

## CHAPTER 4

### HEALTH STATUS IN INDIA

#### 4.1 Introduction

Rivera and Luis Currais (2003) believe that “The health status of the population depends on accumulative variables, such as human behaviour, and environmental and economic factors, such as expenditure on the health system. Measuring the health status of a population poses weighty problems, since an extensive comparative health status index across countries does not exist. A factor which might condition the differences that exist between the results is the variables which have been used to measure health levels”.

Health care plays a significant role in the well-being of the people. The United Nations Millennium Development summit has set eight goals among which two are directly related to health, i.e., to reduce child mortality and improve maternal health. Also, its other goals affect health indirectly (i.e., eradication of extreme poverty and hunger, universal primary education, promotion gender equality and empowerment of women). Obviously, health has a positive effect on these goals indirectly for achieving a better quality of life.

According to United Nations Development Programme’s (UNDP) Health Development Index, 2013 India ranked 136<sup>th</sup> with medium level of development. It has ranked 136<sup>th</sup> in immunization coverage, IMR and UFMR. Also, the public spending on health as a percentage of GDP was only 1.2 in 2010. Table 4.1 shows the changes in health indicators over time in India.

**Table 4.1 Changes in Health Indicators in India, 1992/93-2010/11**

Period	IMR	TFR	Full Immunization	UFMR
1992-93	62.4*	3.13*	40.72*	85.42*
1998-99	58.3	2.76	48.87	78.40
2005-06	47.3*	2.56*	50.58*	60.57*
2010-11	36.2*	2.57*	56.20*	48.67*

*Source:* Based on author’s calculation, \*significant at 5 per cent confidence interval.

In early 1990s, the health indicators were significantly related with time. As seen in Table 4.1, all health indicators are statistically significant at 5 per cent confidence interval with time in 1992-93. In 1998-99, none of the indicators shows significance with time. However, since 2005-06, the health status has considerably improved. Before 2005-06, IMR was 67.6 per thousand live births, TFR was 2.85, and UFR was 95 in India.

However, due to such a condition of the health sector in India, the Central Government initiated many reforms and one of them was the launching of National Rural Health Mission (NRHM) with the objective to provide affordable, accessible and equitable health services to rural India. The funding of health care via the Mission has increased much since then. NRHM also mandates improvements in health infrastructure, human resources for health and availability of drugs. Another important initiative was the introduction of Rashtriya Swasthya Bima Yojana by Union Labour Ministry in 2007. It was an attempt to provide protection against high out of pocket expenditure. Apart from these initiatives within the health sector, there have been improvements in terms of economic growth, literacy rates, poverty and inequality, and other socio-economic factors over time.

#### **4.2 Infant Mortality Rate (IMR)**

IMR is the number of live births out of every 1000 that die during the first year. This is not unrelated to life expectancy at birth, but it focuses on something quite different: nutrition and hygiene at the earliest stage of life. It is also related to the health of mother and to the duration of lactation. Among poor families in poor countries, it is related to the mothers' education as well (Dasgupta 1993).

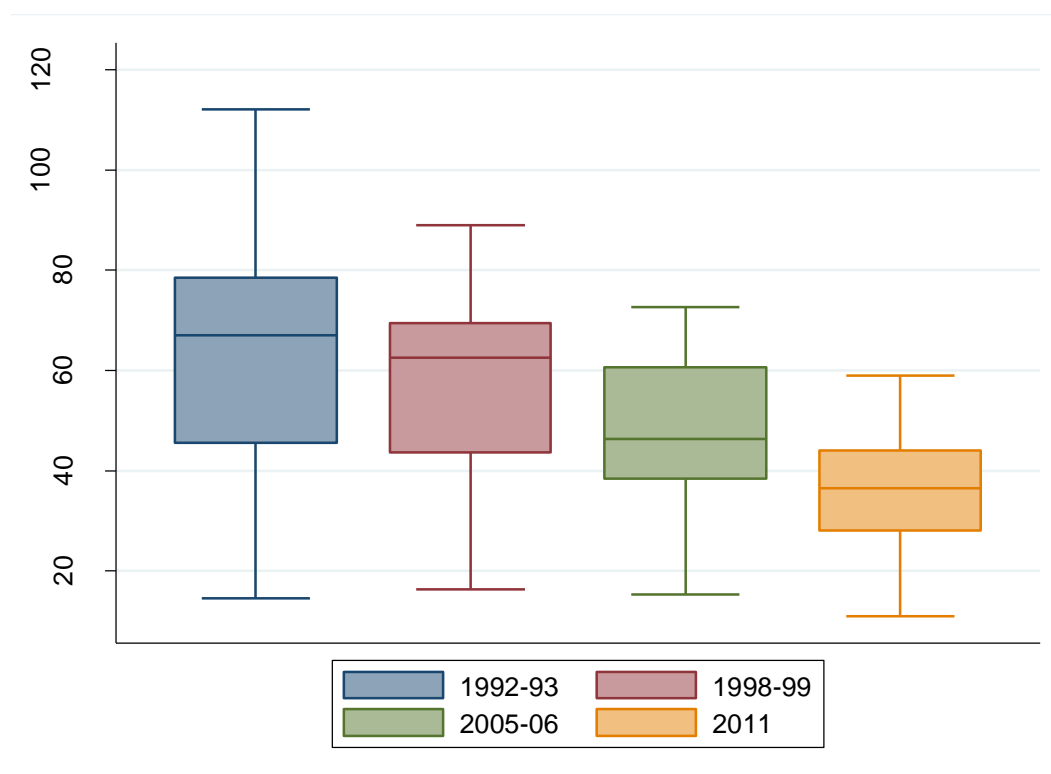
There are inter-state variations in terms of health status in India. Table 4.2 shows the IMR of different states in four periods. In 2011, the average rate fell by 44 per thousand from 78.5 per thousand live births since 1992-93. However, Madhya Pradesh, Uttar Pradesh, Orissa and Assam have IMRs above the national average consistently in all the four periods. In addition to this, the difference in IMR in 2011 between advanced states (Goa, Manipur and Kerala) and backward states (Madhya Pradesh, Uttar Pradesh and Orissa) was around six fold. Moreover, the rate of decline in the advanced states is much faster and smoother than the backward states.

<b>Table 4.2 Infant Mortality Rate in India and its States</b>				
India/States	1992-93*	1998-99*	2005-06*	2011**
Delhi	65.4	46.8	39.8	28
Haryana	73.3	56.8	41.7	44
Himachal Pradesh	55.8	34.4	36.1	38
Jammu & Kashmir	45.4	65.0	44.7	41
Punjab	53.7	57.1	41.7	30
Rajasthan	72.6	80.4	65.3	52
Madhya Pradesh	85.2	86.1	69.5	59
Uttar Pradesh	99.9	86.7	72.7	57
Bihar	89.2	72.9	61.7	44
Orissa	112.1	81.0	64.7	57
West Bengal	75.3	48.7	48.0	32
Arunachal Pradesh	40.0	63.1	60.7	32
Assam	88.8	69.5	66.1	55
Manipur	42.4	37.0	29.7	11
Meghalaya	64.2	89.0	44.6	52
Mizoram	14.6	37.0	34.1	34
Nagaland	17.2	42.1	38.3	21
Tripura	75.8	Na	51.5	29
Goa	31.9	36.7	15.3	11
Gujarat	68.7	62.6	49.7	41
Maharashtra	50.5	43.7	37.5	25
Andhra Pradesh	70.4	65.8	53.5	43
Karnataka	65.4	51.5	43.2	35
Kerala	23.8	16.3	15.3	12
Tamil Nadu	67.7	48.2	30.4	22
India	78.5	67.6	57	44

Source: \*National Family Health Survey (NFHS), India; \*\* Sample Registration System (SRS).

Graph 4.1 shows the box plots of IMR in different periods. It is observed that in 1992-93, the median line is above the middle of the box from the origin. This implies that the distribution is negatively skewed. However, over the period of time, the median has fallen and located in the middle of the box which signifies the normal distribution. Also, in 2011, the box size is relatively thin. This would mean that most of the states lie within this small segment and near the national average. In addition to this, the maximum value of quartile has fallen continuously over time. As seen in Table 2, in 1992-93 Orissa had the highest IMR at 112.1 per thousand live births, while in 2011 the highest IMR had fallen to 59 in Madhya Pradesh. Similarly, the minimum value declined from 14.6 in 1992-93 to 11 in 2011.

**Graph 4.1 Box Plots of IMR in Four Periods**



The median has fallen from around 66 in 1992-93 to around 37 in 2011. This means that in 1992-93, 50 per cent the states had IMR between 66 and 112 and rest of the states had it between 15 and 66. In 2011, half of the states had IMR between 37 and 59 and in other half of the states it ranged between 11 and 37. It indicates that over a period of time, the health status in terms of IMR has improved a lot.

### **4.3 Total Fertility Rate (TFR)**

Table 4.3 represents the state-wise TFR in four time periods. India's average rate had fallen from 3.39 in 1992-93 to 2.66 in 2011. The states of Rajasthan and Uttar Pradesh had higher TFR than India's average rates in the four periods. Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Arunachal Pradesh, Assam, Mizoram and Nagaland had consistently higher TFR than the national average in 2011.

India/States	1992-93*	1998-99*	2005-06*	2011**
Delhi	3.02	2.40	2.13	2.21
Haryana	3.99	2.88	2.69	2.66
Himachal Pradesh	2.97	2.14	1.94	1.99
Jammu & Kashmir	2.13	2.71	2.38	na
Punjab	2.92	2.21	1.99	2.05
Rajasthan	3.63	3.78	3.21	3.42
Madhya Pradesh	3.27	3.43	3.12	3.17
Uttar Pradesh	3.58	4.06	3.82	3.59
Bihar	3.25	3.70	4.00	4.24
Orissa	2.92	2.46	2.37	2.36
West Bengal	2.92	2.29	2.27	2.02
Arunachal Pradesh	4.25	2.52!	3.03	3.29
Assam	3.53	2.31	2.42	2.89
Manipur	2.76	3.04	2.83	2.48
Meghalaya	3.73	4.57	3.80	4.34
Mizoram	2.30	2.89	2.86	2.90
Nagaland	3.26	3.77	3.74	2.82
Tripura	2.67	1.87	2.22	2.21
Goa	1.90	1.77	1.79	1.54
Gujarat	2.99	2.72	2.42	2.38
Maharashtra	2.86	2.52	2.11	2.16
Andhra Pradesh	2.59	2.25	1.79	1.79
Karnataka	2.85	2.13	2.07	2.04
Kerala	2.00	1.96	1.93	1.58
Tamil Nadu	2.48	2.19	1.80	1.62
India	3.39	2.85	2.68	2.66

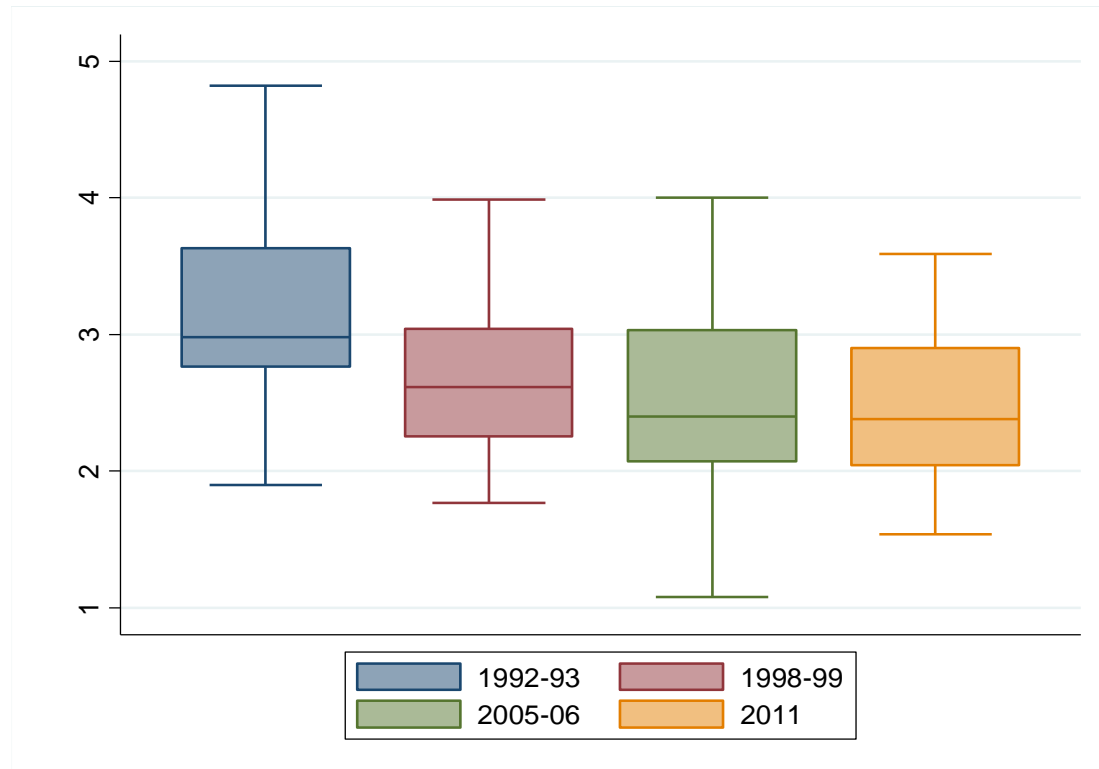
Source: \*National Family Health Survey (NFHS) India; \*\*Census of India.

Further, the highest TFR was in Uttar Pradesh (4.82) in 1992-93 which has decreased to 3.59 in 2011 and is still high. TFR in Meghalaya (4.34) and Bihar (4.24) was more than 4 in 2011. In Goa TFR was under 2 and was the lowest in all the four periods, and in 2011 it was the lowest (1.54) among the states. In Kerala, Tamil Nadu and Andhra Pradesh it was less than 2 in 2011.

As seen in Graph 4.2, in 1992-93, the median lies more towards the x-axis in the box. This means that the distribution is positively skewed and half of the states had TFR that ranged between 3 and 4.8. The median fell to around 2.3 and the data are relatively less skewed in 2011. This means that half of the states had TFR between 2.3 and 3.6. This indicates that over a period of time, the TFR has reduced but not much. Besides, state-

wise pattern of the TFR is not uniform. TFR in Meghalaya, Bihar, Uttar Pradesh, Rajasthan, Arunachal Pradesh, Madhya Pradesh and Assam is still high.

**Graph 4.2 Box Plots of Total Fertility Rate in Four Periods**



#### 4.4 Under Five Mortality Rate (UFMR)

Table 4.4 shows state-wise distribution of UFMR in four periods. In 1992-93, the national average was 109.3 and it declined to half at 55 in 2011. Also, the range in 1992-93 was 112.5 which reduced to 65 in 2011.

The states of Assam, Bihar, Madhya Pradesh, Orissa, Uttar Pradesh and Rajasthan had consistently higher UFMR than India's average in three or four time periods. This implies that these states did not do well and the health status was very weak. This may also infer that the issues of low literacy, especially female literacy rate, poverty, malnutrition, insufficiency of health services in private and public sectors or poor health system, income inequality and other socio-economic factors are more prevalent in these states due to which people do not enjoy healthy life.

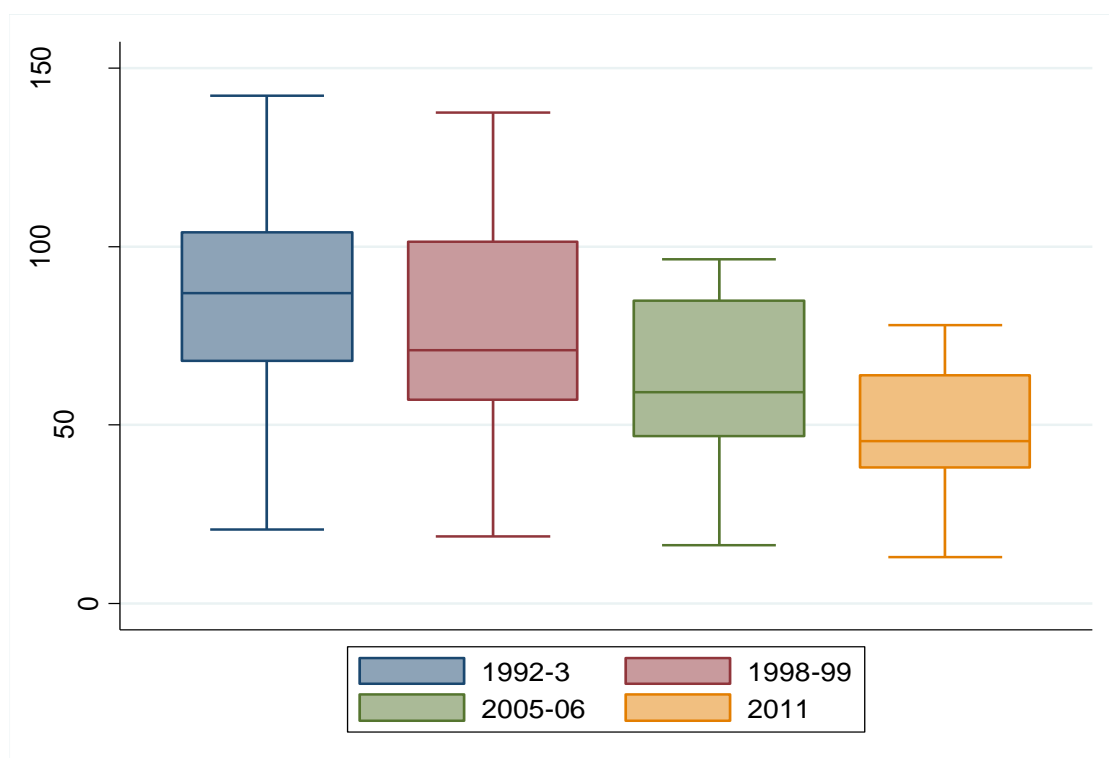
India/States	1992-93*	1998-99*	2005-06*	2011**
Delhi	83.1	55.4	46.7	32
Haryana	98.7	67.8	52.3	51
Himachal Pradesh	69.1	42.4	41.5	46
J & K	59.0	80.1	51.2	45
Punjab	68.0	72.1	52.0	38
Rajasthan	102.6	114.9	85.4	64
Madhya Pradesh	130.3	137.6	94.2	77
Uttar Pradesh	141.3	122.5	96.4	73
Bihar	127.5	105.1	84.8	59
Orissa	131.0	104.4	90.6	72
West Bengal	99.3	67.6	59.6	38
Arunachal Pradesh	72.0	98.1	87.7	na
Assam	142.2	89.5	85.0	78
Manipur	61.7	56.1	41.9	na
Meghalaya	86.9	122	70.5	na
Mizoram	29.3	54.7	52.9	na
Nagaland	20.7	63.8	64.7	na
Tripura	104.6	na	59.2	na
Goa	38.9	46.8	20.3	na
Gujarat	104.0	85.1	60.9	52
Maharashtra	70.3	58.1	46.7	28
Andhra Pradesh	91.2	85.5	63.2	45
Karnataka	87.3	69.8	54.7	40
Kerala	32.0	18.8	16.3	13
Tamil Nadu	86.05	63.3	35.5	25
India	109.3	94.9	74.3	55

Source: \*National Family Health Survey (NFHS), India; \*\* Sample Registration System.

Further, as shown in Graph 4.3, the median has declined continuously over a period of time. In 2010-11 it lay more towards the x-axis. It fell from around 90 in 1992-93 to around 45 in 2010.

However, the data are not uniform over time. This indicates that there are differences in the range of mortality rates in various states. This could be due to some factors that are mentioned above which led to this non-uniformity.

**Graph 4.3 Box Plots of Under Five Mortality Rate in Four Periods**



#### **4.5 Immunization**

Roughly 3 million children die each year due to vaccine preventable diseases (VPDs) with a disproportionate number of these children residing in developing countries (Kane and Lasher 2002). Vaccination coverage in India is also far from complete, despite the long-standing commitment to universal coverage. While gains in coverage proved to be rapid throughout the 1980s, taking off from a below 20 per cent coverage to about 60 per cent coverage for some VPDs, subsequent gains have been limited (WHO 2004, Review of National Immunization Coverage 1980-2003). The Government of India had launched the Expanded Programme on Immunization in 1978 to protect children against diphtheria, pertussis, tetanus and typhoid. The Universal Immunization Program (UIP) was launched to protect all infants (0-12 months) against six serious but preventable diseases, namely, tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis and measles. The objective of the programme was to fully vaccinate at least 85 per cent of all infants of the age of one year.

Table 4.5 demonstrates the state-wise variations in full immunization in four time periods in India. The national average of full immunization has increased over a period of



time. In 1992-93, Goa had the highest percentage of full immunization (74.9) and Meghalaya the least (9.7 per cent). In 2009, the value ranged from 78.9 per cent in Kerala to 24 per cent in Rajasthan.

States	1992-93			1998-99			2005-06			2009
	Full	Partial	No	Full	Partial	No	Full	Partial	No	Full
Delhi	57.8	35.5	6.7	69.8	25.1	5.1	63.2	27.7	9.1	50.7
Haryana	53.5	29	17.5	62.7	27.4	9.9	65.3	26.9	7.8	42.7
Himachal Pradesh	62.9	28.4	8.7	83.4	13.8	2.8	74.2	23.9	1.9	60.3
Jammu & Kashmir	65.7	18.1	16.2	56.7	32.9	10.4	66.7	28.8	4.5	60
Punjab	61.9	20.6	17.5	72.1	19.2	8.7	60.1	33.3	6.6	53.2
Rajasthan	21.1	30.4	48.5	17.3	60.2	22.5	26.5	68	5.5	24
Madhya Pradesh	29.2	36.4	34.4	22.4	63.7	13.9	40.3	54.7	5	45.8
Uttar Pradesh	19.8	36.9	43.3	21.2	49.3	29.5	23	74.3	2.7	35.9
Bihar	10.7	35.8	53.5	11	72.2	16.8	32.8	60.2	7	43.1
Orissa	36.1	35.9	28	43.7	46.9	9.4	51.8	24.1	11.6	58.3
West Bengal	34.2	43.4	22.4	43.8	42.6	13.6	64.3	29.8	5.9	77.8
Arunachal Pradesh	22.5	30	47.5	20.5	50.8	28.7	28.4	47.5	24.1	41.9
Assam	19.4	37	43.6	17	49.8	33.2	31.4	53.4	15.2	66.9
Manipur	29.1	38.6	32.3	42.3	40.5	17.2	46.8	46.7	6.5	55.6
Meghalaya	9.7	35.4	54.9	14.3	43.4	42.3	32.9	50.6	16.5	63.8
Mizoram	56.4	29.1	14.5	59.6	29.9	10.5	46.5	46.5	7	77.9
Nagaland	3.8	21.2	75	14.1	53.2	32.7	21	60.6	18.4	45
Tripura	19	38.9	42.1	na	na	na	49.7	35.6	14.7	75.9
Goa	74.9	19.7	5.4	82.6	17.4	0	78.6	21.4	0	60.6
Gujarat	49.8	31.3	18.9	53	40.4	6.6	45.2	50.3	4.5	49.5
Maharashtra	64.1	28.4	7.5	78.4	19.6	2	58.8	38.4	2.8	58.8
Andhra Pradesh	45	37.5	17.5	58.7	36.8	4.5	46	50.2	3.8	64.9
Karnataka	52.2	32.6	15.2	60	32.3	7.7	55	38.1	6.9	52
Kerala	54.4	34.2	11.4	79.7	18.1	2.2	75.3	22.9	1.8	78.9
Tamil Nadu	64.9	31.8	3.3	88.8	10.9	0.3	80.9	19.1	0	44.8
India	35.4	34.6	30	42	43.6	14.4	43.5	51.4	5.1	51.5

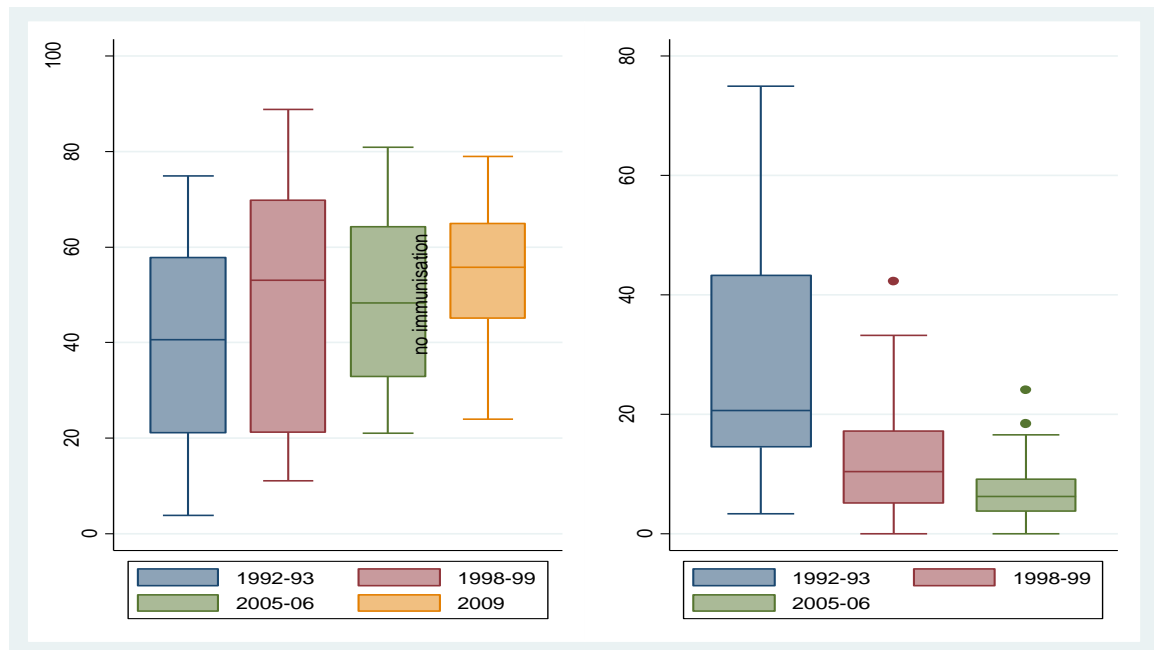
*Source:* National Family Health Survey (NFHS), India; Data for 2009 are from “India Coverage Evaluation Survey”, Ministry of Health and Family Welfare, Government of India and UNICEF.

In addition, it is important to recognize that increase in the percentage of full immunization in the economy is at a slow pace. In 1992-93, 35.4 per cent children were fully vaccinated. The percentage increased to 42 in 1998-99, 43.5 in 2005-06 and 51.5 in 2009. On the other hand, the percentage of children without vaccination declined more significantly from 30 per cent in 1992-93 to 5.1 per cent in 2009. Graph 4.4 shows that the minimum value of quartile of full immunization increased continuously and the maximum value of quartile of children without immunization reduced significantly. It can

be inferred from this that over a period of time, greater numbers of children are getting vaccinated. However, it also shows that the increase in the percentage of full immunization is less than the increase in the percentage of partial immunization. This means that there are more numbers of children who are not getting all vaccinations.

In Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Goa, Gujarat, Karnataka, Tamil Nadu and Maharashtra, the percentage of full immunization has decreased in 2009 compared with 1992. In Uttar Pradesh, Bihar, Orissa, West Bengal, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, full immunization increased significantly in 2009 compared with 1992-93.

**Graph 4.4 Box Plots of Full and No Immunization in Four Periods**



Further, in Graph 4.4 it is observed that the median lies much away from the x-axis for full immunization in 2009. The median decreased in 2005-06 for full immunization, and again increased in 2009. This implies the distribution is skewed and, therefore, it can be inferred that there are many state specific differences that have caused such variations. The median for no immunization decreased over time and it lies much toward x-axis in 2005-06 (no data in 2009). It implies that full immunization and partial immunization in the states improved since 1992-1993.

In conclusion, it can be said that over a period of time, the health status in India has progressively improved consistently. Much of the growth has happened since 2005-06. Also, the health factors are skewed and have variations in the states.

#### **4.6 Health Expenditure and GDP**

The two measures commonly used to compare the levels of health care spending across countries are health care spending as a percentage of the GDP and per capita health care spending, adjusted for costs of living using Purchasing Power Parities (PPP). Health care spending as a percentage of GDP employs an opportunity cost perspective.

Health care spending captures a growing share of the GDP in all OECD countries between 1970 and 2008. In the median OECD countries, health care spending was 5.1 per cent of GDP which increased to 9.1 per cent by 2008. In USA health care spending increased from 7.0 per cent of GDP in 1970 to 16.0 per cent in 2008.

Health care spending can be divided into public and private spending. In 2008, three-quarters of the health spending was from public funds in the OECD countries, while one quarter was from private funds. Only in the USA and Mexico did private health care represent over half of the health care spending.

How has India spent on the health sector in recent decades? What is the role of health expenditure, and public and private sectors? Data of health expenditure are not available before 1995 for most of the countries. Data were collected from the World Development Indicators (WDI) published by World Bank for four periods. Therefore, we compare changes in health expenditure in public and private sectors in India and also health expenditure as a percentage of GDP in some other countries. Table 4.6 shows that the total health expenditure (as a per cent of GDP) fell from 4.01 in 1995 to 3.87 in 2011 in India, while it increased in developed and some developing countries during this period. In India the private health expenditure as a percentage of GDP is significantly more than public health expenditure in four periods. Besides, per capita health expenditure has increased since 1995 from \$45.83 to \$141.12 in 2011.

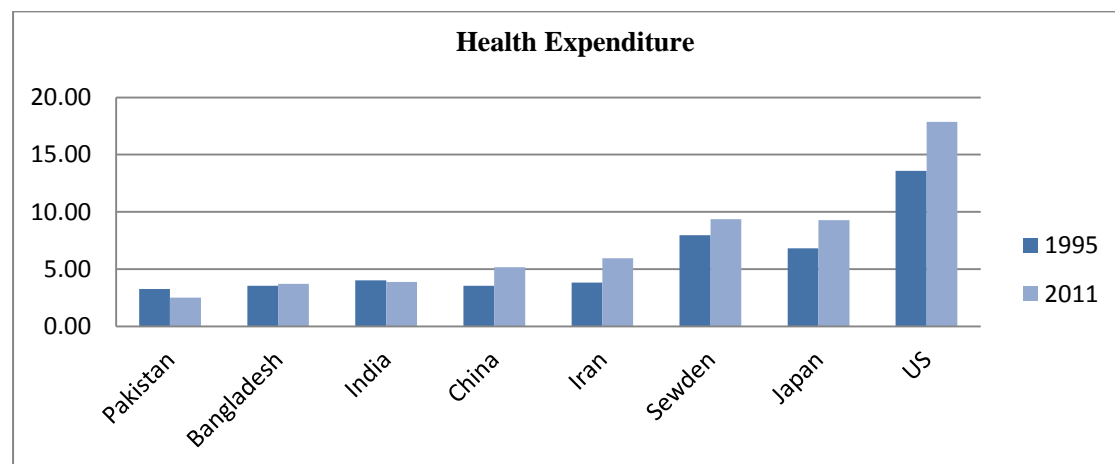
**Table 4.6 Health Expenditure in India**

Year	HE Public: % of GDP	HE Private: % of GDP	HE Total: % of GDP	HE Public: % of total HE	HE Private: % of total HE	HE: Per capita PPP
1995	1.0	2.9	4.01	26.1	73.9	45.83
2000	1.11	3.2	4.31	26.0	74.0	65.3
2005	0.9	3.3	4.20	22.1	77.9	93.85
2011	1.19	2.7	3.87	31.0	69.0	141.12

Source: World Development Index, World Bank 2013, H.E: Health Expenditure

Developed countries spend a high proportion of their GDP on health care because they believe that health can serve as a major driver for economic activities and development. Total health expenditure as a percentage of GDP has increased in all developed and some developing countries since 1995. In the USA it is highest among all the countries, but it does not mean that health indicators are the best there when compared with other developed countries. For example, life expectancy in Japan (83), Sweden (82) and Australia (81), was higher than the USA (78) in 2011. IMR and UFR in these countries (see figure 4.4) were less than in the USA from 1970 to 2010 (our period of study). Life expectancy was 64 in India in 2011, which was the lowest among all the studied countries.

**Figure 4.1 Health Expenditure as a Percentage of GDP in Selected Countries**



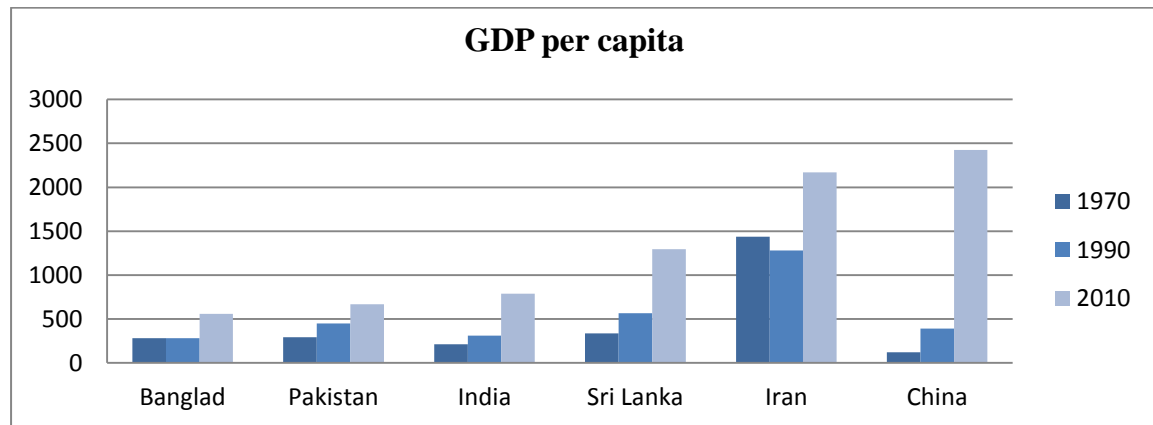
Source: World Development Index, 2013.

Studies have shown that health care expenditure is closely related to a country's GDP. In the developed countries, health expenditure has increased significantly. Figure 4.1 indicates that health expenditure (as a percentage of GDP) has decreased in Pakistan and India, while it has increased in some other studied countries from 1995 to 2011.

The findings by Elmi and Sadeghi (2012) are that income is an important factor across developing countries in the level and growth of health care expenditure in the long-run. As well, the health-led growth hypothesis in developing countries is confirmed. The role of health care spending on stimulating economic growth has been suggested by Mushkin (1962). This is known as the health-led growth hypothesis.

Figure 4.2 shows increase in per capita GDP from 1970 to 2010 in the studied countries. Among them, it has increased in China more significantly as compared with other developed and developing countries, while it was low in China in 1970. In Iran it decreased in 1990 because of the revolution against its king (Pahlavi, 1979), and the war between Iran and Iraq which was fought for eight years. In India per capita GDP increased but it was moderate as compared with China.

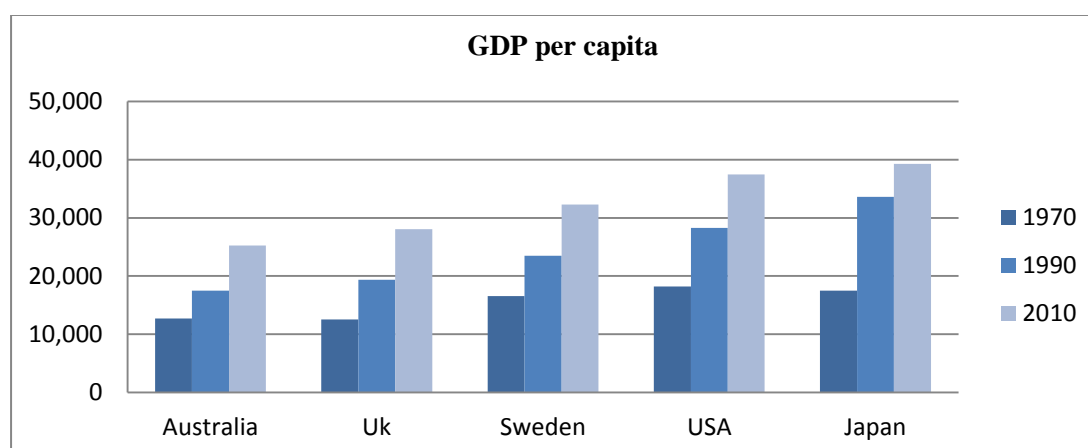
**Figure 4.2 Per Capita GDP (constant prices 2000 US \$) in the Developing Countries**



Source: World Development Index, 2013.

Per capita GDP in the developed countries is very high compared with the developing countries. Even in 1970 the GDP of developed countries was much higher than the GDP of developing countries in 2010 (see figures 4.2 & 4.3). Here we can find the striking role of per capita GDP in improving the health status.

**Figure 4.3 Per Capita GDP (constant prices, 2000 US \$) in the Developed Countries**



Source: World Development Index, 2013.

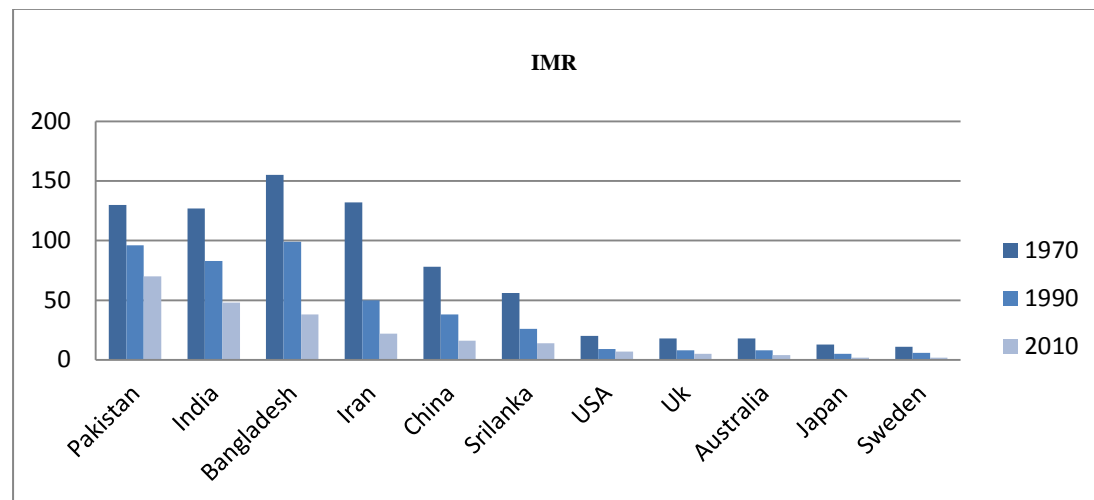
As indicated earlier, the relationship between expenditure on health care services and the health status of a population is not directly proportional. Which additional resources need to be channelled into health care services in order to improve the health of the nation and reduce inequalities? The USA spent around 18 per cent of its gross domestic product (GDP) on health care, over 2.5 times the average health expenditure of the other 29 OECD countries. But it is one of the least healthy of these nations. Japan, which spends about 9 per cent of its GDP on health care, is one of the healthiest with a life expectancy of nearly 83 years – 5 years higher than the USA and the highest in the world.

**Infant Mortality Rate:** IMR is still one of the most important indicators to understand the progress of nations. Figure 4.4 makes a comparison of IMR in some developed and developing countries. It has decreased significantly in most countries in the world.

India's record in reduction in child mortality has been disappointing. The report on *The State of the World's Children 2007* reveals that in 2005 some 1.92 million children died before reaching the age of 5 in India, which is the highest among countries in the world (UNICEF 2006). The average annual rates of reduction in under-5 mortality and IMR for India were 3.4 per cent (from 123 to 74 children per 1000 live births) and 2.2 per cent (from 84 to 56 infants per thousand live births) respectively during 1990-2005, putting India among countries with the lowest rates of decline during this period

(UNICEF 2006). Most of the progress towards reducing child deaths has been in the earlier decades, but this decline has slowed down in the recent past. India has not been able to bring about a more rapid decline in IMR and remains behind countries like Sri Lanka (1970-2010) and Bangladesh (2010) in its achievements in the health sector.

**Figure 4.4 Infant Mortality Rate per 1000 Live Births**



Source: World Development Index, 2013.

#### 4.7 Income and Health in India

The link between income and health exists at both micro and macro levels. At micro level, higher income levels imply higher standard of living, which means that people can afford to spend on quality health care. On the other hand, health is considered to be an important form of human capital as good health increases productivity and, therefore, enhances higher income levels.

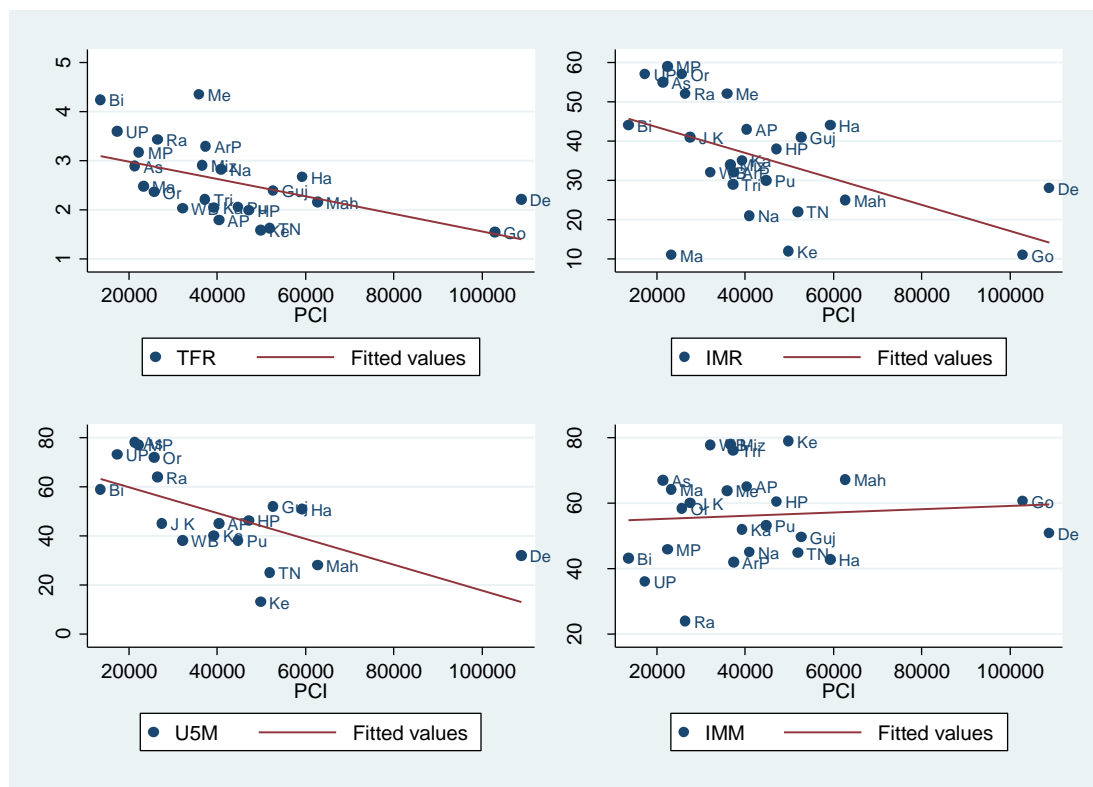
Similarly, at macro level, the correlation is positive. As Bloom and Canning (2000) pointed out, “Higher incomes promote access to many of the goods and services believed to produce health and longevity, such as a nutritious diet, safe water and sanitation, and good health care, but this standard view has been challenged in recent years by the possibility that the income-health correlation is also explained by a causal link running the other way, from health to income”. However, most of the studies conclude that good health contributes to higher incomes. In the paper “The Effect of Health on Economic Growth: A Production Function Approach”, Bloom, Canning and

Sevilla (2004) concluded that a 1-year improvement in a population's life expectancy contributes to an increase in 4 per cent in output.

Therefore, it is not clear which side of the causality is stronger. In addition to this, if we believe that a higher income contributes to better health, then as a matter of policy can we say that economic growth is sufficient to improve well-being? Or, do we need to look at a much broader perspective to improve the quality of health?

Graph 4.5 shows the association between per capita income (PCI) and health indicators via IMR, TFR, immunization and U5M in 2010-11 across the states.

**Graph 4.5 Per Capita Income and Health Indicators 2010-11**



*Note:* De-Delhi, Ha-Haryana, HP- Himachal Pradesh, JK- Jammu & Kashmir, Pu-Punjab, Ra-Rajasthan, MP-Madhya Pradesh. UP-Utter Pradesh, Bi-Bihar, Or-Orissa, WB-West Bengal, ArP-Arunachal Pradesh, As-Assam, Ma-Manipur, Me- Meghalaya, Mi-Mizoram, Na-Nagaland, Tr-Tripura, Go-Goa, Guj- Gujarat, Mh-Maharashtra, AP-Andhra Pradesh, Ka-Karnataka, Ke-Kerala and TN-Tamil Nadu.

In general, states with low per capita income have comparatively high IMR and UFMR than states with higher per capita. However, a state like Delhi has the highest income levels, but Goa (11), Kerala(12) and Manipur (11) have the lowest IMR.



Similarly, the TFR and UFMR are lower in the states which have higher per capita income than the low income group states. Full immunization is also relatively more in high income states but this is not so with respect to TFR, IMR and UFMR. Full immunization has not been promoted more by high level of income. Three points can be made on the basis of Graph 4.5. First, it is plausible that higher income causes low IMR. Second, better health status (as measured in terms of IMR, TFR and immunization) may create more wealth as productivity is higher. Third, there are other socio- economic factors that are more relevant for improving health status than per capita income.

It is interesting to note that at higher levels of per capita income, the slope of the lines has become relatively flatter. This indicates that the impact of income is more at low level of income. But as the states have higher income, there are some other important indicators that may affect the health status.

#### **Average IMR, TFR, IMM, and UFMR by Per Capita Income (PCY) Quartiles**

Table 4.7 shows variations in IMR, TFR, immunization, UFMR and per capita income by income quartiles in four periods. It demonstrates variations in health indicators with respect to changes in income levels over time.

The IMR has an inverse and non-linear relationship with per capita income. Since 1992-93, it has fallen by roughly half from its average level and income has increased by more than 50 per cent. In 2010-11, it fell to 44 deaths per 1000 live births at Rs. 25,708 in the poorest quartile; to 42 at Rs. 37,316.5 in the second quartile; and to 33 and 26 in the third and fourth quartiles respectively.

Similarly, the TFR has declined in all the quartile groups in the same period and has also fallen over a period of time. Total fertility declined from 2.95 to 2.02 among the richest states and from 3.65 to 3.27 among the poorest states, the rate was 1.25 higher than the richest quartile states.

Further, the percentage of full immunization also improved in all the income groups. It increased from 24 to 43 among the poorest 25 per cent states, from 40 to 55 in the second quartile, from 51 to 65 in the third quartile, and from 46 to approximately 60

among the richest 25 per cent of the states. The percentage of immunization is better in the third quartile than the richest 25 per cent states. From this it can be inferred that immunization has improved not by income factor alone, but other important developmental factors as well in these states.

<b>Table 4.7 Average IMR, TFR, IMM and UFMR by PCY Quartiles</b>				
	Poorest 25%	Second Quartile	Third Quartile	Richest 25%
<b>IMR</b>				
1992-93	69.63	67.41	58.72	55.56
1998-99	76.45	52.35	43.64	61.28
2005-06	60.05	45.88	38.85	42.6
2010-11	44.17	42.43	33.17	26.14
<b>TFR</b>				
1992-93	3.66	3.09	2.96	2.95
1998-99	3.10	3.18	2.45	2.48
2005-06	3.10	2.79	3.02	2.70
2010-11	3.30	2.87	2.33	2.02
<b>Immunization</b>				
1992-93	24.42	40.83	51.44	46.09
1998-99	18.23	50.8	67.35	47.16
2005-06	38.65	45.45	59.6	57.21
2010-11	43.22	55.4	65.08	59.88
<b>UFMR</b>				
1992-93	122.89	94.77	63.63	64.12
1998-99	100.65	71.21	60.53	62.86
2005-06	90.2	60.1	59.63	40.67
2010-11	71.75	54.75	42.25	33.5
<b>Income per capita</b>				
1992-93	13468.82	17033.68	19059.81	46803.82
1998-99	16125.8	18943.96	25984.29	71695.38
2005-06	19445	26292.5	34837	80844
2010-11	25708	37316.5	49873	108876

Source: Based on the author's calculation.

Finally, the other important health indicator is UFMR. It fell by around 50 per cent in the richest states since 1992-93, but in other quartiles the fall was less than 50 per cent. Also, there are wide differences among the rates in different income quartiles. The richest 25 per cent states had a rate of 33.5, while it was almost double among the lowest 25 per cent states.

In addition to these differences, there is another source of variation, viz., state-specific factors in all the income quartiles that influence the health status. For instance, in 2010-11, Manipur had the lowest IMR of 11 among the poorest 25 per cent of the states which was better than the lowest in Tripura (29) in the second quartile and Nagaland (21) in the third quartile. Similarly, Bihar (4.24) has the highest TFR among the poorest income groups. But this rate was even lower than the highest TFR of Meghalaya (4.34) in the second quartile. Finally, the UFMR of Himachal Pradesh (46) was the highest in the third quartile, but was still lower than that of Gujarat (52) which was the highest among the richest 25 per cent of the states. This leads us to conclude that there are many other factors in different states that play a significant role in determining the health status. There is extensive literature that explains the importance of female literacy, income distribution, gender equity and other socio-economic factors that are indispensable for improving the health status.

Sen (1998) in his paper “Mortality as an indicator of economic success and failure” argues that the quality of life is related to both development and availability of quality of health services. Income levels, education, orderliness of urban living, and access to modern medical knowledge and health care system are among the important influences on life and death.

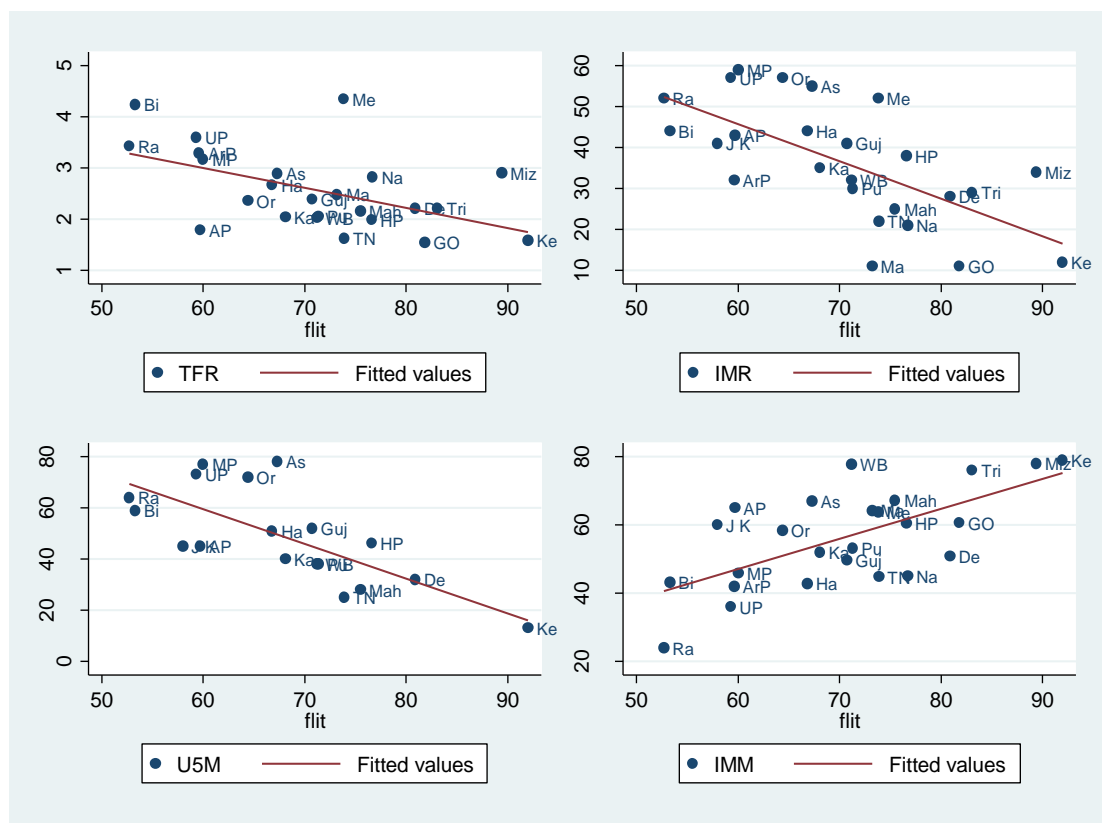
#### **4.8 Female Literacy Rate and Health**

It is widely recognized that education has an indispensable role in improving the health status of individuals. Kapoor (2010) comprehended the role of women’s empowerment in reducing infant mortality. The role of female literacy, female work participation rate and percentage of female labourers in agricultural work seem to have the strongest effect on the IMR.

Graph 4.6 shows an association between literacy rate and health indicators that are IMR, TFR, immunization and UFMR. The curves of IMR, TFR and UFMR are comparatively steeper than Graph 4.5. This means that the impact of literacy rate on these indicators is greater than the impact of per capita income. Similarly, the association between literacy rate and immunization is stronger than per capita income. Additionally, the outliers in the graph are very few in comparison with Graph 4.5. Kerala with the

highest female literacy rate has low IMR, UFRM and TFR (which are very close to the developed countries) and high full immunization.

**Graph 4.6 Female Literacy Rate and Health Indicators, 2010-11**



*Note:* De-Delhi, HA-Haryana, HP- Himachal Pradesh, JK- Jammu & Kashmir, PU-Punjab, RA-Rajasthan, MP-Madhya Pradesh. UP-Utter Pradesh, BI-Bihar, OR-Orissa, WB-West Bengal, ArP-Arunachal Pradesh, AS-Assam, MA-Manipur, ME- Meghalaya, MI-Mizoram, NA-Nagaland, TR-Tripura, GO-Goa, GU- Gujarat, MH-Maharashtra, AP-Andhra Pradesh, Ka-Karnataka, Ke-Kerala and TN-Tamil Nadu.

### Average IMR, TFR, IMM and UFMR by Literacy Rate Quartiles

Table 4.8 illustrates the health indicators IMR, TFR, immunization and UFMR by female literacy rate quartiles in four periods. It shows variations in health status due to changes in literacy rate over time.

The literacy rate increased by approximately 40 per cent from 1992-93 to 2010-11. But the infant mortality rate decreased by more than the increase in literacy rate. It implies that the small percentage rise in literacy rate had much impact on the IMR. In fact, the state with lowest IMR in each quartile is monotonically less in contrast to the states with the lowest IMR when distributed in terms of income quartiles. Among the

states with the least literacy rates, Madhya Pradesh has the lowest IMR of 59 in 2010-11. Similarly, the IMR in 2010-11 was 57 in Orissa at 76.7 per cent, in Manipur (11) at 83.9 per cent and in Goa (11) at 93.9 per cent of female literacy rate.

<b>Table 4.8 Average IMR, TFR, IMM and UFMR by Literacy Rate Quartiles</b>				
	Poorest 25%	Second Quartile	Third Quartile	Richest 25%
<b>IMR</b>				
1992-93	72.87	69.92	36.95	68.81
1998-99	70.07	54.87	61.23	63.3
2005-06	37.58	48.72	47.32	51.43
2010-11	46.86	45.5	25.4	25.28
<b>TFR</b>				
1992-93	3.86	3.32	2.85	2.6
1998-99	3.12	3.09	2.55	2.34
2005-06	3.00	3.12	2.13	2.3
2010-11	3.25	2.72	2.26	2.08
<b>Immunization (full)</b>				
1992-93	38.38	33.53	45.77	40.36
1998-99	53.55	34.9	58.25	41.02
2005-06	53.16	52.16	43.26	48.44
2010-11	52.03	54.17	68.54	54.34
<b>UFMR</b>				
1992-93	110.82	107.57	74.17	54.53
1998-99	110.62	86.85	68.08	50.9
2005-06	61.34	74.94	51.84	57.36
2010-11	60.5	55.8	38.33	29.75
<b>Literacy Rate</b>				
1992-93	46.88	58.1	63.3	89.81
1998-99	62.21	67.85	73.56	90.92
2005-06	67.35	71.5	75.01	92.2
2010-11	70.6	76.7	82.9	93.9

Source: Based on the author's calculation.

The TFR and UFMR have continuously declined over time in all the quartile groups. However, the range between states with the least literacy rate and highest literacy rate is higher. For instance, in 2010-11 the TFR of highest 25 per cent states was 2.08 and of lowest 25 per cent states 3.25. The per cent of full immunization increased over a period of time in all the quartile groups, but the rate of increase was low and even that had fallen in some periods over time. The effect of female literacy in full immunization

was less than per capita income in four periods. Full immunisation (IMM) has not been promoted uniformly over time.

Therefore, it is plausible to say that economic growth is a narrow concept to define the standard of living. The development issues are more relevant and complete to define the quality of life. It is, of course, true that income levels are important for improving the health status in the economy. However, only better income does not reflect the true picture.

#### 4.9 Pearson Correlation between Literacy Rate, Per Capita Income and Health

Table 4.9 shows Pearson correlation between PCNSDP, female literacy rate and health indicators. The IMR, TFR and UFMR were significantly correlated with per capita income in 2010-11. This can be explained by three ways. First, with higher income levels, people can afford better health services that reduce child death. Second, good health enhances the productivity of human beings that helps to generate more income. Third, both income and health are correlated with each other and have a simultaneous impact.

Indicators	PCNSDP	Female Literacy Rate	IMR	TFR	IMM**	UFMR
PCNSDP	1					
Female Literacy Rate	0.57	1				
IMR	-0.52	-0.65	1			
TFR	-0.53	-0.57	0.59	1		
IMM	0.08	0.59	-0.36	-0.42	1	
UFMR	-0.63	-0.70	0.98	0.73	-0.44	1

*Source:* Based on the author's calculation; \*\* Full Immunization.

Table 4.9 indicates that per capita income has positive correlation with female literacy and immunization, but it has negative correlation with IMR, TFR and UFMR. Female literacy has positive correlation with immunization and negative correlation with IMR, TFR and UFMR too.

On the other hand, literacy rate is significantly correlated with all the health indicators. Also, it is important to note that the values of correlation of literacy rate with health indicators are greater than that of income with those indicators. This shows that if literacy rate affects the health status, then its impact is stronger than increasing income. Of course with higher level of income and literacy, there is more possibility for better health because income provides the nutritional requirements and education provides other health information that is essential for healthy lifestyle.

Therefore, as a proof of access to quality health care, these indicators reflect the country's level of socio-economic development as well as quality of life, and are used for monitoring and evaluating population, health programmes and policies. On the other hand, better standard of living by an increase in income and economic development ensures good quality of the health care system and healthy life. This motivates us to explore the causality of association between health status and economic factors in terms of income and literacy rate.