Article

Do Socio-economic Development and Improvement of Health Go Together? A Comparison among Indian States

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Abstract

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Keywords

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Introduction

The improvement of overall health status of the people in a country is very much linked with the socio-economic development in the country. Improvement of health is one of the primary goals of development. Health is thus only one aspect of development. The human development index (HDI) proposed by United Nations has three components. One component is the life expectancy at birth. It may be a difficult task to see the link between the socio-economic development and the improvement of health in a vast country like India, where there is much regional diversity almost in all aspects of life besides being overpopulated. It cannot be denied that there has been economic growth over the last few decades. There has been improvement in the overall standard of living. The level of poverty has declined. So has been the improvement of health situation. The life expectancy at birth has increased by 17 years in last five decades and reached 64 years in 2001. But there are considerable differences in the levels of attainments of people on various aspects of well-being. Not only there are state-wise differences, but also there are differences between rural and urban areas. In fact, most indicators show a dismal situation for people residing in rural areas.

Poverty and inequality have negative impact on the health of population. Past studies have documented a strong association between income inequality and excess mortality (Ben-Sholmo, White and Marmot, 1996; Kaplan et al., 1996). The most important societal factor related to health appears to be the degree of poverty (Haines and Smith, 1997; Reutter, 1995; Warden, 1998). British scientists have identified the social gradient, stress, early life, social exclusion, work, unemployment, social support etc. as key determinants of health. Economic inequality plays an important role in both increasing the extent of poverty and weakening the social structures that support the health (Raphael, 2001). Work of Purohit (2004)

depicts the prevalence of inequity favouring high-income group of states in terms of health care resources.

Slow and unequal social mobilisation in various parts of India led to an uneven economic growth. Caste and social polarisation, literacy and educational levels, natural resources, levels of corruption, role of political leadership etc. are the factors responsible for creating differences among the states in India (Ahluwalia, 2000). This basic inequality was magnified by the rapid but unequal economic growth that India has witnessed in the last two decades. Amidst the rising standards of living, lie pockets of terrible poverty and deprivation.

Human development, in this article, means raising the level of well-being. It is reflected through a range of indicators. Some of these indicators signify development (for example, literacy rates, per capita income), while others just mean the opposite (for example, the degrees of inequality and poverty). The different health indicators also have similar contrasts. Since the status of health is viewed differently for different groups of persons like children, women and old persons, the indicators are also taken differently. There are, of course, some indicators that can be applied to all persons. The health situation of a child can be addressed to by weight-for-height, weight-for-age, height-for-age, infant mortality, occurrence of diarrhoea etc. Women's health situation in a region can be measured by maternal mortality, body mass index (BMI), presence of anaemia, etc., and the overall health situation can be measured by life expectancy at birth.

The limitation of the study is that as the data set is secondary and the periods do not match; there is limited scope for multiple comparisons.

The main objective of this article is to find out the status of human development among the major states in India and relate it to the status of health of the corresponding states. The main points are:

1. To see whether the health and development indicators vary over different states?
2. To see whether there are urban–rural differences of key development determinants and women–child health for the major states of India.
3. To see whether the development and the improvement of health is complementary to each other.

Materials and Methods

The health data primarily have been taken from state level National Family Health Surveys (NFHS-2 and NFHS-3). In addition, data from alternative sources include National Sample Survey Organization (NSSO). To maintain the uniformity, we have taken data only from the major states. The states are Andhra Pradesh (AP), Assam (As), Bihar (Bi), Gujarat (Gu), Karnataka (Ka), Kerala (Ke), Madhya Pradesh (MP), Maharashtra (Ma), Orissa (Or), Punjab (Pu), Rajasthan (Ra), Tamil Nadu (TN), Uttar Pradesh (UP) and West Bengal (WB). The NFHS and

NSS data are known to be the most authentic sources for the national as well as state level information. NSS data are available for a long period of time whereas NFHS data are on child and women health and are available for three periods. The present study uses the NFHS-2 and NFHS-3 data corresponding to the years 1998–99 and 2005–06 and 55th round NSS data corresponding to 1999–2000, which is contemporary to NFHS-2 data. The comparisons have been done mainly between NFHS-2 and NSS-55 data. However, some results from NFHS-3 data, especially the health parameters, have also been discussed in this article. Indicators are chosen both for development and health related attainment of the society. Four items indicating overall development have been chosen. The first two are the head count ratio (HCR) and the real mean consumption (RMC) indicating economic development and the other two are the literacy rate and the sex ratio (adult) showing the other two dimensions of development.

HCR is defined as the percentage of people below poverty line. The data of HCR is taken from NSS 55th round, that is, for the year 1999–2000. The other aspect of development taken here is RMC. RMC measures the economic status of the people in the region. The RMC value for different states in India is taken from the 53rd round (1997) data of NSS. The time period of 53rd round of NSS is very close to that of NFHS-2 round. The adult sex ratio used in this article is taken from NSS record of 55th round. Sex ratio, that is, female–male ratio (FMR) is defined by the ratio of number of females to number of males. It is also sometimes expressed as number of females per thousand males. In an ideal situation FMR should have some value greater than one but very close to one, because for the same situation age-specific mortality rate is less for women. The FMR value is regarded as an indicator of development. The states with higher value of FMR are regarded as more developed. The data on literacy level were taken from NFHS-2. Sex-wise literacy level is not considered here.

There are reasons why we might expect to find urban–rural difference in these development parameters. In India more than 70 per cent people live in rural areas. Strong differences in environment and individual opportunities exist between urban and rural areas. So rural–urban differences have pronounced impact in the development and health status in different states of India. Greater the gap, lower is supposed to be the overall improvement of that state.

Among the health outcomes, infant mortality and some health-related morbidity indicators are taken to measure the health status. For child health, acute respiratory infection (ARI), diarrhoea, child anaemia and nutritional status of children are taken. The weight-for-height index examines body mass in relation to body length. Two standard deviations below the median of the reference population in terms of weight-for-height are taken as the cut-off point. Children whose weight-for-height are below this cut-off point are too thin and are considered to be malnourished or wasted. The percentage in this category indicates the prevalence of acute undernutrition. Acute respiratory infection, primarily pneumonia, continues to be a leading cause of mortality in infants and children. Diarrhoea is also one of the most common killers of children under age of five.

Source of drinking water is one of the leading causes of diarrhoea. The children of the household with open drinking source are more susceptible to diarrhoea. Nutritional status plays a vital role in deciding the health status particularly in children. A child's nutritional status also depends on the economic status of the household to which the child belongs. Access to food is a necessary condition for food security. Nutritional deficiencies give rise to various morbidities, which in turn may lead to mortality. It should be mentioned that the children whose nutritional status is measured are coming from the age group 3 years or less. The International Conference on Primary Health Care held in Alma Ata in 1978 was the first global forum to consider how child mortality could be reduced by systematic development of a primary health care system. Women whose age belongs to the age group 15 to 49 years, that is, women of reproductive age group, are considered here.

Anaemia and low BMI are considered to be vital for women's status of health. The BMI is defined as the weight in kilograms divided by the square of height measured in metres (kg/m^2). The value of BMI less than 18.5 kg/m^2 is considered as chronic energy deficiency (CED). These indices excluded women who were pregnant at the time of survey or women who gave birth during the two months preceding the survey. Since the CED is mainly because of the prolonged low level of food and nutrition intake, higher proportion of women with a BMI below 18.5 kg/m^2 is thought to be the result of lower economic position of the state. Anaemia is characterised by low level of haemoglobin in the blood. It may have detrimental effect on the health of women and children and may be an underlying cause of maternal mortality. Moreover, anaemia results in an increased risk of premature delivery and low birth weight (Seshadri, 1997).

We have three distinct types of state-wise data presented in this article. These are (*a*) the morbidity patterns of children, (*b*) the morbidity patterns of women and (*c*) the development parameters. One can find if there is a relation between these variables: pair-wise and also between groups. In other words we would like to know whether the states with indications of high development have also the low morbidity patterns, and also whether the morbidity patterns of children and women go together when compared state-wise. The correlation coefficients between the variables throw some lights on these relations. However, to find out the relations between groups of variables, one has to find out canonical correlations. Here we first find linear combinations of variables within each group and then find the correlation coefficient between the two linear combinations. Linear combinations are taken in such a way that it gives the maximum correlation. Thus, the value of the canonical correlation must be greater than or equal to the maximum of the correlations between all the pairs of variables such that one variable is taken from each of the two groups. The problem with the canonical correlation is that it always gives the non-negative value as in the case of multiple correlation coefficient. Second, much degree of freedom is lost due to taking linear combinations. Observe that we have only fourteen states, whereas the number of variables in the groups are ten, eight and four for children morbidity, development and

women morbidity respectively. This is because rural and urban sectors are considered separately for each variable. Thus, it is not possible to find canonical correlation between the groups of children morbidity and development. If we further subdivide states by separating out the rural and urban sectors, then it is possible to find out the canonical correlation between any two groups. To overcome these problems of canonical correlations, we have resorted to another method by ranking the states according to morbidity and development parameters in both the sectors. Each item of child health outcomes is then ranked separately according to their values. Ranking is done in such a manner that the same highest rank (that is, rank = one) is given for the value that is most favourable to development. In cases where low proportion represent favourable condition for development, for example, low percentage of ARI or diarrhoea, the lowest value has been given rank one, and where the highest proportion represents for betterment like that of literacy level, then the highest value has been given the rank one. When the ranks of each item are put for each group, the ranks for all items are added. Now this variable is again ranked to get a representative rank value of the group. In this way we get a representative rank of each group. It is given in the Table 4C. The Spearman's rank correlations were then computed using SPSS package for rural and urban sectors separately and also jointly. The SPSS package also gives the significance of the rank correlations. Since the direction of the ranks is taken care of while taking the ranks, the rank correlation will obviously give positive values for most cases.

Results

Child Morbidity Parameters

State-wise percentage distribution of child health parameters in India is given in the following Table 1A. Child health is seen to be better in the urban areas for most states. It is quite surprising that in some states like Madhya Pradesh, Maharashtra, Punjab, Orissa, Andhra Pradesh and even in Kerala, the proportion of children affected with diarrhoea is higher in urban area than in rural area. In fact there are many states in which children of urban areas suffer more from acute respiratory disease and diarrhoea than the children of rural areas. The results of NFHS-3 also confirm the same (Table 2A). For a better understanding we have computed the difference between urban percentage and rural percentage for each state along with their ranks (Tables 1B and 2B).

In case of Kerala, rural sector is in a better position than urban sector for most parameters. The difference between rural and urban sectors is quite noticeable in case of Gujarat, Assam, Maharashtra, West Bengal and Karnataka. The children of the rural sector of these states compared to the urban sector seem to be more neglected than other states. The infant mortality for urban areas is less than rural areas in all the states except for Kerala though the difference is low in Kerala.

Table 1A. State-wise Percentage Distribution of Child Health in India (1998–99)

	*Acute Respiratory Infection		Diarrhoea		Anaemia		Malnutrition through Weight-for-Height		Estimated Infant Mortality Rate, 1999**	
State	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
AP	20.0	16.5	14.7	16.1	73.3	69.5	9.5	7.6	75	37
As	18.3	10.0	8.4	4.1	63.8	52.3	13.4	10.4	79	36
Bi	21.7	21.5	17.9	15.6	81.3	80.7	21.4	17.1	64	55
Gu	11.4	10.4	21.4	17.0	78.5	67.9	19.2	11.3	70	45
Ka	7.1	9.6	14.6	12.4	72.7	66.3	21.8	16.2	69	24
Ke	22.8	23.0	11.0	12.7	43.2	46.8	11.2	10.9	14	16
MP	30.9	23.4	22.4	26.6	75.4	73.7	20.6	17.3	96	55
Ma	15.6	10.3	22.9	29.1	78.0	72.8	24.8	15.7	58	31
Or	22.4	23.3	28.0	29.2	72.7	68.3	24.4	23.6	100	65
Pu	14.0	15.9	9.4	11.0	80.9	77.2	7.0	7.4	57	39
Ra	21.3	24.5	19.9	19.2	82.6	81.3	12.5	8.6	85	59
TN	10.0	10.7	14.0	15.0	70.5	66.2	19.5	20.6	58	39
UP	21.5	18.9	24.1	19.4	73.9	74.1	11.4	9.5	88	66
WB	25.6	21.2	8.6	6.9	81.5	64.1	14.2	11.1	55	40

*ARI = Cough accompanied by fast breathing in 1998–99.

Source: SRS Bulletin, Sample Registration System, Register General, India, Vol. 36, No. 2, October 2002.

Table 1B. Urban–Rural Difference of State-wise Percentages of Child Health Parameters in India (1998–99)

	Acute Respiratory Infection		Diarrhoea		Anaemia		Malnutrition through Weight-for-Height		Infant Mortality		Overall Rank of
State	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank	Differences
A	–3.5	5	1.4	10	–3.8	8	–1.9	9	–38	4	7
As	–8.3	1	–4.3	3	–11.5	2	–3.0	8	–43	2	1
Bi	–0.2	8	–2.3	4	–0.6	12	–4.3	4	–9	13	9
Gu	–1.0	7	–4.4	2	–10.6	3	–7.9	2	–25	8	2
Ka	2.5	13	–2.2	5	–6.4	4	–5.6	3	–45	1	3
Ke	0.2	9	1.7	12	3.6	14	–0.3	12	2	14	14

Table 1B. *(Continued)*

Table 1B. *(Continued)*

State	Acute Respiratory Infection		Diarrhoea		Anaemia		Malnutrition through Weight-for-Height		Infant Mortality		Overall Rank of Differences
	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank	
MP	–7.5	2	4.2	13	–1.7	10	–3.3	6	–41	3	6
Ma	–5.3	3	6.2	14	–5.2	5	–9.1	1	–27	6	4
Or	0.9	11	1.2	9	–4.4	6	–0.8	11	–35	5	10
Pu	1.9	12	1.6	11	–3.7	9	0.4	13	–18	11	13
Ra	3.2	14	–0.7	7	–1.3	11	–3.9	5	–26	7	11
TN	0.7	10	1.0	8	–4.3	7	1.1	14	–19	10	12
UP	–2.6	6	–4.7	1	0.2	13	–1.9	10	–22	9	8
WB	–4.4	4	–1.7	6	–17.4	1	–3.1	7	–15	12	5

Diff. = difference

Table 1C. Product Moment Correlations among the State-wise Percentages of Child Health Parameters in India

	ARIR	DiaR	AneR	WAHR	InfMR	ARIU	DiaU	AneU	WAHU	InfMU
ARIR	1.00	0.18	–0.05	–0.13	0.21	0.83**	0.23	0.04	–0.04	0.42
DiaR		1.00	0.29	0.56*	0.60*	0.23	0.91**	0.48	0.46	0.66*
AneR			1.00	0.19	0.53	–0.02	0.21	0.85**	0.00	0.54*
WAHR				1.00	0.25	–0.18	0.57*	0.14	0.86**	0.13
InfMR					1.00	0.11	0.44	0.50	0.23	0.78**
ARIU						1.00	0.26	0.21	0.00	0.48
DiaU							1.00	0.45	0.50	0.46
AneU								1.00	0.04	0.64*
WAHU									1.00	0.19
InfMU										1.00

ARI: Acute respiratory infection, Dia: Diarrhoea, Ane: Anaemia; WAH: Malnutrition through weight-for-height, InfM: Infant mortality

**Correlation is significant at the 0.01 per cent level (2-tailed)

*Correlation is significant at the 0.05 per cent level (2-tailed)

Previous studies pointed out that education has a direct influence on infant mortality rate. Kerala is having highest literacy with least infant mortality. Punjab, Maharashtra and West Bengal are ahead of others so far as literacy is concerned. There is no strong similarity of rural–urban differences among the different child morbidity parameters as the pair-wise rank correlations of these differences were

found to be small. If the result is compared with NFHS-3 data, it is found that, apart from Gujarat and West Bengal, rural–urban difference is very high in Orissa, Andhra Pradesh, Madhya Pradesh and Karnataka also.

Table 2A. State-wise Percentage Distribution of Child Health in India (2005–06)

	Acute Respiratory Infection		Diarrhoea		Anaemia		Malnutrition through Weight-for-Height		Estimated Infant Mortality Rate, 2005**	
State	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
AP	2.7	1.5	4.8	5.4	72.8	61.3	10.4	8.8	63	39
As	4.9	6.0	8.2	7.8	70.3	60.4	10.6	12.1	71	39
Bi	7.4	5.3	10.5	12.0	79.1	68.4	22.7	23.7	62	47
Gu	4.0	6.6	13.0	13.1	74.7	62.4	16.6	14.1	63	37
Ka	2.2	2.0	8.5	9.0	72.7	66.8	16.9	15.2	54	39
Ke	4.6	6.4	6.5	7.5	44.7	44.5	16.9	9.2	15	12
MP	4.2	2.1	11.1	14.2	75.7	62.0	30.4	27.5	80	54
Ma	4.0	4.6	8.8	7.6	67.2	59.2	14.3	12.8	41	27
Or	5.9	8.0	12.0	9.9	67.0	54.8	15.7	12.5	78	55
Pu	6.8	5.5	8.0	7.4	66.4	65.9	8.3	6.5	49	37
Ra	5.6	7.7	9.1	14.9	72.4	63.9	16.7	19.1	75	43
TN	4.3	2.8	6.5	4.6	62.6	65.8	19.2	18.1	39	34
UP	6.1	7.0	8.1	10.6	74.6	69.7	10.6	8.5	77	54
WB	11.9	8.5	6.8	5.1	64.0	52.1	16.2	12.7	40	31

*ARI = Cough with fever accompanied by fast breathing.

****Source:** SRS Bulletin, Sample Registration System, Register General, India, Vol. 41, No. 1, October 2006.

Table 2B. Urban–Rural Difference of State-wise Percentages of Child Health Parameters in India (2005–06)

	Acute Respiratory Infection		Diarrhoea		Anaemia		Malnutrition through Weight-for-Height		Infant Mortality		Total of	Overall Rank of
State	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank	Ranks	Differences
AP	–1.2	6	0.6	9	–11.5	5	–1.6	9	–24	5	34	6
As	1.1	10	–0.4	6	–9.9	7	1.5	13	–32	1.5	37.5	7
Bi	–2.1	2.5	1.5	11	–10.7	6	1.0	12	–15	8.5	40	8.5

Table 2B. *(Continued)*

Table 2B. *(Continued)*

State	Acute Respiratory Infection		Diarrhoea		Anaemia		Malnutrition through Weight-for-Height		Infant Mortality		Total of Ranks	Overall Rank of Differences
	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank	Diff.	Rank		
Gu	2.6	14	0.1	7	–12.3	2	–2.5	5	–26	3.5	31.5	4.5
Ka	–0.2	7	0.5	8	–5.9	10	–1.7	8	–15	8.5	31.5	4.5
Ke	1.8	11	1.0	10	–0.2	13	–7.7	1	–3	14	49	12
MP	–2.1	2.5	3.1	13	–13.7	1	–2.9	4	–26	3.5	25	2.5
Ma	0.6	8	–1.2	4	–8.0	9	–1.5	10	–14	10	41	10
Or	2.1	12.5	–2.1	1	–12.2	3	–3.2	3	–23	6.5	25	2.5
Pu	–1.3	5	–0.6	5	–0.5	12	–1.8	7	–12	11	40	8.5
Ra	2.1	12.5	5.8	14	–8.5	8	2.4	14	–32	1.5	50	13
TN	–1.5	4	–1.9	2	3.2	14	–1.1	11	–5	13	44	11
UP	0.9	9	2.5	12	–4.9	11	–2.1	6	–23	6.5	54.5	14
WB	–3.4	1	–1.7	3	–11.9	4	–3.5	2	–9	12	22	1
Total		105		105		105		105		105	525	

Diff. = difference

Table 2C. Product Moment Correlations among the State-wise Percentages of Child Health Parameters in India (2005–06)

	ARIR	DiaR	AneR	WAHR	InfMR	ARIU	DiaU	AneU	WAHU	InfMU
ARIR	1.00	–.03	–.09	–.03	–.10	.68**	–.12	–.21	–.04	.03
DiaR		1.00	.45	.43	.51	.27	.76**	.17	.45	.50
AneR			1.00	.15	.80**	–.21	.52	.78**	.43	.78**
WAHR				1.00	.10	–.26	.48	–.01	.91**	.21
InfMR					1.00	.03	.63*	.52	.32	.92**
ARIU						1.00	.18	–.35	–.27	–.02
DiaU							1.00	.30	.57*	.53
AneU								1.00	.27	.59*
WAHU									1.00	.38
InfMU										1.00

ARI: Acute respiratory infection, Dia: Diarrhoea, Ane: Anaemia;

WAH: Malnutrition through weight-for-height, InfM: Infant mortality

**Correlation is significant at the 0.01 per cent level (2-tailed)

*Correlation is significant at the 0.05 per cent level (2-tailed)

We have also found the pair-wise correlations of the morbidity parameters of the children to see whether the different parameters are similar (Table 1C). Only the correlations between rural and the corresponding urban percentages are seen to be quite high. Most of the other correlations are not so large. The only exceptions are between diarrhoea and infant mortality and between infant mortality and anaemia of urban India. It means that the states with high infant mortality are also the states with high occurrence of diarrhoea. But the other correlation seems to be spurious.

Development Indicators

Table 3A shows the state-wise percentage distribution of four development indicators such as HCR, RMC, literacy and sex ratio (adult).

Table 3A. State-wise Percentage Distribution of Development Parameters in India

	Head Count Ratio (HCR)		Real Mean Consumption (RMC)		Literacy (Lit.)		Sex Ratio (adult) (FMR)	
State	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
AP	27.9	11.3	93.1	105.4	49.6	76.1	1.007	0.976
As	35.7	12.1	52.3	117.4	65.1	87.3	0.913	0.846
Bi	39.3	23.5	48.5	90.2	46.0	73.9	0.946	0.824
Gu	20.4	6.6	67.6	98.2	55.6	79.0	0.935	0.946
Ka	30.3	11.5	63.4	112.4	56.1	81.2	0.961	0.964
Ke	11.6	10.5	70.3	112.4	87.7	92.3	1.198	1.124
MP	31.2	14.1	59.4	81.2	51.9	77.8	0.905	0.882
Ma	30.8	13.0	61.2	92.1	64.5	82.7	0.995	0.902
Or	41.3	15.6	59.5	86.5	62.0	78.0	0.995	0.900
Pu	2.8	4.0	88.0	130.1	64.4	88.0	0.986	0.915
Ra	16.2	10.6	58.2	88.1	48.3	74.4	0.973	0.922
TN	25.6	11.1	68.2	93.2	62.0	82.3	1.034	1.019
UP	20.8	16.5	64.3	87.9	52.9	74.9	0.960	0.848
WB	22.7	11.4	71.2	98.4	61.2	83.3	0.943	0.910

HCR = head count ratio, RMC = real mean consumption, Lit. = literacy,
FMR = female–male ratio

In case of development parameters a wide gap has been noticed in the Table 3A. Proportion of rural poor is far more than that of urban poor except for the states of Kerala and Punjab. Kerala and Punjab are regarded as the top two most

developed states in India and the gap between rural and urban poor in those two states are also very low. The figures confirm our popular idea that less developed states like Bihar, MP and UP have low values of adult female–male ratio regardless whether rural or urban sector is considered. It is found from the Table 3A that Punjab and Kerala started with low values of HCR compared to other states. Punjab maintained the top rank in both the rural and urban sectors. The states that have very good positions in urban sector are Gujarat followed by Kerala, Tamil Nadu, Andhra Pradesh and Assam. The situation was bad in the states like Bihar and Orissa in both the sectors.

Real mean consumption shows the economic status of a state directly because it takes actual consumption. Punjab, Andhra Pradesh and Kerala maintained the top places. Assam shows some peculiarities. It has very high real mean consumption in the urban sector but very low consumption in rural sector. The fact that Assam is not a very developed state is clear from the rural–urban gap. Other states that show better position are Karnataka, Gujarat and West Bengal.

Kerala has the highest literacy level among the states. Even the percentage of literacy in rural Kerala (87.7 per cent) is above than those in urban sector of many states. The states like Punjab, Assam, Karnataka, Maharashtra, Tamil Nadu and West Bengal are in good position in comparison to other states. The sex ratio is thought to be one of the development indicators. Once again Kerala is at the highest position. The ratio is slightly higher in rural areas than in urban areas.

The rural–urban difference of all these development parameters is also an important indicator of development (see Table 3B). It is found from the table that Tamil Nadu, Gujarat, UP and West Bengal have low differences. Developed states are expected to have small gap than the comparatively less developed states. This difference is high in Bihar, Assam, Karnataka etc.

Table 3B. Urban–Rural Difference of State-wise Percentage of Development Parameters in India

	Head Count Ratio (HCR)		Real Mean Consumption (RMC)		Literacy (Lit.)		Adult Sex Ratio (FMR)		Overall Rank of
State	Difference	Rank	Difference	Rank	Difference	Rank	Difference	Rank	Differences
AP	–16.6	6	12.3	14	26.5	2	–0.031	10	8
As	–23.6	2	65.1	1	22.2	8	–0.067	7	2
Bi	–15.8	7	41.7	5	27.9	1	–0.122	1	1
Gu	–13.8	9	30.6	7	23.4	7	0.011	14	12
Ka	–18.8	3	49.0	2	25.1	5	0.003	13	3
Ke	–1.1	13	42.1	3	4.6	14	–0.074	5	10
MP	–17.1	5	21.8	13	25.9	4	–0.023	11	9

Table 3B. *(Continued)*

Table 3B. *(Continued)*

State	Head Count Ratio (HCR)		Real Mean Consumption (RMC)		Literacy (Lit.)		Adult Sex Ratio (FMR)		Overall Rank of Differences
	Difference	Rank	Difference	Rank	Difference	Rank	Difference	Rank	
Ma	–17.8	4	30.9	6	18.2	12	–0.093	4	4
Or	–25.7	1	27.0	10	16.0	13	–0.095	3	5
Pu	1.2	14	42.1	4	23.6	6	–0.071	6	6
Ra	–5.6	11	29.9	8	26.1	3	–0.051	8	7
TN	–14.5	8	25.0	11	20.3	11	–0.015	12	14
UP	–4.3	12	23.6	12	22.0	10	–0.112	2	11
WB	–11.3	10	27.2	9	22.1	9	–0.033	9	13

The pair-wise correlations of the development parameters (Table 3C) show that there is a negative relation between poverty and other development parameters especially with mean consumption level. This is expected, since poverty is inversely related with development, whereas other variables are directly related with development. Rural development is found strongly related with the corresponding urban development.

Table 3C. Correlation among the Development Parameters in India

	HCRR	RMCR	LITR	FMRR	HCRU	RMCU	LITU	FMRU
HCRR	1.00	–.586*	–.344	–.397	.717**	–.472	–.417	–.449
RMCR		1.00	–.148	.318	–.630*	.492	.241	.456
LITR			1.00	.738*	–.362	.469	.904**	.631*
FMRR				1.00	–.175	.241	.511	.845**
HCRU					1.00	–.595*	–.533*	–.475
RMCU						1.00	.721**	.295
LITU							1.00	.509
FMRU								1.00

HCRR = head count ratio (rural), RMCR = mean consumption (rural), LITR = literacy (rural), FMRR = sex ratio (rural), HCRU = head count ratio (urban), RMCU = mean consumption (urban), LITU = literacy (urban), FMRU = sex ratio (urban).

*significant at 5% level, **significant at 1% level.

Women Health

We now focus our attention to the health issues of women. State-wise women health position is shown in Table 4A. It is found from the table that the women of

urban sectors are in a better condition than in rural sectors. Here also it is found that Kerala and Punjab are in good positions. The worst affected states are Assam, Bihar, Orissa and West Bengal in case of anaemia in NFHS-2. However, many of the states have improved their positions in 2005–06 in absolute term. The urban–rural difference is not so marked except for the state of Gujarat, West Bengal, Karnataka and Orissa (Table 4B).

Table 4A. State-wise Percentage Distribution of Women Health in India

	Women Anaemia				Percentage of Women with BMI < 18.5			
	1998–99		2005–06		1998–99		2005–06	
State	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
AP	50.6	47.4	64.6	55.0	43.2	19.7	38.7	21.0
As	69.9	67.2	70.2	66.0	27.9	18.8	38.2	26.2
Bi	63.9	59.6	67.5	66.7	40.3	31.1	45.3	31.5
Gu	51.3	39.5	58.6	50.9	47.7	22.8	44.2	24.2
Ka	46.0	35.7	53.5	48.3	47.0	23.8	40.4	25.6
Ke	23.4	20.4	32.1	34.1	19.9	14.7	19.1	14.9
MP	57.0	46.2	59.6	43.4	41.8	28.2	43.7	29.3
Ma	51.2	44.8	50.5	47.9	49.3	26.2	44.4	27.5
Or	64.1	54.8	62.2	56.0	49.9	32.9	43.3	27.8
Pu	42.5	39.0	37.4	39.2	20.5	9.2	19.4	16.9
Ra	49.1	46.7	55.3	48.0	38.7	28.5	38.0	30.8
TN	59.1	51.6	54.3	51.5	35.2	17.5	33.0	19.3
UP	49.4	46.0	50.3	46.3	39.1	23.3	37.2	23.2
WB	64.2	57.8	64.7	56.4	49.8	24.5	45.3	19.5

Table 4B. Urban–Rural Difference of State-wise Percentage of Women Health Parameters in India

	Women Anaemia (1998–99)		Women low BMI (<18.5) (1998–99)		Overall Rank of Differences (1998–99)	Women Anaemia (2005–06)		Women Low BMI (<18.5) (2005–06)		Overall Rank of Differences (2005–06)
State	Diff.	Rank	Diff.	Rank		Diff.	Rank	Diff.	Rank	
AP	–3.2	11	–23.5	3	8	–9.6	2	–17.7	3	2
As	–2.7	13	–9.1	13	13	–4.2	8	–12.0	11	10
Bi	–4.3	8	–9.2	12	11	–0.8	12	–13.8	9	12
Gu	–11.8	1	–24.9	2	1	–7.7	4	–20.0	2	3

Table 4B. *(Continued)*

Table 4B. *(Continued)*

State	Women Anaemia (1998–99) Diff.	Rank	Women low BMI (<18.5) (1998–99) Diff.	Rank	Overall Rank of Differences (1998–99)	Women Anaemia (2005–06) Diff.	Rank	Women Low BMI (<18.5) (2005–06) Diff.	Rank	Overall Rank of Differences (2005–06)
Ka	–10.3	3	–23.2	4	2	–5.2	7	–14.8	6	6
Ke	–3.0	12	–5.2	14	14	2.0	14	–4.2	13	13.5
MP	–10.8	2	–13.6	9	6	–16.2	1	–14.4	7	4
Ma	–6.4	6.5	–23.1	5	7	–2.6	11	–16.9	4	7
Or	–9.3	4	–17.0	7	4	–6.2	6	–15.5	5	5
Pu	–3.5	9	–11.3	10	10	1.8	13	–2.5	14	13.5
Ra	–2.4	14	–10.2	11	12	–7.3	5	–7.2	12	8.5
TN	–7.5	5	–17.7	6	5	–2.8	10	–13.7	10	11
UP	–3.4	10	–15.8	8	9	–4.0	9	–14.0	8	8.5
WB	–6.4	6.5	–25.3	1	3	–8.3	3	–25.8	1	1

Table 4C presents the correlations of the health parameters of women. Only the correlations between rural and the corresponding urban percentages are seen to be quite high. Other correlations are not so prominent.

Table 4C. Correlations among the Women Health Parameters in India (1998–99)

	WomanaR	WolowBMIR	WomanaU	WolowBMIU
WomanaR	1.00	.462	.959**	.500
WolowBMIR		1.00	.297	.756**
WomanaU			1.00	.404
WolowBMIU				1.00

**significant at 1% level.

Table 4D. Correlations among the Women Health Parameters in India (2005–06)

	WomanaR	WolowBMIR	WomanaU	WolowBMIU
WomanaR	1.00	.812**	.900**	.588*
WolowBMIR		1.00	.639*	.728**
WomanaU			1.00	.485
WolowBMIU				1.00

WomanaR = women anaemia (rural), WomanaU = women anaemia (urban),

WolowBMIR = women with low BMI (rural), WolowBMIU = women with low BMI (urban).

*significant at 5% level

** significant at 1% level

State-wise Comparison of Groups of Variables

Since relations between two groups of variables are best described by canonical correlations, we have computed the same in Tables 5A and 5B. It can be seen from the canonical correlation tables that all the values are quite high. The groups are closely related. Thus, the development of a state goes side by side with child and women health. However, it has already been pointed out that, it is not possible to compute the values of the canonical correlations when there are large numbers of variables and also it fails to capture the direction of relations. To overcome these problems of canonical correlations we have resorted to rank correlation method as described before.

Table 5A. Cannonical Correlations Between Child Health, Women Health and Development Indicators (rural versus rural and urban versus urban)

Rural vs. Rural / Urban vs. Urban	Child	Development	Women
Child	1.000	0.970	0.846
Development	0.967	1.000	0.904
Women	0.794	0.893	1.000

Table 5B. Cannonical Correlations between Child Health, Women Health and Development Indicators (rural versus urban)

Urban / Rural	Child	Development	Women
Child	0.988	0.978	0.911
Development	0.940	0.975	0.908
Women	0.736	0.743	0.973

On the basis of the ranks of the states for each group of variables (Table 5C), it was seen that Kerala and Punjab are at the top places. But if we consider only the child health, Assam takes the top position. Bihar, Orissa and Madhya Pradesh come at the end of the list (Table 5C).

Table 5C. Average Ranks of Child Health, Women Health and Development Indicators of Major States of India

	Average Child Health Rank		Average Women Health Rank		Average Development Rank		Overall	
State	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
AP	6	7	7	7	9	10	7	8
As	1	1	8	10	12	6	5	6

Table 5C. *(Continued)*

Table 5C. *(Continued)*

	Average Child Health Rank		Average Women Health Rank		Average Development Rank		Overall	
State	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Bi	12	11	11	14	14	14	13	14
Gu	8	8	10	4	6	4	9	5
Ka	5	5	5	3	8	7	4	4
Ke	2	2	1	1	1	1	1	1
MP	14	13	9	9	13	12	12	12
Ma	9	9	12	8	5	8	11	9
Or	13	14	13	13	11	11	14	13
Pu	4	4	2	2	2	2	2	2
Ra	11	12	3	11	10	9	10	11
TN	3	6	6	5	4	3	3	3
UP	10	10	4	6	7	13	6	10
WB	7	3	14	12	3	5	8	7

The Spearman's rank correlations of groups of variables are given in Tables 6A and 6B. Most significant correlations have been found for urban versus urban pairs. It may be because the links among urban sectors are more than among rural sectors. In case of urban sectors, development is found correlated with both child

Table 6A. Rank Correlations Among the Three Groups of Variables (rural versus rural and urban versus urban)

Urban vs. Urban \ Rural vs. Rural	Child Health	Development	Women Health
Child health	1	–0.319	0.446
Development	0.758**	1	0.248
Women health	0.490	.846**	1

**significant at 1 per cent level.

Table 6B. Rank Correlations among the Three Groups of Variables (rural versus urban)

Rural \ Urban	Child Health	Development	Women Health
Child health	0.934**	0.789**	0.544*
Development	0.519	0.792**	0.670**
Women health	0.285	0.397	0.846**

*significant at 5 per cent level.

**significant at 1 per cent level.

health and women health, whereas the correlation between child health and women health is not much. For the same group, rural versus urban correlation is found to be more than correlation between groups. Thus, the rural sectors of each state move along with the urban sector.

Discussion

India has recently been showing keen interest in regards to human development. The 8th Five Year Plan (1992–97) identified 'human development' as its main focus with health as one of the objectives. In our article we have tried to find out how close the states are in their positions with respect to development and morbidity patterns. It also shows how the rural sectors differ from the corresponding urban sectors. This is an attempt to see whether the health situation in the states move along with the level of development.

The variables considered in the article have been found to move together at the expected directions. There are some variables that are rightly found to be positively linked with the development measured through RMC, literacy, female–male ratio. There are also some variables that are negatively linked with the development. These are the child and women morbidity parameters and HCR. These two types of variables may be termed as 'positively- linked' and 'negatively-linked' variables. There is a clear association among these variables. The variables with each of these groups are found positively related through product moment correlation coefficients and the 'positively-linked' variables have been found to be 'negatively-linked' variables. There are some minor exceptions.

So far as individual states are concerned, Kerala and Punjab top the list of developed states. But there are some differences between these two states. Kerala is developed in all aspects but Punjab is more developed in economic aspects only. Bihar and Orissa are at the bottom of the list. Katakam (2002) in an article of *Frontline* reports that widespread inequalities in the distribution of resources have led to glaring regional disparities, acute poverty and a high level of unemployment. Assam, though poor in development aspects, has been moving towards the attainment of the 'health for all'.

A number of studies regarding different aspects of health show that urban areas are in a better position. The urban areas offer more choices: greater availability of electricity, water and sanitation services, health services and so on (Smith, Ruel and Ndiaye, 2005). We have in our study found similar results. Moreover, the rural–urban difference is found to be more in less developed states, but the correlations between rural and urban sectors of the same states are very high. It means that development of sectors goes together but the gaps between the sectors widens for less developed states.

To compare the groups of variables, the help of canonical correlation analysis is taken. The results are similar. Rural–urban correlations of the same group of variables are found to be more. Since there are degrees of freedom problem in this

analysis, we have resorted to the rank correlation methods. Urban sectors have been found to be more linked with urban sectors.

Assam is not regarded as a developed state. But surprisingly this state comes in the forefront when child health is considered. One has to probe it further to see the reasons behind it.

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