

## **HEALTH PERFORMANCE INDEX : AN ASSESSMENT OF PARITY IN STATUS OF HEALTH IN INDIAN STATES**

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### **Abstract**

The current study analyses the performance of Indian states (major) with regard to their performance in health outcome .The indicators are converted in to indices and an attempt has been made to rank the states by constructing a multi dimensional index .For the same two types of methods are used, one the method adopted to measure PQLI by Morris and Mc Alpin, and the method used to construct the Human Development Index. States are ranked according to the index value between "0" to "1".

### ***Keywords:***

Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR)  
Health Performance Index (HPI)  
Indian States.

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## 1. Introduction

The present paper is developed for suggesting an alternative approach to assess the Indian states (Major category) on the basis of health outcome, through a composite index consisting of four different indicators. Unlike a single indicator based method, like Infant Mortality rate or Maternal mortality rate, the paper advocates a multi dimensional composite index consisting of indicators of the vulnerable section , such as women and children, to assess and rank the states on the basis of their performance. Similar types of attempt has been made by few authors, Sinha Piyush, Sahay Arvind& Koul Sambit (2017): Healthy States , Progressive India, NITI Ayoga (2017) , Urban Health Index, by WHO (2014). The paper is developed by drawing two methods ; method adopted by Morris and McAlpin (1982) for constructing physical Quality Life index and the method used to construct Human Development index.

As the health outcome of a state implicitly reflects the importance of health sector in the policy of a state as an important factor for growth and development ,the indicators selected to develop , reflect the overall health environment of a state . Especially , the performance of a state in providing health services to vulnerable sections such as women and children . The paper is organised in five sections. Section I deals with introduction. Section II discusses the overall health status of India and States. Section III discusses the indicators and the methodology, section IV discusses the proposed composite index which has been named as "Health Performance Index" and analyses the result and section V draws the conclusion .

## II

An outline of Health in India and the states :

India being the third largest economy in terms of its gross national income (in PPP terms), has the potential to develop more equitably. It possess the capacity to provide proper health care facility to its people. The national health policy of 2002 had given guidance regarding the approach for health care in the five year plans . The new health policy of "2017" prescribes the need to inform is to inform, clarify, strengthen and prioritise the role of the Government in shaping the health system in all its dimension; investment in health, organisation of health care services, prevention of diseases , access to the technology, human resource development, encouragement of medical pluralism , building knowledge base, development of better financial

strategy, strengthening regulation and health assurance . In spite of different schemes , still there exists disparity among the states.

Interstate disparity in health sector:

There exists high degree of inequality or disparity among the states regarding their performance in the health sector. This is evidenced by indicators, disaggregated for vulnerable groups between and within states.

Disparity in health outcome

**[T-1]**

		INDIA		
INDICATOR	TOTAL	RURAL	URBAN	DIFFERENCE
TFR	2.3	2.5	1.8	39%
IMR	40	44	27	63%

\*source: Situation Analysis, backdrop to National Health Policy -2017, Ministry of Health and Family Affairs, Govt. of India.

More indicators :

**[T-2]**

Indicator	States with Good Performance	States with greater Challenges
TFR(2013)	W.B(1.6),T.N(1.7), H.P(1.7),Punjab(1.7),Delhi(1.7)	Bihar(3.4),U.P(3.1),M.P(2.9),Rajasthan(2.8)
IMR(2013)	Goa(9),Manipur(10),Kerala(12), Puduchery(17),Nagaland(18).	M.P(14),Assam(54), Odisha(51),U.P(50),Rajasthan(47)
MMR(2011-13)	Kerala(61),Maharastra(68),Punjab(141), T.N(79)	U.P/Uttarakhand(285),Bihar, Jharkhand(208),M.P/Chhatishgarh(221), Rajasthan(224),Odisha(222).

\*source: Situation analysis; Backdrop to National health policy -2017, Ministry of health and Family Affairs, Govt. of India.

To remove the disparity among the states "National Rural Health Mission" was introduced to cover all health needs. The rapid and unplanned urbanisation has led to massive growth in the number of urban poor including migrant population. For the improvement of primary health care

"The National Urban Health Mission" was launched in 2013, which has focus on primary health care especially in urban poor and vulnerable population.

At the backdrop of disparity among the Indian states an attempt has been made to make an assessment of different Major category states of India in providing proper health care services to the people.

## **2. Research Method (12pt)**

Objective and methodology:

Health is a complex sector and the performance is monitored by a number of indicators. Women and children the most vulnerable section of the society and is an important issue as many women, infants and children worldwide still have little or no access to essential health services so this paper takes into account Infant Mortality rate and Mortality rate under the age 5 to measure the performance of a state regarding infant and child health and to measure the performance of a state regarding women health , Maternal Mortality rate and Total Fertility rate are selected .

The proposed composite index will have two component indices.

1. Infant and child health index (ICHI): It consists of two indicators :

- Infant mortality rate : It is an indicator of health status of infants as well as the socio economic condition of a state. It is a sensitive indicator of availability, utilisation and effective health care particularly prenatal and postnatal care.
- Under 5 mortality rate: It indicates both infant and child mortality. It is an important health indicator exhibiting the health status of any state or country .

2. Women and maternal health index (WMHI)

- Total fertility rate: Total fertility rate is the most commonly used demographic indicator. It is closely associated with contraceptive prevalence and other indicators of reproductive health such as maternal mortality ratio. It is a proxy measure of success or failure of family planning services. TFR can also be used as a good measure of poor physical reproductive health, since high parity (>5) represents high risk of maternal mortality and morbidity.
- Maternal mortality rate: This indicator measures the overall health status of an expecting mother including prenatal and postnatal care.

In order to construct the component indices out of the specified indicators, first, the values of each indicator should be converted into indices. For this, the methodology developed by Morris and McAlpin (1982) for constructing Physical Quality of Life Index has been applied here. Accordingly, the best and worst values of the indicators are identified for that year and the index is constructed in such a manner that all indices become unidirectional and could be horizontally combined to construct the component index, and an increase in the value of an indicator index would necessarily mean improvement in the health performance and the vice versa. Then the geometric mean of the component indexes are taken to compute the Health Performance Index. For each indicator, the performance of an individual state is put on a "0" to "1" scale. "0" represents an absolutely defined worst performance and "1" represents an absolutely defined best performance. For construction of these type of indexes, normally, best values are referred to a benchmark value, or a target set by the policy makers, or an inspirational value. Since this paper is developed with the objective of assessing relative position of different states, the best and worst values are empirically observed values of states in that specified time period. For construction of this index, equal weight is given to all indicators as these are the different parameters of the health sector of a state.

Within that specified time period, the best value and worst value of a state is selected, and then the following formula is applied to calculate the composite index;

If, X and Y are the best value and worst value respectively and v is the actual value of a state in a year, the critical values are calculated by applying the following formula:  $(v - Y)/(X - Y)$ . Then, by applying geometric mean the value of the composite index is calculated.

### **3. Results and Analysis**

Empirical Estimates of Health Performance Index (HPI) for states:

The two component indices prepared for general category states for the year 2013, 2014 and 2015 are presented in the tables below:

The first component index is Infant and Child Health Index and it is displayed below for the year 2013, 2014 and 2015 for a comparative perspective of the major category states of India.

**[T-3]****INFANT AND CHILD HEALTH INDEX FOR 2013.**

Sl.Number	STATES	IMR INDEX (2013)	U5mr index (2013)	Infant and child health index(2013)	Rank
2	Bihar	0.285	0.263	0.274	10
3	Chhatisgarh.	0.19	0.28	0.235	11
4	Gujarat	0.428	0.421	0.424	7
5	Hrrayana	0.309	0.421	0.365	9
6	Jharakhand	0.404	0.368	0.384	8
7	Karnataka	0.547	0.596	0.571	5
8	Kerala	1	1	1	1
9	Madhya Pradesh	0	0	0	15
10	Maharastra	0.714	0.754	0.734	3
11	Odisha	0.071	0.052	0.061	14
12	Punjab	0.666	0.666	0.666	4
13	Rajasthan	0.166	0.21	0.188	12
14	Tamil nadu	0.785	0.807	0.796	2
15	Uttar Pradesh	0.095	0.087	0.091	13
16	West Bengal.	0.547	0.596	0.571	5

\* source: calculated from the data given in "SRS" bulletin : 2013

States are classified as better performing states and the poor performing states on the basis of a selected threshold index value (0.5), which is the mid value between the index range ( 0 to 1). In the year 2013 the better performing states are Kerala, Tamil Nadu, Maharastra, Punjab, Karnataka , West Bengal and Andhra Pradesh with index values 1, 0.796, 0.734 , 0. 666, 0.571 and 0.52 and rank 1,2 , 3, 4, 5 and 6 respectively among the 16 general category states of India.

In comparison to that the last three poor performing states are Uttar Pradesh, Odisha and Madhya Pradesh with index values 0.091, 0.061 and 0.00 and rank 13, 14 and 15 respectively.

**[T-4]**

INFANT AND CHILD HEALTH INDEX : (ICHI) (2014)

Sl.No	States	IMR <sub>index</sub>	U5MR <sub>index</sub>	ICHI	Rank
1	Andhra Pradesh	0.325	0.425	0.375	10
2	Bihar	0.25	0.148	0.199	12
3	Chhatisgarh.	0.225	0.234	0.229	11
4	Gujarat	0.425	0.404	0.414	7
5	Hrrayana	0.4	0.425	0.412	8
6	Jharakhand	0.45	0.34	0.395	9
7	Karnataka	0.575	0.617	0.596	6
8	Kerala	1	1	1	1
9	Madhya Pradesh	0	0.17	0.085	14
10	Maharastra	0.75	0.787	0.768	3
11	Odisha	0.075	0	0.037	16
12	Punjab	0.7	0.702	0.701	4
13	Rajasthan	0.15	0.191	0.17	13
14	Tamil nadu	0.8	0.829	0.814	2
15	Uttar Pradesh	0.1	0.063	0.081	15
16	West Bengal.	0.6	0.638	0.619	5

\*source : calculated from the basic data given in different SRS bulletin 2014.

The relative performance of states are almost the same in the year 2014. On the basis of the selected threshold value, the better performing states are Kerala, Tamil Nadu, Maharastra ,

Punjab, West Bengal and Karnatak with index values 1, 0.814, 0.768, 0.701, 0.619 and 0.596 and rank 1, 2, 3, 4, 5, and 6 respectively and the bottom three rank holder states are Madhya Pradesh, Uttar Pradesh and Odisha with index values 0.85, 0.81 and 0.37 and rank 14,15 and 16 respectively. In comparison to the year 2013, in the year 2014 there is an improvement in the performance of each and every state and this is evident from the higher index values in the year 2014, that is displayed in the table above.

**[T-5]**

INFANT AND CHILD HEALTH INDEX:(2015)

States	IMR <sub>index</sub>	MRU5 <sub>index</sub>	Infant&Child Health <sub>index</sub>	Rank
AndhraPradesh	0.342	1.00	0.671	4
Bihar	0.210	0.269	0.239	12
Chhatishgarh	0.236	0.269	0.252	11
Gujrat	0.447	0.5	0.323	10
Harrayana	0.368	0.365	0.550	7
Jharkhand	0.473	0.442	0.457	8
Karnatak	0.560	0.596	0.575	6
Kerala	1	0.961	0.980	1
Madhyapradesh	00	00.00	00	16
Maharastra.	0.763	0.730	0.746	3
Odisha	0.105	0.096	0.099	15
Punjab	0.710	0.629	0.386	9
Rajasthan	0.184	0.230	0.207	13
Tamilnadu	0.815	0.807	0.811	2
Uttarpradesh	0.105	0.177	0.141	14
West Bengal	0.631	0.615	0.623	5

\* source : calculated from the data from "SRS" bulletin of different years.



The above table suggests that in the year 2015, in comparison to the year 2013 and 2014, there is an improvement in the performance of states in the category of Infant and Child Health Index as there are seven states beyond the threshold value 0.5, and these are Kerala , Tamil Nadu, Maharastra, Andhra Pradesh, West Bengal, Karnataka, and Harrayana with index values 0.980, 0.811, 0.746,0.671, 0.623,0.575 and 0.550 respectively with rank 1,2,3,4,5,6,and 7 and the bottom three performing states are Uttar Pradesh, Odisha and Madhya Pradesh with index values 0.141, 0.099 and 0.00 and rank 14,15 and 16 respectively It has been observed that Kerala, Tamil Nadu and Maharastra are the three consistently best performing states consecutively in these three years and Odisha, Madhya Pradesh and Uttar Pradesh have been the bottom three performing states in these three study periods.

#### **[T-6]**

#### WOMEN AND MATERNAL HEALTH INDEX (2013)

Sl.Number	STATES	TFR index (2013)	MMR Index(2013)	Women and maternal health index (2013)	RANKS
1	Andhra Pradesh	0.888	0.842	0.865	4
2	Bihar	0	0.343	0.171	15
3	Chhatishgarh.	0.444	0.285	0.364	12
4	Gujarat	0.611	0.758	0.698	7
5	Hrrayana	0.666	0.691	0.678	8
6	Jharakhand	0.388	0.343	0.365	11
7	Karnataka	0.833	0.678	0.755	6
8	Kerala	0.888	1	0.944	1
9	Madhya Pradesh	0.277	0.272	0.274	13

10	Maharastra	0.888	0.968	0.928	2
11	Odisha	0.722	0.281	0.501	9
12	Punjab	0.944	0.642	0.793	5
13	Rajasthan	0.333	0.155	0.244	14
14	Tamil nadu	0.944	0.844	0.894	3
15	Uttar Pradesh	0.166	0	0.083	16
16	West Bengal.	1	0	0.5	10

\*source: calculated from the basic data provided in SRS bulletin 2013.

In the category of Women and Maternal Health Index, there are nine states above the threshold value and these are Kerala, Maharastra, Tamil Nadu, Andhra Pradesh, Punjab, Karnataka, Gujarat, Harrayana, and Odisha. In comparison to infant and Child Health Index, the performance of states are better in the category of Women and Maternal Health Index and this can be revealed from the higher index values in this category. The poor performing states are Rajasthan, Bihar and Uttar Pradesh with position 14, 15 and 16 respectively.

#### **[T-7]**

##### WOMEN AND MATERNAL HEALTH INDEX (2014):

Sl.Number	STATES	TFR index (2014)	MMR index (2014)	MWHI(2014)	RANKS
1	Andhra Pradesh	0.875	0.842	0.858	4
2	Bihar	0	0.343	0.171	15
3	Chhatishgarh.	0.375	0.285	0.33	12
4	Gujarat	0.562	0.758	0.673	7
5	Hrrayana	0.5	0.691	0.595	8
6	Jharakhand	0.812	0.343	0.577	9
7	Karnataka	0.875	0.678	0.776	6
8	Kerala	0.812	1	0.906	2

9	Madhya Pradesh	0.25	0.272	0.261	13
10	Maharastra	0.875	0.968	0.921	1
11	Odisha	0.687	0.281	0.484	11
12	Punjab	0.937	0.642	0.789	5
13	Rajasthan	0.25	0.155	0.202	14
14	Tamil nadu	0.937	0.844	0.89	3
15	Uttar Pradesh	0	0	0	16
16	West Bengal.	1	0	0.5	10

\* source: Calculated from the basic data provided in SRS bulletin 2014,

In the year 2014, on the basis of selected threshold value the better performing states are Maharastra, Kerala, Tamil Nadu, Andhra Pradesh, Punjab, Karnataka, Harayana and Jharkhand and the worst performing states are Rajasthan, Bihar, and Uttar Pradesh. In the year 2014 the first rank is held by Maharastra. Similarly, like 2013, in 2014 also, the performance of states in the category of Women and Maternal Health Index, is better in comparison to the category of Infant and Child Health Index.

#### **[T-8]**

Women and Maternal Health Index (2015)

States	TFR <sub>index</sub>	MMR <sub>index</sub>	Women and Maternal Health Index	Rank
Andhra Pradesh	0.555	0.842	0.698	3
Bihar	0.194	0.343	0.268	12
Chhatishgarh	0.222	0.285	0.253	13
Gujrat	0.388	0.758	0.573	6
Haryana	0.416	0.691	0.553	7
Jharkhand	0.305	0.343	0.324	10
Karnataka	0.694	0.678	0.686	4

Kerala	1.00	1.00	1.00	1
MadhyaPradesh	0.027	0.272	0.149	15
Maharastra	0.555	0.968	0.761	2
Odisha	0.444	0.281	0.362	9
Punjab	0.416	0.642	0.529	8
Rajsthan	0.194	0.155	0.174	14
Tamilnadu	0.472	0.844	0.658	5
UttarPradesh	0.00	0.00	00.00	16
West Bengal	0.611	0.00	0.330	11

\* source: Calculated from the data from " SRS bulletin " of different years.

In the year 2015, in the similar line, the states which scored more than the threshold value are Kerala, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat, Harayana, Punjab and the bottom three performing states are Rajasthan, Madhya Pradesh and Uttar Pradesh, with very low index values 0.174,0.149 and 0.00 respectively and this is evident from the table displayed above.

### **[T-9]**

#### **Health Performance Index (HPI)**

2013			2014			2015		
STATES	CHPI	RANK	STATES	CHPI	RANK	STATES	CHPI	RANK
Kerala	0.971	1	Kerala	0.951	1	KERAL	0.989	1
T.N	0.843	2	T.N	0.851	2	Maha	0.753	2
Maha	0.825	3	Maha	0.841	3	T.N	0.73	3
Punj	0.726	4	Punj	0.743	4	A.P	0.684	4
Ktk	0.656	5	Ktk	0.68	5	Ktk	0.628	5
A.P	0.602	6	A.P	0.567	6	Harr	0.551	6

Guj	0.544	7	W.B	0.556	7	W.B	0.455	7
W.B	0.534	8	Guj	0.527	8	Punj	0.451	8
Harr	0.497	9	Jhar	0.477	9	Guj	0.43	9
Jhar	0.375	10	Harr	0.469	10	Jhar	0.383	10
Chhat	0.293	11	Chhat	0.274	11	Bihar	0.253	11
Bihar	0.215	12	Raja	0.185	12	Chhat	0.252	12
Raja	0.214	13	Bihar	0.184	13	Odisha	0.189	13
Odisha	0.174	14	M.P	0.148	14	Raja	0.188	14
U.P	0.086	15	Odisha	0.133	15	M.P	0.00	15
M.P	0.00	16	U.P	0.00	16	U.P	0.00	16

\* Source : calculated by basic data provided in SRS BULLETIN of different years.

On the basis of Health Performance Index (HPI), in comparison to the year 2013 and 2014 , on the basis of selected threshold value there is a deterioration in the performance of the states in the year 2015 . In 2013 there are 8 states which are above the threshold value 0.5, and these are Kerala, Tamil Nadu, Maharastra, Punjab, Karnataka and Andhra Pradesh, with index values 0.971, 0.843, 0.825, 0.726, 0.656, 0.602, 0.544 and 0.534 respectively and with rank 1,2,3,4,5,6,7 and 8. In 2014 the same eight states are also above the threshold value . In comparison to 2013 and 2014, in 2015 there are only six states above the threshold value and these are Kerala, Maharastra , Tamil Nadu, Andhra Pradesh, Karnataka, and Harrayana. In HPI, in the year 2015 in comparison to the year 2013 and 2014 , there has been a deterioration. The states like Jharkhand, Chhatishgarh, Bihar, Rajasthan, Odisha, Madhya Pradesh, and Uttar Pradesh are continuously in the category of poor performing states in all these three study years.

#### 4. Conclusion

This present paper makes an attempt to construct a multi dimensional index to understand the relative performance of different states on selected health indicators but not to provide any policy prescription for any states. This also provides guidance to different states on individual sub indexes.

As index number can be constructed by a number of methods , the ranking of states may not remain same if a different method is used . This paper also extends scope for further study , it can provide guidance to different states on different indicators for proper action in that sub index / indicator. Some new indicators and states can also be included to assess the relative performance of the state .

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