95	23.428

Table AVI.10
TREATMENT FOR FEVER

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			0.752	3	0.861	
1 - 5 km	0.255	0.878	0.084	1	0.771	1.29
6 - 10 km	0.656	0.783	0.701	1	0.402	1.927
Above 10 km	0.082	0.453	0.033	1	0.856	1.086
Education			0.502	3	0.918	
Primary School	0.317	0.547	0.336	1	0.562	1.373
Middle School	-0.01	0.533	0	1	0.986	0.99
High School +	6.402	27.248	0.055	1	0.814	602.865
Religion			0.534	2	0.766	
Muslims	0.319	1.268	0.063	1	0.801	1.376
Others	0.772	1.111	0.483	1	0.487	2.163
Ethinicity			2.936	3	0.402	
Scheduled Caste	-0.518	102.538	0	1	0.996	0.596
Scheduled Tribe	-2.539	102.545	0.001	1	0.98	0.079
OBC	-0.25	102.537	0	1	0.998	0.778
Age of Mother			2.315	5	0.804	
20 - 24	0.638	0.595	1.151	1	0.283	1.893
25 - 29	0.576	0.666	0.746	1	0.388	1.778
30 - 34	0.384	0.886	0.188	1	0.665	1.468
35 - 39	0.012	1.379	0	1	0.993	1.012
40 - 44	-1.055	1.596	0.437	1	0.509	0.348
Standard of Living			2.904	2	0.234	
Medium SLI	-0.802	0.478	2.815	1	0.093	0.448
High SLI	6.517	24.215	0.072	1	0.788	676.856
Exposure to Mass Media	-0.112	0.516	0.047	1	0.828	0.894
Constant	4.772	25.91	0.034	1	0.854	118.129

APPENDIX VI
DETAILED RESULTS OF LOGISTIC REGRESSION ANALYSIS: TAMIL NADU
Table AVI.11
ANTENATAL CARE

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			4.527	3	0.21	
1 - 5 km	-0.942	0.592	2.531	1	0.112	0.39
6 - 10 km	-0.411	0.574	0.512	1	0.474	0.663
Above 10 km	-0.795	0.41	3.762	1	0.052	0.452
Education			7.848	3	0.049	
Primary School	0.15	0.348	0.187	1	0.666	1.162
Middle School	1.457	0.535	7.424	1	0.006	4.295
High School +	6.504	12.635	0.265	1	0.607	668.028
Religion			0.471	2	0.79	
Muslims	0.431	1.078	0.16	1	0.689	1.539
Others	0.755	1.336	0.319	1	0.572	2.127
Ethinicity			11.685	3	0.009	
Scheduled Caste	2.23	1.664	1.797	1	0.18	9.302
Scheduled Tribe	-0.032	1.888	0	1	0.987	0.969
OBC	2.792	1.638	2.904	1	0.088	16.307
Age of Mother			5.119	6	0.529	
20 - 24	-0.174	0.591	0.086	1	0.769	0.841
25 - 29	-0.237	0.602	0.156	1	0.693	0.789
30 - 34	-0.923	0.682	1.83	1	0.176	0.397
35 - 39	-0.696	0.865	0.647	1	0.421	0.499
40 - 44	-2.49	1.617	2.371	1	0.124	0.083
45 - 49	7.075	99.633	0.005	1	0.943	1181.846
Standard of Living			0.367	2	0.832	
Medium SLI	-0.047	0.358	0.017	1	0.896	0.954
High SLI	0.758	1.357	0.312	1	0.577	2.133
Exposure to Mass Media	0.278	0.349	0.635	1	0.425	1.321
Constant	4.186	14.593	0.082	1	0.774	65.736

Table AVI.12
SAFE DELIVERY

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Community Health Center			2.809	3	0.422	
1 - 5 km	0.145	0.383	0.143	1	0.705	1.156
6 - 10 km	0.428	0.342	1.561	1	0.212	1.534
Above 10 km	-0.104	0.222	0.221	1	0.639	0.901
Education			23.324	3	0	
Primary School	0.686	0.228	9.04	1	0.003	1.986
Middle School	1.202	0.269	19.976	1	0	3.326
High School +	1.326	0.582	5.19	1	0.023	3.766
Religion			1.82	2	0.403	
Muslims	0.754	0.766	0.967	1	0.325	2.125
Others	0.608	0.649	0.879	1	0.348	1.838
Ethinicity			14.161	3	0.003	
Scheduled Caste	-4.376	12.645	0.12	1	0.729	0.013
Scheduled Tribe	-6.207	12.681	0.24	1	0.624	0.002
OBC	-3.722	12.643	0.087	1	0.768	0.024
Age of Mother			3.421	6	0.754	
20 - 24	0.436	0.306	2.033	1	0.154	1.547
25 - 29	0.249	0.319	0.613	1	0.434	1.283
30 - 34	0.283	0.426	0.441	1	0.507	1.327
35 - 39	-0.208	0.566	0.135	1	0.714	0.812
40 - 44	6.099	15.73	0.15	1	0.698	445.503
45 - 49	5.54	22.243	0.062	1	0.803	254.593
Standard of Living			2.896	2	0.235	
Medium SLI	0.123	0.214	0.327	1	0.567	1.131
High SLI	1.315	0.783	2.82	1		
Exposure to Mass Media	0.508	0.22	5.346	1		
Constant	4.126	5.03	0.673	1		

Diss

362.10681

V816 Ph

Th11697