INTER-STATE VARIATIONS IN OUTCOMES AND PUBLIC EXPENDITURE ON HEALTH IN INDIA

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MASTER OF PHILOSOPHY

Sarika Chaturvedi

Centre for the Study of Regional Development
School of Social Sciences
Jawaharlal Nehru University
New Delhi – 110067
India
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जवाहरलाल नेहरू विश्वविद्यालय
JAWAHARLAL NEHRU UNIVERSITY
Centre for the Study of Regional Development
School of Social Sciences
New Delhi-10067

CERTIFICATE

I, Sarika Chaturvedi, certify that the dissertation entitled **"INTER - STATE VARIATIONS IN OUTCOMES AND PUBLIC EXPENDITURE ON HEALTH IN INDIA"** submitted by me for the degree of **MASTER OF PHILOSOPHY** is my bonafide work and may be placed before the examiners for evaluation.

Sarika Chaturvedi

(SARIKA CHATURVEDI)

Forwarded by

(PROF. RAVI SRIVASTAVA)
SUPERVISOR

25/7/11

(PROF. S.K. THORAT)
CHAIRPERSON

Tel. : (O) 6107676, 6167557/Ext. 2466, 2474, & 2463 Res.: 6164859 (D) Gram : JAYENU
Fax : 91-011-6165886 and 6198234 E-mail :harjit@jnuniv.ernet.in

In loving memory of
Bua Nani

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CHAPTER - I

INTRODUCTION

One of the most critical forms of human capital happens to be health. Health differs from other forms of human capital like education, skill, as it is an inalienable asset subject to unpredictable risks, which are mutually exclusive[1].

Health in narrowest sense implies absence of illness. However, it has broader connotation, it is not only a reflection of biophysical status but also of social status. World Health Organization defines health as a state of complete, physical, mental and social well being and not merely an absence of disease or infirmity.

Health needs are critical to every individual, every nation, and are a precondition to economic growth and welfare. The sin-qua-non of a good healthy nation is a sound health status. Improvement in health status has been recognized as universally accepted social goal, desired by every nation. Every nation has channelised its resources, set goals for improving health outcomes. This has been particularly true for the last fifty years, in which health outcomes like Life Expectancy at Birth (LEB), Infant Mortality Rate (IMR) has dramatically improved. The improved health status is attributed to economic development, technological progress, education and government intervention.

Health Actions are delivered by the Health System. Health System is defined to include all activities whose primary purpose is to promote, restore or maintain health[2]. Hence all organizations, institutions, resources are devoted to produce health actions that make up health system. Health care systems have gradually evolved over the years. They have undergone great deal of reforms like establishment of national health care system, social insurance schemes, implementation of primary health care to achieve health for all. With growing

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[1] World Health Report (2000): Health Systems: Improving Performances, p. 4.

[2] World Health Organization (2000), *op. cit.*, p. 8.

demands on health care, health care systems are facing an enormous challenge of reducing disease burden, arresting incidence of diseases and catering to health care needs of its people. Nevertheless each health care system is complex, varying all over the world in terms of their performance attainments, cost effectiveness choice of intervention and the extent of intervention.

Extent of government intervention can divide health into 3 categories[3]. *Pure Public Good, Cost Effective Private Intervention* and, *High Cost Private Good.* In pure market economy Health care system falls in the last domain. While under a welfare state it comes in the domain. Health exhibits various characteristics of public good, which provides a rational for government intervention. Various health related services like health information, immunization drive entail non rivalness of consumption, secondly provision of health services involve positive and negative externalities and lastly the need for government intervention arises due to market failures that are typically pronounced due to moral hazard, asymmetric information in health insurance.

Government intervention in the field of health has yielded rich payoffs. This can be confirmed from the fact that public health measures have led to eradication of small pox, reductions in deaths caused by vaccines, preventable childhood diseases[4].

However, the most difficult problem is the choice of intervention. Wrong interventions do more harms to a nations' health system. Health care system is facing a large number of problems. This is particularly true for developing and underdeveloped nation whose health care systems are characterized by inequitable, cost explosive and inefficiency in heath care.

Under the given backdrop it becomes necessary to analyze health care system in India. India is a welfare state and thus carries the onus of improving

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[3] Musgrave: "Public and Private Roles in Health", *World Bank Discussion Paper*, No. 339.

[4] World Bank (1993): *World Development Report*, 1993, p. 3.

the health care system. However, the prevailing status of health, mortality transition, extent of resources deployed to health care should precede before any discussion on the health care system of a nation.

The following tables give us a glimpse of the health status of India over the years.

TABLE 1.1
DEMOGRAPHIC INDICATORS OF INDIA (1951-91)

INDICATOR	1951-61	1991	NATIONAL HEALTH POLICY GOAL
Crude Birth Rate	41.7	29.5	21
Crude Death Rate	22.8	09.8	09
Total Fertility Rate	05.97	03.6	
Couple (Op) Protection Rate	NA	44.1	60
IMR	146	80	Less than 60

Source: Http//MOHFW.nic.in

Looking at the population indicators, India's achievement in terms of mortality measures is laudable. There has been a massive decline in death rate, infant mortality rate. However it does not augur well in international comparisons. This can be inferred from Table 1.2.

TABLE 1.2
DEMOGRAPHIC INDICATORS FOR SELECTED COUNTRIES

Country	Total Population (millions)	Projected population (millions)	CBR 90-95	CDR (90-95)	IMR 1997	TFR 95-00	LEB MALE	LEB FEMALE
India	975.8	1330.2	29	10	71	3.02	62.1	62.7
China	1255.1	1430.4	21	7	38	1.8	68.2	71.7
Japan	125.9	121.3	11	7	4	1.48	76.9	82.9
USA	273.8	332.5	16	9	7	1.96	73.4	80.1
UK	58.2	58.5	14	11	6	1.72	74.5	79.8

Source: Http//MOHFW.nic.in

Thus one can see from the above table that India does not enjoy a favourable position in comparison to other countries in terms of demographic indicators. This is particularly true in case of infant mortality rate, which is 71/1000 vis-à-vis 4 in Japan, 7 in USA and 6 in UK.

But when we compare the resources devoted to health with rest of the country we infer that India's health expenditure as a share of GNP is comparable to other nations.

TABLE 1.3
SELECTED COUNTRIES HEALTH EXPENDITURE AS A PERCENTAGE OF GNP

Country	Health Expenditure as percentage of GNP
JAPAN	6
CHINA	3.5
UK	6.1
INDIA	6
SINGAPORE	1.8

Source: World Development Report, 1993.

The health care system in India is a complex blend of public and private sector. Health care services in India are delivered through hospitals, dispensaries, network of Primary Health Centers, Sub-Centers situated in rural areas. The Government is responsible for financing public health care services. Resource allocation for health care is a joint responsibility of Centre and States.

The Centre and State governments are in charge of financing different components of health care expenditure. While central government lays greater emphasis on implementation of various programmes like family planning, primary health care, its actual implementation is undertaken by States. States account for nearly ninety percent of public expenditure[5].

The following table gives us an idea about the break up of Health Care Expenditure by government in 1990-91.

TABLE 1.4
HEALTH CARE EXPENDITURE BY GOVERNMENT IN NOMINAL TERMS (1990-91) (REVENUE AND CAPITAL ACCOUNTS)

GOVERNMENT	Rs Millions	Rs as % of total expenditure
CENTRE	16057	15.59
STATES	83934	81.19
UNION TERITTORY	3321	3.22
TOTAL EXPENDITURE	103013	100

Source: Reddy K.N. and Selvaraju, Health Care Expenditure by Government in India: 1974-75 to 1990-91.

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[5] Duggal (1995): "Health Expenditures Across States Part II", *Economy and Political Weekly*, vol. 30, No. 15, p. 855.

Though state finances a major component of the health expenditure, they rely on Centre for grants and aids which are utilized for the same. The State is in-charge of provision of health care. Article 47 of Constitution of India envisages health as a State subject. It is enshrined in the Directive Principles of State Policy.

I. 2 STATEMENT OF PROBLEM

Health Sector in India evokes special concern, given the sheer size of the population, its level of economic backwardness and demographic diversity. The rapid strides made by health sector in India since the dawn of independence cannot go unacknowledged. There have been discernable improvements in the health outcomes. The mortality and Life Expectancy indicators for the Indian population has significantly improved. The establishment of health infrastructure and institution had commenced during independence. However, in spite of such an intensified effort the status of health in India is still not comparable to other developed countries. India is still experiencing high morbidity prevalence, high mortality rates vis-à-vis its counterparts. In retrospect India's commitment of achieving "Health for All by 2000 AD" made in Alma – Alta declaration has remained a pipe dream.

Today, the health sector in India faces a large number of challenges. Under the backdrop of Structural Adjustment Programme (SAP) there has been axing of health sector expenditures, Fiscal compression, cuts in grants to states have further weakened the position of states to finance health intervention programmes. Voices from different platforms are being raised questioning the implications of SAP on health sector. In light of the above mentioned problems it is necessary to analyze health outcomes in India.

Further there are 2 important characteristics of Health Status in India.

Firstly, Health Status in India cannot be viewed in isolation since it has links with various socioeconomic variables, which have to be gauged and identified to arrive at any conclusive statement about health in India.

Secondly, given the demographic diversity, wide disparities exist in health status. The interstate variations in health outcomes, health expenditures cause a health divide between various States.

In the new millenium that was envisaged a year for provisioning of Health for All, it becomes all the more necessary to analyze the health status of India across the period of time, further the socioeconomic characteristics which explain and influence health outcome also needs to be identified.

This study is an attempt to review the above aspects, by providing a broad overview about health sector in terms of health outcomes, health expenditures. An analysis of data on these factors helps us to understand the trends in mortality rates, and health expenditures at a spatio temporal level. It also helps us to investigate factors affecting health status. This study also examines disparities in health outcomes, health expenditure, and disease pattern at an interstate level.

I. 3 LITERATURE REVIEW

India became signatory to Alma Alta Declaration in 1978 with the commitment to the objective of "Health for All" by 2000 AD. The National Health Policy of 1983 was evolved as a step in right direction to provide concrete suggestions, targets for meeting the above goal. Ever since then Health Sector became a focal point for policy makers and academicians, researchers. A spate of articles, research studies on Health Sector were conducted that reviewed the Health Policy, past mistakes of health planners giving recommendations. Ever since India became committed to SAP various research studies were conducted which inquired into impact of structural adjustment programme on health sector.

The course of research examining health status, health policy and health expenditure in recent years is reviewed below.

Since the inception of Bhore Committee (1946) a blue print of health sector in Independent India was laid. However, since then Health Sector has undergone a complete metamorphosis in terms of its policy prescription but health status has not kept pace with charging times. Various studies have been done analyzing the health policy adapted during planning period. An overview on their achievements, pitfalls of health sector planning are presented below.

Ramachandran and Kamalen (1991)[6] gave a detailed review of health planning in India. The authors have taken stock of health policy under the backdrop of planning. They have pointed out that India has had a paradigm shift in its focus in terms of its health policy. The focus of health policy in initial years of independence was establishment of health infrastructure and its access to all. However, the Planners remained committed to it only for the first two five year plans after which family planning gained momentum. Till fifth five year Plan the approach towards health was very narrow. With formulation of minimum needs programme, Twenty Point Programme, health policy was also streamlined to be integrated with the overall socioeconomic development of the nation.

Not only was there a paradigm shift in policy planning, the basic philosophy of providing Universal access to primary health care as envisaged in Bhore Committee got blurred in due course of time. Banerjee (1989)[7] in his studies concluded that despite sincere steps to build a comprehensive health care infrastructure providing access to health care facilities, it has failed to trickle down to the masses. He points at a complete peripheralisation of rural heath services. This can be attributed to policy failures and lack of ability of

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[6] Ramachandra G. and Kamelen G.K. (1991): "Health Planning in India", *Journal of Rural Development*, vol. 13.

[7] Banerjee Debaber (1989): "Achieving Health for All", Paper presented in International Symposium on 'Achieving Health for All (1985)', pp. 79-85

the international agencies like WHO, UNICEF to tailor health programmes as per the local needs.

A large number of authors (Qadeer Imrana – 1995)[8], Nath K. J. (1997)[9] confirm Banerjee's view that health policies adapted in India are technocratic lacking epidemiological perspective. Hence a holistic, integrated view about health policy is required. The first comprehensive attempt to adapt a concrete Health Policy integrating various aspects was undertaken in 1983. However, despite its ambitious goal of providing "Health to All" by 2000 AD it remained on paper.

VHAI (1995)[10] criticized the 1983 policy for being away from ground realities, ambitious in its prescription. Similarly, Rao and Satyanarayan (1991)[11] have attacked the National Health Policy, as it has been unsuccessful in meeting its objectives. Health policy 1983 has failed to resolve contradiction and conflicting interests characterizing our health system. Their suggestions like integration of medical system, manpower planning, possibility of user charge need to be introspected under the backdrop of SAP.

Our health care policies replicate the Western Model. On the eve of independence the policy prescription suggested by Bhore Committee was inspired by U.K., USA Welfare models. For a long time no serious attempt was made to tailor the health policy to the needs of the people. However suggestions were later given to make health policies people oriented evoking community participation under an alternative framework like Panchayati Raj. Deodhar (1997)[12] recommended that health care services should not be viewed

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[8] Qadeer Imrana (1995): "Primary Health Care: A Paradise Lost", *IASSI Quarterly*, vol. 14(1&2), pp. 1-17.

[9] Nath K.J. (1997): "Fifty Years of Public Health", *IASSI Quarterly*, vol., No. 17, pp. 187-188.

[10] Independent Commission on Health in India, Voluntary Health Association of India, 1995.

[11] Rao Satyanarayan A.V., S. Bhoopathi Rao (1991): "Medical and Health Care in India: An Appraisal", *Journal of Rural Development*, vol. 10(3), pp. 289-298.

[12] Dheodhar N.S. (1997): "Health in Retrospect Lesson and Concern", *IASSI*, vol. 16, pp. 88-99.

in isolation. They have to involve community participation to achieve sound results. Health interventions through community development programme leads to better result vis-a-vis implementation on target groups. This is proved by Raja Ratnam Abel (1995)[13] through the empirical analysis of RHUSA, which is a health Centre situated in Vellore. The experiment suggests that Community Development Programme lead to dissemination of information to entire community leading to better results. The health policies have been criticized since they lack epidemiological perspective, they are adhoc in their approach and driven by some political interests or pressures of donor agencies.

The health policies have not been translated into better health outcomes. India has poor health outcomes despite a massive expenditure on health sector. India's expenditure is more than some of its East Asian counterparts, but health outcomes are very poor in their comparison. India spends nearly 6% GDP on health (Reddy 1994)[14]. Accordingly, dismal health status is attributed to inefficient utilization and misallocation of resources. In another article (Reddy 1995)[15] comments on the futility of raising hopes for increased allocation to health sector under the wake of SAP, given the insignificant relationship between health outcomes and health care expenditures in both developed and developing countries which is stated in his article; the policy thrust should be on switching towards alternative methods of financing.

The last decade characterized a paradox in Health sector. On one hand India had to achieve demographic targets laid by National Health Policy on the other hand it has to be committed to Structural Adjustment programme.

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[13] Raja Ratnam Abel (1995): "Health Care and Community: Some Suggestions from Ruhsa's Experience", *IASSI Quarterly*, vol. 14, Nos. 1 & 2, 1995, pp. 20-33.

[14] Reddy K.N. (1994): "Is Health Care Expenditure in India Low?", *Finance India*, vol. VIII, No. 2, pp. 1-3.

[15] Reddy K.N. (1995): "Resources for Public Financing of Health Care: Problems and Prospectus", Working paper at workshop on "Health Care Financing by Government in India", *NIPFP*, New Delhi.

There was a paradigm shift in health care financing which, in mid 90's, were as per the guidelines of World Bank Report "Investing in Health sector in Developing countries in 1993"[16]. A spate of articles analyzing the decisive shift in Health sector financing has been written. Seeta Prabhu (1995)[17], Tulasidhar (1993)[18], Panchmukhi (2000)[19]. The authors have analyzed trends in health sector financing under SAP regime and its impact on Health care sector.

Prabhu, in her article, has illustrated that nearly seven states have recorded a deceleration in health care expenditure during SAP regime. The author has expressed a grave concern at the pattern of health financing. A cut in health sector expenditures is not desirable as it weakens the ability of states to provide health care services. Cuts in health expenditure take place due to cuts in grants and aids. The hardest hit are weaker states which rely entirely on grants and aids to finance its social sector expenditures, (Tulasidhar 1995) The author points out the cuts in grants and aids of poor states erode real per capita expenditures. The vertically sponsored programmes of health get seriously affected which further ails the health status of poor states leading to health divide between developed and underdeveloped states. Panchmukhi (2000) also analyzed the sympathetic and synergetic relations between fiscal variables of Centre and state. Hence a cut in center's budget downsizes expenditures at state level.

The concern over axing health expenditures, fiscal compression expressed by various authors cannot be neglected. However given government commitment to privatization, liberalization, and structural adjustment programme cuts in health care expenditure cannot be ignored in totality.

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[16] World Bank: "World Development Report 1993 - Investing in Health", Oxford University Press, New York.

[17] K. Seeta Prabhu (1995): "Recent Trends in Health Financing in India", *IASSI Quarterly*, vol. 14(1&2), pp. 46-58.

[18] Tulasidher V.B. (1993): "Expenditure Compression and Health Sector Outlays", *Economic & Political Weekly*, November 6, 1993, pp. 2475-2477.

[19] Panchamukhi P.R. (2000): "Social Impact of Economic Reforms in India: A Critical Appraisal", *Economic Political Weekly*, March 4, 2000, pp. 836-845.

Nevertheless there are various factors influencing health outcomes. Improved health outcome is not just a consequence of a technocratic target oriented health programme but also has a social dimension.

K N. Raj (1995)[20] in his article has explained inter linkages between health, literacy and population. He has substantiated by providing an example of Kerala where decline in birth rate in the 1950's and 60's was much before expenditures on family planning were made and implemented. According to him health outcomes are strongly related by socioeconomic variable like low age of marriage, literacy rather than pure economic variables. Again Ramchandra and Kamalen (1991) have offered solutions of increasing female literacy, female employment as alternative to increase health status.

Nevertheless an integrated view on health sector is not forthcoming under the above studies. The factors affecting health status has been undertaken by Mamta Murthy (19)[21], K N Reddy and Selvaraju (1995)[22]. Mamta Murthy has conducted a district level study based cross-sectional analysis, which tries to explain the influence of various socioeconomic development variables on health indicators like fertility rate, mortality rate. It concluded the most important explanatory variables influencing these indicators were female literacy, female empowerment. K N Reddy and Selvaraju (1995)[23] analyzed the relation between life expectancy at birth with various socioeconomic variables like female literacy, poverty, health care expenditure, NSDP for the year 1991. However, it was a cross-sectional analysis.

The present study draws inspiration from the above empirical research and its undertaken with the following objectives.

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[20] Raj K.N (1995): "Literacy, Health and Population Control", *IASSI Quarterly*, vol. 15(3), pp. 66-71.

[21] Murthi M. et. al. (19): "Mortality, Fertility and Gender Bias in India: in Dreze and Sen (ed.), Indian Development Selected Perspectives, Oxford Press, Delhi

[22] Reddy K.N. et. al. (1994): "Health Care Expenditure by Government of India", Seven Hills Publications.

[23] Reddy K.N. et. al. (1994): "Health Care Expenditure by Government of India", Seven Hills Publications.

I. 4 OBJECTIVES

The following are the main objectives of the study:

1. Providing an insight into the health policy and planning adapted by India since the eve of independence.

2. Analysis of mortality measures like crude death rates, birth rates, fertility rates, and pattern of communicable diseases on spatio temporal scale.

3. Analysis of structure of health care expenditure, composition of health care expenditure, changes in it over a given period of time.

4. To examine disparities in the health outcomes and health expenditures at an inter-state level.

5. To investigate and identify the factors influencing health status.

I. 5 DATABASE

There are four major sets of data that are used under the present study. These relate to mortality, morbidity, health care expenditure and such factors affecting health status in India.

1. MORTALITY DATA

The mortality data has been examined for years between 1975-1999. The data has been compiled from annual reports of Sample Registration System.

2. MORBIDITY DATA

Morbidity data under consideration refers to communicable diseases in terms of the number of cases reported. Communicable Diseases have been examined for the years 1975, 1985, 1995. The Data is published in the Report *"Health Information of India"* published by *Ministry of Health & Family*

Welfare, Government of India. Only the major communicable diseases have been considered in this paper.

3. PUBLIC HEALTH CARE EXPENDITURE

Public Health Care Expenditure for State Governments have been examined for the years between 1975 to 1999. Data for state health care expenditure is taken from ***State Finances of India*** published in *RBI Bulletin* for relevant years.

4. FACTORS AFFECTING HEALTH STATUS

Data on determinants of health status such as percentage of urbanization, female literacy, per capita NSDP have been used in regression. The same has been derived from various sources. Data on population of states, NSDP at constant prices has been taken from Statistical Abstract. For the years 1991-97 percentage of Female Literacy, Urbanization has been taken from Census Data. SRS estimates of infant mortality rate, health care expenditure from state finances and wholesale price index compiled from office of the Economic Advisor, Ministry of Industry, Government of India has also been included in the analysis.

I. 6 METHODOLOGY

1. MORTALITY

Mortality levels across the states were analyzed for the years 1975-99 using standard measures of crude birth rate, crude death rate, infant mortality rate, total fertility rate.

(a) Crude Death Rate (CDR): It indicates the number of deaths in a year for thousand population of that region.

$$\textbf{CDR:} \quad \frac{\textbf{Total number of Deaths}}{\textbf{Estimated Mid Year Population}} \times 1000$$

(b) Crude Birth Rate (CBR): It indicates the number of births in a year per thousand populations.

$$\textbf{CBR:} \quad \frac{\text{Total number of Births}}{\text{Estimated Mid Year Population}} \times 1000$$

(c) Total Fertility Rate (TFR): It represents the average number of children a women would have if she were to pass through her reproductive years bearing children at same rates as women now in each age group. It is computed by summing the age specific fertility rate for all ages. This measure gives us an approximate magnitude of complete family size.

2. MORBIDITY

Proportional Morbidity (PBM) and Disease Prevalence Rate (DPR) are calculated for Morbidity Analysis.

$$\textbf{PMB:} \ \frac{\text{(Total case of a specific communicable disease)}}{\text{Total cases of communicable disease report}} \times 100$$

$$\textbf{DPR:} \ \frac{\text{The total no. of } i^{th} \text{ disease in } j^{th} \text{ region}}{\text{Total population of the region}} \times 1{,}00{,}000$$

3. HEALTH CARE EXPENDITURES

(a) Health Care Expenditure are defined to mean aggregate expenditure under all functional categories under Revenue and Capital Account. Health Care Expenditure include expenditure on public heath, family welfare, water supply sanitation and nutrition under Plan and Non-Plan categories for both Revenue and Capital Accounts. Expenditure under both Plan and non-plan category for all the functional categories include Revenue and Capital Accounts have been aggregated for each State and each year.

(b) Per Capita Health Care Expenditure is derived by

$$\textbf{Per Capita Health Care Expenditure} = \frac{\text{Total Health Care Expenditure}}{\text{Mid Year Population}}$$

c) Per Capita Health Care Expenditure have also been computed at constant prices. Whole Sale Price Index with 1980-81 as the base year is taken.

Per Capita Health Care Expenditures is real terms is derived by dividing. Total Health Care Expenditure with its WPI i.e.

$$= \frac{\text{Total Health Care Expenditure}}{\text{WPI}} \times 1000$$

This is then divided by Mid Year Population to arrive at Per Capita Health Care Expenditure at constant prices.

d) Compound Growth Rate of Health Care Expenditure is computed on computer's Excel Package.

4. FACTORS AFFECTING HEALTH STATUS

Both cross sectional and time series regression analysis is carried out using E view Computer package.

5. MISCELLANEOUS

Statistical tools which have been used in 3rd and 4th Chapter.

CV: $\frac{\text{S.D.}}{\text{Mean}} \times 100$

S.D.

Mean

I. 7 RESEARCH QUESTIONS

The various research questions that the study seeks to analyze are:

1. Has there been any improvement in health outcomes measured by mortality measures over a period of time.

2. Has there been a change in disease profile over three decades.

3. Are there regional state disparities in mortality measures? Does the health Divide confirm to dichotomy between developed and underdeveloped states?

4. Whether there exist disparities in health care expenditure of states.

5. Has there been any change in health care expenditure in growth rates, composition, and size across the years?

6. How strongly does Economic Development and total resources devoted to health sector explain health indicators?

7. Can health be viewed in isolation or are there socioeconomic factors explaining it?

I. 8 AREA OF STUDY

The study confines to state level analysis of India. The time span ranges from 1975-1999. Only 14 major states have been taken into consideration and minor states, special category state have been excluded due to low population base and lack of availability of data.

The study area thus includes four southern states of Kerala, Tamilnadu, Andhra Pradesh, Karnataka, Western States including Gujarat, Maharashtra, Eastern States like Orissa, West Bengal, demographically weaker states like Bihar, Madhya Pradesh, Uttar Pradesh, Rajasthan along with Northern States like Punjab and Haryana.

I. 9 DESIGN OF THE STUDY

The study is divided into **six chapters.**

Chapter II is a comprehensive study about the policy framework of health in India. Since independence it provides an insight into policy stances formulated during five-year plans for health sector.

Chapter III provides us trends in health outcomes for all the 14 observations. It analyses the mortality variables across states from 1975-1999

and also provides an insight into the communicable disease pattern at an interstate level for the following years 1975, 1985, 1995.

Chapter IV analyses trends of states health care expenditure across 14 states from 1975-99. It examines the structure, size, trends of health care expenditure under each category investigating the growth rates, inter state variations among states.

Chapter V contains an analysis of the determinants of health status. It contains a cross section regression analysis for 1981, 1991 to identify explanatory variables affecting health status. Besides a time series regression is undertaken for each of the state under consideration in order to capture the effect of economic development and health care expenditure on the health status.

The concluding chapter briefly summarizes the main observations of the study.

I. 10 LIMITATIONS OF THE STUDY

The following are the major limitation of study:

Non availability of data in respect for some variables hindered the continuity of the analysis and inclusion of certain major states.

The problems were particularly pronounced in mortality and morbidity analysis. Data on communicable diseases was only available till 1995. Hence the disease pattern in years beyond 1995 could not be included.

In analyzing the profile of communicable disease data for states like Bihar, West Bengal, UP was not reported for 1975. In 1985 incidence of diseases of West Bengal was not available and lastly for 1995, Bihar was excluded due to non-availability of data.

Data on communicable-diseases only includes major diseases. Many of the diseases were left out as they did not contribute a substantial portion to disease burden or they were not properly reported.

In mortality analysis, the data on infant mortality rate was not available for West Bengal and Bihar for 1975-1980. Hence in calculation of trends data was taken from 1981 for infant mortality rate. The data on fertility rate was not properly recorded. It pertains to period between 1980-1997, data for Bihar and West Bengal was not available for the year 1980. Hence it had to be substituted by 1981 data.

Compilation of data on Health Care Expenditure also posed difficulties. The data was collected from RBI bulletin for various years. The break up of data as per functional categories was not present till 1985. Hence, trends in health care expenditure pertain from the period 1975 but functional classification has been done only since 1985. Further, data from 1975 to 1998 pertain to actual expenditure (Account estimates) but for 1995 budgeted estimates were used. The data on mid year population was available till 1998.

Another limitation of the analysis was that data on disease pertained only to institutionalized cases public hospitals, health centres. Hence, the exact estimate of morbidity cannot be stated with precision.

Lastly, with the given quantum of data the possibility of computational errors cannot be ruled out.

CHAPTER – II

HEALTH POLICY IN INDIA

II. 1 INTRODUCTION

Health policy is a subset of broader economic framework and is linked with other developmental policies like population, education. It is a mixed outcome of historical and political forces, ideologies, social and economic status. Health policy defines the type of health care system a country adopts. It also throws light on the status of health of a nation.

Health planning in India had started since the eve of independence. It was an integral part of socioeconomic development planning[1]. In the new millenium it is necessary to retrospectively analyze the health policies of India. This chapter makes an attempt to provide a theoretical backdrop about the health policy framework. Such an attempt would provide an insight into the policy stances, enabling us to appreciate the achievements and provide pointers to the current health status.

II. 2 THEORETICAL BACKDROP OF HEALTH POLICY IN INDIA

Our present public health system is a bequest of the colonial legacy. The emergence of the public health system can be traced back to appointment of Royal Commission in 1859 to inquire into causes of poor physical condition of soldiers in the British army.

However, the health care services provided under the British rule were tardy and confined to select urban elite's who had access to Western Medicines. The rest of the nation was cut of from public health services. Even

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[1] Neeraj K. Sethi: "Health Planning implementation in India and its state of implementation", Working Paper in National Seminar on Health Family Welfare Development in Independent India, National Institute of Health and Family Welfare.

provision of drainage and sanitation work was confined to areas of British Residence. Such a skewed distribution of health services weakened the health status.

The growing need to reform the health care system was felt leading to appointment of the Health Survey & Development Committee in 1943 commonly known as the Bhore Committee. The Committee submitted an exhaustive report to the government in 1946 on the state of health of India[2]. It etched a dismal demographic profile and provided a vivid description of the poor health conditions characterized by lack of preventive and promotional health, absence of safe drinking water, sanitation, and poor health consciousness among people. The document forwarded a comprehensive proposal for development of national program of health services in India. The proposals of the Bhore Committee served as a blue print for the future health policies of independent India.

The welfare state movement of the UK and socialistic pattern of USSR inspired the recommendations made by the committee. The essence of the report was evolution of health care system, which characterized a high level of public participation with a decentralized people oriented approach.

The Major policy planks of the report were:

1. Integration of preventive and curative services at all administrative levels.

2. Establishment of Primary Health Centres in two phases. It proposed the development of two-tier health centre with Primary Health Centre at the base level catering to a population of 40,000 and a Secondary Health Centre which would serve as a supervisory, coordinating and referral Institution. Each PHC was to be manned by public health workers, one nurse, four midwives, four trained dais, two sanitary inspectors, 2 health

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[2] Bhore Joseph, (1946): Health Survey and Development Committee, Government of India.

assistants, one pharmacist and 15 class IV employees. It was proposed that a Primary Health Centre would be evolved into a Primary Health Unit for a population of 10,000 and a secondary unit to be a 650 bedded hospital.

3. Establishment of District Health Boards, Village Health Committees to secure active cooperation for evolving health programmes.

4. Provision of adequate water supply and sanitation under a decentralized framework. The Centre was to be assigned the role of charting out National goals and it was believed that phased development of Primary, Secondary and District health unit would have a trickle down effect on the health care services (to the masses). The health planning in India was done on the anvil of recommendations of Bhore Committee with few modifications. Independent India was assigned the stupendous task of rehabilitating the shape of health of the nation. No concise and clear-cut policy was adopted as efforts were made to intensify the network of Primary Health Centers.

Health infrastructure was limited and was urban and clinic based. Hence health Planning was made an integral part of over all five-year plans. The constitution of India, which came into existence on the 26th of January 1950 categorized health as a state subject. Article forty-seven of the constitution in the Directive Principles of State Policy envisaged that states would be responsibility of the improvement of public health and nutritional status of its population.

Since no clear-cut health policy was enunciated, Bhore Committee provided a major plank for health planning in India. Other committees further modified health Planning. However, it is pertinent to note that health planning did not undergo much change in approach. Till 1983, Health Policy was anchored by Bhore Committee, after which a National Health Policy was evolved.

The Draft National Health Policy, 1983 was a direct consequence of Alma Alta Deceleration on Primary Health Care. This was the first turning point in the history of health policy in India. There was a paradigm shift in the policy stances. National Health goals were laid. After 1983 National Health Policy provided major guidelines. All efforts were concentrated towards the objective of "Achievement of Health for All". India carried the spirit of the Alma Alta Declaration and intensified its efforts of achieving health for all through the comprehensive coverage of its network of Primary Health Centres, which had been extensively developed since the dawn of Independence. It is noteworthy to remark that primary health care to all was a radical strategy with a call for equity and social justice.

Just when India was struggling with its efforts to provide basic health services to all, policy stance of health was changing at International level. The primary health care propounded as a result of development movement of 50s and 60s was based on the assumption that global economic growth would trickle down to the poor. However, the growing health divide between the developed and the developing nations, prevalence of mortality & morbidity levels vividly echoed the failure of primary health care to reach all.

Hence, a need for policy alternatives. It was then that the selective primary health care system emerged. The philosophy behind selective primary health care was reprioritization of limited number of diseases[3]. In order to make a stronger impact on mortality it was necessary to select and identify major infectious diseases and a set of cost-effective technologies that were to be used as core interventions[4].

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[3] Emmel N D: "Health for All for 21st Century - Demise of Primary Health Care" *Economic and Political Weekly*, March 14, 1988, pp. 577-583.

[4] Qadeer Imrana: "The Brave New World of Primary Health Care: The World Development Report", 1993, Disinvesting in Health, p. 50.

Despite the fact that selective primary health care had major opponents and it was believed to underplay the importance of epidemiological issues[5], it gained currency in international circles and made a significant impact on the health policy in India. Selective PHCs slowly became a part of health sector planning. Further the World Banks backing for Maternal and Child survival programme, Aids control programme were backed by the World Bank. However, maternal and child mortality is treated without any epidemiological evidences[6].

The health policy in India again made a paradigm shift to coincide with the wave of liberalization. The proposal underlined by the *World Bank Report, (1993)* "Investing in health", namely axing of public spending in health services, relegating curative services to the background, arresting poverty through education and women empowerment, introduction of cost recovery mechanism have been accepted by India. This has been a major turning point in the history of health planning.

Thus, there were two major hallmarks in health policy after the recommendations of Bhore Committee. The first was the evolution of a Comprehensive Health Policy in 1983, and second was a major change in health policy on the prescriptions of World Bank under the backdrop of liberalization.

Having underlined the spirit of health policy, it will be pertinent to review health sector planing in the various five-year plans.

II. 3 HEALTH POLICIES DURING THE FIVE-YEAR PLANS

The **First five-year Plan (1951-56)** initiated the process of development of rural health services and requisite infrastructure. The launching of first Primary Health Center in October 1952 along with revolutionary Community

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[5] Ibid., p. 50.

[6] Ibid., p. 54

Development Program was the major landmark of this plan. It set in process universal coverage of health care services that were people oriented. There were vigorous efforts undertaken to establish medical institutions of various types, training of health personnel, development of research centers. The Plan saw establishment of Departments of Preventive and social Medicine. This department launched a countrywide national program for the control of communicable diseases like malaria, small pox, tuberculosis, and trachoma. Cadres of workers' were imparted training on preventive and curative aspects.

At the end of the first five-year Plan, 725 primary health centers, Institutions for research and training in public health engineering, around 10,000 medical institutions/ training centers for Para medical workers for manning the water supply and sanitation programs were established.

In retrospect the First five-year Plan can be lauded because despite modest budgetary allocation it laid the foundation for the large public health infrastructure. PHCs were visualized as a component of an overall strategy for bringing balanced development of rural populations[7].

The **Second five-year Plan (1956-61)** intensified the efforts made in the first Plan to create a network of PHCs to cover rural population living in different terrain of the vast geographical area[8]. It promised a nation wide coverage of various health programs. Thus the first Two five-year Plans envisaged the vision of Bhore Committee in which ill health was seen as a product of poverty and redressal of which required an integrated strategy[9].

It may be pointed out that the first two Plans did nothing to address to the issue of growing population.

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[7] Banerjee Dhebar: "Achieving Health for All", A paper presented in International Symposium on Achieving Health for All, 1989, pp. 79-85.

[8] Ramachandran G & Kamalen: "Health Planning in India- A Critical Evaluation", *Journal of Rural Development*, Vol. 10(3), 1991, p. 301

[9] Qadeer Imrana: "The Brave New World of Primary Health Care: The World Development Report", 1993, Disinvesting in Health, p. 52.

The **Third five-year Plan (1961-66)** brought about a shift in policy direction emphasizing family planning as a major focus of planned development. During the five-year Plan various committees were appointed who on investigating the health status gave a policy direction. Mudaliar Committee, appointed in 1961, took stock of the progress made in health status. It pointed out the tardiness in the progress of health sector. As per its findings there were only 2800 PHCs in operation. Consequently the basic health service had not reached even half the nation[10]. The existing PHCs were under staffed and were manned by auxiliary nurse midwives. The report suggested consolidation and upgradation of PHCs which were already established, replacement of the existing norm of 60,000 population per PHC to that of 40,000, equipping district hospitals with "Mobile Clinics" to treat population which did not have access to PHCs, training of medical and paramedical staff. Steps were taken to intensify operations of National Eradication Programmes.

In 1963 Chadha Committee was appointed which assigned the PHCs the role of vigilance operations through "monthly home visits" of the basic health workers. It suggested training of basic health workers for this purpose. It recommended one health worker per 10,000 population. The health workers were responsible for collecting vital statistics, family planning, and malaria vigilance in addition to their earlier usual responsibilities and duties. They were, therefore, coined as "multipurpose workers". These recommendations proved faulty since basic health workers were over burdened and could not successfully take on the responsibilities of family planning. At this juncture it was realized that family planning should be given special emphasis to check the population menace. Such a need led to the appointment of Mukherjee Committee, 1965, which envisaged appointment of separate staff to specially undertake family planning activities whereas the basic health workers would carry on activities other than family planning. Such a dichotomization was

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[10] Government of India: "Health Survey and Planning Committee (Mudaliar Committee) Report", Vol. I, (Manager of Publication, 1961), New Delhi.

with an intention of avoiding additional burden and goal congestion to the workers. The Third five-year Plan thus, saw the emergence of family planning as a major thrust area relegating basic health service to the background.

The **Annual Plans (1966-69)** saw establishment of a separate Department of Family Planning in the Ministry of Health and Family Welfare in the year 1966. Like health, family planning welfare was made a state subject. It was a centrally sponsored programme where the onus of implementation was assigned to the state.

The **Fourth five-year plan (1969–74)** intensified the efforts of family planning programme. There was a decisive shift in the health policy in favour of family planning. PHCs were put on the back burner. There was a massive increase in family plan outlay and compression in health budgets. There was massive expenditure on promoting IUD and sterilization.

It will not be out of place to mention that in the sixties there was a major change in trend. Urban hospitals obtained priority over rural institutions. There was massive privatization. Consolidation rather than full coverage with minimum services to all became the new byword in the health service development. Primary health centers degenerated into agencies for meeting family planning targets[11].

In the fourth five-year plan the pace of family planning programme was accelerated. The plan proposed to step up target of sterilization and IUD insertions, widening of acceptance of oral and injectable contraceptives. Initiatives were taken to organize vasectomy camps with the help of more than 1000 mobile service vans attached to district family planning bureaus. Consequently, auxiliary nurse midwives were assigned the role of carrying on family planning activities rather than maternal and child nutrition.

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[11] Qadeer Imrana: "The Brave New World of Primary Health Care: The World Development Report", 1993, Disinvesting in Health.

All this was under taken at the cost of general health services. The growing response at the benign neglect of general health services led to appointment of Kartar Singh Committee in 1972. The Committee suggested integration of vertical programme for economy and feasibility. This led to integration of male health workers of selected four programmes - malaria, small pox, trachoma, and family planning. They were designated as male multipurpose workers. Similarly, the A.N.M were designated as female multipurpose workers. Such a vertical integration further marginalized Primary Health care since the programme was confined to select few diseases.

It must be noted that in all the four five-year plans the health Policy concentrated on the supply side since it confined itself to building of infrastructure and technology based intervention programmes[12]. The health policy laid emphasis on provision of basic health services which included health inputs like communicable diseases, Maternity and Child health, Family Planning, basic curative services, nutrition, health education[13].

Despite the fact that the first comprehensive document on health planning laid in 1946 recognized that property and unemployment had an adverse effect on health. There was a complete disassociation of health diseases from social realities in health planning[14]. The Health Policy failed to be an integral part of socioeconomic development. These distortions were proposed to be corrected by the Fifth five-year Plan.

The **Fifth five-year Plan (1974-79)** attempted to redress the past mistakes by proposing to link health policy with the over all socioeconomic development. The fifth plan can be considered a watershed in health policies in many ways. Firstly, health policy which hitherto was target oriented, technocratic in its approach was given a broader dimension and linked with

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[12] Qadeer Imrana: "Primary Health Care: A Paradise Lost", *IASSI Quarterly*, vol. 14(1&2), 1995, pp. 1-17.

[13] Ibid., p. 2.

[14] Ibid., p. 3.

economic development. Secondly, the role of community participation was recognized for provision of health care services. Thirdly, India became a signatory to the Alma Alta Deceleration in 1978 and its avowed commitment towards the objective of "Health for All by 2000 AD" further brought a paradigm shift in the policy directions in subsequent plans.

During the fifth five-year plan, steps were taken to improve and provide health care services. Under the Minimum Needs Programme the rural component of Minimum Needs Programme assigned fresh targets to the PHCs. It was decided to establish one PHC per block, one sub-centre per 10,000 population. This was a clear-cut shift from vertical approach to multipurpose approach, which was a consequence of the proposals of Srivastava Committee established in 1975. The Committee laid greater thrust on community participation. It stated that community Health workers should cater to primary Health care. This would reorient medical education as per the needs of the community. The decision to entrust "Peoples Health in People's Hands" by training one community worker for every one thousand population was a landmark in the health service development in India. This led to launching of Rural Health Schemes in 1977, which involved local people like health guides, dais and opinion leaders in participation of family welfare programmes.

The fifth five year plan also focussed on Nutrition Programme and Mother & Child Health was given special emphasis through the Twenty-Point Programme which supplemented the Minimum Needs Programme. The Plan also saw travails of coercive family planning measures during emergency after formulation of country's first Nation Population Policy. Lastly, after signing the Alma Alta Declaration Vision of "Health for All by 2000 AD" was enshrined. Massive changes in the policy formulation were called for.

The striking characteristic of the **Sixth five-year Plan (1980-1985)** was the evolution of the first *National Health Policy*, 1983. It was the first comprehensive policy at national level with a mandate to take a stock of health

conditions and organizational structure and make suggestions for further development. The Policy was a direct consequence of the past non-achievements in the health sector.

Evolution of National Health Policy was an inevitable step, given its avowed commitment of attaining the goal of health for all by 2000 AD. The attainment of this goal could be accomplished only by completely overhauling the existing approaches in health care. Further National Health Policy had to be contextualised within the framework of the Twenty-point Program.

It was therefore felt that an integrated comprehensive approach towards the future development of medical education, training, research and health services was needed to serve the actual health needs and priorities of the country[15].

The Policy provided a broader approach to health needs. It identified the past mistakes and suggested proposals for further reforms. According to it poor health situation was attributed to adoption of hospital based curative approach. It acknowledged that there was a complete neglect of promotive and preventive health care, absence of community involvement in health programmes. The policy imperative was provision of comprehensive primary health care services by restructuring the existing public system.

The salient features of the National Health Policy were:

1. To promote network of primary health care services with active involvement of people and the requisite number of health personnel.

2. Modification of training and educational programmes and provision of the same to the grass root level health workers.

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[15] Independent Commission of Health in India, 1995: Voluntary Health Association of India.

3. Setting up of a network of sanitary-cum-epidemiological stations manned by health specialists to provide health care services.

4. Massive orientation to voluntary organizations for catering to the supply of essential drugs.

5. Priorities in health services to tribal, hill and backward areas and to endemic disease affected population.

6. Rehabilitation Program of physically handicapped and special program on provision of mental health.

7. Developing secondary and tertiary levels to buttress existing primary health systems.

8. Evolving a well-knitted package of health related inputs to provide nutrition, water supply, sanitation, and safe drinking water.

9. Provision of Maternal and child health care services policy and environmental protection, massive immunization drive, school health programs were also listed.

The recommendations of the Committee were incorporated in subsequent planning period. It also set demographic targets which were to be achieved by 2000 AD which were as under:

a) Decline in Infant Mortality Rate to 60*

b) Decline in Crude Death Rate to 09

c) Decline in Crude Birth Rate to 21

d) Decline in the Net Reproductive Rate to 01

e) Decline in Maternal Mortality Rate to 02.

Subsequent plans worked towards above targets. The National Health Policy provided a blue print for other plans giving it a policy direction. However, skeptics viewed the National Health Policy as overly ambitious, distinct from ground realities. An evaluation of National Health Policy would be discussed in latter part.

Another important characteristic of sixth five-year Plan was revising the norm for PHCs. Now PHCs were to be established for a population of 30,000 in the plains and 20,000 in tribal and hilly areas. A sub center for population of 5000 in plains and 3000 in hilly areas was also proposed.

There were no turning points in the **Seventh five-year Plan (1985-90)**. It was entirely based on National Health Policy underlined in 1983. Intensive steps were taken to provide comprehensive health care and fulfil the norms of PHC laid in sixth plan. It undertook Universal Immunization drives with great fanfare. Health was integrated with the restructured Twenty-Point Program where top priority was accorded to provision of safe drinking water supply, sanitation, and improvement in nutrition status.

New vertical integration programmes like Aids Control Program (1987), National Diabetes Program (1987) were initiated to combat the menace of communicable disease.

The **Eight five-year Plan (1992-97)** was formulated under the back drop of liberalization. A decade was left for the new millenium and the objective of Health for All in 2000 seemed elusive. It was realized that pursuance of the objective required target oriented approach. Health for All had to proliferate to the vulnerable and the underprivileged sections of the society.

Hence mother and child health were identified as high-risk vulnerable group. The thrust shifted towards female education, female employment, status of women and policy initiatives were taken in the same direction. Another

important feature about the eighth plan was delivery of primary health care system through Village Panchayats. With the arrival of Panchayati Raj Act emphasis was given to encourage participation of Village Pradhans and Panchayati Members at grass root level. It was believed that democratic decentralization in health care system would go a long way towards decline in population.

During the **Ninth five-year Plan (1992-97)** in the nineties the economic landscape of India was changing. At the instance of Bretton Woods Institutions India had embarked on the structural Adjustment Programme. The World Bank's 1992 Draft Document on India's Health Sector Panning followed by the World Development Report in 1993 devoted to health entitled "Investing in Health" provided an outline of World Bank's perspective on health sector development in the developing nations.

Both the World Development reports called for contextualising the health sector financing with Structural Adjustment Programme. The ninth Five-year plan was drafted on the anvil of the World Bank Policy documents cited above. This marked a decisive shift in the health sector policy of India where the planners and policy makers were burdened by onerous task of improving health status under the resource constrains posed by SAP. The relevant policy changes prescribed by the World Bank were[16].

1. Investment on Public Health Activities: The World Bank accords top priority to immunization.

2. Greater emphasis on spending of clinical services: The world Bank prescribes a minimum clinical service which include prenatal and delivery care, family planning services, management of sick child, treatment of tuberculosis and emphasis on STD's. According to the World Bank, Public Sector should channelise all

[16] World Development Report, 1993; chapter 7, pp. 157-159.

its resources in provision of this package in establishing district health infrastructure by expanding programmes for primary care providers, improving efficiency of existing health centers, government hospitals. All this should be met by effective targeting of clinical services to the poor and introduction of user fee for the non-poor.

3. It encourages increased community control and financing of essential health care in the form of user charges, prepaid insurance schemes such user charges and fees should be utilized to improve quality of health services.

4. It emphasized on reduction of wasteful expenditure and inefficiency in government health programmes with special thrust on drug management.

5. Lastly, it recommended major investments in improving schooling for girls.

The investments in rest of the activities were relegated to the background, with increased participation of the private sector. Hence, the major policy planks of World Development Report were increased investments in schooling for girls, investment on Public Health Activities, Clinical Services and reduction of Wasteful Expenditures.

The recommendations of World Bank made far-reaching changes in the health sector planning in India. The Ninth Plan accords highest priority to Reproductive and Child Health Care Programmes and Nutrition. It pays special emphasis on low female literacy pocket. In 1997 special package for girl child under 15 was announced, women empowerment increasing women employment were some of the areas on which plan sought to concentrate. Though the ninth five-year plan makes passing reference to strengthening primary health care activities, the relative investments of Health care have

declined successively, while expenditure on family welfare has increased. The expenditure budget indicated the fall in budgeted share of health expenditure to 37 percent vis-a-vis family welfare to 61 percent[17].

There has been a fall in health investments as a percentage of total outlay. Similarly, despite the growing menace of communicable diseases, the only diseases that have witnessed a rapid increase in funding are AIDS and TB, which is at the cost of diseases that bear epidemiological evidence[18].

Thus in this plan period there has been an encouragement to privatization giving birth to new generation of hi-tech hospitals.

The health policy contextualised under the guidelines of World Bank were criticized on its suggestions of downsizing of expenditures, decline of public investments which has led to the weakening of the health sector. With almost three-quarters of expenditure footed by the private sector, any further cut in the public sector expenditures on health would deny large masses of population even basic health services. The recommendation of user charges and subsidizing of user poses practical problems of implementation. The menace of growing population, high disease burden, interstate disparities in health outcomes pose a challenge to India, which will have to be met by stringent policies recommended by the World Bank.

II. 4 CRITICAL APPRAISAL OF HEALTH POLICIES OF INDIA

The journey from inception of the Bhore Committee (1946), to the acceptance of policy recommendations of World Bank has been long and winding. There has been a complete restructuring of the health sector. The vision of providing health for all enshrined by Bhore committee has been lost. Despite the changes in policy prescription from time to time health sector remains a cause of concern. Primary health centers, which were to act as

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[17] Qadeer Imrana: "Alternate Economic Survey -1998-2000", pp. 141-142.

[18] Ibid., p. 140.

agencies for delivery of basic health services, have translated into family welfare centers. The expanding budgets of family planning have led to gradual decline in health expenditure indicating benign neglect of the same. There are various pitfalls in the health policy of India.

Health policies and programmes have been formulated as per the guidelines and dictates of the funding agencies. They lack sound epidemiological perspective. They have failed to resolve contradictions and conflicting interest. The health policies present a complete mismatch between malady and remedy, precept and practice, ailment and therapy.

The approach towards health sector has been technocratic, target oriented. It has failed to formulate health service system by using people oriented technologies. The entire emphasis of health sector planing has been on building of health sector infrastructure. However, emphasis on cost effective health outcome is ignored. There has been an imbalance in provision of services. Most of the services have an urban base. There has been an unscrupulous growth of medical care services in the private sector and a complete neglect of health in rural sector there has been a complete neglect of promotional and rehabilitative aspects of health. Health is narrowed down to curative aspect in highly commercialized form. All this has created distortions in health care in our country, reducing health care to economic service with a price tag instead of making it a basic human right of the Indian citizens. Another lacuna in the planning is its inability to evince real and active participation of the states in the provisioning of health services. The need of the hour is therefore to restructure health programmes on the morbidity and mortality pattern rather than on the dictates of funding agencies. Primary Health Centers should be revamped to facilitate accessibility of health inputs to all. The prescriptions of World Bank should be carefully examined and the policies to be tailored to the local health needs of Indian masses. The unquestioned shifts to privatization and decline in public investments need to

be reviewed. Until the policy distortions in health sector are not corrected, significant improvement in health outcomes will not be achieved.

The following chapters will seek to examine the impact of health policies on health status in India and extent to which they have succeeded in mitigating the health divide.

CHAPTER - III

HEALTH STATUS IN INDIA – A SPATIO TEMPORAL ANALYSIS

III. 1 INTRODUCTION

Health status of India is kaleidoscopic as it has sociological, cultural economic, gender, regional and political dimension. The demographic diversity, poverty and malnutrition, infrastructure bottlenecks, regional dualities accentuate the complexities of health status in our country. Health status can have different connotations. The range may vary from human physical health implying absence of infirmity or illness to more holistic concept of quality of life. In order to make meaningful comparison, the present analysis of Health Status focuses in the narrowest sense on basic physical health, which can be gauged by mortality and morbidity measures that define the health status.

In the past five decades, India like every nation has undergone transition in its health status. Health transition of a nation takes place in two steps:

1. Demographic Transition, and
2. Epidemiological Transition

The first refers to a decline in mortality from infectious diseases along with decline in fertility. The second is a consequence of declining fertility and differential rates of decline among causes of death leading to epidemiological transition[1]. Demographic transition comprises of three stages:

(a) High Birth Rate and High Death Rate

(b) High Birth Rate and Low Death Rate

(c) Low Birth Rate and Low Death Rate

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[1] World Bank (1993): World Development Report, p 30.

The pattern of demographic transition over time depends upon the timing of two effects viz. Mortality Effect and Fertility Effect[2] and the rate at which the two effects operate determines the stage of demographic transition. For instance, in developed nations decline in mortality and fertility rate takes place simultaneously leading to third stage of transition, while in a developing nation demographic transition is characterized by low death rate and high birth since fertility rates decline slower than the mortality rates.

The change in disease pattern refers to epidemiological transition. Changes in disease pattern are a consequence of economic development and demographic transition. As development proceeds there is a control gained over communicable diseases. Health interventions trickle down with economic development. Common communicable diseases are eliminated while the relative importance of other disease increases.

Further, demographic transition leads to change in the population structure. Reduced mortality rates and increased life expectancy at birth leads to increase in number of population in higher age group. This increases the importance of other diseases like cardiovascular diseases, cancer and menopausal disorders among women. On both these accounts, the disease pattern changes leading to epidemiological transition. Both these transitions are inter-linked with the level of development. High growth path and increased standard of living lead to a higher consumption of health improving goods thereby improving the health status[3].

India too has witnessed demographic as well as epidemiological transition. In the past five decades there has been a substantial reduction in the death rates. In fact, one of the most striking demographic features of India has been a decline in the mortality rates from 45 per thousand in the early twenties

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[2] Jack William (1999): "Principles of Health Economic for Developing Countries", World Bank Institute Development Studies, Chapter III, p. 29.

[3] Jack William (1999): *op.cit.*, p. 28.

to 15 per thousand in mid seventies[4] it has further declined to 9 in the year 1995. Life expectancy at birth has shown a marked improvement from 23 years (1901-1911) to 59 years (1988-1992). Rapid strides have been made in control of communicable disease and there has been a decline in the disease burden up to 50 percent of communicable diseases[5].

Despite above achievements, the health status of India is a cause of concern since India still does not enjoy high Life Expectancy comparable to developed countries like USA (76 years), the UK (77 years) and Canada (78 years). Moreover, India carries one fifth of the world's burden of communicable diseases[6] and the transition of the health status is not uniform. There is a lot of inter-state variation in stages of demographic and epidemiological transition. Having crossed the one billion marks, it is high time to realize the need for identifying the demographically weaker states for focused intervention. This chapter attempts to analyze and find out such states, which requires increased attention. This chapter etches the demographic profile over a period of time by indicating state wise pattern of mortality measures. In the later part of the chapter, the morbidity level across states is also investigated. Both these factors determine the inter-state variation in health outcomes across the states.

III. 2 MORTALITY PROFILE: AN INTERSTATE ANALYSIS

The mortality indicators of a nation evaluate its health status. Mortality Rate, Birth Rate and Fertility rate help in making a meaningful comparison of the health status of different regions. The measures that have been used in this study are Infant Mortality Rate, Crude Death Rate, Crude Birth Rate and Fertility Rate.

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[4] Padmanabha, P. (1982), "Mortality in India: A Note on Trends and Implications", *Economic & Political Weekly*, vol. XVII (32), p. 1285.

[5] World Bank (1993): *op. cit.*, p. 27.

[6] Ibid., p. 27.

III.2.1 INFANT MORTALITY RATE (IMR)

Infant Mortality rate is the most sensitive indicator of a country's health status. It encompasses all the facets from health services to socioeconomic development. There has been a significant decline in infant mortality rate in our country. The table given below indicates Infant Mortality Decline.

TABLE 3.1
INFANT MORTALITY RATE IN INDIA (1941-1999)

YEAR	1941-4	70	71	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
IMR	171	129	129	110	105	105	104	97	96	95	94	91	80	80	75	74	74	74	72	71	72	70

Source: SRS Annual Reports

One can observe from the above figures that there has been a steep decline in the IMR from 171 in the year 1941-45 to 70 in 1999. Yet, India has a very high IMR (as high as three times the average IMR) as compared to the IMR of the developed nations. Hence, the policy thrust should be placed on reducing the levels of IMR.

1. Inter State Profile of IMR

The trends in IMR have been calculated for the 14 states under study for a period of 25 years from 1975 to 1999 depicted in the table 3.2 below. This done to provide a comprehensive overview about the interstate differences in infant mortality rate. To provide a spatio temporal profile of IMR the states have been divided into three categories. The states with high IMR, moderate IMR and low IMR. Such a categorization is done for the years 1975, 1985, 1995 and 1999. The same pattern has been used to analyze other indicators of health status.

TABLE 3.2
INFANT MORTALITY RATE ACROSS STATES (1975-99)

Range	Year	States	State with Highest Value	State with Lowest Value
High > 149	1975	Uttar Pradesh (UP), Gujarat, Madhya Pradesh (MP), Rajasthan	UP (198)	MP (151)
> 115	1985	Uttar Pradesh (UP), Gujarat, Madhya Pradesh (MP), Orissa	UP (142)	MP (122)
> 105	1990	Orissa, Madhya Pradesh (MP)	Orissa (122)	MP (111)
> 85	1995	Orissa, Madhya Pradesh (MP), Rajasthan, Uttar Pradesh (UP)	Orissa (103)	UP (86)
> 76	1999	Madhya Pradesh (MP), Orissa, Rajasthan, Uttar Pradesh (UP)	Orissa (97)	Rajasthan (81)
Moderate 100-149	1975	Andhra Pradesh (AP), Haryana, Orissa, Tamilnadu	Orissa (149)	Tamilnadu (112)
75-110	1985	Bihar, Gujarat, Haryana, Andhra Pradesh (AP), Rajasthan	Bihar (106)	AP (83)
70-105	1990	Bihar, Gujarat, Rajasthan, Uttar Pradesh (UP)	UP (99)	Gujarat (63)
56-85	1995	Andhra Pradesh (AP), Bihar, Gujarat, Haryana, West Bengal (WB)	Bihar (73)	WB (58)
51-75	1999	West Bengal (WB), Andhra Pradesh (AP), Bihar, Gujarat, Haryana, Karnataka, Punjab, Tamilnadu	Haryana (68)	TN (52)
Low < 100	1975	Karnataka, Kerala, Maharashtra, Punjab.	Punjab (98)	Kerala (154)
< 75	1985	West Bengal (WB), Karnataka, Kerala, Maharashtra.	WB (74)	Kerala (31)
< 55	1995	Karnataka, Maharashtra, Punjab, Tamilnadu.	Punjab (55)	Kerala (15)
< 50	1999	Kerala, Maharashtra	Maharashtra (48)	Kerala (14)

Source: Computed

(a) States with high IMR

From 1975 to 1999, it can be observed that consistently Uttar Pradesh, Madhya Pradesh and Rajasthan had high IMR for all most all the years. Uttar Pradesh ranked first in IMR, alternating with Madhya Pradesh. Uttar Pradesh had an IMR of 198 followed by Rajasthan (155), Gujarat (154) and Madhya Pradesh being the lowest (151).

In the year 1985, the states of Gujarat, Madhya Pradesh, Orissa and Uttar Pradesh had a significant proportion of high IMR. The same position continued in 1995. However, Gujarat dropped out from the list of high IMR, whereas Orissa topped the IMR chart for the same year. Uttar Pradesh for the same year clocked a low IMR of 86.

(b) States with Moderate IMR

Between 1975 and 1999, a large number of states underwent transition from high to moderate levels of IMR. In the year 1975, Andhra Pradesh, Haryana, Orissa and Tamilnadu were the states, which had a moderate IMR. Orissa topped with an IMR of 149, whereas Tamilnadu had the lowest of 112.

In the year 1985, Bihar, Gujarat, Rajasthan, which were earlier under the high IMR category transited to moderate range of IMR. Bihar had a high IMR of 106, whereas Andhra Pradesh had the lowest IMR of 53. In the year 1995 almost the same pattern was observed. However, later on West Bengal and Karnataka got included in this category.

(c) States with Low IMR

In the year 1975, Karnataka, Kerala, Maharashtra and Punjab enjoyed relatively lower IMR levels. In this category Punjab had the highest value (98), while Kerala had the least (54). However, by 1985, only Karnataka and Kerala were the two states, which recorded a low IMR level below 75. In the year 1995, there was an improvement in the number of states falling under lower IMR category to 4. Maharashtra, Punjab and Tamilnadu had relatively a lower IMR as compared to the their counterparts. However, there were large variations within this category with Kerala clocking as low as 15, while Punjab registering a high IMR of 55. The year 1999 saw only two states with low IMR levels viz. Kerala and Maharashtra.

The overall pattern that emerges from the above is that the four southern states along with Maharashtra showed low to moderate levels of IMR, while IMR levels were relatively higher for the Northern states of Uttar Pradesh, Rajasthan, Madhya Pradesh and Orissa. Though, Bihar underwent transmission to moderate levels of IMR still remains on the threshold of high IMR. West Bengal, who was categorized under low IMR, has inched up in its position from low to moderate levels.

The number of states in with moderate level of IMR was in large number. This was because Kerala with the lowest IMR since 1975 has been decelerated at a faster pace *vis-a-vis* its counterparts.

III.2.2 CRUDE DEATH RATE (CDR)

The death rate in India has registered a meteoric fall and stands in comparison with rest of the developed countries of the world. The death rate has fallen from 40 per thousand population in the beginning of the 20th century to around 9 per thousand in recent years.

Such a rapid decline in the mortality levels can be attributed to medical progress, inoculations, vaccination and efficacious health intervention programmes undertaken by the Government. Yet, a "mortality divide" exists between different states. In order to get a comprehensive overview of the inter-state differences, we have analyzed the Crude Death Rates (CDR) for the period 1975-99. Thus, we have tried to get a spatio temporal profile of CDR by analyzing the CDR pattern for 1975, 1985, 1995 and 1999.

TABLE 3.3

CRUDE DEATH RATE ACROSS STATES (1975 – 1999)

Range	Year	States	State with Highest Value	State with Lowest Value
High > 13	1975	Andhra Pradesh (AP), Bihar, Madhya Pradesh (MP), Orissa, Rajasthan, Tamilnadu & Uttar Pradesh (UP)	UP (22.6)	Bihar (13.3)
> 11	1985	Andhra Pradesh (AP), Gujarat, Madhya Pradesh (MP), Rajasthan, Orissa, Uttar Pradesh (UP)	UP (15.8)	AP (10.3)
> 9	1995	Bihar, Madhya Pradesh (MP), Orissa, Uttar Pradesh (UP)	MP (12.6)	Bihar (9.8)
> 10	1999	Madhya Pradesh (MP), Orissa, Uttar Pradesh (UP)	MP (11.2)	UP (10.8)
MODERATE 10-13	1975	Haryana, Karnataka, Maharashtra, Punjab, West Bengal (WB)	WB (13)	Karnataka (11.1)
8-11	1985	Haryana, Karnataka, Maharashtra, Tamilnadu, WB, Punjab	WB (11)	Karnataka (8.8)
7-9	1995	AP, Maharashtra, Rajasthan, Haryana, Tamilnadu, Gujarat, Karnataka, WB, Punjab	Gujarat (8.9)	Maharashtra (7.4)
Low ≤ 9	1975	Kerala	Kerala	(8.4)
≤ 7	1985	Kerala	Kerala	(6.5)
≤ 6	1995	Kerala	Kerala	(6.0)
≤ 7	1999	Kerala & West Bengal (WB)	Kerala (6.4)	WB (7.1)

Source: Computed

1. Interstate Pattern of CDR

(a) States with High CDR

In the year 1975, Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Tamilnadu and Uttar Pradesh had high crude death rates. With Uttar Pradesh topping the chart at 22.6 and Bihar with the lowest in this category at 13.3. In the year 1985, Tamilnadu moved out from this category but all other states like Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh continued to have a high level of CDR. Uttar Pradesh continued with a high CDR of 15.8, while Andhra Pradesh was on threshold at 10.3.

In the year 1995, Rajasthan, Gujarat and Andhra Pradesh, which belonged to the high CDR category, had scaled down to moderate levels of crude death rate. However, the positions of Bihar, Madhya Pradesh, Orissa and Uttar Pradesh remained unchanged so far as their category is concerned. There was a decline in the IMR of Uttar Pradesh, which did not rank the highest. Madhya Pradesh had the highest Crude Death Rate (12.6). Lastly, in the year 1999, only Madhya Pradesh, Orissa and Uttar Pradesh had high levels of crude death rate with Madhya Pradesh topping the list at 11.2. Looking at the pattern of the high CDR states we can infer that there has not only been a decline in the levels of CDR but also in the number of states belonging to this category, which have almost halved since the year 1975. Large number of states has moved to the moderate category of crude death rate, viz. Andhra Pradesh, Gujarat, Bihar and Tamilnadu over a period of time.

(b) States with Moderate CDR

There has been an increase in the number of states in this category over a period of time. In the year 1975, the states of Haryana, Karnataka, Maharashtra, Punjab, West Bengal and Kerala recorded a moderate Crude Death Rate ranging from 10 to 13. By the year 1995, the number of states increased from 6 to 9 with the inclusion of Andhra Pradesh, Gujarat,

Tamilnadu and Rajasthan, which had registered a drop in the Crude Death Rate. In the year 1999, West Bengal transmitted to lower death rate, while Bihar with high death rate in previous years showed marked improvement and got included in this category. Though, Tamilnadu, Karnataka, Maharashtra, Haryana are having Moderate Crude Death Rates, they are little short of achieving the Crude Death Rate, which is comparable to Kerala.

(c) States with Low CDR

From the year 1975 to 1999, only Kerala recorded lower levels of death rate. In 1999 West Bengal got included in this category. The rate of decline in death rate of Kerala is unparalleled. As mentioned earlier, a large number of states like Tamilnadu, Karnataka, Maharashtra can have lower levels of death rates. On the whole, the four southern states, Maharashtra, West Bengal has shown lower CDR, whereas the states of Madhya Pradesh, Orissa and Uttar Pradesh showed relatively higher levels of death rate. It is believed that major source of mortality decline since independence in India is attributed to eradication of small pox, plague, cholera, malaria and tuberculosis.[7]

III.2.3 CRUDE BIRTH RATE (CBR)

Despite an unblemished history of family planning, India has not been able to make a dent on reducing birth rates. Although across the period of time there has been a reduction in birth rates yet such a decline is not adequate since the birth rates in India continue to be very high. They also exhibit inter-state disparities in their incidences. The Crude Birth Rate has been effectively analyzed in the table 3.4 given below. The data pertains to all observation for the period 1975-1999. It gives us an insight about the changes in trends that have taken place in the birth rates.

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[7] Cassen Robert (1976): "Development and Population", Economic and Political Weekly, vol. 11, No. 31-33, as cited in Narayan KV, "Limits to Technical Intervention in Health Care", Disinvesting in Health, p. 194.

TABLE 3.4
CRUDE BIRTH RATES ACROSS STATES (CBR – 1975-1999)

Range	Year	States	State with Highest Value	State with Lowest Value
High > 33	1975	Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh	UP (43.1)	Orissa (33.6)
> 30	1985	Bihar, Gujarat, Haryana, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh	UP (39.7)	Orissa (32.5)
> 25	1995	Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh, Gujarat, Haryana.	UP (34.8)	Gujarat (26.7)
> 24	1999	Bihar, Gujarat, Haryana, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh	UP (32.1)	Gujarat (25.4)
MODERATE 29-33	1975	Maharashtra, Punjab, Tamilnadu, West Bengal, Bihar	Punjab (31.8)	WB (23.7)
25-30	1985	Andhra Pradesh, Maharashtra, Karnataka, Punjab, Tamilnadu, West Bengal	AP (25.4)	TN (24.7)
19-25	1995	Andhra Pradesh, Karnataka, Assam, Punjab, Tamilnadu, West Bengal.	Bihar (106)	TN (20.3)
19-24	1999	Andhra Pradesh, Karnataka, Maharashtra, West Bengal, Punjab, Tamilnadu.	AP (21.7)	TN (18.3)
Low □ 28 □ 24 □ 15 □	 1975 1985 1995 1999	 Karnataka, Kerala Kerala Kerala Kerala	 Karnataka 28	 27.7 23.3 19 18

Source: Computed

(a) States with High CBR

In the year 1975, Uttar Pradesh ranked number one with CBR (43.1). The other states were Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Rajasthan and Orissa. Orissa had the least CBR (33.6) in this category. In 1985, the same states had high CBR except for Andhra Pradesh, which reached moderate levels. The trends and category of high CBR states did not change. Uttar Pradesh consistently for all the years (1985, 1995, and 1999) had highest Birth rates at 39.7, 34.8, and 32.1 respectively and Orissa ranked last in this category in 1985 at (32.5). In 1995 and 1999, Gujarat stood on the threshold 25.6 and 25.4 respectively.

(b) States with Moderate CBR

There have been no significant changes in the number of states with moderate CBR since 1975. In 1975, there were only 4 states having moderate CBR - Maharashtra, Punjab, Tamilnadu, Bihar and West Bengal. Punjab had

the highest CBR in this category (31.8), while West Bengal 29.7 was the lowest. In 1985, Andhra Pradesh transited to moderate CBR range while Bihar to higher CBR range. The rest of the states remained in the same position - Maharashtra, Karnataka, Punjab, Tamilnadu and West Bengal. Andhra Pradesh had the highest birth rate 29.4 while Tamilnadu at 24.7 was the lowest. The same trends continued in 1995 and 1999.

(c) States with Low CBR

In 1975 Karnataka and Kerala were the only state with lower Birth rates at 28 and 27.7 respectively in 1985, 1985, 1999 only Kerala recorded lower birth rate.

An analysis of trends of Crude Birth Rate reveals that the transition towards the low birth rate regime has not been effective for a large number of states. Though, there have been declines in absolute birth rate, but the pattern of Birth rate has more or less remained uniform. Maharashtra, Punjab, West Bengal and Southern states have achieved either low or moderate level of CBR. But states in Northern, Central Belts (Bihar, Madhya Pradesh, Haryana, Rajasthan and Uttar Pradesh) along with Orissa and Gujarat continue to maintain status quo, having relatively higher range of birth rate. This calls for attention of policy planners, review of family planning programmes, policy initiatives to make a significant impact on birth rates.

III.2.4 TOTAL FERTILITY RATES

In recent years, fertility rate has been effectively utilized as an indicator to analyze the fertility behavior of a region. Fertility behavior refers to the choice of the family size. It is not only an important demographic indicator but also reflects the socioeconomic well being. Birth rates are a direct consequence of fertility rate. The fertility rate has various determinants like education, socioeconomic state, poverty levels, contraceptive usage behavior and women empowerment and as also place of residence (rural and urban).

In India, the fertility differentials are on account of place of residence, educational level, religion, and caste groups[8]. Fertility reduction can arrest deterioration of women's health[9]. It can go a long way in arresting the birth rates, which are still very high. There are wide disparities in fertility rates, which can be analyzed from the table 3.5 given below:

TABLE 3.5
TOTAL FERTILITY RATE ACROSS STATES (1980-97)

Range	Year	States	State with Highest Value	State with Lowest Value
High > 4.6	1980	Gujarat, Haryana, Madhya Pradesh, Rajasthan, Uttar Pradesh	Uttar Pradesh (5.9)	Gujarat (4.7)
> 4.1	1985	Bihar, Haryana, Madhya Pradesh, Rajasthan, Uttar Pradesh	Uttar Pradesh (5.6)	Haryana and MP (4.6)
> 3.5	1995	Bihar, Haryana, Madhya Pradesh, Rajasthan, Uttar Pradesh	UP (5)	Haryana (3.7)
> 3	1997	Bihar, Haryana, Madhya Pradesh, Uttar Pradesh, Rajasthan.	MP (4.8)	Haryana (3.4)
MODERATE 3.6-4.6	1980	Maharashtra, Tamilnadu, Punjab, Orissa, Haryana.	Orissa (4.11)	TN (3.4)
3.1 – 4.1	1985	Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Orissa, Punjab, Haryana.	Gujarat (3.9)	Punjab (3.5)
2.5-3.5	1995	Andhra Pradesh, Gujarat, Karnataka, MH, Orissa, Punjab, WB	Orissa (3.3)	TN (2.2)
2-3	1997	Gujarat, Karnataka, MH, West Bengal, Orissa, Punjab	Orissa, Haryana (3.0)	AP (2.5)
Low □ 3.5 □ 3 □ 2.5 □ 2	 1980 1985 1995 1997	 AP, Karnataka, Kerala Tamilnadu, Kerala Kerala, Tamilnadu Kerala, Tamilnadu	 Karnataka (3) Kerala (1.7) Kerala (1.8)	 AP(2.8) TN (2.1) TN (2)

Source: Computed

(a) States with High Fertility Rates

From 1988 to 1997 there has been no change in the states with high fertility rate. Consistently Uttar Pradesh, Madhya Pradesh, Haryana and Rajasthan have had high fertility rates. Only in Gujarat there has been a rapid

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[8] James KS (1999): "Fertility Decline in Andhra Pradesh: A Search for Alternative Hypotheses", *Economic and Political Weekly*, Feb. 20, 1999, p. 492.

[9] VHAI (2000): "National Profile on Women, Health Development", p. 200.

decline in the fertility rates. For all the years Uttar Pradesh continued to remain the state with highest fertility rate.

(b) States with Moderate Fertility Rates

In the year 1980, Maharashtra, Tamilnadu, Punjab, Orissa and Haryana had moderate levels of fertility rates. Orissa had highest range 4.1 and TN was on the threshold with 3.4. In 1985, Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Orissa, Punjab and W.B. had moderate fertility rates, ranging between 3.9 to 3.5. Gujarat and Punjab had the highest and lowest fertility rates respectively. The same states continued to have moderate fertility rates. In 1995, Orissa had a high TFR in this category and TN was the lowest with 2.2.

(c) States with Low Fertility Rates

In 1980, AP, Karnataka, Kerala had the lowest CDR with AP being the lowest at 2.8 and Karnataka at 3. In 1985, only TN and Kerala had the lowest fertility rates.

The fertility decline in Southern States is more prominent in comparison to the northern states. The fertility transition in Southern States is on account of various development variables. Female literacy is one of them[10]. This is particularly true for Kerala and Tamilnadu, where female literary came out to be the strongest variable explaining fertility decline[11].

Beside reduction in infant morality rate is also one of the plausible explanation in explaining high fertility rates. In Tamilnadu the explanatory variables of fertility decline is implementation of vigorous family planning[12]. In Contrast to southern states Bihar, Haryana, Madhya Pradesh, Uttar Pradesh, Rajasthan have relatively high fertility rates. Incidentally these states are

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[10] James, KS (1991): *op. cit.*, p. 491.

[11] Bhat Rajan (1990): As quoted in James KS (1991), *op. cit.*, p. 493.

[12] Anthony (1992): Cited in James KS (1991), p. 493.

characterized by relatively low level of literacy and high infant mortality rates, which may be a factor explaining slow fertility transition in these states. Hence policy initiatives which change the material conditions create mass awareness should be undertaken.

III. 3 TREND ANALYSIS OF MORTALITY MEASURES

In the previous section the study examines mortality pattern across states. An interstate disparity was explained by dividing states according to high, moderate and low morality rates for different points of time. Nevertheless, in order to get a comprehensive view it is of immense importance to find out the growth rates of the mortality indicators for the given period under study. The trends in growth rates of the mortality indictors been analyzed in this section. A graphic representation is given be seen in graph 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7 and 3.8.

III 3.1 TRENDS IN GROWTH RATE FOR INFANT MORTALITY RATES

There has been a wide variation in the growth rates of Infant mortality rate across the period of time. All the states have registered a decline in the growth rates, yet such decline is not uniform. Growth rate differentials in infant mortality rate lead to interstate variation in mortality measures. The table 3.6 below presents growth rates of IMR for the period 1975-99.

TABLE 3.6
COMPOUND GROWTH RATES OF INFANT MORTALITY (1975-1999)

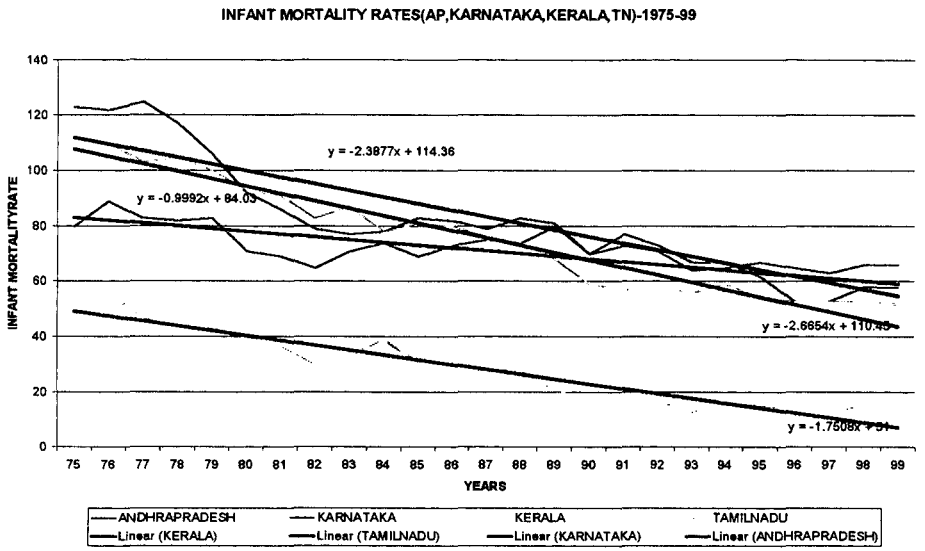
STATES	75-99	85-90	81-90	90-99	95-99
Andhra Pradesh	-2.56	-3.34	-1.80	-0.65	-0.65
Karnataka	-1.33	0.28	1.22	-2.07	-1.65
Kerala	-5.46	-11.32	-8.8	-2.13	-1.71
Tamilnadu	-3.1	-6.14	-5.06	-1.39	-0.92
Orissa	-1.7	-1.56	-0.93	-2.5	-1.48
West Bengal	-	-3.16	-2.7	-2.10	-2.60
Bihar	-	-6.6	-.57	-1.41	-2.48
Gujarat	-3.65	-5.97	-5.6	-1.47	+0.40
Maharashtra	-2.67	-3.13	-3.01	-2.08	-3.34
Madhya Pradesh	-2.08	-1.87	-2.2	-2.18	-2.08
Uttar Pradesh	-3.5	-6.96	-.4.7	-9.89	-0.58
Rajasthan	-2.6	-4.9	-3.8	-0.4	-1.4
Punjab	-3.6	-2.9	-4.6	-1.5	-0.46
Haryana	-2.6	-4.08	-5.2	-0.16	-0.36

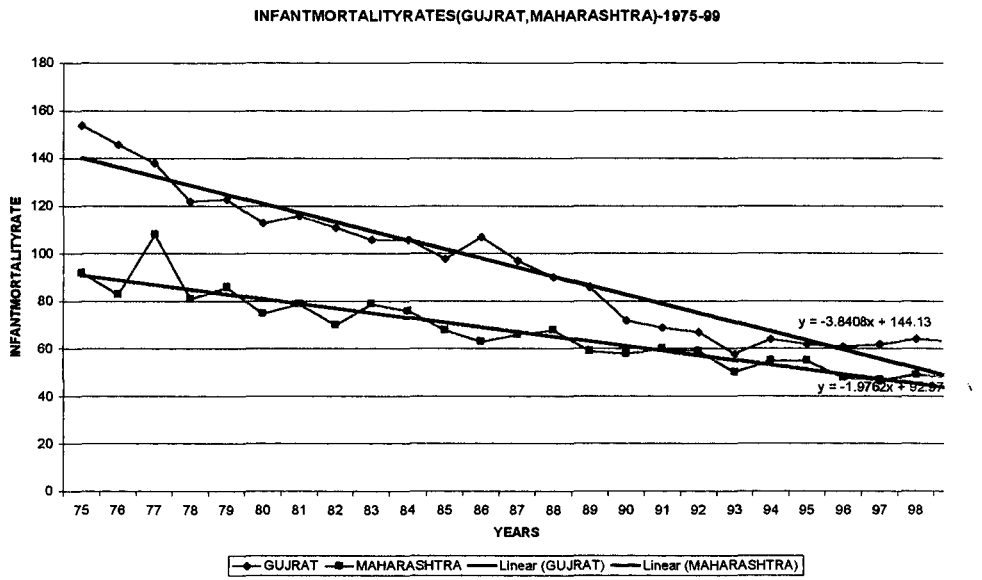
Source: Computed

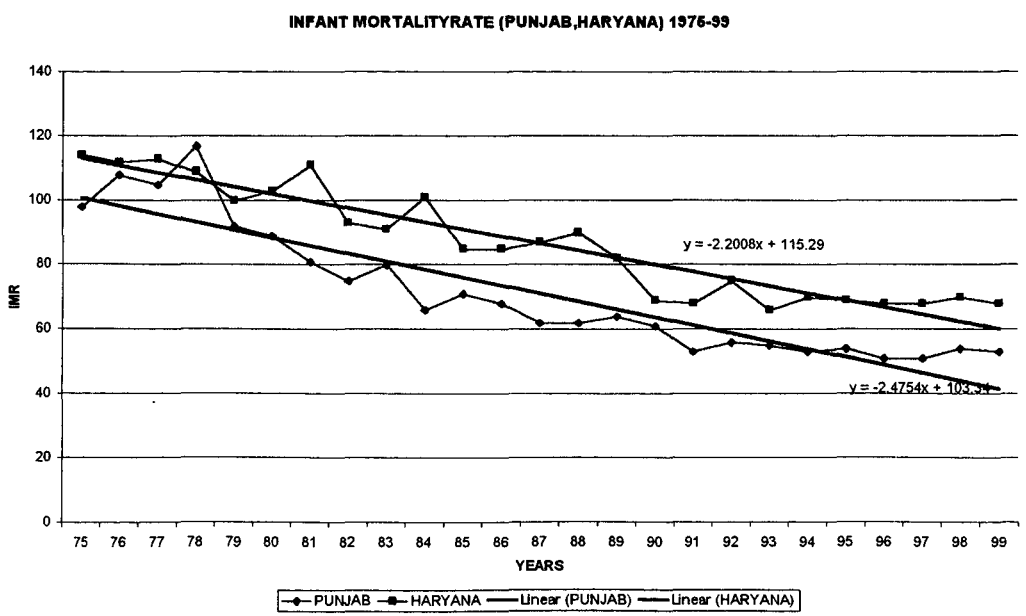
There are differentials in the rate of decline of infant mortality rates across states. The annual rate of change for the period between 1975-1999 reveals that Kerala has been the fastest in its decline of infant mortality rate, where infant mortality rate dropped by 5.46% annually. Among other states noting a rapid decline were Gujarat (-3.65%), Punjab (-3.6%) and Tamilnadu (-3.1%). However, states like Rajasthan, Haryana, Orissa and M.P, the rate of decline was relatively lower (-2.6%, -2.6%, -1.7%, -2.08% respectively). Interestingly, Uttar Pradesh with highest infant mortality rates has declined appreciably at (-3.5%) while Karnataka with comparatively low IMR has registered a very slow decline (- 1.33%) annually.

It is interesting to compare the decline in growth rate with the trends depicted in the graph 3.1 and 3.2. It can be seen among the southern states the trend lines indicate lowest trend rate for Karnataka and highest for TN followed by Andhra Pradesh and Kerala (see coefficients). However, in reality Kerala's IMR declined at a faster pace, while Karnataka's decline in IMR rates was the lowest. Similarly for the Western region, Gujarat, compared to Maharashtra has shown a faster decline, which is supported by trend equation. Among UP, Rajasthan, MP, the actual decline of UP was the highest followed by Rajasthan, MP, which is supported by their trend equations. Between Haryana and Punjab the rate of decline of Haryana was slower than that of Punjab. But their trend equations depict the opposite.

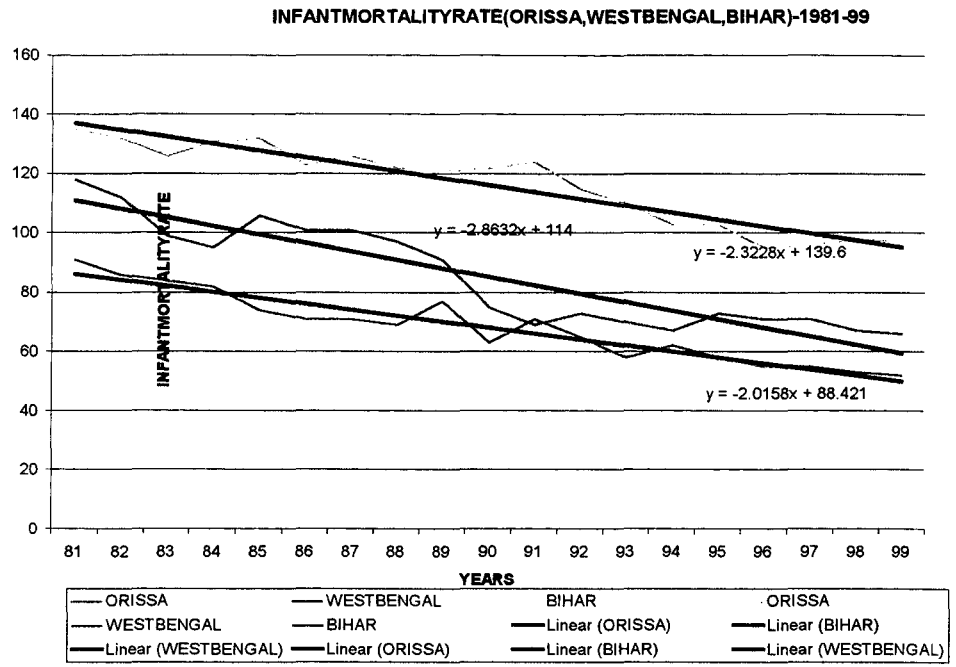
3.1 INFANT MORTALITY RATE OF INDIAN STATES - 1975-99

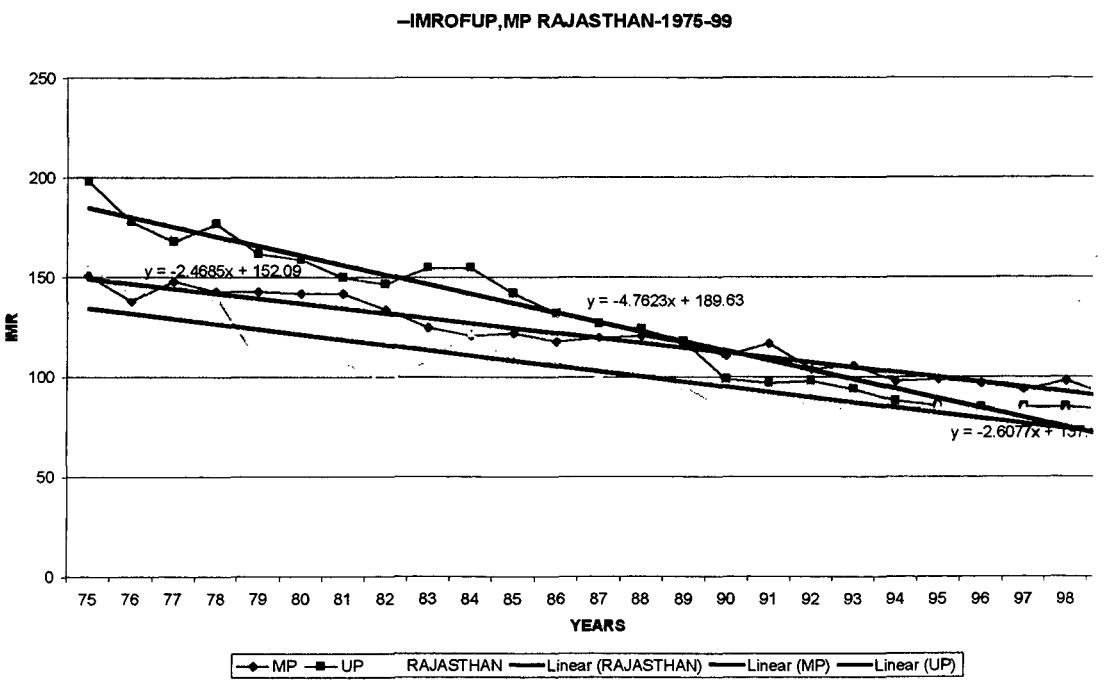






3.2 INFANT MORTALITY RATE OF INDIAN STATES - 1975-99





An attempt is made to compare the growth rate among various states for the period preceding liberalization i.e. 85-90 with the period after liberalization 95-99. A close look at the figures depicts that there has been a slow down in the rate of decline of IMR. In the post liberalization period as compared to the pre-liberalization period for most of the states. The table 3.5 also indicates that since mid-nineties, the rate of decline in infant mortality rates has slowed down for most of the states across the board. This hold true for demographically superior states like Kerala where annual rate of decline was 1.71 per cent per annum in this period vis-a-vis 11.32% percent in 85-90.

III 3.2 COMPOUND GROWTH RATES OF CRUDE DEATH RATE

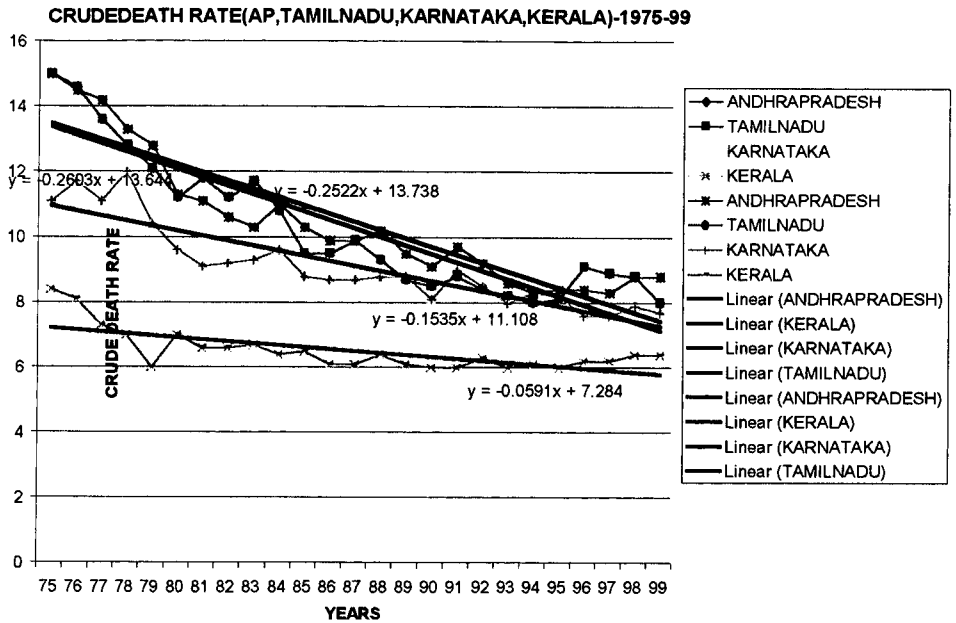
The table 3.7 below indicates that there are differentials in the rate of decline of Crude Death Rates across states. The annual rate of change for the period between 1975-1999 show that Uttar Pradesh has been the fastest in its decline of CDR, since it dropped by –3.14% annually. Among other states noting a rapid decline in the growth rates were Gujarat (-2.74%), Rajasthan (-2.62%) and Tamilnadu (-2.58%). However, states like Kerala, Karnataka, Punjab, and Maharashtra the decline in growth rates was unimpressive viz. (-1.12%, -1.51%, -1.56%, -1.72% respectively) implying slow rate of decline. It is interesting to compare the actual rate of decline with that predicted by the trend equations in graph 3.3 and 3.4.

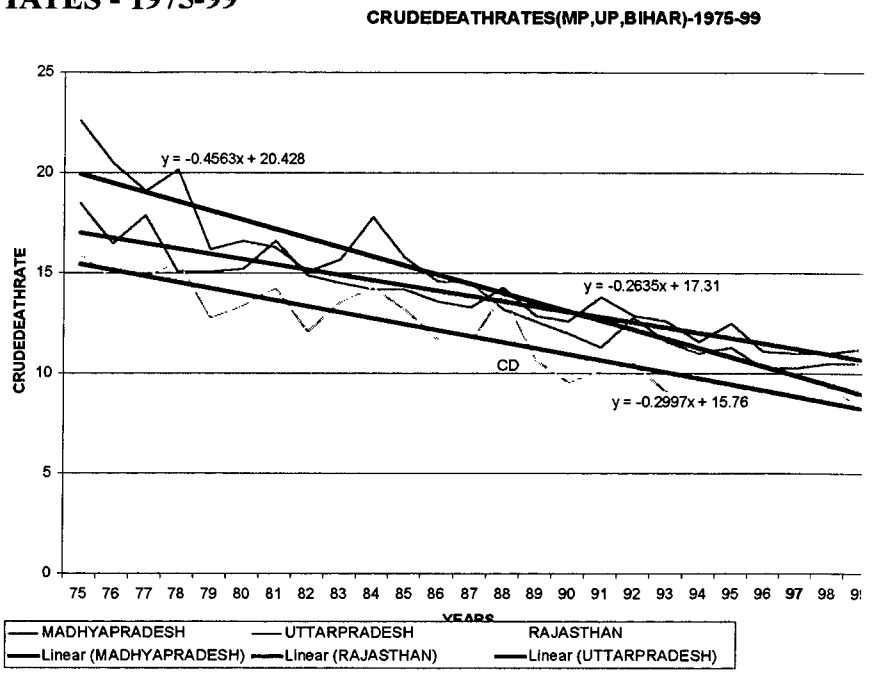
TABLE 3.7
ANNUAL GROWTH RATES OF CDR (1975-1999)

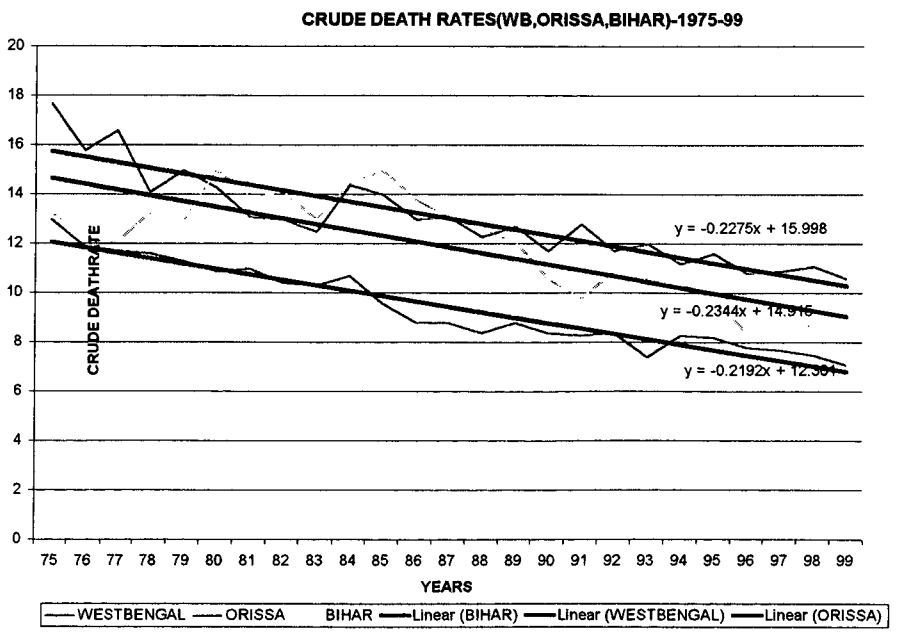
STATES	75-99	85-90	81-90	90-99	95-99
Andhra Pradesh	-2.15	-2.44	-2.54	-0.37	+1.16
Tamilnadu	-2.58	-2.19	-4.22	-0.67	-0.31
Karnataka	-1.51	-1.64	-1.83	-0.56	-1.56
Kerala	-1.12	-1.58	-0.34	-0.71	+1.62
Madhya Pradesh	-2.06	-2.36	-4.2	-1.3	-2.70
Uttar Pradesh	-3.14	-5.3	-4.76	-1.47	-1.81
Rajasthan	-2.62	-6.17	-5.74	-1.47	-1.71
West Bengal	-2.47	-2.63	-4.74	-1.85	-3.53
Orissa	-2.11	-3.52	-2.32	-1.05	-2.22
Bihar	-1.99	-6.7	-5.69	-2.81	-4.35
Gujarat	-2.74	-3.7	-4.53	-1.31	-1.22
Maharashtra	-1.72	-2.5	-2.7	0.14	-0.33
Punjab	-1.56	-2.6	-2.62	-0.58	4.7E-10
Haryana	-1.77	-1.58	-3.76	-0.54	-0.61

Source: Computed

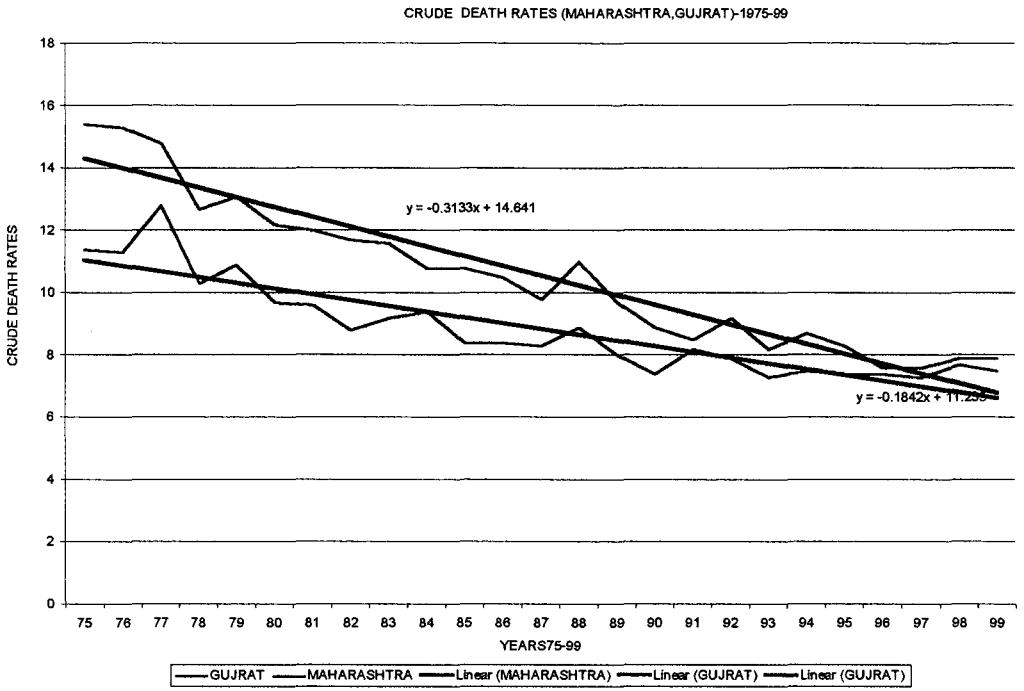
3.3 CRUDE DEATH RATE OF INDIAN STATES - 1975-99

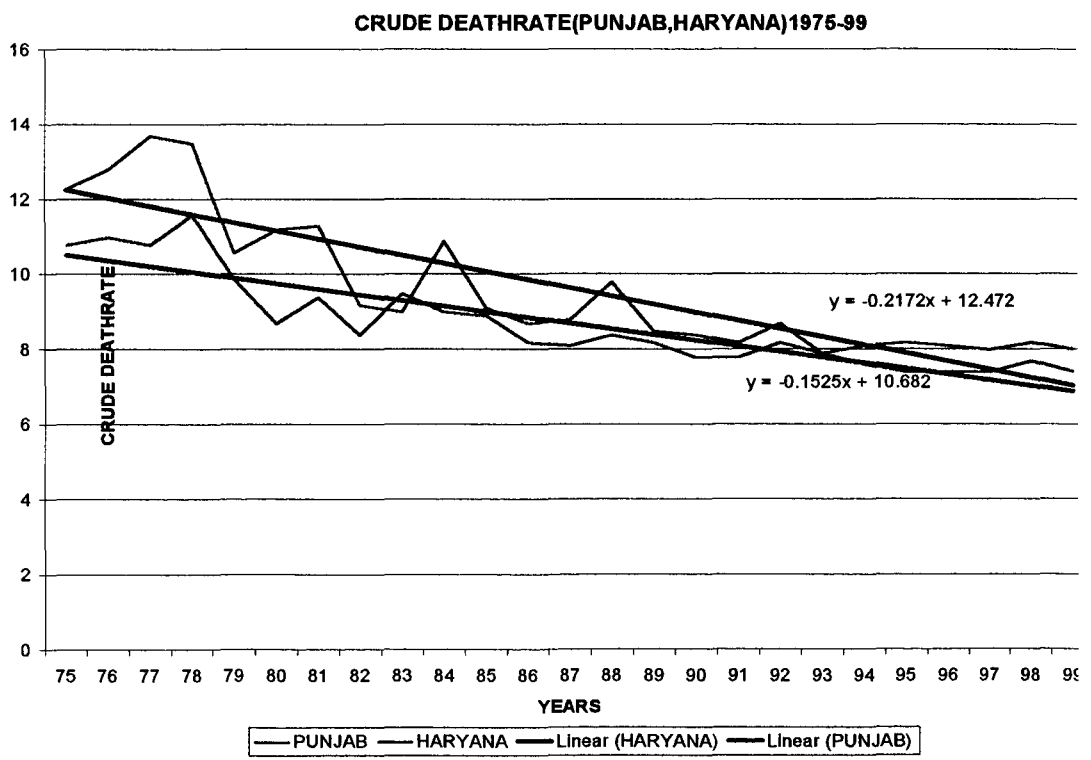






3.4 CRUDE DEATH RATE OF INDIAN STATES - 1975-99



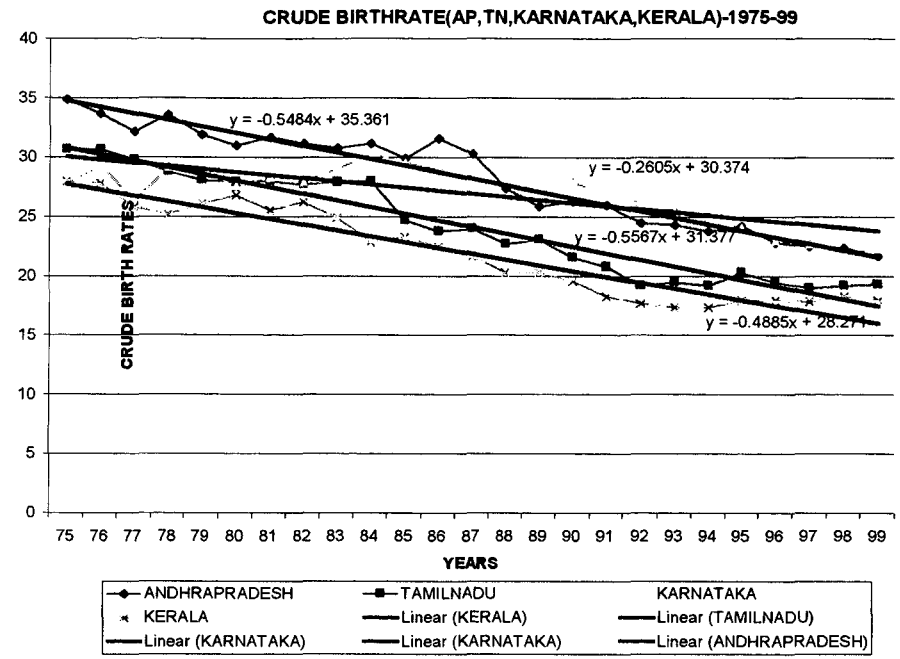


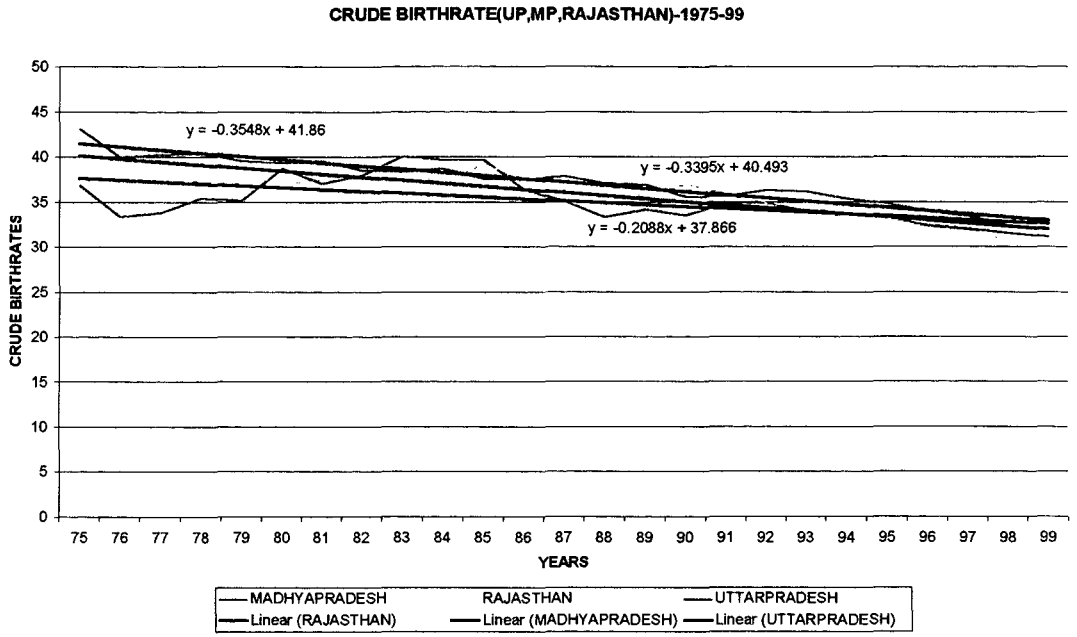
The coefficient of the trend equation depicted in graphs 3.3, 3.4 indicates that among the southern states, Tamilnadu's trend line has the steepest slope indicating fastest declining trend followed by Andhra Pradesh, Karnataka and Kerala. The rate of decline in crude death rate of Kerala between 1975-99 is the slowest. The actual growth rates also present the same position. Among the eastern states West Bengal has declined faster than its position indicated in the trend equation while in Bihar, the actual rate of decline is much slower than its trend. Both the trend rate and actual rate of decline of Maharashtra and Gujarat confirm that Maharashtra has a slower growth rate vis-a-vis Gujarat. The trend equation of Punjab and Haryana present a contrary view to actual fall in growth rates per annum. Punjab's actual decline in crude death rate is slower that that of Haryana.

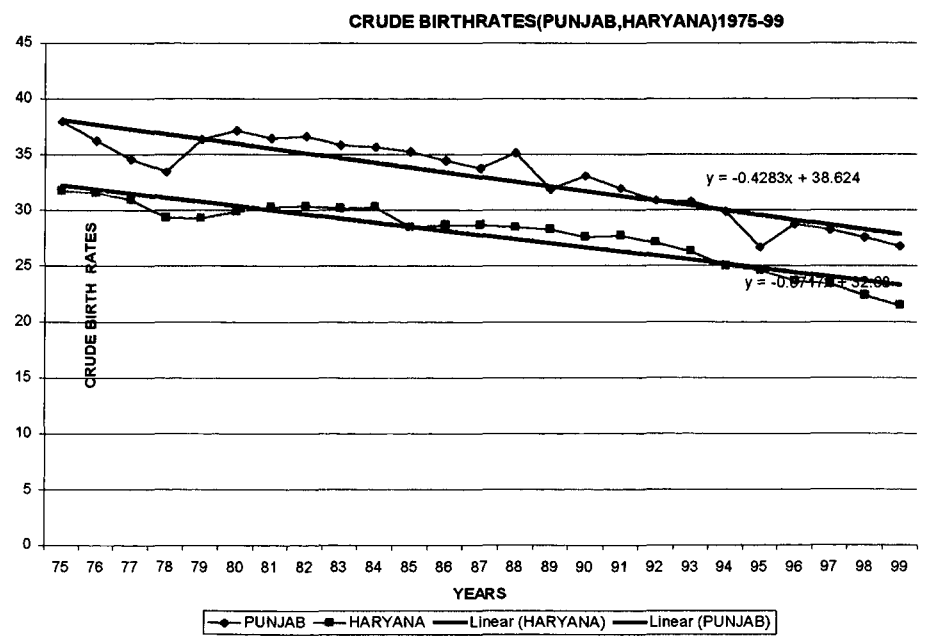
Comparison of the rate of decline between the decade preceding Liberalization i.e. 81-90 and also the decade of liberalization (1990-99) depict that there has been a slow down in the rates of CDR in the post liberalization period as compared to the pre-liberalization period. It can be seen that in mid nineties the annual rate of decline were lower than that recorded in other periods. Maharashtra had a positive growth rate indicating reversal of trends. Comparison of growth rates between post liberalization period (90-99) and previous decade i.e. 81-90 indicates that the period between 1981-90 has recorded much faster decline in crude death rates.

Reversal of trends in Maharashtra in Crude death rate between 90-99 presents a disturbing picture. Thus, like infant mortality rates, there are strong indicators conveying that the decline in crude death rates have slowed down in post liberalization period.

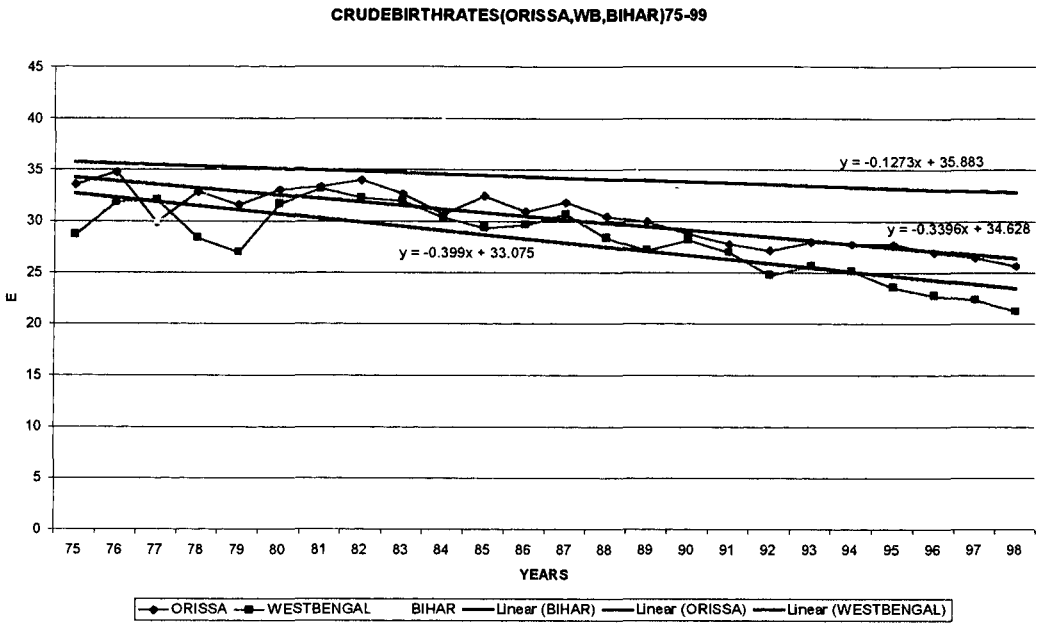
3.5 CRUDE BIRTH RATE OF INDIAN STATES - 1975-99

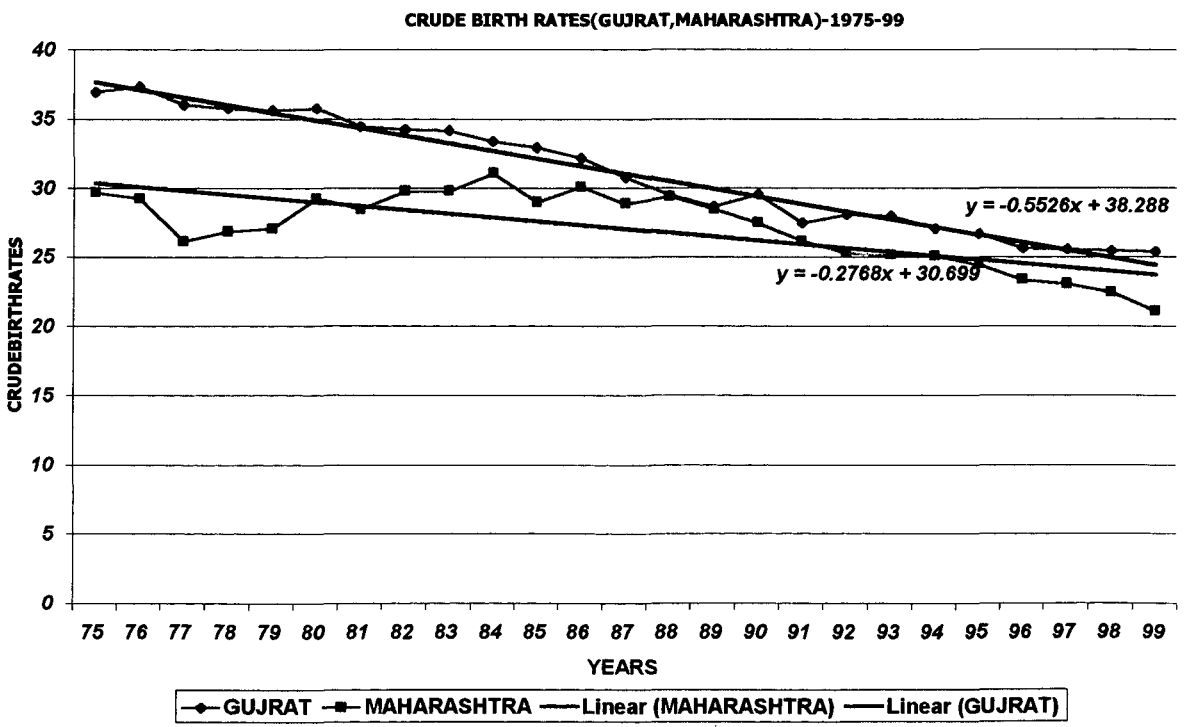






3.6 CRUDE BIRTH RATE OF INDIAN STATES - 1975-99





III.3.3 TRENDS IN GROWTH RATES OF CRUDE BIRTH RATE

TABLE 3.8
TRENDS IN GROWTH RATE OF CBR (1975-1999)

STATES	75-79	85-90	81-90	90-99	95-99
Andhra Pradesh	-1.96	-2.53	-0.77	-2.11	-1.65
Tamilnadu	-1.91	-2.64	-1.07	-1.24	-1.23
Karnataka	-0.89	-1.10	-0.04	-2.49	-2.95
Kerala	-1.82	-3.39	-1.10	-0.94	-1.68
Madhya Pradesh	-0.70	-3.28	-0.41	-0.85	-0.17
Uttar Pradesh	-1.22	-1.08	-0.44	-1.14	-0.45
Rajasthan	-	-1.19	-0.05	-2.08	-2.18
West Bengal	0.112	-0.82	-0.67	-3.37	-3.49
Orissa	-1.35	-2.38	-0.61	-1.96	-0.73
Bihar	-1.37	-2.73	-0.71	-0.87	-0.43
Gujarat	-0.09	-2.15	-0.63	-1.68	-2.04
Maharashtra	-1.55	-1.05	-0.14	-2.90	-2.28
Punjab	-1.41	-1.27	-0.4	-2.31	-4.2
Haryana	-1.44	-0.63	-0.38	-2.7	-2.27
	-1.61				

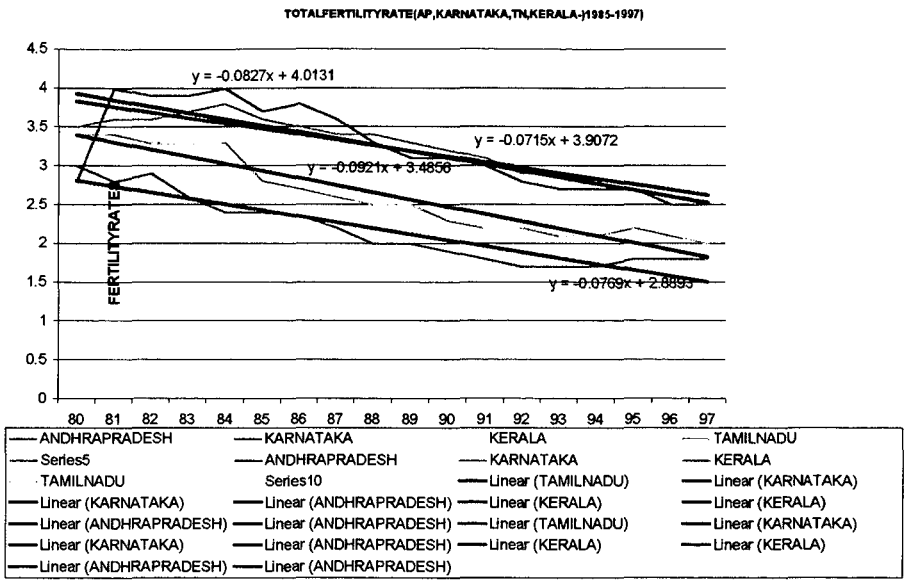
Source: Computed

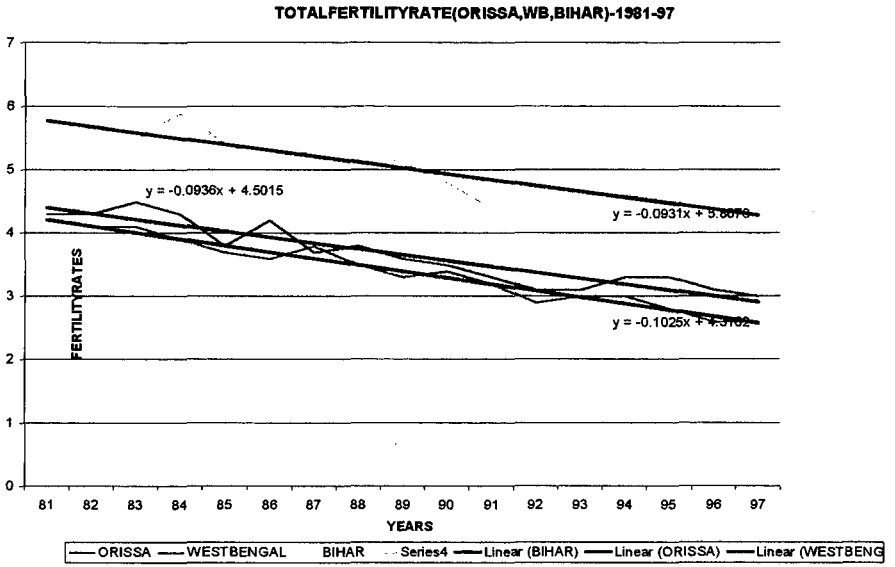
The trends of the crude birth rates depict the same pattern. There has been a fall in the annual growth rates in mid-nineties for most of the state except for Maharashtra and MP. Mid-nineties recorded a slow down in the rate of decline in comparison to the period (85-90).

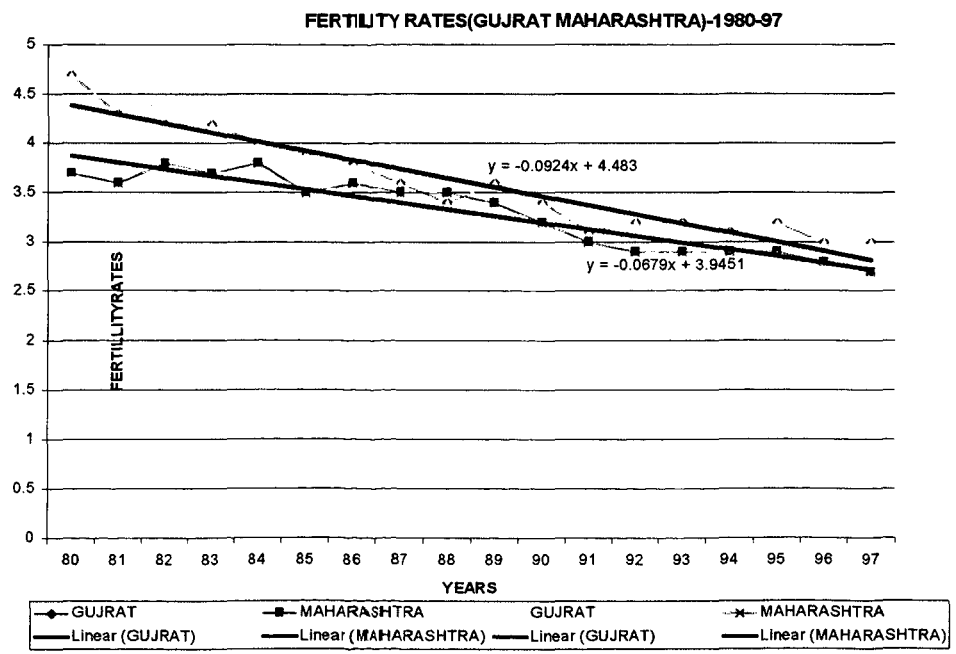
The annual compound growth rates for the period between 1975-1999 reveal that Andhra Pradesh has been the fastest in its decline of Crude Birth rate, where it dropped by 1.96% annually. Among other states noting a rapid decline in the growth rates were Tamilnadu (-1.91 %), Kerala (-1.82%) and Haryana (-1.61%). However, states like Bihar, Rajasthan, MP and Karnataka the rate of decline was less (-0.09%, -0.112%, -0.70%, -0.89% respectively).

It is interesting to compare the decline in growth rate with trends depicted in the graph 3.7 and 3.8.

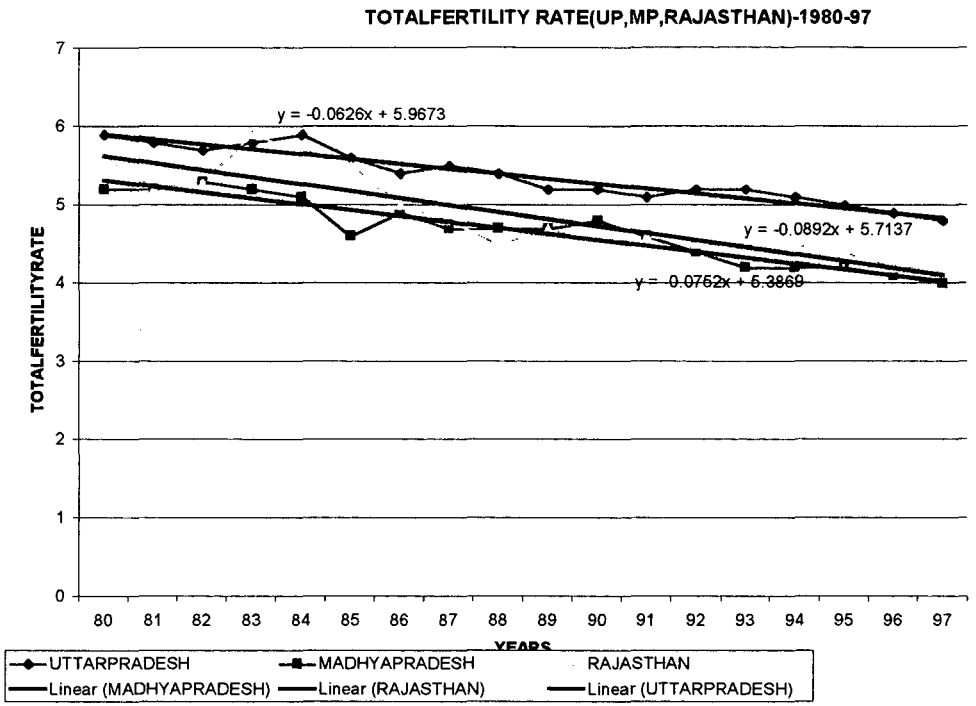
3.7 TOTAL FERTILITY RATE OF INDIAN STATES - 1980-97

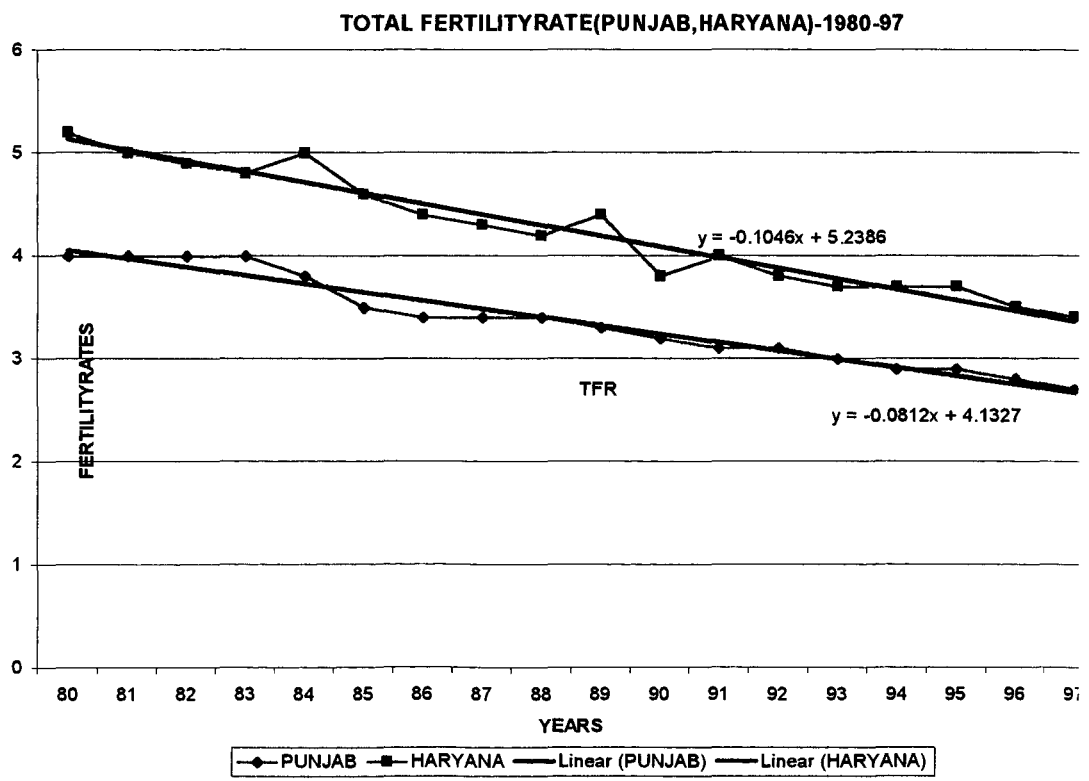






3.8 TOTAL FERTILITY RATE OF INDIAN STATES - 1980-97





The trend equation computed for crude birth rates for all the states indicate that among southern states Kerala has registered steepest fall in Crude birth rates, while AP in comparison to Tamilnadu has recorded a faster decline in birth rates.

Among MP, UP and Rajasthan the actual decline in Uttar Pradesh was faster which confirms the trend line equation shown in the graph. This confirms to the trend line equation shown in the graph. The rate of actual decline in Haryana's case is more than that of Punjab, though the trend equation depicts crude birth rate of Punjab falling at a faster rate. In case of Orissa, West Bengal, Bihar unlike depicted in trend equation Orissa has registered a decline at faster rate than West Bengal. The decline in birth rates of Gujarat is faster than Maharashtra, which confirm with trend equation.

An attempt is made to analyze the declining trends among the various states between 85-90 and 95-99. A close look at the figures depicts that crude birth rate have slowed down in the rate of fall in the post liberalization period vis-à-vis the pre-liberalization period for all most all the states AP, TN, Kerala, MP, UP, Orissa, Bihar, Gujarat.

Nevertheless in comparison with growth rates of other mortality indicators decline in birth rates are relatively slow. This is typically true for the states of Bihar, Rajasthan, Madhya Pradesh and Uttar Pradesh.

III.3.4 TRENDS IN COMPOUND GROWTH RATES OF TOTAL FERTILITY RATE

This study has already examined the trends of decline in crude birth rates. But in order to get a more comprehensive view, trends in compound growth rates of Total fertility can seldom be left out. A look at Table no. 3.8 gives the interstate disparities in the rate of fall of Fertility for the 14 states under review for the period 1981- 1997.

TABLE 3.9
COMPOUND GROWTH RATE OF TOTAL FERTILITY RATE (1981-97)

STATES	1981-1997
Andhra Pradesh	-2.85
Karnataka	-2.25
Kerala	-2.72
Tamilnadu	-3.26
Punjab	-2.42
Haryana	-2.38
Gujarat	-2.22
Maharashtra	-1.78
Uttar Pradesh	-1.17
Madhya Pradesh	-1.62
Rajasthan	-1.32
Orissa	-2.22
West Bengal	-2.95
Bihar	-1.60

Source: Computed

Thus, for the period between 1981-1997 the states with steepest decline in fertility rates are Tamilnadu (-3.26%) followed by West Bengal (-2.95%), Andhra Pradesh (-2.85%) and Kerala (-2.72%). The states with a dismal record in the fall in fertility rates were Uttar Pradesh (-1.17%), Rajasthan (-1.32%), Bihar (-1.60%), and Madhya Pradesh (-1.62%). The difference between the growth rates decline in these states stands out starkly in comparison to their southern counterparts like Kerala, AP, and Tamilnadu. The fertility transition in these states is more impressive than that of the other states. Among eastern states the performance of West Bengal is impressive with compound growth rates of -2.95% per annum. Both Punjab and Haryana also showed an appreciable decline in fertility rates with annual compound growth rate of –2.42% and –2.38% respectively. Maharashtra known as a progressive state with respect to other mortality measure and also high in the rankings of development in social sector registers a dismally low growth rate of TFR (-1.78%). This calls for attracting policy initiatives to overhaul the fertility scenario.

Interestingly, most of the states with low growth rate, decline in crude birth rate (Bihar, Rajasthan, UP, MP) have shown similar trends in fertility rates. Hence slow decline in TFR translates into high Crude Birth Rates. For population control intensive drive should be taken to arrest TFR which would eventually slow the birth rates.

The trend equations computed for total fertility rates indicate that among the southern states, the highest coefficient value of trend equation is for Tamilnadu, followed by Andhra Pradesh, Kerala and Karnataka, which confirms with the order of actual growth rates. The coefficient of trend equation of UP, MP, Rajasthan show a faster decline in case of Rajasthan in comparison to MP. However in reality the decline in fertility rate of MP has taken a faster pace than Rajasthan. The trend equation of other states confirms to relative position of actual grow decline of fertility rate among states.

III.3.5 INTER STATE VARIATION IN MORTALITY MEASURES

In the previous sections we analyzed the trends, mortality measures, and found out existence of disparities in the mortality measures for all the states across period of time. Any temporal analysis is incomplete without examining whether the disparities in health outcome have converged across the period of time. An insight into disparity is indicated by coefficient of variations given in the table no. 3.10 above, which calculates CV for IMR, CBR, CDR, TFR.

TABLE 3.10
CO-EFFICIENT OF VARIATION IN MORTALITY MEASURES (1975-1999)

YEARS	IMR	CBR	CDR	TFR
1975	32.30	14.3	25.64	
1980	33.08	13.54	23.04	24.41
1985	32.51	16.34	26.15	24.11
1990	34.70	16.91	20.46	26.33
1991	36.40	18.17	21.72	277.33
1994	31.65	19.61	18.05	29.32
1996	34.07	19.54	16.7	29.33
1998	33.03	18.94	16.84	-
1999	32.92	19.39	16.77	-

Source: Computed

Between 1975 and 1999 coefficient variation of crude death rates have declined form 25.64% to 16.77% which indicates narrowing gaps between

crude death rates of different states. However, for all other indicators the coefficients of variation have increased over the years. This is very stark in case of crude Birth rate and total fertilities rate. The C.V. has gone up from 14.3 in 1975 to 19.33 by 1999 in case of crude birth rate. Similarly for infant mortality there has not been an appreciable decline in coefficient variation values. It was 32.30 in 1975 and stood and 32.92 by 1999 registering no change. Total fertility rates also undergone a significant rise in C.V values. This indicates that inter state disparities in health outcome have not fallen across a period of time.

III. 4 OBSERVATIONS AND FINDINGS

The following are the main points, which emerge after an in-depth analysis of the mortality rates.

1. The demographic transition across the period of time has not been uniform leading to wide interstate disparities in the health outcomes.

2. Trends of Crude Death rates over the states indicate that four states have consistently shown high death rates. They are Utter Pradesh, Madhya Pradesh, Orissa and Bihar. Not only are these states populous but also rank lowest in the levels of socioeconomic development. A dent in the mortality rates can be made only by undertaking substantial socioeconomic development in these states.

3. Madhya Pradesh, Orissa, Rajasthan, UP lead in terms of Infant Mortality Rates

4. Some states like AP, Gujarat, Tamilnadu with high levels of mortality have been able to reduce them to moderate rates by 1999.

5. The trends of compound grow rate of mortality rates indicate a slow down in decline of the mortality rates in all the states. In mid nineties

some states there are reversal of trends with an increase of mortality rates.

6. Kerala comes out to be the only state that whose decline in mortality rates are fastest and the demographic transition of Kerala is comparable with most developed nations.

7. A large number of states which have achieved moderate levels of mortality measures like Maharashtra, Tamilnadu, Gujarat, Punjab can be pushed further low levels of mortality levels with policy initiatives.

8. The inter state disparities have widened across a period of time for all the indicators except crude death rates which is supplemented by an increase in C.V. values over a time period.

9. Among all the indicators India's accomplishment in arresting the death rates is most discernable while for other indicators like crude birth rates, fertility rates its achievements are not very impressive.

10. Special Policy thrust on demographically weaker states like UP, MP, Rajasthan, Orissa, is called for with immediate effect.

11. Health Interventions, Policies and Programmes need to be re-looked at, given the stagnation in decline in mortality measures.

The trends in mortality measures across the states over the years 1975-1999 have build a comprehensive picture about achievements in health outcomes in India. In the following section we propose to study inter state analysis of disease profile followed by its linkages with mortality levels

III. 5 PROFILE OF COMMUNICABLE DISEASES IN INDIAN STATES

In this section an analysis of the disease pattern prevailing in the states is attempted. Such an analysis gives us an insight into the *morbidity profile* of the country. Morbidity has different connotations. However, it is commonly used

to connote sickness, illness or disability[13]. Morbidity has been increasingly recognized as a measurable indicator of well being[14]. There are various reasons attributed to this. Firstly, with the spread of accessibility of modern medicines, the mortality measure has recorded a significant improvement. All over the world, a decline in the death rates and improvement in the life expectancy is evident. It is, therefore, essential to look beyond morality measures. Secondly, mortality rates do not give us an insight into the burden of disease and therefore need to be supplemented by morbidity indicators. Lastly, compared to the mortality measures that oscillate between the two extremes (birth and death), morbidity is a more frequent measure and can be quantified and measured in a cost-effective manner.

At an international level, the data on morbidity is utilized for constructing an index which combines health life years lost due to premature mortality along with life years lost as a result of disability. This index is called DALY by the World Bank for making international comparison[15].

The studies on morbidity are of recent origin. The data on morbidity is confined to the number of hospitalized cases for various diseases and causes of death, computed from hospital records and presented by Ministry of Health & Family Welfare. A comprehensive and countrywide survey of the magnitude of morbidity has not been conducted to this date. However, National Sample Survey and NCAER have carried out the morbidity research.

The 38th round of National Sample Survey during 1989-90 has collected Community level data on hospitalized cases. This data was improvised further by NCAER in 1993 where morbidity data covered both untreated and

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[13] Park, JE and K. Park (1991): "Text Book of Preventive and Social Medicine", 13th edition, p. 64.

[14] Shariff (1995): "Health Transition in India", Working Paper No. 57, NCAER, New Delhi, p. 1.

[15] Ibid., p. 1.

hospitalized episodes. However, the magnitude of actual morbidity is more than estimated by these surveys[16].

Nevertheless, the studies on morbidity cannot be strictly comparable because reporting of morbidity is a complex process and differences may persist between actual morbidity and perceived morbidity. The disease pattern varies among different regions and depends on the state of epidemiological transition prevailing in that region. The disease pattern of a developed world contrasts with that of the underdeveloped world. In underdeveloped nation infections, parasitic and respiratory diseases constitute a large segment of total incidence of diseases whereas in developed nations cardiovascular and degenerative diseases are reported in larger number. Economic advancements, higher standards of living, strong hygienic standards, universal access to medical facilities strengthen the developed nations in abating the toll of communicable diseases.

In a developing nation like India there exist a dual burden of diseases. On one hand it is posed with a challenge of arresting and decimating diseases like cholera, hepatitis, TB, dysentery which are a by product of low levels of socioeconomic development. On the other hand it has to combat dreaded diseases like AIDS, hypertension, heart ailments, diabetes, which are mushrooming due to increased industrialization and changes in life styles. The dichotomy of diseases of poverty and disease of life style makes evaluation of morbidity profile even more complex.

Such an analysis of the disease pattern required classification of diseases. The International classification of Disease (9th Revision) of 1977 is one of the most comprehensive classification where diseases are categories into 109 categories[17] which cover all possible causes of diseases.

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[16] Shariff (1995): *op. cit.*, p. 34.

[17] World Bank (1993): *op. cit.*, p. 26.

However, in common parlance diseases can be broadly classified into 2 categories: (a) Communicable Diseases and (b) Non-communicable Diseases.

Communicable diseases occur due to specific infectious agents or its product, which can be directly or indirectly transmitted[18] whereas non-communicable diseases are non-transmittable and have specific origins. An improvement of health status leads to a decline in the disease burden and a shift in the distribution of burden from preponderance of communicable disease to preponderance of non-communicable diseases[19].

In a developing nation prevalence of communicable diseases is primarily responsible for a high disease burden. As per the World Bank, 71 percent of disease burden measured per 1000 population of sub-Saharan country was due to communicable disease whereas it was only around 9 percent for the market based economies. In India nearly 51 percent of the disease burden is attributed to the communicable diseases, 9 percent to injuries and rest to non-communicable diseases. It is for this reason that the present study confines to communicable diseases alone which are examined for 3 years viz. 1975, 1985 and 1995 in order to analyze the changes in the disease pattern over 3 decades.

III.5.2 COMMUNICABLE DISEASE PATTERN IN INDIA

The data for communicable diseases is taken from Health Information of India of communicable diseases. The following communicable diseases are selected.

1. Acute Respiratory Diseases (ARI).
2. Chicken Pox (CP)
3. Dysentery
4. Diarrheal Diseases

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[18] Park JE and K Park (1991): *op. cit.*, p. 102.

[19] World Bank (1993): *op. cit.*, p. 29.

5. Cholera
6. Enteric Fever (EF)
7. Diphtheria
8. Gonnococal Infection (GI)
9. Influenza
10. Poliomyelitis
11. Gastroenteritis (GE)
12. Measles
13. Tuberculosis
14. Whooping cough (WC)
15. Viral Hepatitis (VH)

These are the most commonly prevailing communicable diseases forming a large proportion in the total cases of communicable diseases so reported. Though clubbed under communicable disease, each disease varies in terms of its host factor, mode of transmission and symptoms. Hence a brief overview of the communicable disease is provided[20].

1. **Chicken Pox**: Chicken Pox, in medical parlance, is called *varicella* and is caused by virus of *varicella* and *herpes*. It is a contagious disease, striking mostly children under the age of 10 years. The disease is characterized by vesicular rash, which takes place with fever, aches. It is a mild disease and is seldom fatal. It can be prevented by passive immunization.

2. **Cholera:** It is an acute diarrheal disease caused by an organism *vibrio cholerae* affecting all age group and both genders. Rapid dehydration, muscular cramps and vomiting are some of the causes of cholera. It is

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[20] See Park JE and K Park (1991): "Text Book of Preventive and Social Medicine", 13th edition.

mainly water borne disease transmitted through contaminated water, food drinks, flies and direct contact. Cholera can be treated by effective re-hydration therapy. Hygienic living conditions, safe drinking water and sanitation are preconditions to prevent cholera.

3. **Diphtheria:** It is an infectious disease caused by *Cory nebacterium diphthereriae*, which produces a powerful exotoxin leading to prevalence of this disease. It usually prevails among small children and infants. It can effectively be treated and prevented by active immunization since childhood.

4. **Enteric Fever:** Typhoid and paratyphoid fevers lastly for 3-4 weeks are included in Enteric fever. The causative organism is *bacillis typhi.* Lack of sanitary hygienic conditions is favourable to prevalence of Enteric fever. It is a commonly occurring disease in India and other developing countries Headaches, constitutional disturbance and persistent fever are major symptoms. Contaminated food, water and hands are the main vehicle of transmission of typhoid.

5. **Gonnococal Infection** is also known as *gonorrhea*, which belongs to the chain of sexually transmitted diseases. There is no decisive information about this infection. It prevails among women and can be detected through variety of tests like smear examination, oxidase test, florescent anti body tests.

6. **Influenza:** Influenza is caused by a family of viruses which are classified into 3 types A, B, C viruses. It refers to respiratory infections characterized by fever, cough, and headache.

It is an airborne disease transmitted from one person to another. The persistence of fever due to influenza can translate into pneumonia. It is highly contagious leading to epidemic and sudden outburst.

7. **Measles:** It is caused by *RNA virus* and characterized by symptoms of fever, rashes over face and other parts of body. Measles prevail mainly among children and nutritional levels influence its prevalence. It is a mild disease preventable by measles vaccines. However, it has ramifications. Most common are measles associated diarrhea, pneumonia, and bronchitis. Like smallpox measles can also be eradicated by intensive immunization drive.

8. **Poliomyelitis:** It is caused by *enterovirus*. It is prevalent among infants, children and leads to varying degrees of paralysis. The vehicles of transmission are contaminated water and food. It can solely be prevented by immunization of infants and children.

9. **Tuberculosis:** Tuberculosis is an ancient disease caused by intracellular parasite named *myco tuberculosis*. If generally affects intestine, bones, lymph nodes. The decease prevalence is more in younger age group, though it can occur at any age. It is an air borne disease transmitted by cough, malnutrition, and poor sanitary conditions since they are favourable to prevalence of this disease.

10. **Whooping Cough:** It is caused by *B pertussis*, and is characterized by acute cough accompanied by mild fever. The incidence of whooping cough is found among children.

11. **Viral Hepatitis:** It is caused by Four virus types namely Hepatitis A virus (HAV), Hepatitis B virus (HBV), Non A non-B virus and lastly delta virus. It can be transmitted through *Faecal-oral route*. Water Borne, Food Bone are major factor responsible for transmission of viral hepatitis.

The most common among then is Infectious Hepatitis which is clinically characterized by symptoms like fever, chills, acute weakness followed by vowing nausea.

12. **Diarrheal Diseases:** This disease is a by-product of assortment of organism causing diarrhea. Various pathogen agents like virus, *Rotavirus Echovirus* get transmitted by facial, oral route leading to diarrhea.

III.5.3 COMPOSITION OF COMMUNICABLE DISEASES

After providing a brief overview about the nature of communicable diseases, we will now analyze the disease pattern. The disease pattern can be understood only

(1) By identifying proportional morbidity for different states; and

(2) Estimating the disease prevalence of communicable disease.

The former would help not only to identify major diseases that add to the disease burden but also their changes in relative importance across time. While the latter would provide an insight about interstate disparity in disease prevalence. Proportional morbidity is defined by

$$\textbf{PMB: } \frac{\textbf{(Total case of a specific communicable disease)}}{\textbf{Total cases of communicable disease report}} \textbf{ X 100}$$

While disease prevalence rate is defined by

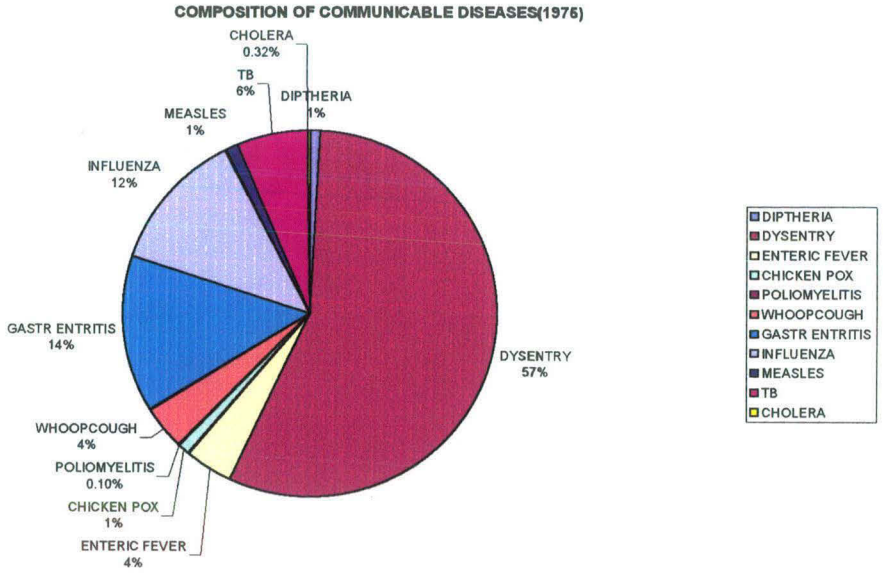
$$\textbf{DPR: } \frac{\textbf{The total no. of } i^{th} \textbf{ disease in } j^{th} \textbf{ region}}{\textbf{Total population of the region}} \textbf{ X 1,00,000 population}$$

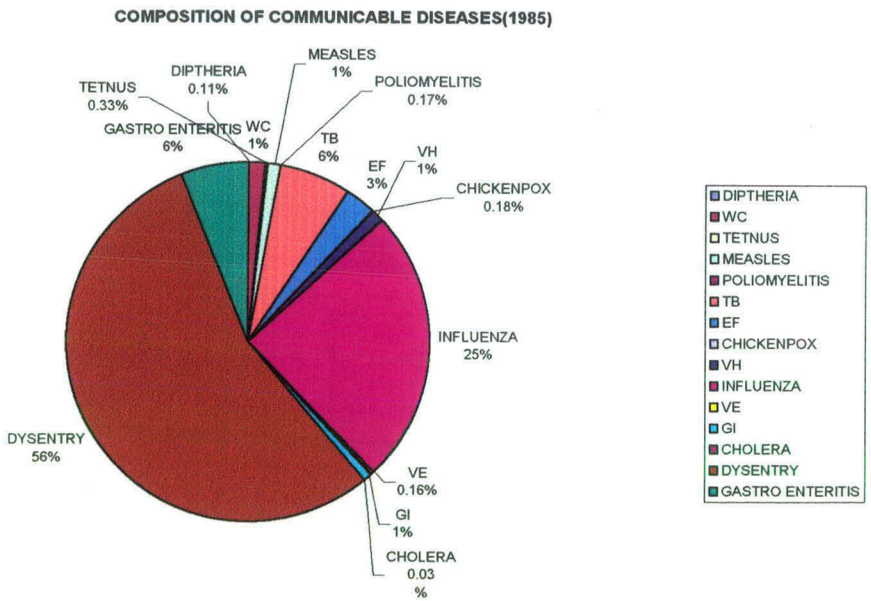
Where, i stands for any of the particular diseases under study and j stands for the state

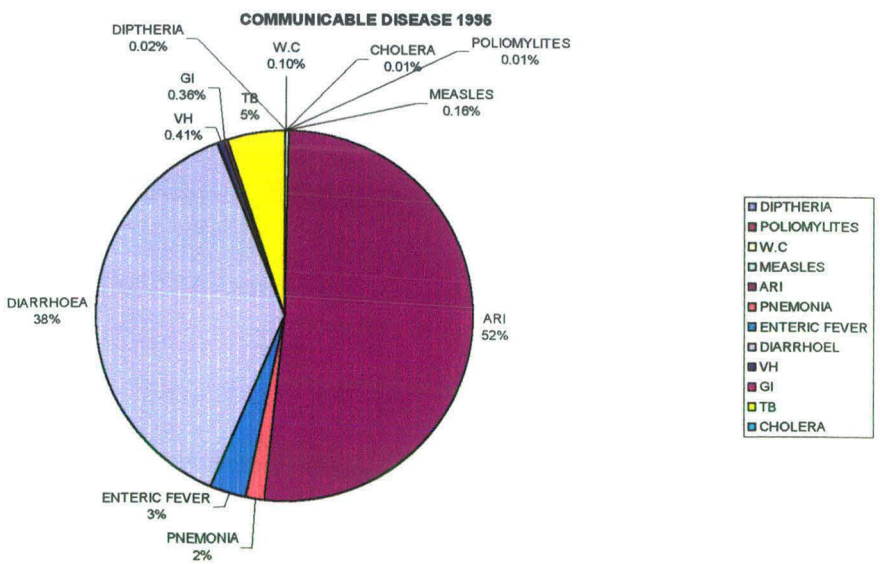
III.5.4 DISEASE PATTERN

The composition of communicable disease is depicted in the graphs 3.9 shown in the next page. Looking at the pie charts for three decades, we infer that the proportional morbidity burden is not uniform for 1975, 1985 & 1995. However, there has not been any significant change in the composition of communicable diseases.

3.9 COMPOSITION OF COMMUNICABLE DISEASES OF INDIAN STATES 1975-95







It can be seen that the composition of diseases has remained uniform for all the 3 decades at an aggregate level. In 1975 intestinal diseases like dysentery, gastroenteritis constituted a larger share in total communicable diseases reported. Together they constituted nearly 71% in the diseases composition. Influenza ranked next, its proportional morbidity burden accounting to 14 percent. The share of TB amounted to sizeable percent while both whooping coughs and poliomyelitis share was four percent. Rest of the diseases contributed a miniscule figure of the total composition of communicable diseases.

In 1985 there has been a slight change in pattern of disease at an aggregate level. Dysentery was still a major constituent of the communicable diseases with 56 percent share. There has been a slights fall in share of gastroenteritis vis-à-vis last decade. The percentage share has dipped to 6 percent. The share of influenza has gone up. It makes up for nearly one forth of morbidity burden. TB maintains a status quo position sharing six percent like last decade. The rest of diseases had a negligible share in composition of communicable diseases.

In 1995 there has been a discernable change is the composition of diseases. With the rise in the incidence of acute respiratory infectious diseases there has been a corresponding rise in its share. The proportional morbidity of acute respiratory infection accounted to nearly 52 percentage while diarrheal diseases dropped to nearly 38 percentage. The share of other diseases remained more or less uniform.

III.5.5 DISEASE PREVALENCE RATES

After examining proportional morbidity it is necessary to look at disease prevalence rate is defined as the total number of cases of disease per lac population. Comparison of the disease prevalence rate shows that incidence of disease per Lac population are not uniform. On one hand Diphtheria, Poliomyelitis, cholera, measles have lower prevalence rate ranging between 50

per lac to 323 per lac population, while on the other hand diseases like dysentery, gastroenteritis, influenza have a higher disease prevalence rate. Dysentery and gastroenteritis records the highest disease prevalence rate. While whooping cough, Enteric fever, TB has a moderate disease prevalence rate around 800-1200 per lac population.

The estimates of 1985 indicate a perceptible decline in the disease prevalence rate for a large number of diseases. Notable among them are diphtheria, chicken pox, Enteric fever, whooping cough which registered a steep fall vis-a-vis 1975. While there has been significant rise in cases of influenza per lac population (from 2825 to around 6093 per lac population) between 1975 and 1985. The disease prevalence rate of TB has gone up from 1243 to 1476 respectively. There is marginal rate in case of measles, while a marginal rise in case of poliomyelitis. The 1995 estimates show a decline in the disease prevalence rate of all the disease in the past two decades. This is indicated in the given table.

TABLE 3.11
DISEASE PREVALANCE RATE (1975-1999)

DISEASES	DPR 1975	DPR 1985	DPR 1995
Diphtheria	139	23.57	6.26
Poliomyelitis	21.50	37.66	3.96
Measles	295	256.16	57.06
Chicken Pox	323.12	55.29	-
ARI	-	-	22397
Enteric Fever	1067	623.96	852.22
Viral Hepatitis	-	254	156
Gonnococal infection	-	165.12	118
Cholera	50.11	5.65	2.18
Tuberculosis	1243.03	1476.60	1461.95
Diarrhea	-	-	12889.19
Dysentery	-	14649	-
Gastroenteritis	5559.29	1854.76	-
Pneumonia	-	-	487.59
Tetanus	-	8283	-
Influenza	2825.73	6093.81	-
Whooping Cough	8.9.88	262.52	32.25
Viral Enteritis	-	36.51	-

Source: Computed

Notable among them are whooping cough, cholera, poliomyelitis and diphtheria. However, there has been a sharp resurgence of other diseases like Acute Respiratory Infection whose disease prevalence rate is the highest

around 22397 per lac population. The position of diseases like TB has remained status quo with disease prevalence rate of 1461 per lac population. Enteric Fever has shown a rise in disease prevalence vis-à-vis last decade to 852 per lac population.

Decadal comparison of estimates of Disease prevalence Rate indicates a fall in rate per lac population for large number of communicable diseases. In the previous section we had analyzed infant mortality rate have declined over a period of time, Many of the communicable diseases in this study (Diphtheria, Poliomyelitis, Chicken Pox, Gastroenteritis) are prevalent among children and infants. An arrest of communicable diseases will have a significant impact on not only the crude death rates but also infant mortality rates. However a rise in acute respiratory diseases, high incidence of TB pose disturbing trend. In order to examine further trends each disease has separately been discussed in terms of their proportional morbidity, Disease prevalence rate for all the years, at the interstate level.

1. (a) Diphtheria: This disease has a low prevalence rate vis-à-vis other diseases. It stood at 139/lac in 1975 and declined to 23.57/lac in 1985 and further fell to 6/lac in 1995. In 1975 Andhra Pradesh recorded the highest DPR, it was 108/lac followed by Karnataka 11/lac and Madhya Pradesh 6/lac. However, in other states disease prevalence rate was negligible. It was as low as 1/lac in Haryana, even the remaining states DPR did not exceed 3/lac. Hence Andhra Pradesh records the highest disease prevalence rate in case of diphtheria. There has been a steep decline in Andhra Pradesh in 1985 where DPR drastically fell to 0.64. The fall in DPR in 1985 prevails for all the state since disease prevalence rate ranged between (1-6)/lac which is appreciably less. In 1995 disease prevalence rate was appreciable low. This is a heartening trend, as it indicated that health interventions have been effective in controlling Diphtheria.

1. (b) Proportional Morbidity: The PMB has appreciably been very low, being 1percent in 1975 and 0.11 percent in 1985 falling to 0.02 percent in 1995. By 1995 all the states had a uniform proportional morbidity of 0.01 percent.

2. (a) Enteric Fever: Enteric Fever is a disease of developing nations including India, It has a high Prevalence rate among this group of communicable diseases under consideration. Disease Prevalence Rate of Enteric Fever is Very high in comparison to other diseases. It was the highest in 1975 (1067/lac) population. It steeped down to (623/lac) by 1985 and again rose to (852/lac) by 1995.

The Disease prevalence Rate was the highest in Kerala (522/lac) followed by Orissa (127.68/lac), M.P. (127.68/lac), Karnataka (71.08/lac) and AP (43.89/lac). However, in other states disease prevalence rate was comparatively lower, Maharashtra and Tamilnadu recorded the lowest disease prevalence rate. In 1985 there was a steep rise in number of cases per Lac population in Rajasthan which increased to (172.76/lac) population, followed by M.P (86.50/lac), Orissa (61.68/lac), Karnataka (51/lac). Compared to 1975 in both A. P. and Kerala DPR dropped to 12.99/lac and 21/lac, however it steeply increased in 1995 in both states. A.P alone accounted for disease prevalence rate of 454/lac which was more than 50% cases reported in all the states, Gujarat & Haryana recorded the lowest disease prevalence rate of 5.91/lac and 5.07/lac respectively. Orissa and Kerala had a high disease prevalence rate 75.53/lac and 68.04/lac respectively. There was a decline in DPR of Rajasthan vis-à-vis 1985 to 13/lac. For rest of the states with exception of U.P, Karnataka where DPR stood 46/lac other states DPR was less than 25/lac.

2. (b) Proportional Morbidity: Despite such a high DPR, the position of this disease in Proportional Morbidity is highly insignificant. In 1975 it was 4.32%, in 1985 2.62% in 1995 it increased to 3.16%. However at individual state levels

disparity was observed. In 1975 it contributed nearly 14.77% to the disease profile of Kerala. It was 7.38% in M. P. in rest of the States its Proportional Morbidity was uniform ranging between 1% to 3%. In 1985 in Rajasthan PMB stood at 20.71% which was the highest, TN ranked next with 7.57% followed by Punjab (7.43%) and Bihar (5.72%). However in other states Proportional morbidity was 2 to 3 percent.

3. (a) Tuberculosis: Tuberculosis or TB is still a major public health problem. Although various steps have been taken to arrest TB at national and State level, it still has a high disease Prevalence Rate. In 1975 DPR stood at 1243.03/lac. It rose to 1476/lac and then marginally dropped to 1461/lac by 1995. A.P had the highest Disease Prevalence Rate at 296/lac in 1975 followed by states like Karnataka (263/lac) Haryana (188/lac) and M.P. (130/Lac), Rajasthan (87/lac) while Maharashtra had the lowest DPR (28/lac). In remaining States DPR was less than 50 per Lac population. In 1985, AP continued to have highest disease prevalence rate (220/lac) though it slightly dropped in comparison with 1975. While states like Haryana, Rajasthan, Kerala, M.P and Maharashtra had disease Prevalence rate of more than 150 per lac population. In Gujarat and UP disease prevalence rate stood at 89/lac and 99/lac respectively. In all other states DPR was lesser than 50 per Lac. It was lowest in Bihar at 3lac. In 1995 U.P, W.B., registered an increase in DPR compared to their previous years at 202/lac and 119/lac. Haryana had the highest DPR at 253.59 while AP stood second at 213.50/lac. Karnataka had 151/lac while in the remaining states DPR was less than 100/lac population. Gujarat had the lowest DPR at 33/lac.

3. (b) Proportional Morbidity: TB occupied six percent in 1995 in proportional morbidity terms in both 1975 and 1985. In 1995 its significance in disease profile sharply fell to four percent. Maharashtra had the highest proportional morbidity at twenty percent followed by Karnataka (13%). Other states like A.P, Rajasthan, and Gujarat it ranged between 7 to 11 percent. It was lowest in Orissa (0.58%). In other states the share of TB in disease profile was between 2 to 3 percent. In 1985 Rajasthan was the only state with proportional

morbidity at 20 percent. There was a drop in PMB of Karnataka (1.04%) which was the lowest. In rest of the states PMB was less than 10 percent. In 1995 the PMB of W.B. was 17 percent which was the highest, while U.P, TN, M.P. had PMB around (8%). In the remaining states PMB was low.

4. (a) Whooping Cough: There has been a significant decline in the disease prevalence rate of whooping cough from 809/lac to 32.25/lac between 1975 and 1995.The prevalence rate of whooping cough was highest in states like TN, Kerala, Orissa, the DPR stood at 204/lac, 128/lac and 156/lac respectively. States with low DPR were Maharashtra. (2.85/lac), Gujarat (15/lac) and Rajasthan (26/lac) In remaining states it was less than 100 per Lac population. In 1985 there was a drastic fall in prevalence rate of whooping cough in all the states. In M. P. the DPR was high at 67.per lac followed by Kerala 68/lac. In all the remaining states DPR was less than 25/lac. It was phenomenally low in Tamilnadu only 1.90/lac, Bihar 1.08 per lac. The declining trend continued even in 1995, with Kerala being the only state recording DPR at 11/per lac while A. P. it stood at (6/lac), Orissa (7/per lac). In rest of the states prevalence rate was drastically low. It was almost 'nil' in Orissa and AP and less than 3 cases per lac population in rest of the states.

4. (b) Proportional Morbidity: In 1975 Tamilnadu had the highest PMB at 25 percent followed by Punjab at 8 percent, in rest of the states PMB was not more than 0.4 percent. In 1985 in no state proportional morbidity was more than 3%. It was the highest in M.P at 2.55% and lowest in Orissa (0.42.percent). In rest of the states PMB ranged between one and two percent. In 1995,0 the relative importance of this disease profile of communicable disease drastically went down to less than 0.10% for all the states.

5. (a) Poliomyelitis: There has been a steep fall in prevalence rate of polio in past 3 decades from 21.50 per lac to 3.96 per lac. Invariably in all the states the disease prevalence rate was less than 5 per lac cases, In 1985 there has been a rise in the prevalence rate to 38/ lac. Only Orissa & Punjab had DPR at 7 per

lac, Bihar and Kerala recorded lowest DPR less than 0.5 per lac case. In rest of the states it ranged between 2 and 3 /lac population.

5. (b) Proportional Morbidity: Polio in recent decades occupies an insignificant position. In 1975 PMB in all the states was less than one percent. The same was true for 1985 and 1995.

6. Cholera: Once a fatal disease, the prevalence rate of cholera has rapidly declined over the past 3 decades. The disease prevalence rate has gone down, although in 1975 it prevailed at 50 cases per lac population, by 1995 it went down to 3.96 per lac cases. In 1975 Gujarat and MP were the only states which reported around 2 cases per lac population for cholera. In rest of the other states consecutively DPR was never more that 1 case per lac population.

7. Influenza: This belongs to the category of diseases with high prevalence rate and higher percentage in proportional morbidity.

7. (a) Prevalence Rate: The prevalence rate for all the states stood at 2825/lac. In 1975 it increased to 6093.81/lac. In 1995 influenza was not reported separately due to resurgent of other acute respiratory diseases. DPR was the highest in Orissa with 1840/lac population, followed by A.P at 440/lac, Kerala (186/lac). In other states DPR was less than 100 per Lac. Punjab, Rajasthan recorded lowest DPR at 4/lac. In 1975, Kerala alone the disease prevalence rate of 2020/lac population which is the highest. In 1985, while Orissa continued to have a high prevalence rate at 14.80/lac, AP registered a fall in DPR at 155/lac, In Karnataka it stood at 207/lac, MP 216.6/lac. The remaining states had a low DPR comparatively. It was lowest in Bihar and Rajasthan, Haryana, around 8 per lac.

7. (b) Proportional Morbidity: It occupies a relatively higher weightage in terms of proportional Morbidity. It stood at 12.37 percent in 1975 and increased to 25% percent in by 1985. In states like Gujarat, Maharashtra, Orissa Punjab proportional morbidity was around 25%. In 1975, while Gujarat,

M.P, Tamilnadu it was between 10.percent – 17 percent. In remaining states it was less than 1 percent. In 1985 influenza constituted the major disease, in disease composition of Maharashtra, having PMB at 70 percent, followed by Haryana and Karnataka around 40 percent, Rajasthan had the lowest PMB at 1 percent. In rest of the states it was less than 20 percent.

8. ARI: Acute Respiratory Infection is not a single disease but includes a group of respiratory diseases like asthma, bronchitis and other respiratory infections. The data on ARI has been present only since nineties, owing to increased level of pollution, overcrowding, and congestion there has been a rise in cases of ARI.

8. (a) Prevalence Rate: It stood at 22397/lac in 1995, even in proportional morbidity it constituted highest share (51%). Prevalence rate was highest in Kerala at 7572/lac followed by Haryana (3305/lac), Karnataka (2554.56/lac), Orissa (2448/lac) and AP (1923/lac). The Disease prevalence rate was the lowest for WB (90/lac). In other states it ranged between 300/lac to (1000/Lac).

8. (b) Proportional Morbidity: In terms of Proportional morbidity ARI occupied a significant position. In West Bengal PMB stood at 13 percent which was the lowest. Kerala ARI constituted nearly 80 percent to the total disease composition. In M. P. and U. P. proportional morbidity was around 35 percent. In rest of the states it ranged between 40 to 60 percent. Hence proportional morbidity of ARI was higher for all the states vis-à-vis other diseases.

9. Intestinal Diseases: Diarrhea, Dysentery, Gastro Enteritis are some of the intestinal infection diseases. Diarrhea and Gastroenteritis are interchangeably used, though there are some differences in terms of their agents. Nevertheless they constitute the largest segment of Disease Profile under consideration and also account for a high disease prevalence rate.

10. (a) Dysentery: In 1975, Dysentery constituted not only the major segment of communicable diseases but also had the highest disease Prevalence Rate.

The DPR of dysentery was 14152/lac case, Orissa constituted the highest segment with DPR of 4367/lac, followed by Kerala 2486/lac, Haryana 2082/lac, Gujarat, Maharashtra had the lowest Disease Prevalence rate of 47/lac & 225/lac respectively. In rest of the states it ranged between 300/lac to 1000/lac. In 1985, the DPR stood at 14649/lac and proportional morbidity at 55 percent. The Disease prevalence rate was highest for Maharashtra (4110/lac) followed by Kerala (2782/lac). In other states it ranged between 200/lac to 1000/lac.

10. (b) Proportional Morbidity: The PMB of Dysentery was the highest in both 1975 and 1985, it was 56 percent and 55 percent respectively. In 1975 in some states it constituted a major segment of disease profile like Kerala (70 percent), Rajasthan (71 percent), Punjab (61 percent). In rest of the states it ranged between thirty to fifty percent. Similarly, in 1985 in states like Haryana, Uttar Pradesh, Orissa. M.P, A.P, PMB of dysentery was very high. (86 percent), (79 percent), 68 percent, 75 percent, and 61 percent respectively. It was the lowest in Punjab at 8 percent. In rest of the states it ranged between forty to fifty percent,

11. (a) Gastroenteritis: The Disease Prevalence Rate of Gastroenteritis has been on a higher side. It was 5599/lac in 1975 and fell to 1854/lac in 1985: In terms of proportional morbidity but it was sell to 14 percent in 1975 6 percent in 1985. In 1975 in Haryana it was around 3700/lac, followed by Orissa (1039/lac) it was the lowest in MP (5/lac), Maharashtra (17/lac), Kerala (26/lac) and Gujarat (36/lac). In rest of the states it was more than (50/lac) population. Similarly in 1985 states in which DPR was high were Maharashtra (4110/lac), Kerala (27.82/lac), Madhya Pradesh (1997/lac), Andhra Pradesh (978/lac), it was lowest in Bihar (29/lac) In rest of the stated it ranged between (117/lac) to (472/lac).

11. (b) Proportional Morbidity: In 1975 except for Haryana PMB were the highest (59 percent), in Punjab it was 18 percent followed by Karnataka and

UP around 16 percent. It was lowest for Kerala and MP at 0.74 percent and 0.33 percent respectively. In the remaining states it was less than 13 percent. In 1985 there was a decline in percentage share of gastroenteritis in disease composition to 6.05%. In Rajasthan this disease constituted nearly seventy percent of the communicable disease contrasting in Haryana it made up 0.23 percent, states like U.P, Orissa, M.P, Maharashtra, Andhra Pradesh Kerala PMB ranged between one to six percent. In other states it made up less than fifty percent of the Disease Profile.

III. 6 INTER STATE COMPARISON OF MORBIDITY PATTERN

In the previous section we analyzed the composition of diseases, and prevalence rate among the fourteen states. In order to get a clear idea about the event of morbidity level, it is imperative to compare Proportional Morbidity and Disease Prevalence rate among various states and this will help us to draw inferences about the morbidity Profile. This can be done by aggregating the disease prevalence rate of each state and assigning rank to then in ascending order for all the states.

TABLE 3.12
DISEASE PREVALNCE RATE IN ALL COMMUNICABLE DISEASES (PER LAC POPULATION)

STATES	1975	Ranks	1985	Ranks	1995	Ranks
A. P.	2518.87	4	1585.33	6	4455	3
Bihar	----	----	55.69	13	21	---
Gujarat	454.79	10	980.07	9	1208	9
Haryana	6181.28	2	2402.30	5	5652	2
Karnataka	2029	5	2585.72	4	4161	5
Kerala	3536	3	5314	2	9367	1
M. P.	1729	6	2653	3	1780	7
Maharashtra	140	11	1284	8	1645	11
Orissa	7743	1	5994	1	4404	4
Punjab	624	9	1335	7	1683	8
Rajasthan	754	8	834	10	1095	10
Tamilnadu	815	7	485	11	599	13
U. P.			366	12	2306	6
W. B.					675	12
All States	26528		25878		38458.62	

Source: Computed

States ranked in ascending order have higher Disease Prevalence rate. In 1975, states with higher DPR were Orissa, Haryana, Kerala, AP and Karnataka. They occupied the top 5 positions in there of incidence of diseases. For per lac

population in terms of incidence of diseases reported per lac population. While Gujarat, Maharashtra, Rajasthan, Punjab had lower disease prevalence.

In 1985 Orissa occupied the first position in terms of disease prevalence rate followed by Kerala, M. P., Karnataka & Haryana. In states like Tamilnadu, UP, Rajasthan, Gujarat morbidity levels were relatively lower. Bihar ranked last in terms of Disease Prevalence rate. The Position of Maharashtra improved indicating a higher morbidity levels vis-a-vis last decade.

In 1995 Kerala topped showing a high disease prevalence rate, followed by Haryana and AP. The morbidity levels of Orissa improved. The position of Karnataka and Rajasthan remained states quo while Uttar Pradesh inched up vis-a-vis last decades ranking showing higher morbidity levels.

A state-wise comparison of disease prevalence rate for last 3 decades presents paradoxical results is may be observed that some of the demographically superior states like Kerala, Karnataka, and Gujarat with either low or moderate infant mortality rates paradoxically occupy higher ranks indicating higher prevalence of morbidly. In contrast, UP, Rajasthan and Bihar, which are demographically weaker states recorded lower disease prevalence rate which implies that Demographic transition does not co-exist with epidemiological transition. Mortality and Morbidity levels are inversely related. Several reasons are attributed to it. Firstly as mentioned earlier, morbidity is a subjective concept; A host of socioeconomic-cultural & psychological factors are its determinants. Secondly, high disease Prevalence rate cannot be interpreted as high morbidity level. In Kerala, disease prevalence rate can be higher that other states due to difference in reporting. One of the limitations in analyzing the disease profile was lack of availability of data for Bihar, WB, UP which indicates inefficiency in compilation of morbidity data. Hence high disease incidence in Model State likes Kerala may be on account on efficient reporting vis-a-vis other states.

Further, higher education levels, awareness and literacy plays an effective role in sensitizing people about their health needs, making people more conscious about there well being taking immediate action in preventing illness. Hence socially developed states like Kerala, Karnataka have higher-disease Prevalence in comparison to Bihar where the Population are ignorant, unaware of their own health problems, illness. Lastly, the data pertains only to institutional cases, States like Kerala, Karnataka, AP due to stronger health infrastructure have more institutionalized cases in comparison to their counterparts. Hence to conclude that high morbidity levels do not translate into low mortality measures would be entirely fallacious. In reality there are stronger linkage between mortality measures and morbidity pattern. Hence emphasis should be laid on arresting both simultaneously.

III. 7 INFERENCES

1. States with consistently higher levels of morbidity in our analysis were Orissa, Kerala, Karnataka, Haryana, AP while states with lower disease prevalence rate were Maharashtra, Gujarat, Punjab, Bihar, UP and Rajasthan.

2. The morbidity pattern in the past 3 decades has not materially changed. Water borne disease like Diarrhea, Dysentery, Gastroenteritis constitutes a large share in the composition of communicable diseases.

3. The prevalence rate of TB, Enteric fever continues to be high.

4. In early nineties there has been an increase in share of Acute Respiratory Disease that not only constitutes a high disease Prevalence Rate but make a major portion of disease composition.

5. A consistent decline in disease Prevalence Rates of diphtheria, polio, cholera, chicken pox, whooping cough and enteric fever is an encouraging trend. It indicates the health interventions in the form immunization drive, vaccinations initiated at national level have been

highly efficacious which have also helped in reducing the mortality rates.

However, diseases like ARI, bacterial Diseases, TB with a high composition and Disease Prevalence rate continue to be a cause of concern. Steps should be take to arrest these diseases. Policy thrust should be laid on programs that lead to improvement in water supply and sanitary conditions.

The primary prevention of communicable diseases depends on investments in provision of save drinking water sanitary condition, effective intervention. The extent of disparities in health sector investments (expenditure) is dealt with in the next chapter.

CHAPTER - IV

HEALTH CARE EXPENDITURE BY STATE GOVERNMENT

IV. 1 INTRODUCTION

The interstate variation in mortality and morbidity pattern etched in the previous chapter is an interplay of host of factors. A crucial factor influencing it is the level of intervention undertaken by the government in influencing the health outcomes. An insight into the level of the government intervention is got by the amount of investment made in health sector and the cost effectiveness of the same. It is hence essential to make an in-depth analysis on health sector financing so as to evolve a right perspective on interstate differentials in health outcome. Due to complexities of health system and limited estimates on health expenditure, it is difficult to state the total resources devoted on health care with exactitude and precision and thereby arrive at a comprehensive definition of health expenditure. In common parlance, health care expenditure is defined as any amount defrayed on health care. However, such a definition is too wide as all kinds of financing that promotes health care get included. To arrive at a meaningful definition it is first necessary to identify the players in provision of consumption of health care in India. There are three major sectors financing health care in India:

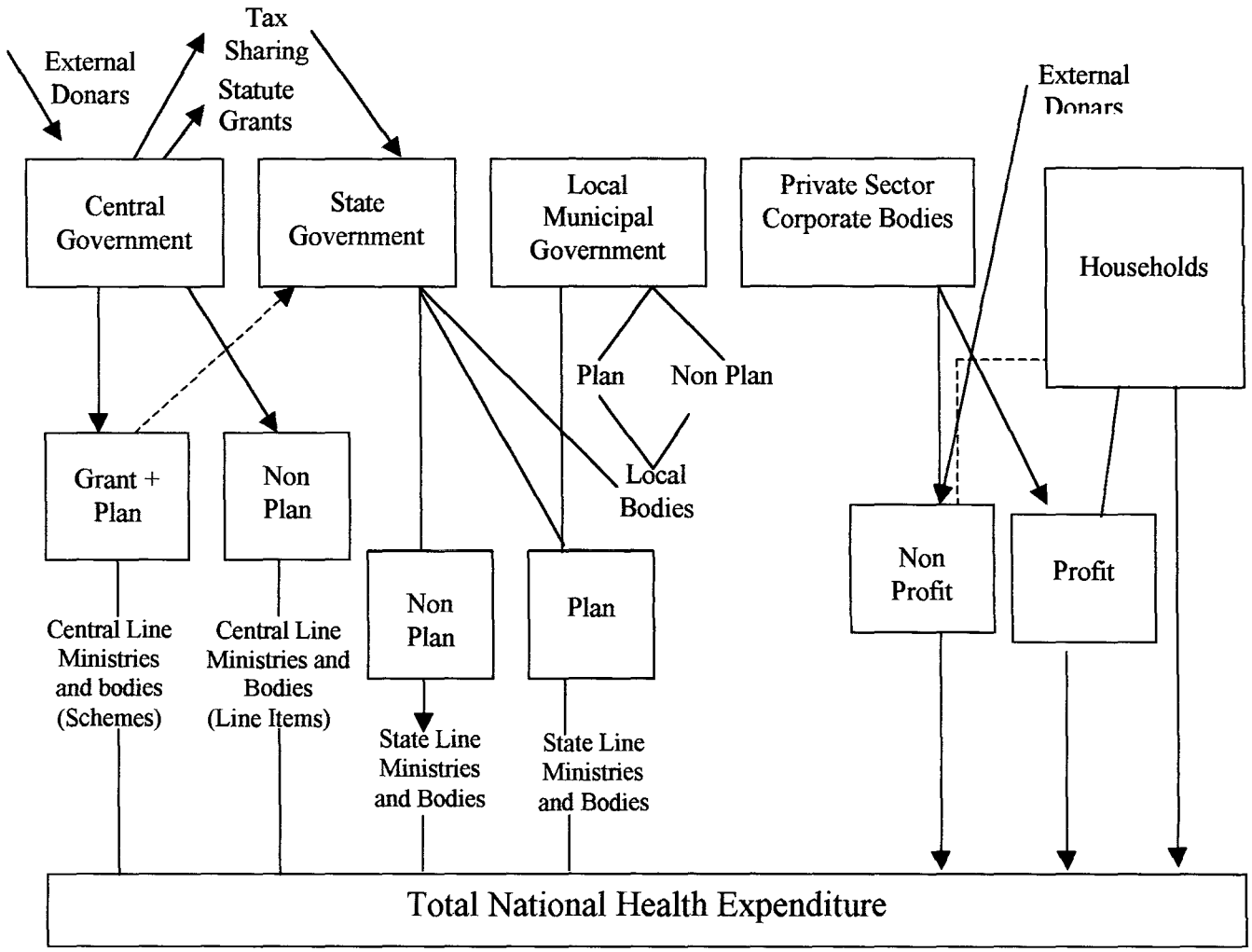
(i) Public Sector (various levels of government and its agencies);

(ii) Private Sector (organizations institutions, corporation and non-government bodies); and

(iii) Individuals and households.

These three different groups of financiers of health care are graphically depicted in the fig. 4.1 below, which gives us a rough estimate on pattern of transfers between different levels of government.

FIG. 4.1 THE STRUCTURE OF HEALTH EXPENDITURE IN INDIA



Source: Health Economics, Health Financing
(Ford Foundation Programme Paper, Peter Burman Foudation, New Delhi 1991)

The figure 4.1 indicates on one hand the financing of health expenditure is undertaken by different levels of government viz. Central, State and Local Government. On other hand there is a major chunk of health financing by the private sector. There are inter-sectoral and intra-sectoral problems of accounting procedure and data estimation making enumeration of health care expenditure very difficult. Nevertheless, from previous estimates and past studies, few characteristics of health sector financing in country can be listed. Firstly, at an international level, India spends relatively high expenditure on health (estimated to be six percent of its GDP accounting to US $ 21 per capita for 1990). This expenditure place India at par with its developed counterparts like Japan (6.5%), U.K. (6.1%). India's health care expenditure as a percentage of its GDP is much higher as compared to that of China (3.5%), Sri Lanka (3.7%), and Singapore (1.8%)[1]. Of this six percent, the share of public sector as a percentage of G.D.P. accounts to 1.3 while that of private sector at 4.7%[2]. This implies that the private sector roughly accounts for nearly 80 percent of the total health expenditure while public sector accounts for the remaining 20 percent. The huge reliance on private sector is on account of inadequate facilities, poor resources deployed by central government. Secondly, health in India is a state subject. The constitution of India entrusts the responsibility of raising the health status with the states. However, it is supported by the Central Government, which plays an important role in formulating and implementing a variety of disease control programmes. The following sections of the chapter will examine the health care expenditure incurred at the state government level for a period starting 1975 to 1999 with the objective of examining the percentage differentials in the composition, size trends and growth rates across the states over a given period of time.

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[1] World Bank: World Development Report, 1993, p. 210.

[2] Ibid., p. 210.

IV. 2 STRUCTURE OF HEALTH CARE EXPENDITURE

As stated earlier the structure of health care expenditure varies due to computational differences and differences in methodology and purpose of study. Health care expenditures can be broadly classified into two categories,

(1) Economic, (2) Functional.

The Economic Health Care Expenditure includes expenditure incurred on items like salary, office expense, machinery and equipment. Such a classification helps us to dichotomize expenditure on consumption and capital goods. This will help us to gauge the extent of capital formation in health sector. Table 4.1 below gives as an insight about trends in health care expenditure by economic categories in major states.

TABLE 4.1
HEALTH CARE EXPENDITURE BY ECONOMIC CATEGORY FOR MAJOR STATES

	1974-1999 Percentage Composition				
Year	**Salary**	**Office Expenses**	**Machinery & Equipment**	**Others**	**Total Percentage**
1974-75	39.15	3.7	2.33	54.83	100
1977-78	39.13	3.32	2.58	54.97	100
1990-91	61.6	2.12	1.87	34.84	100

Source: Reddy & Selvaraju: Health Care Expenditure by Government of India.

The classification of health care expenditure under economic category indicates a steady rise is salary component and the material component which tend to influence the health care system is gradually shrinking in its percentage. The expenditure can also be classified by functional category, which includes expenditure on

(i) Medical Public Health, family welfare;

(ii) Water supply sanitation;

(iii) Food and Nutrition; and

(iv) Child and Handicapped welfare.

Such a functional analysis helps us to know the nature and extent of health intervention as well as policy initiatives of the government. Expenditure under functional category helps us to know the amount of expenditure incurred on preventive services and curative services. Usually expenditure on Medical Public Health refers to curative expenditure while any expenditure on research, education, water supply, nutrition falls under preventive services. The extent of preventive and curative expenditure depends upon the disease pattern and disease prevalence rate. Recent recommendations of the World Bank have confined the role of public sector into preventive health care leaving curative health care entirely to the private sector[3].

Estimates on health care expenditure under functional category vary because of inclusion or exclusion of the above functional components. K.N. Reddy and Selvaraju's "Health Care Expenditure" includes all functional categories like expenditure on medical, public health, family welfare; water supply and sanitation; nutrition; and child and handicapped welfare. Tulasidhar (1993), Seeta Prabhu (1995) defined health sector expenditure to include expenditure on medical, public health, family welfare, water supply and sanitation. The definition of health care in the present study includes expenditure under medical, public health, family welfare, water supply sanitation and nutrition. Health care expenditure is aggregated for all categories to include Plan and Non Plan expenditures under revenue and capital account.

Expenditures on medical and Public Health include expenditure incurred on hospitals, primary health centres, immunization drive, drugs, medicines, while expenditure on family welfare pertain to expenses incurred for sensitizing family welfare concept, campaigns, publicity expenditure on sterilization, contraceptives and the like. Expenditure on water supply and

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[3] World Bank (1993), *op. cit.*, p. 14.

sanitation pertains to the amount defrayed on provision of water supply; sanitary conditions and lastly, expenditure on food and nutrition pertain to maintenance of overall nutritional requirement of caloric intake. Further, expenditures can also be categorized as Plan Expenditure and Non Plan Expenditure.

Plan Expenditures: The amount spent on the newly initiated schemes in the current plan towards development such as recruitment of new staff, construction of new hospitals expenditures on primary health centres. Hence any development expenditure refer to plan expenditure. They reflect the policy stances of government. Non Plan expenditure on the other hand reflect expenditures on maintenance of existing projects, staff salary.[4] There are empirical evidences to indicate the inter-linkage between plan expenditure and non plan expenditures.[5]

Lastly expenditures calculated under both the heads fall under two categories (i) Revenue Account, (ii) Capital Account. Hence, the structure of health care expenditure reveal the intricacies involved in computation and compilation. The exercise becomes all the more difficult when expenditure on health care are aggregated for all levels of government (Central, States, Union Territory Government). Due care must be exercised in aggregation because of transfers involved from centre to state in form of grants and aids. Any neglect would lead to double country. This is one of the chief reasons of confining the present analysis to state expenditures only. Having analyzed the nature of health care expenditure it is necessary to examine the composition of health care expenditure under various functional categories, across the period of time and identifying manifestations of inter state differentials in composition of health care expenditures.

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[4] K.N. Reddy and V. Salveraju, *op. cit*, p. 41.

[5] Ibid., p. 42.

IV. 3 INTRA SECTORAL ALLOCATION OF TOTAL HEALTH CARE EXPENDITURE OF STATE GOVERNMENTS

One of the difficulties in computing functional break up of health care expenditures from state finances was that data on break up under different functional heads was available only since 1985 in which Medical Public Health and Family Welfare are clubbed under one head, Water Supply and Sanitation, Food and Nutrition are under different heads.

The total Health Care Expenditure under each category is aggregated for all the states, the percentage breakup has been shown for the stated years in table 4.2 below and graphically represented.

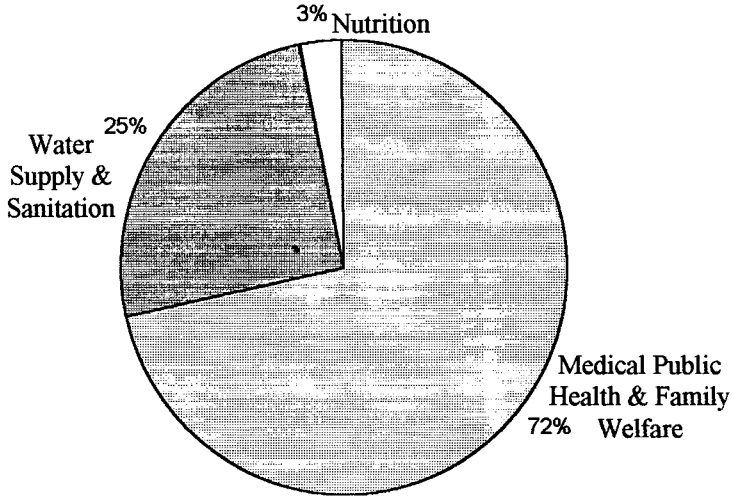
TABLE 4.2
COMPOSITION OF HEALTH CARE EXPENDITURE OF STATE GOVERNMENT (PERCENT)

Year	Medical Public Health & Family Welfare		Water Supply & Sanitation	Nutrition	Total
1985	71.27		25.41	30.3	100
	Medical and Public Health	Family Welfare			
1995	69.30	7.825	13.65	9.21	100
1995	51.87	10.34	28.51	9.26	

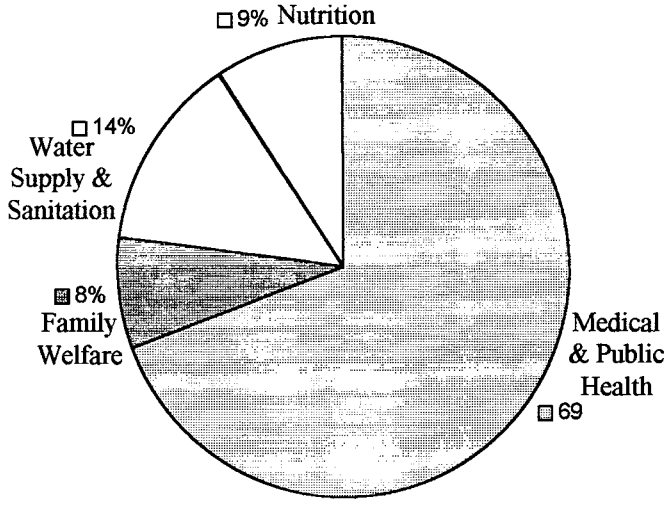
Source: Computed

A look at the intra sectoral allocation as shown in the pie diagram indicates gradual fall in the share of Medical Public Health and Family Welfare component. For all the years expenditure under Medical Public health and Family Welfare constituted a major segment of total health care component. However, after mid nineties there is a fall in expenditure under this head. The second component was expenditure on water supply and sanitation. In 1985 they made up nearly one fourth of the total expenditure. However, it slipped to fourteen percent in 1995 and increased to around twenty nine percent by 1995. The nutrition expenditure component that made only 3 percent of the total health care expenditure clocked at nine percent in 1995 and 1999. The rise in share of a nutrition is discernable. If we look into the intrasectoral category of expenditure for individual states. As given in table 4.3 we notice a large disparities.

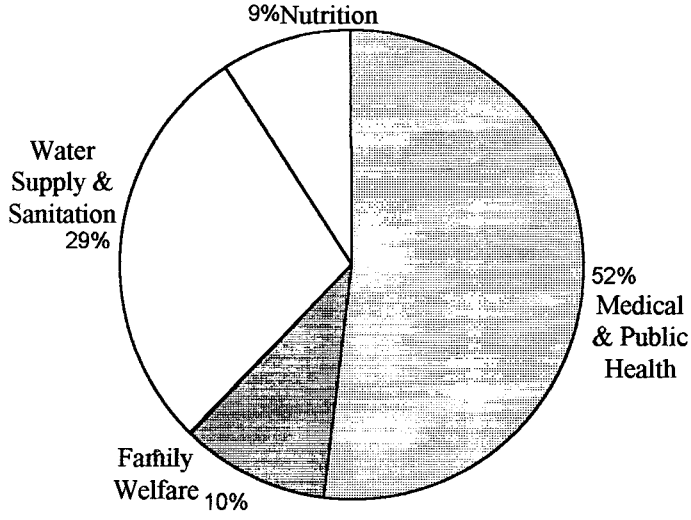
GRAPH 4.1
COMPOSITION OF HEALTH CARE EXPENDITURE-1985, 95, 99



1985



1995



1999

TABLE 4.3
STATE WISE BREAK UP OF HEALTH CARE EXPENDITURE (1985-99)

States	1985				1995					1999				
	MPH/FW	WS&S	Nut.	Total	MPH	FW	WS&S	Nut.	Total	MPH	FW	WS&S	Nut.	Total
A.P.	69.31	30.32	0.36	100	47.1	4.4	8.5	3.9	100	36.61	8.41	12.72	42.24	100
Bihar	68.85	31.15	0	100	66.25	26.03	7.63	0.08	100	53.85	18.46	26.07	1.60	100
Gujarat	61.05	36.81	2.13	100	69.68	14.08	7.0	9.2	100	46.48	7.72	34.88	10.81	100
Haryana	56.39	41.49	2.11	100	69.31	12.35	15.22	3.1	100	36.9	7.82	50.84	4.33	100
Karnataka	64.45	31.35	4.19	100	74.71	6.25	15.09	3.9	100	52.78	13.71	28.25	5.25	100
Kerala	87.76	5.7	6.51	100	82.08	6.3	10.51	1.1	100	70.28	8.87	19.48	1.36	100
M.P.	53.78	43.31	2.90	100	72.3	5.01	19.81	2.8	100	48.41	15.53	29.96	6.08	100
Maharashtra	77.8	3.90	18.20	100	75.15	5.1	13.03	6.6	100	50.69	6.8	34.28	8.21	100
Orissa	60.8	32.05	7.14	100	62.62	8.1	15.87	1.33	100	49.21	12.75	27.60	10.42	100
Pubjab	77.46	22.42	0.11	100	80.51	5.45	13.6	0	100	66.62	6.38	26.9	0	100
Rajasthan	38.85	60.65	0.49	100	59.08	5.6	33.61	1.7	100	36.37	11.40	48.54	3.27	100
T.N.	96.49	0	3.50	100	69.51	4.1	12.9	1.4	100	63.32	10.67	21.28	4.7	100
U.P.	96.49	0.38	3.61	100	80.02	9.3	10.67	-	100	64.74	11.51	23.7	0	100
W.B.	80.93	16.04	30.5	100	83.42	7.01	8.91	0.58	100	69.68	7.34	20.81	0	100

Source: Computed

The Table 4.3 indicates that despite uniformity in ranks of breakup of health care expenditure, a wide range of inter state disparities exist. In 1985, expenditure on medical public health and family welfare in states like Tamilnadu, U.P., West Bengal, Kerala, Maharashtra and Punjab was the highest (70% to 90%) while in Rajasthan medical public health and family welfare made up only 38 percent of the total expenditure. Rajasthan, Haryana were high ranking states. In case of expenditure on water supply and sanitation while in states U.P., Kerala, Maharashtra it composed a relatively smaller percentage of total expenditure. Nutrition in Maharashtra comprised nearly twenty percent of health care expenditure, while in other states the proportion was relatively less. However, over the years there has been a significant rise in share of expenditure on nutrition for all the states. The proportion of nutrition the total expenditure has increased. When we compare figures of 1985 with that of 1999 we notice a slight fall in share of medical public health and family welfare. Again, wide disparities exist in proportion of expenditure on water supply and sanitation. Between 1985 and 1995, proportion of water supply and sanitation registered a decline. A high proportion of expenditure on medical public health and family welfare is necessary given the poor mortality measures prevailing in demographically weaker states. Further, increasing proportion of expenditure on nutrition and child care is encouraging.

The composition of health care expenditure reveal the interstate differences in the significance of each component of health expenditure. For states like Rajasthan, Haryana, Gujarat, water supply and sanitation expenditure are significantly of larger importance constitute relatively higher proportion whereas U.P., Punjab, Rajasthan, Bihar the nutrition expenditure are dismally low.

A higher allocation of expenditure on nutrition, water supply and sanitation is in keeping with the minimum need approach in the planning. Break up of family welfare expenditure since mid-nineties reveal the composition of family welfare expenditure has hovered around five to fifteen

percent. This is quite contrary to the general view of growing importance of family planning in India.

Nevertheless there are shifts in allocation of health care expenditure with marginal decline in medical public health component and rise in expenditure of nutrition. After examining the composition of health care expenditure, an analysis of size, trends and growth rate of health care expenditure will provide a clearer understanding about changes in heath care expenditure across states over a period of time.

IV.4 TRENDS IN HEALTH CARE EXPENDITURE: AN INTERSTATE ANALYSIS

Size: In terms of sheer size there has been a phenomenal increase. The combined health care expenditure aggregated for all the states in 1975 stood at Rs. 761.07 crores which increased to Rs. 21,618.18 crores by 1999 (almost 2500 percent growth). Such a mammoth increase however is deceptive since it fails to account for population changes and price changes. The two important factors have to be included to make the spatio temporal comparison of health care expenditure a meaningful exercise. For this purpose the per capita healthcare expenditures have to be calculated, which is chosen by dividing the total health care expenditure by estimated mid year population. However, this would not account for price changes. To arrive at per capita health care expenditures at constant prices, they have to be deflated by a price index. A general wholesale Price Index is used with 1981 as base year. WPI is the most commonly used indicator, hence it has been used in the analysis.

Changes in Per Capita Health Care Expenditure at Current Prices: On comparison of per capita health care expenditure at current prices we observes that there has been a meteoric rise in per capita health care expenditure over the years. In 1975, the combined per capita health care expenditures stood at Rs. 218.85, which, rose to a massive Rs. 4,458.33. Such a rise gets dwarfed in comparison to real per capita health care expenditure, which has increased from Rs. 355.86 in 1975 to Rs. 1,075.84 in the year 1999,

an increase by 202%. Another important trend of health care expenditure is that, revenue expenditure makes a major portion of the total health care expenditure.

TABLE 4.4
SHARE OF REVENUE AND CAPITAL EXPENDITURE TO TOTAL HEALTH CARE EXPENDITURE (PERCENT)

States	1975			1985			1995			1999		
	Rev.	Cap.	Total	Rev.	Cap.	Total	Rev.	Cap.	Total	Rev.	Cap.	Total
AP	91.4	8.5	100	97.09	2.5	100	92.09	7.09	100	97	2.29	100
Bihar	85.17	14.8	100	78.42	21.5	100	88.23	11.74	100	90.36	9.62	100
Gujarat	90.5	9.42	100	91.8	8.18	100	84.72	15.27	100	72.77	27.23	100
Haryana	88.19	11.8	100	96.5	3.5	100	79.28	20.71	100	78.69	21.3	100
Karnataka	98.16	1.39	100	90.29	9.7	100	86.06	13.93	100	81.1	18	100
Kerala	78.21	21.8	100	91.81	8.18	100	88.57	11.42	100	97.90	2.09	100
M.P.	94.4	5.5	100	96.99	3.01	100	82.89	17.1	100	97.25	2.74	100
Maharashtra	91	8	100	92.28	7.71	100	87.95	12.04	100	98.5	1.45	100
Orissa	97.9	2.03	100	96.68	3.31	100	86.91	13.08	100	92.8	7.17	100
Punjab	95.69	4.3	100	95.54	4.45	100	87.55	12.45	100	98.4	1.5	100
Rajasthan	85.07	14.9	100	72.5	27.49	100	81.9	18.93	100	70.67	29.32	100
TN	92.17	7.8	100	99.65	0.34	100	89.13	10.86	100	91.81	8.18	100
U.P.	94.9	5.06	100	92.19	7.80	100	88.34	11.65	100	86.8	13.13	100
W.B.	92.3	7.6	100	97.42	2.57	100	90.32	9.67	100	93.3	6.1	100
All States	91.9	80.2	100	91.8	8.19	100	87	13	100	88	12	100

Source: Computed

The break up of health care expenditure into revenue and capital account indicate that revenue expenditure constitute above 90% of total expenditure in most of the states in 1975. The same trend was observed in 1985 but in mid nineties there was a slight increase in share of capital expenditure. It is evident from the fact that the share of revenue expenditure which hovered around 91.9% in 1975 has gone down to 87 percent by 1995, and 88% by 1999. Among all the states Rajasthan had a higher share in capital expenditure (almost 30%) by 1999. This is due to large expenditure incurred on water

supply and sanitation[6]. Further, the state differentials in revenue and capital account for health care expenditure are growing. The coefficient variation of total capita health expenditures from 60.35 in 1975 to 107.36 indicate widening disparity among states, in provision of capital assets across different states. However the coefficient variation for revenue expenditure have declined from 44% in 1975 to 40% in 1999 indicating reduction in outlays of revenue expenditure.

Having thrown light on revenue and capital expenditure differentials across the states it is now imperative to look at inter state variations in real per capita health care expenditure across the period of time.

IV.4.2 INTER STATE VARIATION IN PER CAPITA HEALTH CARE EXPENDITURE

An analysis into the inter state variation gives us an insight about differences in health care expenditure and whether existence of disparity in expenditure in health care have converged over time. A cursury glance at per capita real expenditure on health care for years between 1975-1999 can be had from the table 4.5.

In 1975, Karnataka ranked first in per capita health care expenditure followed by Kerala. While Punjab ranked third at (32.8) states with lowest per capital health care expenditure were demographically weaker states like Bihar (9.83), U.P. (10.82), M.P. (14.18). in other states per capita health care expenditure hovered around Rs. 15 to 25. Over the years there has been a massive improvement in position of AP, TN, Maharashtra, which have moved up in terms of those health care expenditure. For all the years U.P., Bihar, Madhya Pradesh. Occupied low ranks in health care expenditure. While states like Punjab, Haryana, Kerala consistently ranked higher in terms of per capita WSDP. States like Maharashtra, West Bengal continued to have moderate per capita NSDP. Among demographically weaker states Orissa, Rajasthan had

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[6] K. Seeta Prabhu and Radha (1995): "Recent Trends in Health Financing in India", *IASSI Quarterly*, vol. 1, Nos. 1, 2, p. 51.

relatively higher expenditure devoted to health care. In Rajasthan massive expenditure on water supply sanitation were responsible for increased outlay.

TABLE 4.5
PER CAPITA HEALTH CARE EXPENDTURE IN (RS.) ACROSS STATES – 1975-99

	1975	1981	1985	1990	1995	1999
A.P.	17.96	24.62	33.34	40.94	93.17	99.09
Bihar	9.83	14.7	27.23	29.71	29.59	39.28
Gujarat	22.45	35.41	82.81	59.74	62.60	106.83
Haryana	23.91	36.48	39.13	54.99	64.31	104.48
Karnataka	48.05	23.12	46.52	51.59	54.49	86.83
Kerala	33.01	63.92	47.98	61.45	56.90	83.55
M.P.	14.19	24.80	25.05	42.74	39.31	44.24
Maharashtra	26.37	34.64	47.39	59.42	54.39	76.68
Orissa	23	24.59	36.78	12.96	53.34	62.51
Punjab	32.8	35	82.39	63.34	54.68	93.51
Rajasthan	27.12	37	28.83	73.14	90.15	119.41
T.N.	21.78	28	48.37	85.38	89.39	66.48
U.P.	10.82	14	28.80	38.02	29.10	31.58
W.B.	25.65	29	36.15	47.95	29.42	61.20
All States	355.86	425.28	610.77	721.37	800.84	1075.67

Source: Computed & Budgeted Estimates

The coefficient variations of the per capita health care expenditure indicate that the disparity in the health care expenditure is tapering down over the years.

TABLE 4.6
DISPARITIES IN PER CAPITA HEALTH CARE EXPENDITURE: COEFFICIENT VARIATION (1975-99)

Years	Coefficient Variation	Standard Deviation	Mean
1975	41	9.89	24.04
1981	27	8.58	31.21
1985	32	12.58	38.63
1990	35	18.21	51.60
1995	38.1	21.8	57.90
1999	35	26.9	76.01

Source: Computed

In 1975, the coefficient of variation of per capita health care expenditure was 41% which dropped to 27% by 1981. After mid eighties there was a gradual increase. In 1990 and 1995 the C.V. of per capita health care expenditure increased to 35% and 38.1% respectively. However, by 1999 the value of coefficient variation climbed up to 35%. Hence in the post liberalization periods, there is conclusive evidence of rising disparity between health care expenditure of States. Various reasons are attributed to this. The

periods between 1990-95 were the years of Structural Adjustment Programme (SAP) regime. The states suffered on account of declaration in tax revenues and Plan and Non-Plan grants from the centre[7]. This weakened the ability of poor states that suffered due to cut in grants and aids. An analysis of interstate variation is incomplete without examining the growth rate of health care expenditure. It is therefore imperative to make an interstate comparison in the growth rate of health care expenditure, which provided under table 4.7 below.

TABLE 4.7
TRENDS IN GROWTH RATE OF PER CAPITA HEALTH CARE EXPENDITURE (1975-99)

	75-99	75-85	81.90	85-90	90-95	95-99	91-99
AP	7.37	7.62	4.28	1.79	17.87	1.55	10.31
Bihar	5.9	8.64	4.08	5.68	-0.08	7.33	3.15
Gujarat	6.71	6.4	1.23	7.3	0.939	14.2	6.67
Haryana	6.33	8.8	3.7	-0.37	3.18	12.8	7.39
Karnataka	2.49	-0.56	7.24	2.58	10.9	12.35	5.9
Kerala	3.94	2.5	0.54	7.98	-1.52	10.07	3.4
M.P.	4.85	10.55	4.46	1.99	-1.74	3.11	0.38
Maharashtra	4.55	5.54	-9.9	3.18	-1.75	9.02	2.88
Orissa	4.25	4.17	+3.3	-	32.07	4.04	19.02
Punjab	4.45	4.41	3.89	4.57	-2.89	14.34	4.42
Rajasthan	6.3	7.9	4.15	4.62	4.26	7.27	5.59
TN	4.7	6.78	1.15	15.2	0.92	-7.12	-2.74
U.P.	4.5	7.1	2.26	12.5	-5.6	2.06	-2.34
W.B.	3.6	3.06	1.0.4	5.31	-9.3	20.09	2.7

Source: Computed

The compound growth rate of aggregate health care expenditure indicates that for the period between 1975-1999 AP, Gujarat, Haryana, Rajasthan recorded an annual growth rate of more than five percent. These states ranked high in terms of annual compound growth rate whereas states like Punjab, Rajasthan, MP, Bihar recorded modest growth rate. Strangely high ranking states like Kerala, Karnataka had lower growth rates. During the period between 1975 and 1985 the annual growth rate of most of the states was impressive except for Maharashtra, Karnataka which saw a deceleration growth rates. Most of states health care expenditure hovered between 5 percent to 10 percent. However, since mid nineties slow downs in growth of health care

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[7] K. Seeta Prabhu (1999): "Structural Adjustment and Health Sector in India", Disinvesting in Health. The World Bank's Prescription for Health.

expenditure was observed. The growth rate of nearly seven states i.e. Bihar, Kerala, M.P., Maharashtra, Punjab, U.P. and W.B. showed negative trends except for AP and Orissa which had a high growth rate. The growth rates of per capita health care expenditure were either negative or low for most of the states.

However, since mid nineties there was a reversal of trends. In the period 1995-99, most of the states registered a positive annual growth rate. Interestingly in the period between 1995-99 most of the highly developed states had a high growth rate like Gujarat, Haryana, Punjab and Maharashtra hovering in the range of seven to fourteen percent. However, UP, Orissa, AP and MP had relatively lower growth rates between 1990-99. The post liberalization period does not show deceleration of growth rates since, health care expenditure grew positively between 1995-99.

The disturbing aspect has been deceleration of per capita health care expenditure in 1990-95. The pattern of real per capita health care expenditures indicate variation in expenditure at inter state level in India. However, trends in health care expenditure do not reveal anything about the trends of expenditure of each functional category. It is necessary to analyze the changes is trends across states for each component of health care expenditure. The next section are devoted to analyzing inter state variation among various categories.

IV.4.3 TRENDS IN EXPENDITURE OF MEDICAL PUBLIC HEALTH AND FAMILY WELFARE

Expenditure on Medical Public Health and Family Welfare comprise a major bulk of expenditure of health care. An insight into the given table helps us to point out the inter state variations in expenditure under this category.

In 1985, Tamilnadu had the highest per capita health care expenditure i.e. Rs.40.52. Among other states with high per capita expenditure in this component were Punjab (Rs.39.23), Kerala (Rs.36.73), Haryana (Rs.31.59) while UP, Rajasthan, Maharashtra, Bihar ranked on the lower rung of per

capita health care expenditure. In 1990, AP, Maharashtra and W.B. improved their per capita expenditure under this category. In comparison to 1985, states like Kerala, Punjab, TN continued to enjoy higher ranks. In fact for all the years under consideration Uttar Pradesh, Bihar and Madhya Pradesh had lower ranks implying less spending on medical public health and family welfare while Punjab, Haryana, Kerala and TN enjoyed higher ranks. Gujarat and Maharashtra recorded an increase in per capita expenditure.

TABLE 4.8
REAL PER CAPITA EXPENDITURE ON MEDICAL PUBLIC HEALTH AND FAMILY WELFARE ACROSS STATES (1985-1999) (RS.)

States	1985	1990	1995	1999
AP	25.97	30.35	28.04	44.62
Bihar	15.52	23.07	25.64	28.41
Gujarat	25.63	37.25	44.35	57.90
Haryana	31.59	32.44	40.58	46.82
Karnataka	29.27	33.82	35.23	57.74
Kerala	36.73	46.41	44.79	66.13
MP	20.82	26.11	21.51	28.29
Maharashtra	11.61	38.65	35.03	44.15
Orissa	21.05	1.07	28.54	38.37
Punjab	39.23	51.04	40.01	68.27
Rajasthan	22.66	38.86	39.6	57.05
TN	40.52	43.07	46.69	49.2
UP	20.73	29.97	23.41	24.08
WB	28.07	41.42	29.03	47.15
All States	369.45	470.51	48.53	658.59

Source: Computed

Low expenditure on this component by states like Bihar, Uttar Pradesh and Madhya Pradesh reflected neglect in the most populous states on curative services and family welfare. The coefficient of variation of per capita medical, public health and family welfare expenditure reveals reduction in disparity over a period of time.

The value of coefficient variation has declined from 32.43 percent to 29 percent between 1985 and 1999. However, the period 1985-1990 saw marginal

increase in the value of C.V. Again, in the period 1995-99 the same trend continued indicating a rise in inter state variation.

TABLE 4.9
COEFFICIENT OF VARIATION OF REAL PER CAPITA EXPENDITURE ON MEDICAL PUBLIC HEALTH FAMILY WELFARE (1985-99)

Years	Coefficient Variation	Standard Deviation	Mean
1985	32.43	8.5	26.38
1990	36.10	12.13	33.60
1995	24.25	8.43	34.53
1999	29	13.76	47.04

Source: Computed

The growth rate on medical public health and family welfare tabulated below indicates an annual growth rate of roughly 2.4 percent for all the states for the entire period 1985-99. For all the period under consideration the growth rates recorded are positive except for the period between 1990-95 in which the growth rates were negative. The negative growth rates indicate a deceleration in spending of per capita expenditure on medical, public health and family welfare component. However, per capita expenditure picked up after 1995 and in the period between 1995-99 growth rates picked up for all the states except UP. Thus, in the post liberalization period the compound growth rates for all states were positive indicating higher allocation of outlays under this category.

TABLE 4.10
COMPOUND GROWTH RATES OF PER CAPITA MEDICAL FAMILY WELFARE EXPENDITURE ACROSS STATES (1985-99) (PERCENT)

States	85-99	85-95	90-95	90-99	95-99
AP	2.28	0.77	-1.57	4.37	12.3
Bihar	2.55	5.14	2.19	2.37	2.5
Gujarat	3.45	5.77	3.8	5.02	6.53
Haryana	1.65	2.53	4.57	4.16	3.64
Karnataka	2.87	1.87	0.82	6.12	13.1
Kerala	2.47	2.04	-0.69	4.01	10.22
MP	1.28	0.52	-3.41	0.89	6.55
Maharashtra	5.72	11.66	-1.97	1.48	5.97
Orissa	2.57	3.09	92.8	48.9	7.92
Punjab	2.33	0.19	-4.75	3.28	14.2
Rajasthan	3.92	5.73	2.01	5.29	9.55
TN	0.811	1.42	1.63	1.49	1.31
UP	0.626	1.22	-4.81	-2.4	0.70
WB	2.18	0.33	-6.85	1.4	12.8
All States	2.43	2.72	0.54	3.8	8.03

Source: Computed

From the table 4.10 we infer that the per capita (real) expenditure have grown phenomenonely between 1995-99 for state like Karnataka, Kerala, Punjab, Rajasthan and WB record double digit growth rate. This was a mark improvement from the period (1990-95) where nearly seven states saw a deceleration of growth in expenditure under this head.

For the entire period invariable UP, MP, Bihar recorded low growth rates while other states alternated in their ranks sometimes recording a significant rise sometime while sometimes a deceleration in growth rates. The deceleration in growth rates in mid nineties is in consonance with an overall decline in health care expenditure. Since Medical Public Health Family Welfare is a major component of health car expenditure it strongly influences the growth rate of total health are expenditure. The impact of other components viz. Water supply, sanitation expenditure and nutrition gets overshadowed. Hence in next paragraphs interstate differentials in health care expenditures for both the categories are analyzed.

IV.4.4 TRENDS OF REAL PER CAPITA EXPENDITURES ON WATER SUPPLY AND SANITATION

Expenditure on water supply and sanitation are of crucial importance in a developing country like India plagued with growing incidence of outbreak of communicable diseases.

TABLE 4.11
PER CAPITA REAL EXPENDITURE ON WATER SUPPLY SANITATION (1985-99) (RS.)

States	85	90	95	99
AP	11.36	9.64	11.52	12.60
Bihar	7.02	6.02	3.91	10.24
Gujarat	15.46	12.73	7.61	37.27
Haryana	23.24	18.90	19.65	53.1
Karnataka	14.24	8.25	15.26	24.53
Kerala	2.35	13.73	10.56	16.27
MP	16.77	5.29	15.05	13.25
Maharashtra	0.58	16.45	12.83	26.32
Orissa	11.09	9.43	13.47	17.25
Punjab	11.35	11.70	14.67	25.24
Rajasthan	35.38	35.26	48.02	58.45
TN	-	16.29	19.45	14.15
UP	0.08	9.04	5.68	7.48
WB	5.56	6.28	5.88	12.75

Source: Computed

In the previous chapter we had analyzed a higher disease prevalence of water borne diseases like dysentery, cholera, diarrhea which increases the importance of expenditure under this head. The interstate difference in per capita expenditure under this head over a period of time can be deduced from table 4.11 above.

The inter state disparities are glaring in per capita expenditure of water supply and sanitation. The coefficient of real per capita expenditure under this category highlight that variation has gradually declined over the years.

TABLE 4.12
COEFFICIENT VARIATION OF REAL PER CAPITA EXPENDITURE ON WATER SUPPLY AND SANITATION

Year	Coefficient Variation	Standard Deviation	Mean
1985	89.76	9.9	11.04
1990	54.85	7.40	13.5
1995	74.01	10.78	14.5
1999	67.28	15.81	23.49

Source: Computed

There has been a drop in the percentage of coefficient variation between 1985 and 1999, indicating narrowing of inter state differences. Yet the percentage of coefficient variation of this category picked up in 1995 showing that expenditure divide has widened. However, in 1999, it dropped to 67.28 percent from 74 percent in (1995) indicating convergence in per capita differentials under the category.

In the period 1985 to 1999, Rajasthan ranked first in per capita health expenditure of water supply and sanitation, states like Gujarat, Haryana also spend relatively higher amounts on water supply and sanitation. States like UP, Kerala, Tamilnadu were the low ranking states in terms of resource deployed under water supply sanitation. Nevertheless, over a period of time each state improved its outlay under this category. The changes in expenditure of water supply and sanitation can be inferred from the compound growth rates tabulated in Table 4.13 below.

As can be seen from the table for the entire period, the per capita expenditure under this category has increased sharply after 1995 for most of the states. This can be deduced from the high growth rates of 95-99 with exception of MP, UP, which decelerated in growth rates. All the states showed a massive rise in growth rates.

TABLE 4.13
COMPOUND GROWTH RATE OF PER CAPITA EXPENDITURE ON WATER SUPPLY SANITATION (1985-99)

States	85-99	85-95	90-95	95-99	90-99
AP	0.43	0.143	3.6	2.26	30.2
Bihar	1.58	-5.67	-8.19	27	6.12
Gujarat	3.73	-6.83	-9.76	48	12.67
Haryana	3.50	-1.64	0.82	28.14	12.16
Karnataka	2.29	0.69	13.10	12.5	12.87
Kerala	8.31	16.43	-4.41	10.4	1.90
MP	-0.97	-1.07	-0.31	-3.13	-1.57
Maharashtra	17.2	36.2	-4.84	19.67	5.35
Orissa	1.85	1.95	7.37	6.33	6.93
Punjab	3.38	2.59	4.61	14.5	8.91
Rajasthan	2.11	3.101	6.3	5.03	5.77
TN	-	-	3.61	-7.6	-1.55
UP	2.69	52.7	-8.8	7.17	-2.05
WB	3.51	0.55	-1.33	21	8.16
All States	3.01	2.81	1.53	11.5	5.83

Source: Computed

Most of the states have registered positive growth rates for all the entire period except 1995-99. In this period most of the states recorded either slow growth rate or negative growth rate. The deceleration in growth rate of the expenditure was evident in at least 7 states. For the entire period 85-99 growth rate averaged at 3.01 percent with W.B., Rajasthan, Orissa, MP and AP recording slow growth in per capita health care expenditure while Maharashtra, Kerala and UP recorded high growth rates. The period 1985-95 also saw decline in growth rates of Bihar, Gujarat, Haryana and MP who had negative growth rates while phenomenal growth rates prevailed in Maharashtra and UP.

The growth rates of per capita expenditure on water supply sanitation are low for the entire period 1975-99 for most of the states indicating lesser resources allocation to water supply and sanitation. However, phenomenal growth rates were observed since 1995, which is a welcome step.

Among all the components of health care expenditure, expenditure on Nutrition has grown impressively across the period of time for most of the states. The per capita expenditure on nutrition as shown in table 4.13 across states substantiates the above statement.

TABLE 4.14
PER CAPITA EXPENDITURE OF NUTRITION 1985-1999 (RS.)

States	1985	1990	1995	1999
AP	0.2	0.54	41.85	53.59
Bihar	0	0.71	0.63	0.04
Gujarat	0.89	9.75	11.65	10.02
Haryana	1.18	3.64	4.53	4.02
Karnataka	1.90	9.52	4.56	3.98
Kerala	2.72	1.31	1.14	1.15
MP	1.12	1.33	2.69	2.13
Maharashtra	2.71	4.31	6.30	6.55
Orissa	2.47	2.45	6.51	11.32
Punjab	0.05	0.59	0	0
Rajasthan	0.28	0.02	3.9	2.52
TN	1.47	26.02	3.13	23.13
UP	0.78	0	0	0
WB	1.07	0.23	1.31	0.39
All States	16.38	62.86	88	103.3

Source: Compiled

The per capita expenditure on nutrition has phenomenally increased. In 1985, the aggregate per capita expenditure on nutrition was on Rs. 16.38 which went up to Rs. 103 by 1995 and slightly declined to Rs. 88 in 1999. The most impressive growth has been that of Andhra Pradesh where expenditure on nutrition stood at Rs. 41.8 in 1999 from a meagre Rs.0.2. Despite an impressive rise in per capita health expenditure on nutrition the performance of UP, WB, Bihar and MP is not forthcoming. These states spend negligible amounts (less than Rs. 1 per capita) on nutrition. States, which have improved their performance, are Gujarat, Maharashtra, Orissa and TN. In these states there was a discernible rise in per capita expenditure on nutrition.

IV. 5 INFERENCES

From the analysis on health care expenditure for state following inferences can be deduced.

1. The composition of health care expenditure has not drastically changed over the years. Medical public health and family welfare constitutes a major proportion of the total health care expenditure, followed by water supply and nutrition.
2. Over the years there has been a gradual decline in the share of medical public health expenditure coupled with a massive rise in proportion of expenditure on nutrition.
3. Health care expenditures are marked with inter state differentials in terms of growth rates, composition and size.
4. The interstate disparity has narrowed down in health care expenditure across the period of time.
5. In the Structural Adjustment Period (1990-95), the growth rate of health care expenditure has registered a decline. The deceleration in growth of health care expenditure prevails for all the functional categories.
6. States with poor health outcomes like UP, MP, Bihar and Orissa rank lowest in health care expenditure. This is particularly evident in case of expenditure on medical public health and nutrition.

Health expenditure on these components made highest dent in arresting the mortality rates. Neglect of these expenditures would further worsen the situation of health status in the erstwhile neglected states. In mid nineties all the states showed stagnation in health outcomes. This was even true for demographically superior states. During the same period health care expenditure saw significant deceleration.

It is interesting to probe into the inter linkages between health outcome and health expenditures. Do states with higher health expenditure enjoy better

health outcomes? Can higher expenditure be translated into higher health status? Are there other variables influencing health outcomes? The next chapter seeks to address these issues. It inquires into determinants of health outcomes and its varying impact across states.

CHAPTER - V

V. 1 INTRODUCTION

The previous chapters dealt with an interstate analysis of health outcomes and health expenditure. The pattern of health status that emerged in the analysis indicates disparities in both health expenditures and health outcomes. On one hand, Kerala maintained an impressive health record on health indicator akin to those of the developed nations while on the other, states like UP, Bihar and Orissa had health indicators comparable to the likes of some of the world's least developed nations. These inter state and inter temporal variations cannot be examined in isolation. Their analysis has to be supplemented by investigating the determinants of demographic outcomes. An inquiry into determinants of health outcomes is an interesting exercise, which not only provides a holistic view about health outcome differentials, but also provides pointers to formulate policies, which would overhaul the health status and narrow the health divide between various states.

This chapter seeks to examine some of the relevant variables affecting health outcome. The study is based on a cross sectional analysis of the state level data for two periods 1981 and 1991. It is followed by a biviarate analysis, which gauges the relationship between the health indicators and each variable in isolation concluding with a time series regression analysis to identify differentials in the impact of explanatory variables on health indicators.

Health status is interplay of various factors like technical, environmental, socioeconomic and institutional. All these factors have to be viewed in tandem. However, the degree to which these factors affect the health status is region specific and time specific. Interestingly, not all the determinants of health status can be quantified availability of a broad range of factors affecting health status makes it very difficult to evolve a universally accepted set of determinants for health status. Thus, given the wide

differentials in the determinants of health status, the empirical analysis conducted on this subject is not strictly comparable.

Experts differ in their views on the contribution of factors influencing mortality transition in India. For instance – Robert Cassen in his book "Development and Population" attributes the mortality decline in India during early fifties and sixties to the technological advances in medical care, eradication of communicable diseases, extension of medical care services and educational[1]. He has ignored the important role of socioeconomic development in bringing about mortality transitions. However, with the passage of time socioeconomic factors have increasingly being recognized as vital contributors to improved health status. Thus, the rapid strides in health indicators of Kerala as a result of developed socioeconomic parameters confirms that health is a multidimensional aspect and that one has to look beyond medical and technological factors to bring about significant changes in it.

The growing importance of socioeconomic factors can be traced to growing mortality divide between developed and less developed states. Krishnan P has in his study titled "Mortality Decline in India, 1951-61" stated that mortality differentials in the Indian states is also a consequence of economic development and social factors[2].

Mortality transitions are a consequence of rising economic growth and income levels. Increased income levels lead to an increase in life expectancy of birth and reduction in child mortality. The empirical study conducted by the World Bank for sixty-five countries for the period 1970 to 1988 clearly establishes that falling rate of child mortality is a consequence of growth in per

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[1] Cassen Robert, (1976): "Development and Population", *Economic and Political Weekly* as quoted in "Limits to technical intervention in Health Care (1993)", Disinvesting in Health.

[2] Krishnan P (1975): "Mortality Decline in India, 1951- 1961: Development Versus Public Health Programme Hypothesis", Social Science and Medicine, vol. 9, Nos. 8-9 as quoted in K. V. Narayan, *op. cit.*

capita income[3]. However, the effectiveness of this relationship diminishes at higher levels of income.

The other important determinant of health status is the share of population living below the poverty line. The World Development Report, 1993 establishes a strong co-relation between poverty and health for developing countries like India and Kenya[4]. Empirical analysis at national level by Minhas, Jain and Tendulkar, however, indicates a weak relationship between child mortality and incidence of poverty in different states[5]. Hence the role of economic development as a determinant of health status does not evoke a uniform consensus. According to Carnin, basic need variables like clothing, sanitation, shelter, nutrition and education play an important role in influencing the health outcomes[6]. Panikar and Somen (1984) in their studies on Kerala indicate the same determinants[7].

A district level study based on cross sectional analysis conducted by Mamta Murthi, Catherine Guio and Jean Dreze tried to examine the relationship between literacy, mortality, fertility and gender bias. The variables chosen as determinants of fertility, child mortality and female disadvantage were female literacy, male literacy, female labor force participation, urbanization, medical facilities and poverty. Most of the variables were statistically significant for mortality rate, fertility rate and female disadvantage[8]. The empirical results indicated the importance of female empowerment, female education in improving mortality indicators.

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3 World Bank: World Development Report, 1993, Investing in Health, p. 41.

4 Ibid., p. 40.

5 Minhas, Jain and Tendulkar, (1991): Government of India, 1990, statement, No. 39, p. 48.

6 Guy Carnin (1984): "Economic Evaluation of Health Care in Developing Countries", Croom Helm, London as quoted in K.N. Reddy and Selvaraju-Health Care Expenditure by Govt. of India, 1994, p. 66.

7 Ibid., p. 66.

8 Murthi M. et. al. (19), 'Mortality, Fertility and Gender Bias in India' in Drez and Sen (eds.), Indian Development Selected Perspectives, Oxford Press, Delhi., pp. 358-397.

Among the recent empirical studies K.N. Reddy and V Selvaraju (1994) through a cross-sectional state level data analysis identified various determinants of health status and its impact on life expectancy at birth. The explanatory variables selected were per capita health expenditure, female literacy, per capita NSDP and poverty. The results highlighted that positive effect of income and female literacy on improving health status was significant[9]. Encouraged by these results, the present study makes an attempt to identify the determinants of health status in India. The choice of explanatory variables is guided by the empirical studies discussed earlier and partly by constraints posed due to non-availability of data. In next section a cross sectional regression analysis is undertaken to inquire into the contribution of various economic factors affecting health status.

V.2 PRINCIPAL MEASURES OF HEALTH STATUS AND THEIR DETERMINANTS: A CROSS-SECTIONAL REGRESSION ANALYSIS

The principal measures of health status include Life Expectancy at Birth, Infant Mortality Rate, Crude Birth Rate and Crude Death Rate. Among these three measures the most significant ones are Life Expectancy at Birth and Infant Mortality Rate. Life Expectancy at Birth is commonly used because of its simplicity. However, infant mortality rate is considered to be a more sensitive indicator since it captures both socioeconomic development and access to health services' aspect. Though both the principal measures are used for a biviarate analysis. But in regression analysis Infant Mortality is taken as an indicator for health development. The explanatory variables relate to health expenditure, literacy, and level of economic development and amenities to provide a holistic view about health status. The Regression Analysis pertains to two-time periods i.e. 1981, 1991 and is carried on for fourteen observations.

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[9] Reddy K.N. and Selvaraju (1994), *op. cit.*, p. 64.

The explanatory variables selected for the analysis are described in the next section.

V.2.1 EXPLANATORY AND INDEPENDENT VARIABLES SELECTED IN THE ANALYSIS

1. Health Status: The health status is represented by infant mortality rate since it takes into account a variety of factors like availability of medical care facilities, state of health status of mother, prevalence of communicable diseases affecting infant. In comparison to other indicators this is the only indicator which captures socioeconomic factors affecting health status.

2. Economic Development: There are two indicators to represent the level of economic development across the states. The level of Per Capita Domestic Product (NSDP) across states at current prices for the years 1981 and 1991 as published in the Economic Survey of India by Government of India was selected as an income indicator which is used as a proxy for Economic Development.

3. The level of urbanization is represented by the percentage of urban population to total population for the years 1981 and 1991 across states as an indicator for urbanization.

4. Educational Status: The level of educational status is represented by the level of female literacy, which is indicated as percentage of literacy among female population. It is selected for the periods 1981 and 1991 across states from Census of India for 1981 and 1991 respectively. Female literacy is also used as a proxy to represent status of females.

5. Health Intervention is represented by per capita expenditure on health and family welfare, water supply sanitation and food and nutrition for 1981, 1991 across states. The data is derived from State Finances of

India, RBI bulletin for respective years and computed by aggregating the total expenditure under various categories and dividing by estimated mid year population per capita health expenditure indicate the extent of resources deployed by state on health sector.

V.2.2 CHOICE OF VARIABLES

The explanatory variables are selected on the basis of World Banks' *World Development Report,* 1993. The World Bank has prescribed adoption of such policy initiatives that lead to an increase in economic growth, implementation of essential clinical package and massive drive for increasing schooling for girl child. This, it states, can bring about significant reduction in mortality measures, leading to an improved health status[10].

V.2.3 REGRESSION RESULTS (1981)

A cross sectional regression analysis across fourteen states is carried out in order to examine the impact of each variable on health status. The method of Least Square is used. The regression results obtained are:

TABLE 5.1
REGRESSION RESULTS - 1981

Variables	Co-efficient	R^2	Adjusted R^2	t – Statistic
IMR	Y	0.71	0.59	
PC HEXP	X1 (-0.113)			-0.125
PC NSDP	X2 (-0.0083)			-0.55
FLIT	X3 (-1.49)			-3.67*
URB	X4 (-0.93)			-0.93
CONSTANT	C (162.67)			

Source: Computed
#Significant at 1 %

where,

Variable Y (IMR) corresponds to Infant Mortality Rate.
Variable X_1 (PC HEXP) corresponds to per capita health expenditure.
Variable X_2 (PC NSDP) corresponds to per capita net state domestic product.
Variable X_3 (FLIT) corresponds to female literacy and
Variable X_4 (URB) corresponds to urbanization.

Regression Equation:

$$IMR = 162.67 - 0.113\ X_1 - 0.008\ X_2 - 1.49\ X_3 - 0.93\ X_4$$

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[10] World Bank (1993): World Development Report, 1993, *op: cit.*, pp. 157-158.

The results of the estimated equation are as follows:

1. Per Capita Health Expenditure was inversely related to infant mortality rate indicating that a fall in the Per Capita Health Expenditure would lead to a rise in the value of Infant Mortality Rate. However, the value of t-statistics indicates that the effect of health care expenditure on IMR is not significant.
2. The impact of per capita NSDP was inversely related to infant mortality rate implying that a fall in per capita NSDP leads to a rise in infant mortality rate. However, it did not have significant influence on infant mortality rate.
3. The influence of female literacy on infant mortality rate was negative implying that a rise in female literacy would lead to a fall in IMR and the results were significant.
4. Lastly, the impact of urbanization on infant mortality was negative, but did not exert any significant influence on IMR.

Thus, the only variable, bearing a significant influence was female literacy (FLIT). The same exercise was undertaken in 1991 with the same explanatory variables (PCHEXP, PCNSDP, FLIT, URB) and infant Mortality Rate (IMR) as the dependent variables. The results were similar to that of 1981. In 1991 only female literacy had a significant influence on IMR.

V.2.4 REGRESSION RESULTS FOR 1991

The same exercise was undertaken in 1991 with the same explanatory variables like PCHEXP, PCNSDP, FLIT, URB, Urbanization and IMR as a dependent variable. The results were similar to 1981.

TABLE 5.2
REGRESSION RESULTS - 1991

Variables	Co-efficient	R^2	Adjusted R^2	t – Statistic
IMR	Y	0.60	0.40	
PC HEXP	X1 (-0.35)			-0.98
PC NSDP	X2 (-0.0058)			-0.17
FLIT	X3 (-1.169)			-3.017#
URB	X4 (-0.055)			-0.0616#
CONSTANT	C (140.27)			5.4

Source: Computed

#Significant as 1%.

Regression Equation:

$$IMR = 140.27 - 0.35\ X_1 - 0.00058\ X_2 - 1.169\ X_3 - 0.055\ X_4$$

The regression results indicate that female literacy is the only variable significantly affecting health status. It explains that an increase in female literacy by 1.16 unit leads to a decline in infant mortality rate by 1 unit. The overwhelming importance of female literacy in the Regression analysis is in conformity with earlier empirical studies (Reddy 1994), Mamta Murthi (1995).

A high level of female literacy is an indicator of a high level of social development, higher responsiveness to family welfare programmes, interventions, greater knowledge about nutrition among mothers hygiene and health care. Hence infant mortality rate declines with the rise in female literacy and vice-a-versa.

One of the limitations in a multiple regression analysis is that it fails to capture the effect of other variables on dependent variable because of significant influence exerted by one of two variables. In order to investigate the effect of each variable on infant mortality rate, a biviarate analysis with the help of scatter diagram is inevitable. The next section deals with biviarate analysis for each of these variables.

V. 3 BIVARIATE ANALYSIS OF MEASURES OF HEALTH STATUS AND ITS DETERMINANTS

An attempt to study the relation between principal health measures like infant mortality, Life with explanatory variables like per capita NSDP, Per Capita Health Expenditure, and female literacy is done. This indicates the degree of relation between the two variables.

V.3.1 INFANT MORTALITY AND HEALTH CARE EXPENDITURE

A bivariate analysis for cross sectional data of 1981 across 14 states is examined to study the impact of health care expenditure on infant mortality rate. As indicated by the graph 5.1, per capita health expenditure is depicted on

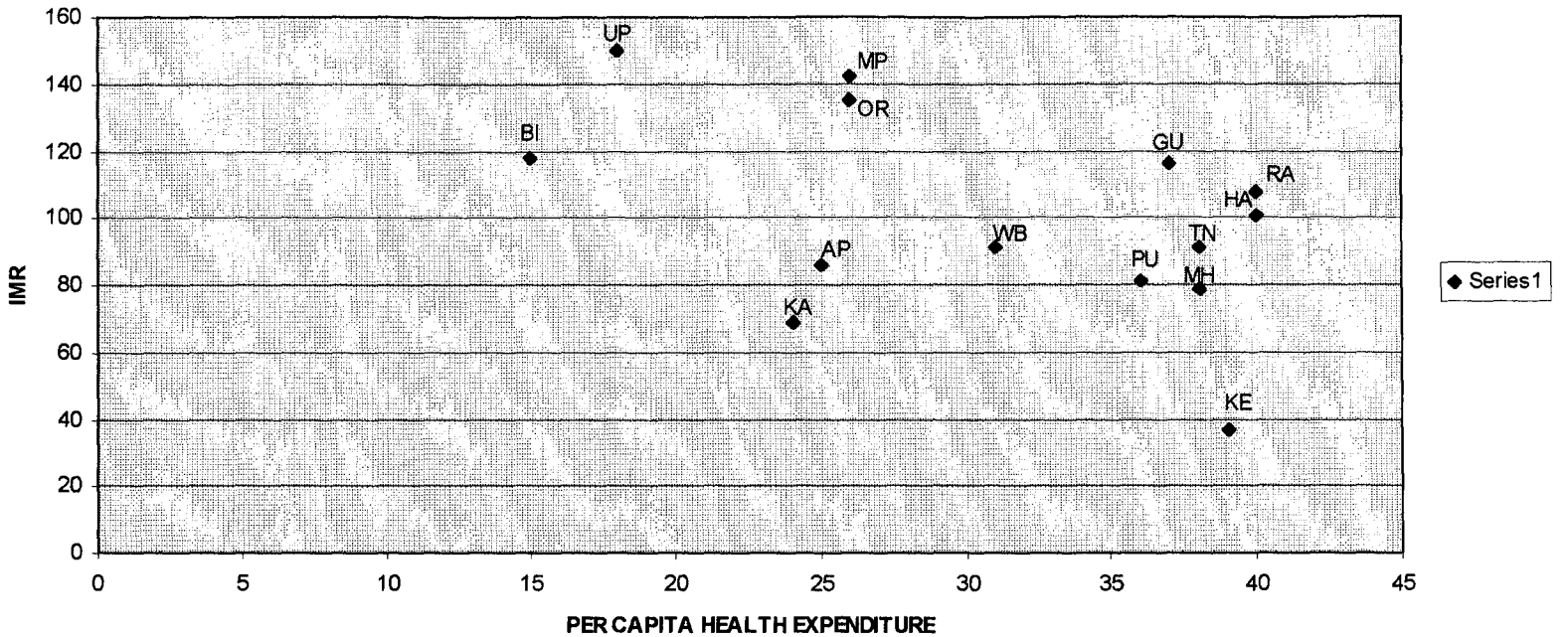
X-axis and IMR on Y-axis. States like Punjab, Maharashtra, Tamilnadu, Haryana, Rajasthan, Gujarat per capita health expenditures of Rs. 36 to Rs. 40 have infant mortality rate between 79 to 116. On the other hand States like Madhya Pradesh, Orissa, Uttar Pradesh and Bihar with per capita health expenditure between Rs. 15 to 26 have IMR in higher ranges (118-142) indicating a negative relationship. However, Southern States spending between Rs. 25 to Rs. 37 per capita on health care have lower infant mortality rate. For instance Kerala spending per capita health expenditure of Rs. 37 has phenomenally low IMR of 39. Similarly, Andhra Pradesh and Karnataka spends the same amount of per capita expenditure on health as Madhya Pradesh but enjoy comparably low levels of IMR ranging between 69 to 85 vis-à-vis 142 of Madhya Pradesh.

Hence scatter diagram indicates that Infant mortality rate and per capita health expenditure are negatively related but the relationship is not strong.

V.3.2 INFANT MORTALITY RATE AND PER CAPITA NSDP

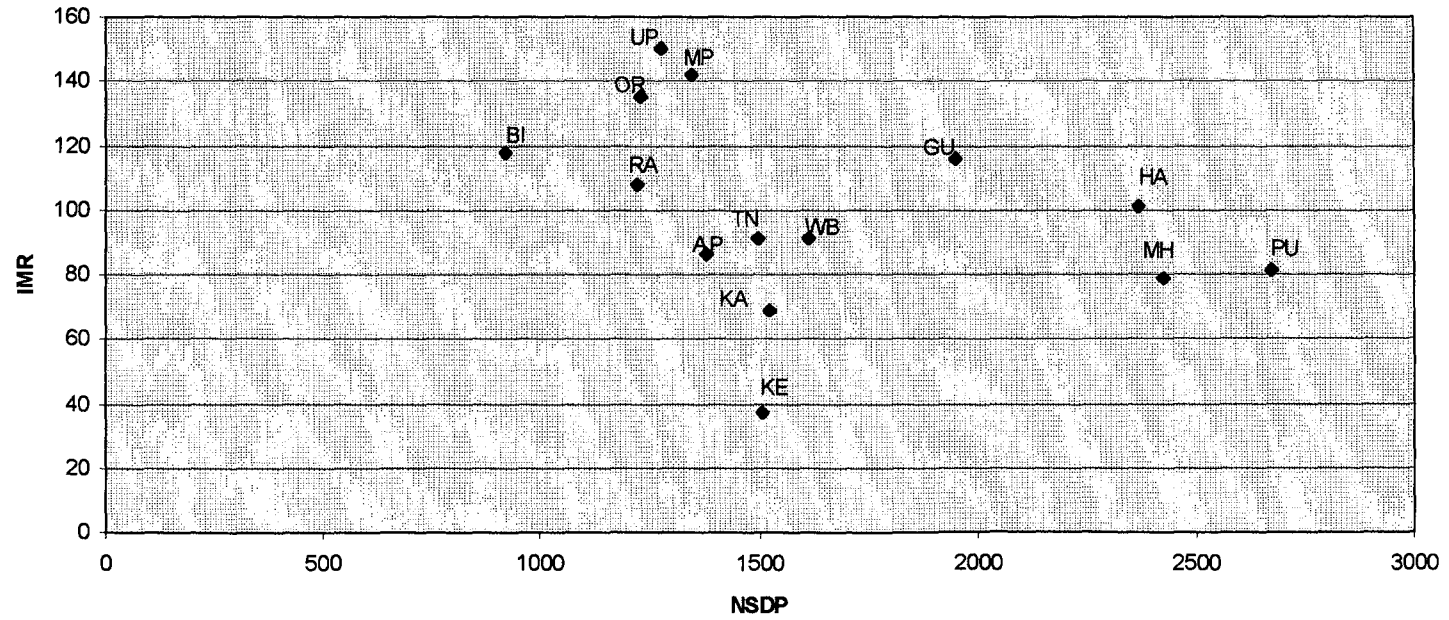
The relations between infant mortality rate and per capita NSDP is negative States with relatively lower Per Capita NSDP like Bihar, Madhya Pradesh, Orissa, Uttar Pradesh, Rajasthan have high IMR ranging between 108 to 150. While states with per capita NSDP between Rs. 1500 to 2700 have relatively lower IMR. Kerala and Haryana stand on two extremes. Kerala with a moderate NSDP Rs. 1508 had lowest level of IMR (37) and Gujarat with higher NSDP Rs. 1948 had a higher IMR (116). The relationship between the two is negative and is fairly correlated.

GRAPH 5.1 (a) PER CAPITA HEALTH EXPENDITUREAND IMR-1981

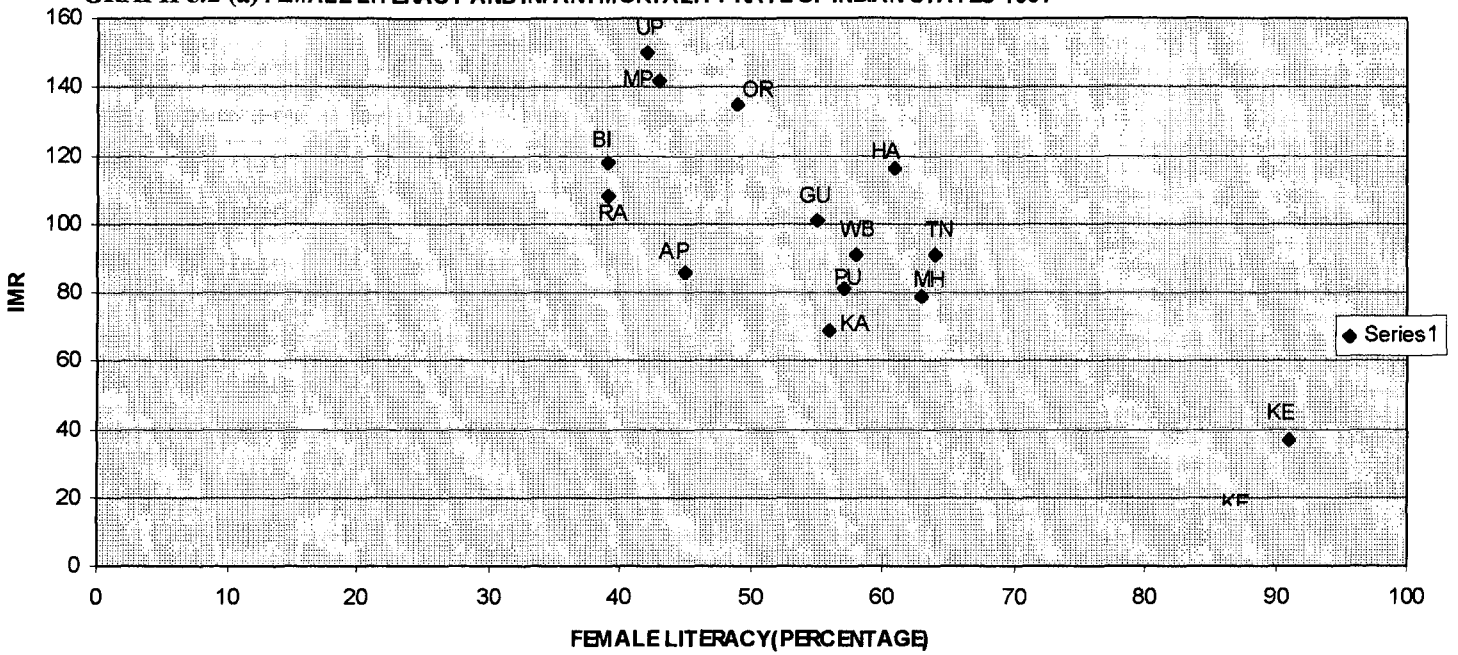


AP- Andhra Pradesh
BI- Bihar
GU – Gujarat
HA – Haryana
KA – Kamataka
KE – Kerala
MP – Madhya Pradesh
MH – Maharashtra
OR – Orissa
PU – Punjab
RA – Rajasthan
TN – Tamilnadu
UP – Uttar Pradesh
WB – West Bengal

(b) PER CAPITANSDP AND INFANT MORTALITY RATE OF INDIAN STATES - 1981

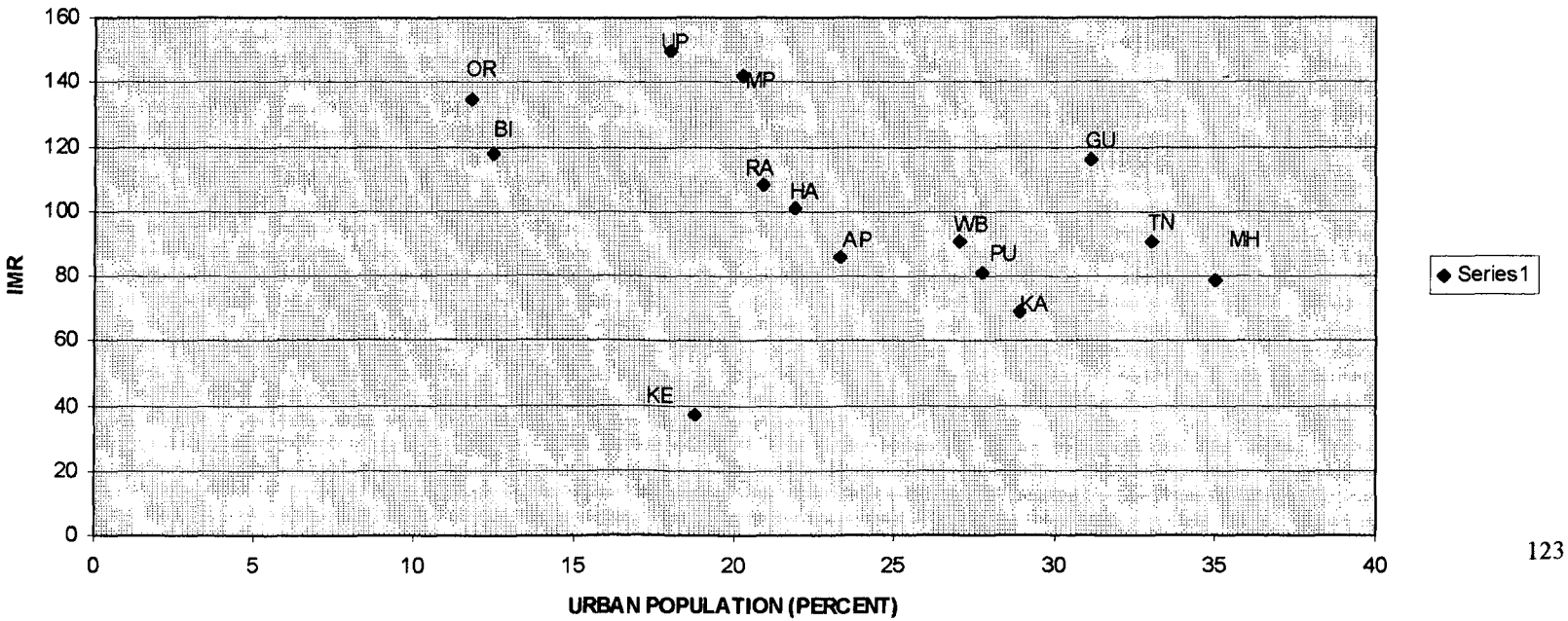


GRAPH 5.2 (a) FEMALE LITERACY AND INFANT MORTALITY RATE OF INDIAN STATES-1981



AP- Andhra Pradesh
BI- Bihar
GU – Gujarat
HA – Haryana
KA – Karnataka
KE – Kerala
MP – Madhya Pradesh
MH – Maharashtra
OR – Orissa
PU – Punjab
RA – Rajasthan
TN – Tamilnadu
UP – Uttar Pradesh
WB – West Bengal

(b) URBAN POPULATION AND IMR-1981



V.3.3 FEMALE LITERACY AND INFANT MORTALITY RATE

The scatter diagram indicates that the relationship between female literacy and infant mortality rate is negative and highly correlated. States like Uttar Pradesh, Madhya Pradesh, Bihar, Orissa and Rajasthan with relatively low percentage of female literacy have lower infant mortality and states with relatively higher level of literacy had moderate range of infant mortality rate. Kerala with highest level of female literacy at 91% has the lowest infant mortality rate. Such a strong degree of correlation highlights the crucial role literacy among women can play in influencing the health outcomes.

V.3.4 URBANISATION AND INFANT MORTALITY RATE

Infant mortality and urbanization are negatively correlated. The correlation however is not very strong in states like Uttar Pradesh, Orissa, Madhya Pradesh and Bihar, with an urbanization range of twelve to twenty percent have high infant mortality rate while Maharashtra, Punjab, Tamilnadu, Andhra Pradesh, West Bengal having high levels of urbanization have low rates of infant mortality. However, Kerala with low level of urbanization has enjoyed the infant mortality at lower rate while Gujarat with high urban population has high infant mortality rate.

Hence the biviarate analysis indicated results akin to multiple regression analysis. From the scatter diagram it is evident that of all the variables selected the relationship between female literacy and infant mortality appears to be negative and strong. The influence of other variables is also negative but relatively weak.

Hence both the cross sectional regression and scatter diagram have been undertaken to find the influence of socioeconomic variables on infant mortality rate. However, cross sectional analysis has its limitations. The effect of multi co-linearity cannot be avoided. In order to get a more comprehensive idea about the temporal behavior of determinants of health status time series

regression is done for each state under consideration. The next section gives a time series regression analysis.

V.4 TIME SERIES REGRESSION ANALYSIS

In order to examine the temporal influence of economic development and health expenditure on health status an empirical analysis based on time series data since 1980-1997 is conducted.

Dependent variable = IMR
Sample: 1980-1997
Observations: 18

TABLE 5.3
TIME SERIES – REGRESSION ANALYSIS 1982-1997

States	Constant	Coefficient X_1	Coefficient X_2	T statistic		R2	Adjusted R
				X_1	X_2		
AP	118.92	-0.027	-0.13	-2.48*	0.72	0.80	0.64
Bihar	195.30	-0.083	-0.37	-2.60*	-5.04*	0.69	0.65
Gujarat	136.77	-0.016	-0.23	-3.75*	-1.16	0.70	0.66
#Haryana	111.80	-0.00026	-0.52	-0.76	-2.48*	0.59	0.34
Karnataka	90.33	-0.013	0.14	-2**	0.66	0.56	0.31
Kerala	47.84	-0.058	-0.286	-1.35	-1.16	0.20	0.09
MP	213	-0.051	-0.45	-4.08*	-1.87**	0.79	0.76
#Maharashtra	100.08	-0.01	-0.024	-6.98*	-0.21	0.84	0.82
Orissa	191.7	-0.03	-0.60	-1.93**	-2.17*	0.60	0.55
Punjab	132.09	-0.017	-0.075	-8.05*	-0.85	0.88	0.86
Rajasthan	137.72	-0.105	-0.35	-1.09	-2.13*	0.64	0.60
Tamilnadu	101.9	-0.003	-0.36	-1.003	-4.33*	0.65	0.60
Uttar Pradesh	421.75	-0.197	1.197	-8.15*	-1.94**	0.90	0.89
West Bengal	861.28	-0.038	-0.06	-4.33*	-0.23	0.76	0.58

**5% Level of significance.*
***10% Level of significance.*

The time series regression analysis relates to 14 states. Infant mortality rate (IMR) is used as an indicator to represent health status whereas economic development is represented by NSDP (X_1) and the extent of health intervention is represented by per capita health expenditure (X_2) of state governments. Both NSDP and per capita health expenditure are taken on constant price (1981) as the base year. Time series regression is carried out for each individual state, hence 14 regression results have been obtained by Least Square Method.

V.4.1. RESULTS OF REGRESSION ANALYSIS

The regression analysis so conducted shows mixed results.

1. Invariably in most of the states under study the effect of per capita NSDP on infant mortality rate is negative and significant. However, there are some exceptions.

2. In Demographically superior states like Kerala, Tamilnadu economic growth measured by per capita NSDP did not exert any significant influence on infant mortality rate.

3. The effect of per capita health expenditure on infant mortality rate was negative implying a decline in per capita health expenditure would lead to a rise in infant Mortality Rate in most of the States. In Southern states like Karnataka, Kerala. The effect of per capita health expenditure on infant mortality rate was insignificant. Among fourteen states under study the impact of health care expenditure on infant mortality rate was significant in nearly seven states Bihar, Haryana, MP, Orissa, Rajasthan, Tamilnadu and UP.

4. In the states of Bihar, Orissa, MP both the explanatory variables i.e. per capita NSDP and per capita health care expenditure had a significant influence on the decline in infant mortality rates.

5. States in which only per capita NSDP had significant effect on infant mortality rate were Andhra Pradesh, Gujarat, Madhya Pradesh, Rajasthan, and Punjab.

6. States in which only per capita health care expenditure was a significant variable were Haryana, Tamilnadu and Rajasthan.

7. The values of Beta coefficient of X_1 and X_2 i.e. (per capita NSDP, per capita health care expenditure) indicate disparities in the degree of influence of these variables on infant mortality rate.

V.4.2 INFERENCES

1. The Regression Analysis indicates that importance of economic growth and health care expenditure cannot be undermined. Since it had jointly or individually exerted significant influence over all the states.

2. The importance of economic growth in influencing health outcomes is very pronounced in demographically weaker states like Madhya Pradesh, Rajasthan, Orissa and Bihar.

3. The regression coefficients of per capita NSDP viewed at individual state level indicate inter state disparities. For instance economically backward states like Bihar.

Keeping per capita health care expenditure constant an increase of per capita NSDP by Rs. 0.083 would bring a unit decline in infant mortality rate vis-à-vis Punjab where a mere unit increase of per capita NSDP by Rs. 0.017 would lead to a unit fall in IMR.

4. The interstate disparities are found in the extent of influence per capita health care expenditure has on infant mortality rate when per capita NSDP is kept constant.

For instance in Uttar Pradesh (Keeping per capita NSDP constant) an increase in per capita health expenditure by Rs. 0.626 is necessary to bring a unit decline in infant mortality rate.

5. In demographically weaker states like Bihar and Orissa, both the variables play crucial role in arresting infant mortality rate.

V.4.3 IMPLICATIONS

The role of economic growth and per capita health care expenditure is more crucial in demographically weaker and economically backward states in improving the health outcomes. In demographically superior states of Kerala, neither of the variables (Per Capita NSDP, Per Capita Health Expenditure) was significant showing that infant mortality rate was influenced by factors other than economic development. There are enough empirical studies, which confirm with the present regression results. Good health outcomes of Kerala are a by-product of a socioeconomic factors like female literacy, education and are independent of economic growth. K N. Raj (1995)[11] in his article has explained inter linkages between health, literacy and population in explaining the mortality transition of Kerala. The decline in birth rate in the 1950's and 1960's was much before expenditures on family planning were made and implemented. According to him health outcomes are strongly related by socioeconomic variable like low age of marriage, literacy rather than pure economic variables.

Panikar on the other hand, attributed health improvement in Kerala mainly to the development of public health measures. He argued that mortality rate has started falling much before the development of medical care system. The main factor behind the mortality decline were high priority given to female literacy and better utilization of health care services[12].

V.5 CONCLUSION

From the cross sectional regression analysis and time series regression analysis 3 distinct variables emerge, which have a significant bearing on the health outcome (IMR). These are:

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[11] Raj K.N (1995): "Literacy, Health and Population Control", *IASSI Quarterly*, vol. 15(3), pp. 66-71.

[12] Panikar PGK (1975): "Fall in Mortality in Kerala: An Explanatory Hypotheses", *Economic and Political Weekly*, vol. 10, No. 47.

1. Female literacy
2. Per Capita NSDP
3. Per Capita Health Expenditure

The extent of influence of these variables may differ across states. However, their importance cannot be undermined. The significance of these three variables confirm to the policy prescription of the World Bank made in WDR (1993) where, for developing countries enhancing female literacy, economic growth and improving utilization of health services was prescribed. Special focus should be laid on states, which are economically backward, and demographically weak states like Bihar, Madhya Pradesh, Uttar Pradesh, and Orissa by increasing allocation of per capita health expenditure and taking steps to enhance the level of economic development. Immense drive must be undertaken to enhance the level of education in general and among women in particular. The earlier empirical studies along with the present ones confirm the strong linkage of female literacy and health outcomes. Female literacy not only influences infant mortality rate but also has a significant bearing on other variables like fertility rate, birth rates, in their ability to reduce family size, reduce repeated pregnancies[13]. Literacy is a very strong variable in influencing health outcomes.

Lastly with the advent of structural Adjustment Programme cuts in health care expenditures are inevitable. Increased allocation in per capita health care expenditure is a wishful thinking. However, the harshness of budgetary cuts should be mitigated in states where health care expenditure exerts a significant influence on improving health outcomes. A benign neglect would only aggravate the health transition leaving weak states like Uttar Pradesh, Madhya Pradesh, Orissa and Bihar with poor health outcomes.

In other states special emphasis on improving the cost effectiveness and efficiency of utilization of health care expenditure should be placed.

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[13] Mamta Murthi, *op.cit.*, p. 361.

CHAPTER - VI

CONCLUSION

The study was conducted with an objective of integrating different health aspect of health sector falling within the framework of health policies prescribed by planners. The spirit behind this study was to review the progress of India's commitment of "Achieving Health for All" by 2000 AD. The study seeked to provide a spatio temporal analysis of health outcomes and health expenditures in Indian states to etch a demographic-health profile of Indian states on the canvas of mortality, morbidity, measured and state health expenditure data across twenty five years (1975-99).

The scenario of health outcomes and health status depicted persistence of interstate variations. The interstate difference was observed in mortality measures, morbidity pattern, health care expenditure, and determinants of health status. The inferences drawn have been underlined in the course of the study. Presented below us are some important conclusions.

A review of health sector planning indicates the inability of the planners to fulfill the commitment of providing "Health for All by 2000 AD". The vision enshrined in the Bhore Committee Report of providing universal access of primary health care to the masses seems to be lost in wake of liberalization and decisive shift in health policy which echoes the prescription of external funding agencies, donors rather than the guidelines envisaged by the policy makers during eve of independence.

An analysis of health status outlined in chapter three provides a macro level picture of pattern of morbidity and mortality, It can, conclusively be said that India has made rapid status in improvement of health outcomes. The

decline in death rate, birth rate and infant mortality rate across the period of time is discernable. The steep decline in crude death rate is attributed to technological advances in medical and public health. The other indicators of health have substantially improved over time. However, significant disparities persist in mortality measures, which has resulted in a demographic divide with demographically weaker states like Uttar Pradesh, Orissa, Bihar, Madhya Pradesh on one hand and Kerala, Karnataka, Tamilnadu, Maharashtra on the other. The demographically states are marked with high death rate, birth rate, infant mortality rate and fertility rate. These states (Uttar Pradesh, Orissa, Bihar, MP) are characterized by low level of socioeconomic development and high concentration of population. On the other hand, a large number of states that had poor health outcomes have relatively improved and reduced mortality levels to moderate rates by 1999. An analysis of data indicates that interstate disparities have widened across the period of time for most of the health indicators. This is because the pace of mortality transition is not uniform across states. On one hand, Kerala has achieved better health outcomes. Its mortality transition is comparable to most of the developed countries. On the other hand, Uttar Pradesh, Orissa, Bihar have lagged behind with mortality rates comparable to countries with poor health outcomes. Such a contrast in health outcomes only aggravates interstate disparities. This is a disquieting feature, which calls for attention especially in recent decade in which most of mortality measures recorded stagnation, or a dismally low decline rate. Since mid nineties the decline in mortality rates have slowed down for all the states.

As analyzed in the third chapter the disease pattern has not materially changed. Water borne disease like Dysentery, Diarrhea, Gastroenteritis and acute respiratory infection constitute a large segment of disease composition. The decline in incidence of cholera, poliomyelitis, diphtheria, whooping cough

over the time period for most of the states is heartening. It reflects the efficacy of health intervention carried by central and state governments. Unfortunately due to conceptual problems indicated in the chapter, about definition of morbidity. No conclusive evidence could be made about linkages between mortality measures and morbidity pattern. Paradoxically, states like Kerala, Karnataka characterized by improved mortality rates have recorded the highest disease prevalence rates. This should not be construed to imply high morbidity pattern in these states. A high disease prevalence rate can be attributed to a host of factor like efficiency in reporting, effective compilation of disease incidences, higher literacy levels, high level of socioeconomic development. All these factors play a crucial role in creation of health awareness. Consequently, individuals are sensitized about the importance of incidences of disease and take necessary precaution.

In contrast, the backward regions equipped with poor health facilities/health infrastructure and poverty relegate illness to the background. This explains the reason for consequently high morbidity rate in the developed states and low morbidity rates in the underdeveloped states. In reality the linkages between morbidity and mortality cannot be ruled out. The decline in death rates, infant mortality rate have been only possible due to arrest of communicable diseases, hence lower morbidity in practice translate into lower mortality rates.

Further, the analysis of health care expenditure in the IV chapter also confirms to the health expenditure differentials that persist not only in states but also in among various components of health care expenditure, expenditure on water supply nutrition, medical public health and family welfare. Medical, Public Health and Family Welfare Expenditure were the major component of

health care expenditure. Glaring disparities were observed with states like Punjab, Kerala, Haryana ranked high in terms of health care expenditure on one hand and Uttar Pradesh, Madhya Pradesh, Bihar spending dismally low on health care expenditure, on the other.

The growth rates of health expenditure was at its lowest ebb during the period (1990-95) confirming an adverse impact of Structural Adjustment Programme on the health care expenditures. However, the growth rates firmed up in the later half. The demographically poor states of UP, Bihar, MP, and Rajasthan have shown a dismally low per capita expenditure on nutrition and medical public health and sanitation.

It is unfortunate that the health planning has not been target oriented. It has failed to make a dent on the most populous and economically backward states. Low expenditure on health care only reflects the lack of commitment on part of the government towards upliftment of the health status, and their inability of breaking the trap of high mortality rates and poor health outcomes. Low levels of socioeconomic development, illiteracy, poor infrastructure further degenerates the health status. The low health care expenditure in demographically weaker states made it necessary to investigate into the linkages between health care expenditure and health outcomes. It was necessary to find out whether high health care expenditures translate into better health outcomes and whether economic development was a precondition to health transition or whether the latter had to be viewed beyond the realm of economic development. The regression analysis in chapter four presented a holistic picture about the determinants of health status. The proxy for health status was Infant Mortality Rate, which was strongly influenced by female literacy rate. The time series regression for individual states with economic

development (NSDP) health care expenditure as explanatory varies showed mixed results. The influence of NSDP on IMR was evident in most of the states while health care expenditure in few states.

From the three regressions undertaken in chapter V, three strong variables emerged were Female literacy, economic development, and health care expenditure. All the three variables have significant impact on the infant mortality rate. However, they varied in their degree of influence across states.

Strong thrust should be placed on accelerating economic development, particularly of demographically weaker states. The crucial role of female literacy calls for initiatives, which increases the status of women. Hence increased investments in schooling for girls, women empowerment, upliftment of them, economic status would be steps in the right directions.

The observation and suggestions cited above are in conformity with to the recommendations of the World Bank in *World Development Report* on Investing in Health (1993). Hence the recommendation of improving health status through higher economic growth, increased investments in improving educational levels of women should be unequivocally accepted. But the recommendations of gradual withdrawal of public sector and increase role of private sector in provision of curative services needs to be reconsidered in light of poor health outcomes, and relatively lower proportion of public sector health expenditure (1.3% of G.D.P.). The unquestioned shift to privatization in health care need to be introspected given relatively lower contribution of public sector expenditure. Any further downsizing of public sector health expenditure will only weaken the health status further accentuating the health divide between the states.

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APPENDIX

GLOSSARY

ARI	:	Acute Respiratory Diseases.
CBR	:	Crude Birth Rate
CDR	:	Crude Death Rate
CH.	:	Cholera
CP.	:	Chickenpox
DIA.	:	Diarrheal Diseases
DIP.	:	Diphtheria
DPR	:	Disease Prevalence Rate
DYS.	:	Dysentery
EF.	:	Enteric Fever
GDP	:	Gross Domestic Product
GE.	:	Gastroenteritis
GI	:	Gonnococal Infection
IMR	:	Infant Mortality Rate
INF.	:	Influenza
LEB	:	Life Expectancy at Birth
ME.	:	Measles
PMB	:	Proportional Morbidity
PNEM.	:	Pneumonia
POLIO.	:	Poliomyelitis
TB.	:	Tuberculosis
TET.	:	Tetanus
TFR	:	Total Fertility Rate
VE.	:	Viral Enteritis
VH.	:	Viral Hepatitis
WC.	:	Whooping Cough

APPENDIX: III.5.3

COMPOSITION OF COMMUNICABLE DISEASES 1975 (Percentage)

STATES	DIP.	DYS.	EF.	CP.	POLIO.	WC.	GE.	INF.	ME.	TB.	CH.	TOTAL
AP	4.31	53.10	1.76	0.88	0.16	2.81	6.81	17.65	0.59	11.86	0.96	100
BIHAR											0.00	
GUJRAT	0.84	49.50	2.32	3.33	0.06	3.34	7.90	21.75	1.69	7.72	1.55	100
HARYANA	0.02	33.69	1.09	0.22	0.03	1.30	59.33	1.13	0.14	3.06	0.00	100
KARNATAKA	0.54	59.88	3.50	0.25	0.12	0.00	16.85	2.66	3.14	13.00	0.06	100
KERALA	0.04	70.30	14.77	4.62	0.02	3.64	0.74	0.00	3.46	2.40	0.01	100
MADHYAPRADESH	0.35	67.58	7.38	0.57	0.09	4.28	0.33	10.80	0.74	7.56	0.32	100
MAHARASHTRA	1.41	34.02	3.39	0.14	0.97	2.03	12.55	23.05	0.56	20.11	1.77	100
ORISSA	0.02	56.41	2.09	1.07	0.03	2.02	13.42	23.76	0.56	0.58	0.03	100
PUNJAB	0.18	61.50	3.63	0.14	0.65	8.32	18.07	0.63	1.79	5.09	0.00	
RAJASTHAN	0.29	71.44	3.56	1.24	0.38	3.41	6.26	0.47	1.39	11.54	0.02	100
TAMIL NADU	0.18	38.15	1.06	0.12	0.04	25.11	16.60	11.73	0.03	6.33	0.65	100
UP											0.00	
WEST BENGAL												
TOTAL	**0.90**	**56.02**	**4.22**	**1.22**	**0.10**	**3.72**	**14.08**	**12.37**	**1.17**	**6.04**	**0.32**	**100**

APPENDIX: III.5.3

COMPOSITION OF COMMUNICABLE DISEASES 1985 (Percentage)

STATES	DIP.	WC.	TET.	ME.	POLIO.	TB.	EF.	CP.	VH.	INF.	VE.	GI.	CH.	DYS.	GE.	TOTAL
AP	0.04	1.45	0.15	0.75	0.07	13.90	0.82	0.06	0.71	9.82	0.04	4.44	0.01	61.70	6.01	100.00
BIHAR	0.11	1.93	1.17	0.88	0.28	5.19	5.72	0.15	4.38	11.79	0.76	0.22	0.00	53.70	13.72	100.00
GUJRAT	0.45	1.57	0.30	1.62	0.28	9.18	2.00	0.18	2.56	21.16	0.06	0.16	0.00	48.24	12.23	100.00
HARYANA	0.01	0.88	0.62	0.27	0.09	8.81	0.80	0.14	0.42	0.34	0.03	0.54	0.00	86.80	0.23	100.00
KARNATAKA	0.16	0.69	0.25	0.98	0.16	1.04	1.98	0.12	0.82	36.64	0.35	0.84	0.06	46.34	9.57	100.00
KERALA	0.04	0.69	0.01	1.68	0.01	3.96	0.40	0.39	0.46	38.02	0.02	0.19	0.00	52.36	1.77	100.00
MADHYAPRADESH	0.21	2.55	0.50	0.37	0.14	6.38	3.26	0.07	0.96	8.16	0.20	0.33	0.00	75.29	1.57	100.00
MAHARASHTRA	0.10	2.11	0.35	2.83	0.17	12.44	2.23	0.07	2.44	70.99	0.18	0.98	0.15		4.94	100.00
ORISSA	0.03	0.42	0.14	0.54	0.06	1.05	1.03	0.28	1.17	24.74	0.14	0.18	0.00	68.56	1.68	100.00
PUNJAB	0.10	0.82	1.53	0.69	0.52	7.43	7.43	0.16	1.06	1.83	0.32	0.11	0.00	8.79	69.22	100.00
RAJASTHAN	0.19	1.27	0.31	1.72	0.83	20.71	20.71	0.22	1.61	1.05	0.21	1.19	0.01	44.60	5.38	100.00
TN	0.04	0.39	0.39	0.49	0.31	7.57	7.57	0.12	0.92	15.69	0.26	0.84	0.34	44.25	20.81	100.00
UP	0.13	1.04	1.04	0.53	0.59	4.00	2.93	0.22	0.22	7.38	0.23	0.15	0.03	79.27	2.23	100.00
WEST BENGAL	0.00															
TOTAL	0.11	1.22	0.33	1.04	0.17	6.37	2.62	0.18	1.06	24.75	0.16	0.82	0.03	55.09	6.05	100.00

APPENDIX: III.5.3

COMPOSITION OF COMMUNICABLE DISEASES 1995 (Percentage)

STATES	DIP.	POLIO.	W.C.	ME.	ARI.	PNEM.	EF.	DIAH.	VH.	GI.	TB.	CH.	TOTAL
AP	0.02	0.00	0.12	0.04	43.18	0.53	11.11	37.95	0.85	1.40	4.79	0.01	100
BIHAR													100
GUJRAT	0.02	0.02	0.01	0.29	59.93	0.49	0.49	35.37	0.62	0.06	2.69	0.01	100
HARYANA	0.00	0.01	0.01	0.01	58.47	0.59	0.09	35.84	0.13	0.36	4.49	0.01	100
KARNATAKA	0.02	0.00	0.08	0.11	61.38	0.94	0.96	32.31	0.15	0.41	3.64	0.00	100
KERALA	0.00	0.00	0.03	0.17	80.83	0.48	0.20	17.03	0.22	0.02	1.01	0.00	100
MADHYAPRADESH	0.01	0.01	0.62	0.15	43.36	2.27	3.82	44.70	0.80	0.26	3.98	0.00	100
MAHARASHTRA	0.01	0.01	0.01	0.46	34.48	1.32	1.19	54.11	0.45	0.08	7.85	0.03	100
ORISSA	0.00	0.01	0.16	0.11	55.59	1.15	1.76	38.87	0.73	0.11	1.49	0.00	100
PUNJAB	0.00	0.01	0.00	0.01	58.67	0.79	0.69	34.67	0.49	0.02	4.64	0.01	100
RAJASTHAN	0.02	0.01	0.14	0.34	55.04	7.63	1.19	31.15	0.50	0.08	3.90	0.00	100
TN	0.00	0.03	0.00	0.67	38.67	7.78	5.57	37.38	0.16	0.47	9.16	0.11	100
UP	0.00	0.02	0.01	0.05	35.67	2.77	2.04	50.57	0.01	0.06	8.78	0.00	100
WB	0.45	0.21	0.07	1.37	13.42	0.94	3.64	61.46	0.69	0.00	17.75	0.00	100
TOTAL	0.02	0.01	0.10	0.16	51.26	1.66	3.16	37.88	0.41	0.36	4.96	0.01	100

APPENDIX: III.5.3

COMMUNICABLE DISEASES (PER LAC CASES) 1975

STATES	DIP.	DYS.	EF.	CP.	POLIO.	WC.	GE.	INF.	ME.	TB.	CH.	TOTAL
AP	107.69	1325.85	43.89	21.89	3.89	70.09	169.99	440.62	14.77	296.12	24.07	2518.87
BIHAR											1.22	
GUJRAT	3.83	225.12	10.53	15.16	0.25	15.21	35.91	98.90	7.71	35.09	7.07	454.79
HARYANA	0.99	2082.63	67.36	13.29	1.91	80.15	3667.35	70.01	8.53	188.96	0.10	6181.28
KARNATAKA	10.93	1215.42	71.08	5.05	2.48		342.08	53.96	63.80	263.80	1.15	2029.75
KERALA	1.59	2486.31	522.38	163.42	0.62	128.60	26.08		122.21	84.90	0.51	3536.61
MADHYA PRADESH	6.02	1168.88	127.68	9.84	1.63	74.04	5.66	186.77	12.84	130.70	5.57	1729.61
MAHARASHTRA	1.98	47.64	4.75	0.19	1.36	2.85	17.58	32.29	0.79	28.17	2.47	140.07
ORISSA	1.28	4367.66	162.09	83.09	2.08	156.65	1039.38	1840.06	43.33	44.93	2.49	7743.03
PUNJAB	1.11	383.81	22.67	0.86	4.08	51.89	112.74	3.95	11.17	31.79		624.06
RAJASTHAN	2.21	538.67	26.82	9.35	2.90	25.69	47.22	3.56	10.48	86.99	0.15	754.04
TAMIL NADU	1.47	310.98	8.62	1.00	0.31	204.73	135.31	95.62	0.25	51.58	5.32	815.19
UP	NA											
WEST BENGAL	NA											
TOTAL	139.11	14152.98	1067.87	323.13	21.50	809.89	5599.29	2825.73	295.88	1243.03	50.12	26528.52

APPENDIX: III.5.3

COMMUNICABLE DISEASES (PER LAC CASES) 1985

STATES	DIP.	WC.	TET.	ME.	POLIO.	TB.	EF.	CP.	VH.	INF.	VE.	GI.	CH.	DYS.	GE.	TOTAL
AP	0.64	23.05	2.44	11.87	1.12	220.39	12.99	0.97	11.20	155.76	0.68	70.42	0.22	978.22	95.34	1585.33
BIHAR	0.06	1.08	0.65	0.49	0.16	2.89	3.19	0.08	2.44	6.57	0.43	0.12	0.00	29.91	7.64	55.69
GUJRAT	4.39	15.43	2.95	15.89	2.72	89.99	19.63	1.72	25.13	207.42	0.63	1.62	0.00	472.74	119.82	980.07
HARYANA	0.18	21.25	14.95	6.53	2.17	211.68	19.24	3.47	10.16	8.15	0.82	13.05	0.00	2085.17	5.47	2402.30
KARNATAKA	4.19	17.76	6.44	25.35	4.19	26.97	51.10	3.18	21.14	947.51	8.96	21.75	1.61	1198.24	247.34	2585.72
KERALA	2.05	36.44	0.64	89.51	0.44	210.30	21.38	20.77	24.28	2020.59	1.07	9.96	0.00	2782.79	94.22	5314.43
MADHYAPRADESH	5.58	67.77	13.16	9.69	3.70	169.42	86.50	1.80	25.55	216.60	5.31	8.89	0.01	1997.71	41.73	2653.42
MAHARASHTRA	1.28	27.16	4.50	36.34	2.13	159.82	28.69	0.96	31.39	911.87	2.35	12.56	1.98		63.51	1284.54
ORISSA	1.66	25.33	8.34	32.52	3.44	61.68	61.68	17.07	70.02	1482.87	8.17	10.78	0.00	4110.01	100.95	5994.51
PUNJAB	1.28	10.89	20.47	9.23	6.96	99.27	99.27	2.08	14.13	24.49	4.21	1.47	0.03	117.45	924.61	1335.84
RAJASTHAN	1.59	10.64	2.56	14.39	6.93	172.76	172.76	1.82	13.40	8.74	1.77	9.90	0.05	372.07	44.87	834.25
TN	0.18	1.90	1.90	2.39	1.52	36.76	36.76	0.58	4.46	76.20	1.25	4.07	1.67	214.91	101.08	485.64
UP	0.48	3.83	3.83	1.96	2.18	14.66	10.76	0.79	0.79	27.09	0.86	0.54	0.09	290.77	8.18	366.82
WEST BENGAL															0.00	
TOTAL	23.57	262.52	82.83	256.16	37.66	1476.60	623.96	55.29	254.08	6093.84	36.51	165.12	5.65	14649.99	1854.76	25878.56

APPENDIX: III.5.3

PER LAC CASES OF COMMUNICABLE DISEASES 1995

STATES	PERLAC CASES OF DIPTHERIA	POLIOMYLITES PER LAC CASES	WC	PER LAC CASESMEASLES	PER LAC CASESOF ARI	PER LAC CASESPNUEMONIA	PLAC CASES OF EF	PERLAC CASESOFVH	PER LACGI	PERLACCHOLERA	PER LAC TB	PER LAC CASES OF DIAH	TOTAL
AP	1.05	0.14	5.25	1.78	1923.98	23.48	494.95	37.87	62.31	0.26	213.50	1690.97	4455.54
BIHAR	0.00	0.00	0.00	0.00	0.00	21.74	0.00	0.00	0.00	0.00	0.00	0.00	
GUJRAT	0.23	0.20	0.11	3.52	724.03	5.87	5.91	7.53	0.74	0.13	32.44	427.36	1208.08
HARYANA	0.01	0.30	0.51	0.76	3305.23	33.38	5.07	7.60	20.14	0.32	253.59	2025.89	5652.81
KARNATAKA	1.03	0.17	3.13	4.53	2554.56	39.15	39.79	6.11	16.98	0.00	151.57	1344.60	4161.62
KERALA	0.08	0.01	2.78	15.56	7572.37	45.01	18.96	20.57	2.31	0.02	94.28	1595.79	9367.75
MADHYAPRADESH	0.26	0.18	11.06	2.72	771.99	40.50	68.04	14.22	4.63	0.07	70.83	795.85	1780.34
MAHARASHTRA	0.09	0.10	0.06	4.81	360.60	13.84	12.40	4.66	0.88	0.32	82.13	565.90	1045.79
ORISSA	0.13	0.41	7.01	5.01	2448.64	50.79	77.53	32.13	4.96	0.20	65.51	1712.25	4404.59
PUNJAB	0.02	0.19	0.00	0.19	987.88	13.26	11.60	8.23	0.30	0.19	78.07	583.77	1683.71
RAJASTHAN	0.27	0.12	1.58	3.69	602.72	83.57	13.00	5.45	0.87	0.00	42.70	341.17	1095.15
TN	0.00	0.15	0.01	4.00	231.91	46.64	33.42	0.94	2.84	0.67	54.93	224.16	599.68
UP	0.07	0.53	0.25	1.23	822.74	63.97	46.99	0.33	1.41	0.00	202.45	1166.27	2306.26
WEST BENGAL	3.01	1.44	0.48	9.26	90.66	6.38	24.56	4.63	0.00	0.00	119.93	415.19	675.55
TOTAL	6.26	3.96	32.25	57.06	22397.33	487.59	852.22	150.29	118.34	2.18	1461.95	12889.19	38436.00