



ORIGINAL RESEARCH PAPER

Arts

A STUDY OF INTERSTATE VARIATIONS OF HEALTH OUTCOMES IN INDIA

KEY WORDS: Health, IMR, LEB and Socio-economic variables of health outcomes.

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ABSTRACT

The present study attempts to highlight the trends and regional variations in health outcomes in major states of India. The study investigates the spatial variations across the selected states of India in terms of basic health indicators such as infant mortality rate(IMR), under five mortality rate (U5MR), life expectancy rate(LEB) and literacy rate. In order to capture the health outcomes of 20 major states of India spearman's rank correlation has been calculated. In the study, health outcomes data have been used for IMR trends in rural urban comparison for the period 1980 to 2017. The study revealed the rank correlation between Life expectancy at birth(LEB) and poverty level, per capita NSDP, total literacy rate, per capita health expenditure show highly statistically significant correlations. Human Development Index (HDI) value and LEB also shows the rank correlation (0.809) which are highly statistically positively significant correlations. Negative signare(-0.275) of rank correlation between LEB and poverty level depicts the inverse relationship between them, showing an increase in poverty level is expected to bring a fall in LEB. The study revealed the Inequalities in the availability of health services across the selected states of India. Variations are pronounced in terms of socio-economic, demographic and maternal health outcomes. The interstate variation are the best illustrated by comparing the state of Kerala with (7 per thousand live birth) in IMR and female literacy rate with (92.1 percent). The study also focuses on the inequalities in utilization of preventive and curative services across the rural -urban areas of selected states of India and found that the economic conditions and effectiveness of health services at the state level have direct bearing on health status of people in the respective states.

1. INTRODUCTION

An inter-state analysis of trends and variation in health outcomes has attracted considerable interest on the part of economic researchers in the empirical levels. It is universally acknowledged that good health has intrinsic value and therefore constitutes an integral element of development. Development of any country is directly linked with the health indicators of people of the country. Health status is assessed on the basis of health outcomes of a population, reflected in such indicators as life expectancy at birth, infant mortality rates as well as incidence of morbidity and malnutrition. India's health outcomes have improved overtime because of extension of primitive, preventive and curative services to all section of the society. Despite falling child mortality, other rates remain high as they are strongly related to child malnutrition where little progress has been made (Choudhary 2015).

However, on the other hand, (Baru 2010) in their studies have found out a persistence and in some cases, the widening of inequities in health outcomes as well as access to health services in India, over the last two decades, the health policy document of 2002 and the sub documents have highlighted these concerns that statistics bring out the wide differences between the attainments of health goals, in the better performing states as compared to the low-performing states. It is clear that national averages of health indices hide wide disparities in public health facilities and health standards in different parts of the country. This observation is reinforced by some studies that show the growing inequalities in mortality and nutrition at all India level, across states, as well as within states and social groups. These groups have faced social and economic inequality that disadvantages themes of in term of access to resources and basic needs which is reflected in poor health outcomes. Rao 2007 in his analysis of financial variations shows that while per capita spending on health is Rs. 35.05 for Kerala and Rs. 42 for Tamil Nadu, it is abysmally low for Uttar Pradesh at Rs. 18.10 during 1998-99.

At the independence time, health circumstances in India were extremely poor with poor health care services which were unequal and much urban dependent than rural areas. But after independence India witnessed a remarkable progress in health sector. Bhore Committee, 1946 on Health Policy was

given first stepping stone in remodeling the health services in India. India's crude birth rate has come down from 40.8 in 1947 to 20.2 in 2017 and crude death rate has also reduced from 27.4 to 6.3 per 1000 people. Infant Mortality Rate has declined from 146 in 1947 to 33.0 in the year 2017, while at the same time Life Expectancy at Birth has increased from merely 35 years in 1947 to 68.8 years in 2016 (SRS, 2018).

In global scenario, India's position in respect of health outcomes is not very impressive. Life expectancy at birth in India in the year 2017 is much below (68.8 years) than its neighboring countries, Bangladesh (72.8 year) and better than Pakistan (66.6 years) and Afghanistan (64.0 years). Infant Mortality Rate (IMR) per 1000 live births in Pakistan (64.2) and Afghanistan (53.2) which is higher from India i.e. (34.6) and on the other side with better position in IMR comparison to India like China (8.5), and U.S. (5.6) in the year 2016 (UNDP, 2016).

Table 1: Health Indicators Among Selected Countries

Country	Total Health Expenditure Percentage of GDP On Health (2015)	IMR(2016) Per 1000 Live Birth	UMR (2016)	LEB (2017)
Us	16.8	5.6	6.5	79.5
Germany	11.2	3.2	3.8	81.2
U. K.	9.9	3.7	4.3	81.7
Japan	10.9	2.0	2.7	83.9
Canada	10.4	4.3	4.9	82.5
China	5.3	8.5	9.9	76.4
India	3.9	34.6	43.0	68.8
Pakistan	2.7	64.2	78.8	66.6
Bangladesh	2.6	28.2	34.2	72.8
Nepal	6.1	28.4	34.5	70.6
Afghanistan	10.3	53.2	70.4	64.0
Myanmar	4.9	40.1	50.8	66.7
Bhutan	3.5	26.8	32.4	70.6

Source: HDR Report 2016

Review Of Literature

There is a large volume of empirical literature to scrutinize the linkages of health system and socio economic factors with health outcomes. **Kurian(2010)** assessed the overall condition and health outcomes in different states of India. The health indicators of India were quite unimpressive and there exist vast disparities in the achievement of health outcomes across the regions of the country, between the genders. The basic weakness is the absence of accessible basic doctors. Over eighty percent of health expenditure in the county is borne by the household as out-of pocket expenditure. The study found that the richest quintile enjoy three times the share of public subsidy for health care compared to the poorest quintile and limited public expenditure on health care are regressively distributed among the people of the country. The country have yet to take-up the challenges of public health sanitation, potable water, housing, food security, and working environments all these were important aspect of public health, where coordinated action by all concerned were essential to achieve better health outcomes. Female literacy, women empowerment, community action, antenatal and continuous monitoring of the health parameter of the infants, quality of drinking water and sanitation were all equally important for fighting against malnutrition. India needs to strengthen the publicity funded primary healthcare services with universal coverage and no user charges.

Amonker And Brinker (1997) has explained the role of various socio-economic factors that influenced infant and child mortality in different states of India, 23 socio-economic variables have been taken from NFHS-1 data, which have been then grouped into 4 major categories such as educational, modernization, health and family planning variables. The dependent variables in their study are infant mortality and child mortality rate. Three statistical tests that have been used the Pearson's correlation coefficients, Spearman's correlation coefficients and multiple regression analysis. Their results showed that higher socio-economic development ensured lower IMR and CMR among Indian states.

The interstate variations in availability of healthcare services across 15 major states of India which have been categorized as high, middle and low income states according to their per capita income has analyzed by **Purohit (2004)**. On the basis of data by NSSO (52nd round) has concluded that there exists an inequality in health care resources favoring the high income states.

However, poor in the rich states were also not in favorable situation in terms of overall distribution of healthcare services. In case of Out Patient Department (OPD) treatment and impatient care, there was high financial burden for low income states than the other states. The study emphasized on mobilization of additional resources through the assistance of donor agency to overcome regional disparities in healthcare across the different states of India.

The rest of the paper organized as follows. **Section 2** presents the data sources and methodology are discussed and **section 3** presents the inter-state variation and inequalities in health outcomes **section 4** presents the inequities in health services in terms of availability and inequalities in utilization of preventive and curative services and **section 5** presents the results of the study. Finally, the conclusion can be found in **Section 6**.

2. DATA SOURCES AND METHODOLOGY

For the purpose of this study, secondary data has been used. The data has been collected from various issues of SRS bulletin, International Institute of population science (IIPS) NFHS, Registrar General of India and planning commission of India and National health Profile, Central statistical office (CSO), GOI.

Objectives of the study

1. To analyze the inter-state trends and variation in health outcomes.
2. To study the inequalities in availability of health services across the selected states of India.

In order to capture the association among the health outcomes variables of 20 major states of India spearman's rank correlation has been used. In order to significance of rank correlation coefficients of different indices for different states, empirical value of has been computed,

$$t = rR\sqrt{n - k} / \sqrt{1 - rR^2}$$

Where t distribution has n-k degrees of freedom.

Spearman's rank correlation has been done to explore the correlations among the ranking of the states on the basis of health outcomes variables along with IMR and U5MR. For the purpose of analysis twenty major states of India has been considered. The null and alternative hypothesis have been formed which are as follows:

H0: There is no significant difference in the ranking of the states given on the basis of health outcomes variables.

H1: There is significant difference in the ranking of the states given on the basis of health outcomes variables.

TRENDS OF IMR IN INDIA

In recent years the rate of decline in IMR trends has been stagnated making it difficult to achieve the millennium development goal of child mortality (Subburamn 2015). According to SRS reports, India has reduced its IMR trends in the years 1980 was 114 to 33 by 2017. Between 2004 and 2008 the average decline of IMR trends has been about 1 Percent per year. Had India maintained the long term trend achieved till early nineties, the observed rate would have been much less today, implying of many infants. It is expressed from the data of IMR trends since 1980 to 2017 that the rural urban differences in IMR trends have been continuing for a long time. More female infants die as compare to males. It is seen in the Year 2017 female IMR is at 34, whereas male IMR is 32 per thousand live births.

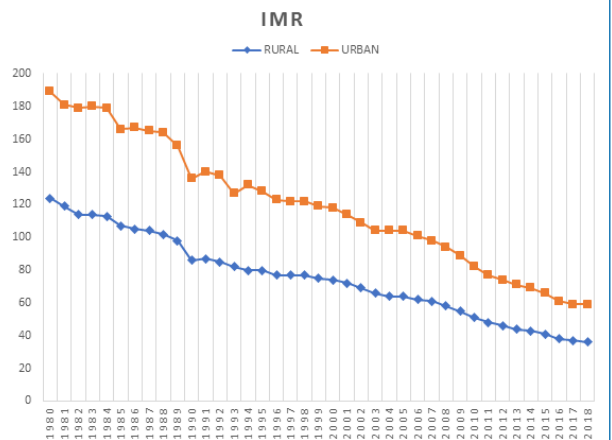


Figure:1 IMR IN INDIA 1980-2018

Table 2: Trends of India's IMR

Year	Total	Male	Female	Rural	Urban
1980	114	113	115	124	65
1981	110	-	-	119	62
1982	105	106	104	114	65
1983	105	105	105	114	66
1984	104	104	104	113	66
1985	97	96	98	107	59
1986	96	96	97	105	62
1987	95	95	96	104	61

1988	94	96	94	102	62
1989	91	92	90	98	58
1990	80	78	81	86	50
1991	80	81	80	87	53
1992	79	79	80	85	53
1993	74	73	75	82	45
1994	74	75	73	80	52
1995	74	73	76	80	48
1996	72	71	73	77	46
1997	71	70	72	77	45
1998	72	70	73	77	45
1999	70	70	71	75	44
2000	68	67	69	74	44
2001	66	64	68	72	42
2002	63	62	65	69	40
2003	60	57	64	66	38
2004	58	58	58	64	40
2005	58	56	61	64	40
2006	57	56	59	62	39
2007	55	55	56	61	37
2008	53	52	55	58	36
2009	50	49	52	55	34
2010	47	46	49	51	31
2011	44	43	46	48	29
2012	42	41	44	46	28

2013	40	39	42	44	39
2014	39	37	40	43	37
2015	37	35	39	41	35
2016	34	33	36	38	23
2017	33	32	34	37	23

Source: SRS 2013, SRS 2016, SRS 2019

Figure 1 shows the inequities variation in rural urban IMR trends in India. IMR trends in rural area (37 per 1000 live births) is significantly higher than that of urban area (23) over the Three decades. However, significant decline in IMR trends has been observed both in rural and urban areas over the years.

3. INTER-STATE VARIATION AND INEQUALITIES IN HEALTH OUTCOMES

The gross inequalities in health within and between the countries presents a challenges of the world (Marmot 2005). It is well known that IMR is a sensitive indicator for socio-economic and health services development. As Deogankar's (2009) analysis shows the infant mortality rate in the poorest 20 per cent of population is 2.5 times higher than that in the richest 20 per cent of the population. A child in the low standard of living economic group is almost four times more likely to die in childhood than a child in the 'High standard of living' group. A female child is 1.5 times more likely to die before reaching her fifth birthday as compared to male child.

Table 3: Selected Health Outcomes In India And Major States

States	LEB (2013-2017)	IMR SRS 2019	USMR (2017)	TFR (2019 SRS)	Poverty level	Total literacy Rate	Per capita NSDP (2017)	Per capita health expenditure (2018)	HDI value (2018)
1	2	3	4	5	6	7	8	9	10
India	69.0	33	37	2.2	21.9	73	82229	3826	.647
Andhra Pradesh	69.7(9)	32(14)	35(12)	1.6(2)	9.2(6)	67(16)	550584(8)	1013(12)	0.650(12)
Bihar	68.9(13)	35(15)	41(14)	3.2(19)	33.7(17)	61.8(19)	340512(14)	491(19)	0.576(20)
Chhattisgarh	65.2(18)	38(16)	47(17)	2.4(14)	39.9(20)	86(4)	200453(16)	1354(6)	0.613(15)
Delhi	74.7(2)	16(3)	21(3)	1.5(1)	39.3(19)	86.2(3)	529739(9)	1992(4)	0.746(3)
Goa	-	9(1)	-	-	9.9(7)	88.7(2)	51878(20)	3643(1)	0.761(2)
Gujarat	69.7(10)	30(12)	33(10)	2.2(12)	5.1(1)	78(8)	1036859(3)	1189(8)	0.672(11)
Haryana	69.7(11)	30(13)	35(13)	2.2(13)	16.6(12)	75.4(11)	477834(11)	1119(11)	0.708(6)
Himachal Pradesh	72.6(4)	22(7)	25(7)	1.6(3)	11.2(9)	82.8(5)	101534(18)	2667(2)	0.725(4)
Jammu And Kashmir	74.1(3)	23(8)	24(5)	1.6(4)	8.1(3)	67.2(15)	91666(19)	2359(3)	0.688(9)
Jharkhand	68.6(14)	29(11)	34(11)	2.5(15)	10.3(8)	66.4(17)	204423(17)	866(15)	0.599(18)
Karnataka	69.2(12)	24(9)	28(9)	1.7(8)	37(18)	75.4(11)	976948(5)	1124(10)	0.682(10)
Kerala	75.2(1)	10(2)	12(1)	1.7(9)	20.9(14)	94(1)	513322(10)	1463(5)	0.806(1)
Madhya Pradesh	66.0(17)	47(20)	55(19)	2.7(17)	7.1(2)	69.3(13)	461903(12)	716(18)	0.606(17)
Maharashtra	72.5(5)	19(5)	21(4)	1.7(10)	31.6(15)	82.3(6)	1794123(1)	1011(13)	0.696(8)
Orissa	68.4(16)	41(18)	47(18)	1.9(11)	18.9(13)	72.9(12)	327805(15)	927(14)	0.606(16)
Punjab	72.4(6)	21(6)	24(6)	1.6(5)	32.6(16)	75.8(10)	354830(13)	1173(9)	0.723(5)
Rajasthan	68.5(15)	38(17)	43(15)	2.6(16)	8.3(5)	66.1(18)	600433(7)	927(14)	0.629(14)
Tamil Nadu	71.7(7)	16(4)	19(2)	1.6(6)	8.2(4)	80.1(7)	1079894(2)	1235(7)	0.708(7)
Uttar Pradesh	65.0(19)	41(19)	46(16)	3.0(18)	14(11)	67.7(14)	979159(4)	733(17)	0.596(19)
West Bengal	71.2(8)	24(10)	26(8)	1.6(7)	11.3(10)	76.3(9)	662432(6)	778(16)	0.641(13)

Source: Registrar general of India Col.2Abridge life table, 2010-14 planning commission, RGI, GOI, Col.2,3SRS2016,2017, Col. 5 SRS2017, Col.6: Planning commission, Tendulkar estimates 2011, Col. 7: Censes of India 2011. Col.10: UNDP, Human development index 2018 India state, Col.8: RBI handbook of statics 2017-18 Report, CSO., Col.9National Health Profile 2018.

Note: IMR 2017, USMR 2017, LEB 2013-17, Total fertility rate2017, Poverty level2011, Total literacyRate2011. Per capita NSDP (R.S.)2017, Per capita health expenditure (crore)2018. In brackets figures ranks are given on the basis of states performance which are best and worst in the health variables.

Interstate variation in health outcomes is clear from the table 3., IMR varies from 47 in Madhya Pradesh to 9 in Goa, Under five mortality rate ranges from 12 in Kerala to 55 in Madhya Pradesh. LEB ranges from Kerala75.2 per cent which is highest

in all states ranking and 65.0 per cent in Pradesh which is lowest ranking. In total fertility variable of health outcomes Delhi with 1.5 per cent are achieved first ranks and Bihar 3.2and U.P. with 3.0 per cent and followed by M.P. with 2.7 per cent at the Lowest ranking across the states. In poverty level the states Bihar(33.7) and Chhattisgarh(39.9)per cent are lowest performing. Bihar is also lower performing in per capita health expenditure and per capita NSDP variables.

In literacy rate Kerala is highest per cent 94 and Bihar is lowest per cent (61.8).

In the study concluded that there is huge variation in Indian state in terms of health outcomes in which Kerala, Goa, WestBengal, TamilNadu ,Delhi, Maharashtra are better performing states in these health outcomes and EAG states such as Bihar, Jharkhand ,U.P. Orissa, M.P. and Chhattisgarh are lower performing states.

4. INEQUALITIES IN AVAILABILITY OF HEALTH SERVICES

It is known that reduction in mortality and morbidity is partly due to preventive and curative intervention by public health services. The availability of services in across Indian states because of differences in socio-economic, demographic and maternal health outcomes (Baru, R.2010).

Inequalities persistent in the availability of public health services across the selected states of India. Variations are pronounced in terms of socio-economic (IMR), demographic (children immunization) and maternal (institutional birth) health outcomes. In the table 4 the interstate variation are the best illustrated by comparing the state of Kerala with (10 per thousand live birth) that of best performing state in IMR and female literacy rate and also showed Kerala state is better position in percentage of institutional birth (96.9) and Goa is highest position in percentage of children 12-23 monthly fully immunized i.e. 88.4. and M.P. with (47 per thousand live birth are worst performer in health services indicators in IMR and the state Bihar is lowest performer in female literacy rate (51.2 per cent) and in percentage of institutional birth the lowest position state are Jharkhand with (61.9 percent). Rajasthan is the less percent 51.1 in children who 12-23 monthly fully immunized. Average population served per govt. hospital the state Andhra Pradesh with highest performance and Himachal Pradesh is lowest in this position and H.P. also in lowest position in population served per govt. hospital bed and Bihar and Andhra Pradesh are good performing. But Overall health outcomes indicators Kerala, Goa are better performing than Bihar and Andhra Pradesh Which was Worst performing and Himachal Pradesh is lower performers than Kerala, Goa and better performing than Bihar and Andhra Pradesh in terms of health outcomes variables.

Table:4 Inter-state Inequalities In Availability Of Health Services

State	IMR	Female Literacy Rate	Institution Birth	Children 12-23 monthly fully immunized	Average population served per govt. Hospital	Average population served per govt. Hospital Bed
Andhra Pradesh	34	59.1	90.5	65.3	342484	3819
Bihar	38	51.2	63.8	61.7	100589	8645
Chhattisgarh	39	60.2	70.2	76.4	116397	2647
Delhi	18	80.8	84.4	66.4	184331	824
Goa	8	84.7	96.9	88.4	48167	671
Gujarat	30	69.7	88.5	50.4	129270	1946
Haryana	33	65.9	80.5	62.2	42001	2496
Himachal Pradesh	25	75.9	76.4	69.5	8928	577
Jammu And Kashmir	24	56.4	85.7	75.1	94083	1066
Jharkhand	29	55.4	61.9	61.9	59825	3079
Karnataka	24	68.1	94.3	62.6	24056	979
Kerala	10	92.1	99.8	82.1	27873	939
Madhya Pradesh	47	59.2	80.8	53.6	170166	2661
Maharashtra	19	75.9	90.3	56.3	166880	2306
Orissa	44	64	85.4	78.6	23729	2312
Punjab	21	70.7	90.5	89.1	43067	1638
Rajasthan	41	52.1	84.0	54.8	97005	2291
Tamil Nadu	17	73.4	99.0	75.2	57297	899

Uttar Pradesh	43	57.2	67.8	51.1	47782	2904
West Bengal	25	70.5	75.2	84.4	58697	1170
India	34	64.6	78.9	62.0	55591	1844

SOURCE:CENTRAL BUREAU OF HEALTH INTELLIGENCE, MINISTRY OF HEALTH AND FAMILY WELFARE, GOI NHP 2018. NFHS- 4 (2015-16), Column 4 data from censuses of India 2011, column -2,3 SRS 2015,2016, column 5,6 NFHS-4, Column 7,8 National health profile (2018).

Note: IMR(per 1000 live birth)2015, Female Literacy Rate(percent)2011, Percentage of institution Birth(2015-16), Children 12-23 monthly fully immunized(2015-16), Average population served per govt. Hospital and Average population served per govt. Hospital 2017.

INEQUALITIES IN UTILIZATION OF PREVENTIVE AND CURATIVE SERVICES

The inequalities explained by availability and more importantly by the accessibility and quality of services provided (Baru 2010). This study shows the inter-state variation in the effectiveness of preventive service delivery. It shows a clear north south divide in the inequality of services delivered. The overall indicators for full immunization are poor in India with variation across rural and urban areas in the selected states of India.

Table: 5 Inequality In Children And Maternal Health Services Indicators Across Inter-state.

State	Full immunization			Mother who received the at least 4 ANC visit		
	Rural	Urban	Total	Rural	Urban	Total
Andhra Pradesh	50.4	53.6	65.3	75.1	79.6	76.3
Bihar	61.9	59.7	61.7	13.0	26.3	14.4
Chhattisgarh	74.3	84.9	76.4	55.7	71.1	59.1
Delhi	66.2	-	66.4	-	68.8	68.6
Goa	90.1	87.7	88.4	90.6	86.2	89.0
Gujarat	50.4	50.4	50.4	63.0	80.5	70.5
Haryana	65.1	57.0	62.2	42.6	49.3	45.1
Himachal Pradesh	69.9	64.8	69.5	67.3	90.2	69.1
Jammu And Kashmir	72.9	81.6	75.1	78.8	89.2	81.4
Jharkhand	60.7	67.0	61.9	69.4	75.6	72.2
Karnataka	64.8	59.8	62.6	70.9	69.5	70.3
Kerala	82.0	82.2	82.1	91.7	88.4	90.1
Madhya Pradesh	50.2	63.0	53.6	29.6	51.6	35.7
Maharashtra	55.8	56.7	56.3	69.4	75.6	72.2
Orissa	79.2	75.0	78.6	60.6	69.7	62.0
Punjab	89.3	88.7	89.1	67.8	69.4	68.5
Rajasthan	53.1	60.9	54.8	34.1	53.8	38.5
Tamil Nadu	66.8	73.3	75.2	81.0	81.3	81.2
Uttar Pradesh	50.4	53.6	51.1	21.7	43.3	26.4
West Bengal	87.1	77.7	84.4	75.8	78.1	76.5
India/ Average	61.3	63.9	62.0	44.8	66.4	51.2

Source: NFHS-4

Note: Percentage of children 12-23 months fully immunized (BCG, measles and 3 doses each of polio/DPT) 2015-16. Mother who received the at least 4 ANC visit (2015-16).

In the table in India 61.3 percent children are fully immunized in rural areas and 63.9 percent in urban areas. Goa with 90.1 per cent with high performing state or less inequalities in rural areas and worst performing state is M.P. with 52.2 per cent it means that more inequalities in children full immunized

health services in the state of M.P. On the other hand, Punjab with (88.7 per cent) is better performing state in preventive and curative health services and Gujarat with 50.4 per cent is worst performing state in utilization preventive and curative health services. On the other side the mother who received the 4 ANC Visit which are 51.2 per cent in average India. In variation across the state Kerala with 91.7 per cent high performer in ANC visit and followed by Goa with 90.6 and TamilNadu with 81.0 per cent. Bihar with 13 per cent in the lower position and U.P.(21.7) and Rajasthan(34.1 per cent) are the following state by Bihar.

5. RESULTS OF THE STUDY

In order to capture the association among the health outcomes variables of 20 major states of India spearman's rank correlation have been calculated. The correlation has been shown among Life expectancy at birth (2013-17), infant mortality rate and U5MR (2017), total fertility rate (2017), poverty level (2011), per capita net state domestic product (2016-17), total literacy rate (2011), per capita health expenditure (2018) and HDI value (2018). Results showed the significant correlation among the health outcomes. The rank correlation between LEB and per capita NSDP, total literacy rate, per capita health expenditure and HDI value show highly statistically significant correlations. Negative sign between LEB and poverty level depicts the inverse relationship between them, showing an increase in poverty level is expected to bring a fall in LEB. Increase in LEB will be reflected on HDI value, as life expectancy is an important component of HDI. Here the positive association of poverty level with IMR and U5MR

Table4: Health Outcomes And Socio-economic Factors: Correlation Matrix

	LEB	IMR	U5MR	TFR	Pove rty level	Total litera cy rate	Per capita NSDP	Per capita health expe nditur e	HDI valu e
LEB	1	-.90 7** (.00 0)	-.92 8** (.00 0)	-.804 ** (.000)	-.076 (.763)	.484* (.042)	.071 (.779)	.553* (.017)	.853* (.000)
IMR		1	.841 ** (.00 0)	.795* * (.000)	-.137 (.565)	.548* (.010)	-.106 (.647)	-.598* * (.004)	-.861 ** (.000)
U5MR			1	.533* (.015)	-.191 (.419)	-.629 ** (.003)	-.111 (.642)	-.289 (.217)	-.815 ** (.000)
TFR				1	.059 (.804)	-.379 (.100)	-.204 (.389)	-.663* * (.001)	-.797 ** (.000)
Poverty level					1	.332 (.142)	-.166 (.471)	-.092 (.693)	.050 (.833)
Total literacy Rate						1	-.073 (.752)	.392 (.078)	.766* * (.000)
Per capita NSDP							1	-.225 (.326)	-.016 (.947)
Per capita health expend iture								1	.730 (.000)

HDI value									1
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Note: ** Correlation is significant at the 0.01 level (2 tailed), * Correlation is significant at the 0.05 level (2 tailed)

The negative association IMR and per capita health expenditure is because of the fact that the rise in per capita health expenditure is because of the fact that the rise in per capita health expenditure will ensure better health status, which is expressed to be reflected on health outcomes such as IMR. The same is true for U5MR also. Literacy rate also shows an inverse relation with IMR and U5MR. Higher level of population literacy makes people conscious about the health of their children which ensure reduction in IMR and U5MR(Amonker and Brinker 1997).

To test the significance of rank correlation coefficients of different indices for different states, 't' statistics has been carried out to calculate the empirical 't' value.

Table:5 Test Of Significance For Rank Correlations

Rank correlation between variables	Empirical t value	Significance Level	Null Hypothesis
IMR and U5MR	4.10	Significant at five percent	Rejected
IMR and Per capita NSDP	3.54	Significant at five percent	Rejected
IMR and Per capita health expenditure	2.39	Significant at five percent	Rejected
LEB and HDI	3.037	Significant at five percent	Rejected
LEB and Per Capita NSDP	3.45	Significant at five percent	Rejected
IMR and Literacy Rate	2.28	Significant at five percent	Rejected
Health Expenditure and HDI	3.70	Significant at five percent	Rejected
Health expenditure and NSDP	2.21	Significant at five percent	Rejected

From the table 5 it is clear that in the health outcomes variables association null hypothesis is rejected and alternative hypothesis is accepted as the absolute value of empirical 't' value is greater than the tabulated 't' value and showed significant difference in the ranking of the states given on the basis of health outcomes variables.

6. CONCLUSION AND POLICY SUGGESTION

The present study has been an effort to illustrate the trends and interstate variation in health outcomes in India. Infant mortality is widely accepted indicator of well being and is accepted as a key indicator of social progress and economic development. Health outcomes in India have been showing trends of improvements over a period of time. Infant mortality has declined significantly and at the same time life expectancy at birth has been continuing its upward climb. The study indicates that there is a huge variation between northern and southern states of India in respect of demographic behavior. The southern states are highly advanced in demographic parameters, while the EAG states are at the bottom of the spectrum. The study results revealed the rank correlation between LEB and poverty level, per capita NSDP, total literacy rate, per capita health expenditure and HDI value show highly statistically significant correlation. Human Development Index(HDI) value and Life expectancy at birth (LEB) also showed the rank correlation has been highly statistically positively significant correlations. Negative sign of rank correlation between Life expectancy at

birth(LEB) and poverty level depicted the inverse relationship between them. The study also revealed the inequalities in utilities of health services in which showed the variations across the rural-urban areas in the state of India.

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