Infant Mortality in India: An Assessment with respect to Demographic and Socio-Economic Factors

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1. Introduction

An important measure of health of the population of a country is its ability to ensure that every child born is entitled to basic health facilities that ensures a child's survival beyond the crucial neo natal period and on to the infant and later stages of life. There is a potential association between the causes of infant mortality and factors that are likely to influence health status of the whole population (Crevoiserat & Kim, 2013). It is the responsibility of the government to design public health schemes that ensure equity while improving the quality of public health services. The government of India has initiated many policies and programs in the public health sector over the years. The success of these initiatives can be measured in terms of improvement in health parameters, one of them being assessing infant and child mortality. Some important measures of child mortality are *neonatal mortality* – probability of dying in the first month of life, *infant mortality* – probability of dying before reaching the first birthday, *child mortality* – probability of dying between the first and the fifth birthday and the *under five mortality* – probability of dying before the fifth birthday.

In particular, the infant mortality rate (IMR) is defined as the ratio of number of infant deaths in the first year of life out of 1000 live births. Although IMR has been on a decline in India over past decades, the rate of decline has been much lower than anticipated. The objective of this paper is to analyze progress of the IMR of India with respect to certain demographic and socio economic factors, in the light of various government policies, introduced in an effort to reduce the IMR. Eight states of India that come under the umbrella of the Empowered Action Group (EAG) have been given special focus in current government health policies owning to the high IMR in these states. These states are Bihar, Chhattisgarh, Rajasthan, Uttar Pradesh, Uttarakhand, Odisha, Jharkhand and Madhya Pradesh and together they account for about 48% of the total population. In this study, socio economic and health related data of the EAG states are analyzed to understand where the gaps between the different states and the rural-urban divide lie.

2. Data

Data has been compiled from the following sources:

Data and information from policy documents have been used for discussion and analysis. The policy documents which have been considered for this study are National Health Policy (NHP) - 1983, National Health Policy (NHP) - 2002, National Health Mission – 2005, National Rural Health Mission (2005), National Urban Health Mission (2013), Framework for Implementation-

National Health Mission (2012-2017), National Health Policy (2017). All of the above are publications of the Government of India (GOI) and are available in the public domain.

The Sample Registration System (SRS) is a large-scale demographic survey conducted every year by Office of the Registrar General, India in all States and Union territories. The results of this survey includes reliable annual estimates of infant mortality rate, birth rate, death rate and other fertility and mortality indicators at the national and sub-national levels, and are presented in the SRS bulletins published by the Vital Statistics Division, Office of the Registrar General, India and available in the public domain from the year 1997 to 2020 (website reference). The time series IMR data of India has been sourced from these bulletins.

Health statistics data from the different states have been used to analyze public health facilities and health standards. State level data on public health infrastructure has been taken from 'Rural Health Statistics (RHS)', an annual publication of the Statistics Division, under the Ministry of Health and Family Welfare, Government of India. RHS provides reliable and updated data on public health facilities and human resources in rural, urban and tribal areas of the country.

The National Sample Survey Office, under the Ministry of Statistics and Program Implementation, GOI, conducted a nationwide survey on social consumption related to education as part of its 71st round in 2014. The survey results were published in the form of a document called 'Key Indicators of Social Consumption in India: Education', available on the website. The data on the variable, 'Percentage of educated female persons (highest level of completed education secondary and above) among persons of age 15 years and above for different States', has been taken from this document. This data has been considered to analyse ……under the assumption that females above 15 years in 2014 would have reached …… age by 2020.

The National Family Health Survey (NFHS) series, provides information on population, health, and nutrition for India, each state and union territory (UT). So far five such surveys have been conducted under the Ministry of Health and Family Welfare, Government of India. Data from these surveys have been accessed wherever necessary.

And finally, the data on per capita net state domestic product at (current prices) for 2020 has been taken from the 'Handbook of Statistics on Indian States', an annual publication of the Reserve Bank of India.

3. IMR in India: Trends and Analysis

The IMR of India was recorded as 125 per 1000 live births in 1978 (India, 1983) and almost 45 years later it now stands at 28 per 1000 live births in 2020 (ref: SRS bulletin…). The World Bank estimate of the IMR of India for the same year is 27 per 1000 live births, a difference of 1. The overall IMR and the IMRs for both male and female child has been on a decline since 1998 as evident from the data (figure 1). A regression analysis of the time series data on IMR from 1997 to 2020 indicates that the rate of change of the IMR at 4% every year on an average is

statistically significant. Further as seen from the graph (fig 1) IMR for females has been historically higher than that of males and in fact it has been higher than the overall IMR throughout this period. However despite the substantial drop, the current IMR for India (2020) compares poorly with countries like UK, USA and Asian nations like Thailand, Sri Lanka, China, Nepal and Bangladesh, which have all maintained lower IMRs indicating a more robust health of its populations (figure 2). Despite significant improvement in the IMR, the measure is still unacceptably high which means that many children are still dying before even reaching one year of age. This is an unfortunate indication of the limited success of the public health initiatives in the country.

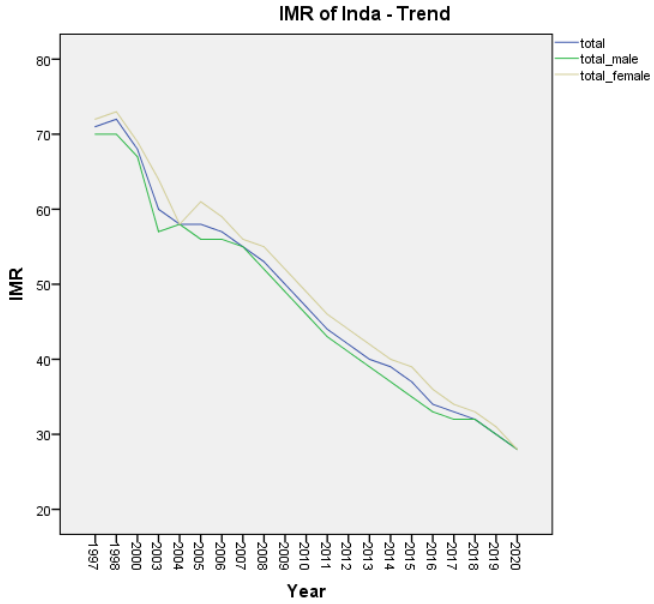

Figure 1: IMR trend in India
(Data Source: SRS bulletins, 1997 – 2021)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	83.291	2.780		29.956	.000
	year	-.040	.001	-.986	-28.554	.000

a. Dependent Variable: logimr

Table 1: Regression analysis of time series data on IMR - output

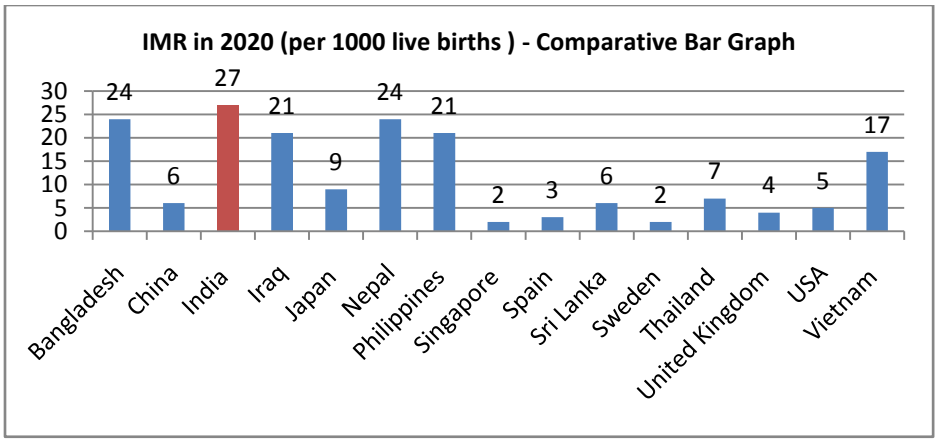

Figure 2: Comparative IMR of a few countries in 2020

(Data Source: data.worldbank.org)

4. Health Policies in India

National Health Policy of 1983 had strived to provide 'Health for All by the year 2000 A.D.', particularly the poor and under-privileged, through the universal provision of comprehensive primary health care services. Almost twenty years later when the National Health Policy of 2002 was being framed, it was observed that the financial resources and public health administrative capacity which was possible to marshal, was far short of that necessary to achieve such an ambitious and holistic goal. It was felt that it would be appropriate to pitch NHP 2002 at a level consistent with realistic expectations about financial resources, and the likely increase in Public Health administrative capacity. The NHP 2002 while acknowledging the limited success of NHP 1983 attempted to maximize the broad-based availability of health services to the citizens of the country and focused on two major thrust areas:

a. Allocation of additional financial resources. The public health investment in the country over the previous years had been comparatively low, and as a percentage of GDP has declined from 1.3 percent in 1990 to 0.9 percent in 1999. The aggregate expenditure in the health sector was 5.2 percent of the GDP and the central budgetary allocation for health over this period, as a percentage of the total Central Budget, had been stagnant at1.3 percent, while in the States it had declined from 7.0 percent to 5.5 percent. It was planned, under NHP 2002 to increase health sector expenditure to 6 percent of GDP, with 2 percent of GDP being contributed as public health investment, by the year 2010.

b. Despite a conscious focus on equitable regional distribution in the development process in centralized planning, statistics indicated an uneven attainment of health indices across the rural and urban areas and wide differences between the attainments of health goals in the better-performing states as compared to the low performing states. Access to, and benefits from, the public health system were very uneven between the better-endowed and the more vulnerable sections of society. A principal objective of NHP-2002 was to evolve a policy structure which

reduces these inequities and allows the disadvantaged sections of society a fairer access to public health services. The policy document stated that it would attempt to set out a new policy framework for the accelerated achievement of public health goals in the socioeconomic circumstances currently prevailing in the country.

Reproductive and Child Health I (RCH I) is a programme initiated in October 1997 with the primary objective of reducing maternal, newborn, and child mortality rates. Reducing child mortality and safe motherhood was one of the chief components of RCH I. RCH Phase II was introduced in 2005 and focused on lowering mother and child mortality and morbidity while concentrating on improving rural health care and particularly on promotion of institutional deliveries. 'Improving access, use and quality of RCH services especially for the poor and undeserved population', was part of the vision statement of RCH II.

National Health Mission (NHM) - One of the prime focus of National Health Mission (NHM) was to reduce infant mortality rates (IMR), maternal mortality rates (MMR) and to ensure quality services to pregnant women and children across the country. All schemes and programmes that constituted RCH-II were absorbed into the NHM in 2013.

The Janani Suraksha Yojana (JSY) is one such program under the National Rural Health Mission. This program was introduced in 2005 with the objective of reducing maternal and neo natal mortality by promoting institutional delivery among poor pregnant women. This yojana (scheme) is currently being implemented through the Accredited Social Health Activists (ASHA) and Anganwadi Workers (AWW). Under this scheme, a comprehensive package of free and cashless services is offered to all pregnant women, and sick infants up to the age of one year, in government health institutions (table 2). The Janani Shishu Suraksha Karyakram (JSSK), thereby is aimed at reducing financial barriers to care and improving access to health services by eliminating out of pocket expenditure in all government facilities.

Janani Suraksha Yojana Packages						
Category	Rural		Total	Urban		Total
	Mother's package	ASHA's package		Mother's package	ASHA's package	
LPS*	1400	600	2000	1000	200	1200
HPS	700		700	600		600

*LPS – Low performing states (U.P, Uttarakhand, Bihar, Jharkhand, Madhya Pradesh, Chhatisgarh, Assam, Rajasthan, Orissa and Jammu and Kashmir).
HPS – all other states

Table 2:
(Source: www.nhp.gov.in)

Despite considerable focus on reducing mortality rates, important targets in successive health policies have been missed by considerable margins (table 3). For example, the National Health Policy (NHP) formulated in the year 2002 while acknowledging the shortfalls in the previous NHP (1983) had set a goal of achieving IMR of 30 per 1000 live births by 2010. The actual

estimated IMR in 2010 was 47 per 1000 live births. Clearly the target was missed by a huge margin.

Sl. No.	Policy Name	Introduced in year	Estimated IMR in the year of introduction	Target	Actual estimated IMR in target year
1.	National Health Policy (NHP)	1983	Rural – 136 Urban – 70 Total – 125 (estimates of 1978)	Reduce IMR for rural – 122 urban – 60 total – 106 by 1985	110 in 1981 (as per NHP 2002)
2.	National Health Policy (NHP)	2002	62 (UN estimate)	Reduce IMR to 30 by 2010	47
				Increase public expenditure on health expenditure as a percentage of GDP to 2% by 2010.	1.10% of GDP in 2012 (source: National Health Profile – 2020, ebook, page 279)
3.	National Health Mission	2005, Extended till March 2020	58		
4.	National Rural Health Mission	2005	50	Reduce IMR to 30 by 2012 under the	42
5.	National Urban Health Mission	2013			
6.	National Health Policy(NHP)	2017		Reduce IMR to 28 by 2019	30
				Increase public expenditure on health as a percentage of GDP from the existing 1.15% to 2.5 % by 2025.	1.87% of the GDP in 2020 (source: National Health Profile – 2020, ebook, page 279)

Table 3: Comparative Summary of a few Health Policies in India

Statistics after almost 45 years of implementation clearly indicate that attainment of an equitable distribution in public health policies remains a distant target. There is wide variation in the IMR of different states even in 2020 with some states performing better than others (figure 3). Kerala for example has had a consistently low IMR ranging from 12 in 1000 live births in 1997 to 6 in 1000 live births in 2020. On the other hand states like Madhya Pradesh and Uttar Pradesh have not fared very well in terms of reducing their IMRs. Madhya Pradesh had the highest IMR in 1997 at 94 per 1000 live births and continues to record the highest IMR in 2020 as well at 43 per 1000 live births. Interestingly the state of Chhattisgarh, formerly a part of Madhya Pradesh also has registered the second highest IMR of 38 per 1000 live births in 2020. In Uttar Pradesh the IMR was recorded at 85 in 1997, the second highest among the states in that year. It continues to hold that position with 38 per 1000 live births in 2020. State wise gaps like this that have not been bridged even in 25 years despite a number of policies and programs initiated by successive governments need to be examined.

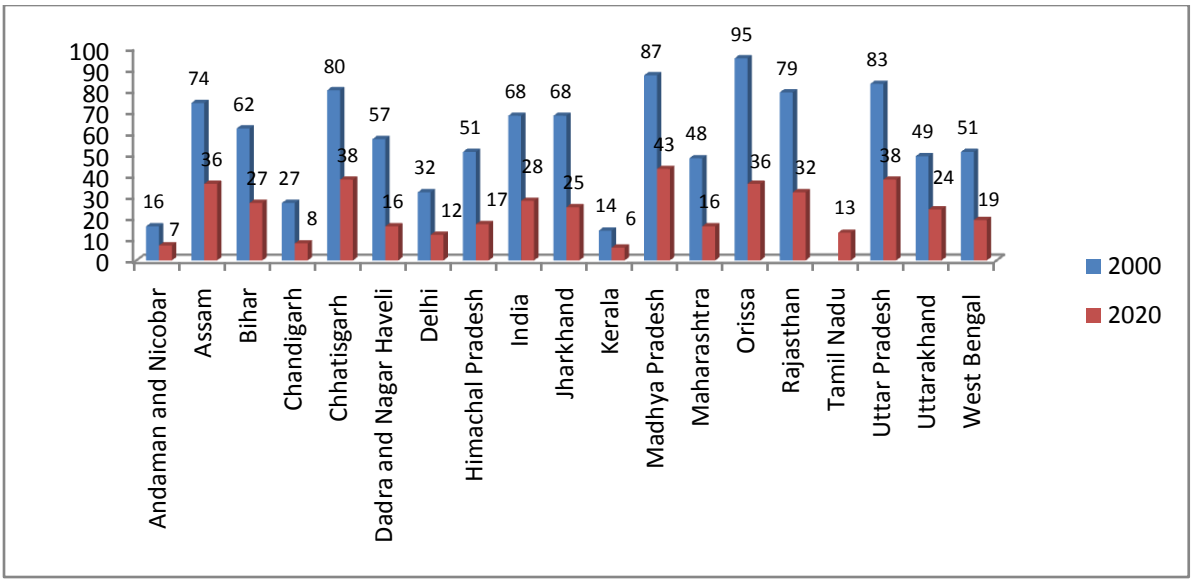

Figure 3: IMR of a few States of India, (2000, 2020)

Statistics also indicate that the IMR has been uneven across the rural urban divide (figure 4). IMR in rural areas of India are significantly and consistently higher than in urban areas. A t test confirms that this difference is statistically significant.

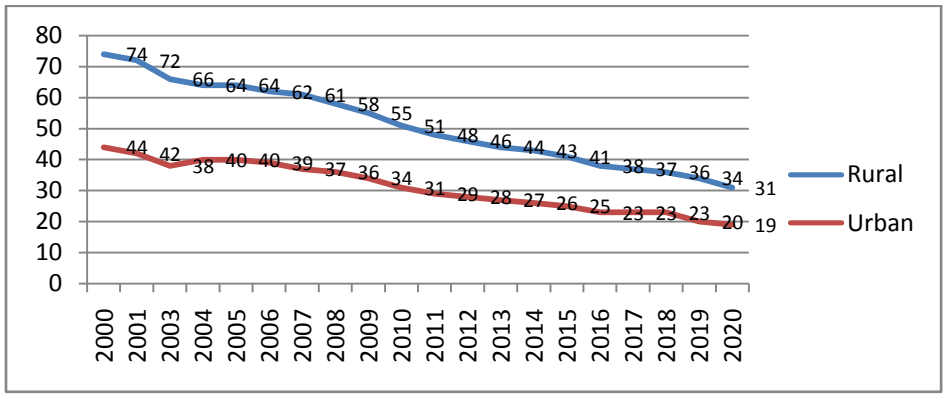

Figure 4: IMR in Rural and Urban Areas in India, 2000-2020

(Data Source: SRS Bulletin, 2000- 2020)

5. IMR – Demographic and Socio Economic Assessment with respect to the EAG States

One of the most important determinants of infant mortality is the percentage of birth deliveries conducted by health personnel or trained birth attendants (Jain, 1985). In other words whether the birth takes place in a healthcare institution under the supervision of trained medical staff. An examination of the data from NFHS V shows that in India, institutional deliveries have increased markedly from 39 percent in 2005-06 to 79 percent in 2015-16 and 89 percent in 2019-21. (Source: NFHS V, 2019-21). The data is based in the five years prior to the surveys. This number

however hides the state-wide inequality in the number of institutional deliveries. While on one hand states of Tamil Nadu, Puducherry, Lakshadweep, Kerela and Goa registered 100% institutional deliveries, on the other end of the spectrum states of Jharkhand and Bihar recorded lower percentage of institutional births. The north eastern states of Meghalaya and Nagaland registered even lower figures of 58 and 46 percent respectively.

Percentage of Institutional Deliveries, (2015- 2020)			
Sl. No.	State	**Percentage of Institutional Deliveries**	IMR
1.	Bihar	76	27
2.	Chhattisgarh	86	38
3.	Jharkhand	76	25
4.	Madhya Pradesh	91	43
5.	Odisha	92	36
6.	Rajasthan	95	32
7.	Uttarakhand	83	24
8.	Uttar Pradesh	83	38
9.	Goa	100	5
10.	Kerela	100	6
11.	Tamil Nadu	100	13
12.	Lakshadweep	100	9
13.	India	89	28

Table 4: IMR and Percentage of Institutional Deliveries

(Source: NFHS V, 2019-20, page 298)

A Pearson correlation coefficient value of - 0.55564 obtained from analysis of the data in table 4 indicates that IMR and percentage of institutional deliveries are inversely correlated. The higher the percentage of deliveries registered in health facilities, the lower the IMR tends to be corroborating similar result from studies by Adhikari R, Sawangdee, Rao et. al. (1996) and Gakidou et. al. (2010).

Sl. No.	**Educational Status**	**Percentage of Institutional Deliveries**
1.	No schooling	75
2.	Less than 5 years of schooling	83
3.	5 to 7 years of schooling	87
4.	8 to 9 of schooling	91
5.	10 to 11 of schooling	95
6.	12 years and above of schooling	97

Table 5: Educational Status and Percentage of Institutional Deliveries

(Source: NFHS V, 2019-20)

Several studies have established that there is an inverse relationship between female literacy and infant mortality rate. A basic minimum level of education empowers females and helps creates awareness about health practices. Maternal health is an immediate and important factor in determining child mortality. Factors such as low birth weight, nutritional deficiency in infants are all tied to maternal health and can affect the child's survival. Socio economic and demographic factors identified in various studies include nutritional status of mother, age of the mother, gaps between two deliveries, access to healthcare services that ensure safe delivery

along with ante natal and post natal care. From the observed data of educational status and percentage of institutional deliveries, obtained from the NFHS V survey, in table 5, it can be seen that higher the education level of the mother, the more likely she is to go for a safer delivery in a health facility with trained medical staff. Among women who had completed 12 years of schooling and above 97 percent had institutional deliveries as compared to women with no schooling among whom the percentage was 75. Probing further into the reasons women gave for not going to a health facility for delivery, from table 6, it can be observed that the most common reason for not delivering in a health facility for both rural as well as urban areas was that the woman did not think it was necessary. 19 percent said that the husband or family did not allow them to have the delivery in a health facility, 17 percent of women said that a health facility was too far or there was no transportation, and 15 percent said it costs too much. These statistics also clearly indicates that female literacy plays an important role in the decision making process of going for an institutional delivery. The fact that 28 percent women in rural and 30 percent women in urban areas felt that it was not necessary indicates a clear lack of awareness about safe deliveries, importance of ante natal and post natal care, proper nutrition of the mother. It indicates a casual approach towards the process and education would play a vital role here to educate and empower women to make better choices regarding health services.

Sl. No.	**Reasons for not delivering in health facility**	Urban	Rural
1.	Costs too much	15.2	15.1
2.	Facility not open	9.1	9.8
3.	Too far/ no transportation	12.4	17.4
4.	Don't trust/poor quality service	6.8	4.7
5.	No female provider at facility	4.3	3.9
6.	Husband /family did not allow	18.1	19.5
7.	Not necessary	30.5	27.6
8.	Not customary	3.6	3.5
9.	Other	19.1	16.4

Table 6: Reasons for not delivering in a health facility

(Source: NFHS V, 2019-20)

Improvements in infant and child morality have been uneven not only according to region, but socio economic inequalities are also very high. The brunt of high child deaths is borne by the marginalized and socially disadvantaged section of the population. For example, the Infant Mortality Rate in the poorest 20 percent of the population is 2.5 times higher than that in the richest 20 percent of the population indicating that an infant born in a relatively poor family is more than two times likely to die in infancy than an infant born in a better off family.

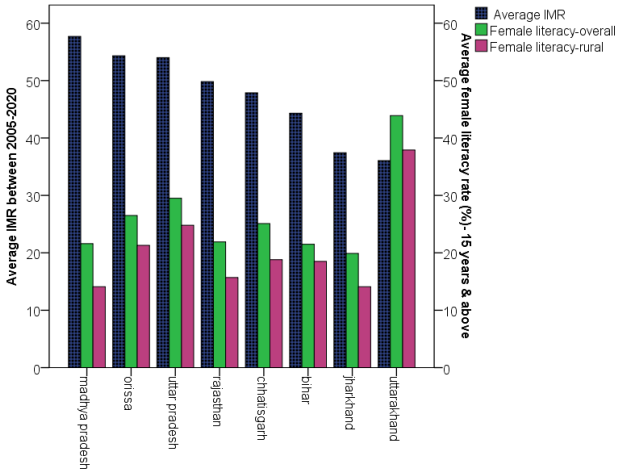

Figure 5: IMR and Female Literacy

6. Current Status of Public Health Institutions in the EAG States

To understand the functioning of rural health systems, it is important to discuss the structure of the rural health system in India. The primary healthcare infrastructure system has been developed as a three tier structure with Sub Centre (SC), Primary Health Centre (PHC) and Community Health Centre (CHC) being the three pillars of the System.

Sub Centre (SC)

The first point of contact of the community with a healthcare provider is the sub centre (SC). Sub centres provide services like maternal and child health, family welfare, nutrition, immunization, diarrhoea control and communicable diseases as well as non-communicable diseases. The staffing as per norms of Indian Public Health Standards (IPHS) is at least one auxiliary nurse midwife (ANM) / female health worker and one male health worker at each centre. Under the National Health Mission, there is a provision for one additional second ANM on contract basis and one lady health visitor (LHV) is entrusted with the task of supervision of six Sub Centres.Average number of villages covered by a sub centre is 4.

Primary Health Centre (PHC)

This is the initial point of contact between the village community and the medical officer. A PHC is run by a medical officer along with paramedical and other staff as per IPHS norms. Apart from technical staff, this includes three mid-wife/ staff nurse, one female health worker and one female health assistant. Under National Health Mission, there is a provision for two additional staff nurses at PHCs on contract basis. The PHC acts as a referral unit for 6 Sub Centres and has

4-6 beds for patients. The activities of PHC involve curative, preventive, promotive and family welfare services.

Community Health Centres (CHC)

CHCs are maintained by the State government under the Minimum Needs Program (MNP)/Basic Minimum Services Programme (MSP). As per minimum requirement, a CHC is manned by four medical specialists – a surgeon, a physician, an obstetrician/gynecologist and a pediatrician supported by paramedical and other staff as per IPHS norms. A CHC is required to have 30 in-door beds with one OT, X-ray, labour room and laboratory facilities. It serves as a referral centre for 4 PHCs and also provides facilities for obstetric care and specialist consultations.

Status of the Rural Health Structure in India

Table 7, 8 and 9 shows the status of various healthcare workers in SCs and PHCs in 2021. Vacancies of healthcare workers are large in almost all the EAG states.

Sl. No.	State	**Health Worker (Female)/ANM- 2021**			
		Required (one per existing SC and PHC)	Sanctioned	In position	Vacant
1.	Bihar	12190	45109	20403	24706
2.	Chhattisgarh	5884	7058	8273	NA
3.	Jharkhand	4139	8278	5185	3093
4.	Madhya Pradesh	11423	12867	11981	886
5.	Odisha	7976	8498	7579	919
6.	Rajasthan	15661	17941	15454	2487
7.	Uttarakhand	2068	2276	1816	458
8.	Uttar Pradesh	23701	28448	21830	6618
9.	India	181241	268913	214820	56868
10.	Kerela	6016	6730	5895	835

Table 7: Status of Health Workers – (Female/ANM)

(Data source: Rural Health Statistics, 2020-21)

Sl. No.	State	**Doctors at Primary Health Centres (PHC) in Rural Areas 2021**			
		Required	Sanctioned	In position	Vacant
1.	Bihar	1932	4317	2902	1415
2.	Chhattisgarh	769	874	498	376
3.	Jharkhand	291	291	278	13
4.	Madhya Pradesh	1234	1887	1307	580
5.	Odisha	1288	1331	926	405
6.	Rajasthan	2130	2463	2101	362
7.	Uttarakhand	245	416	301	115
8.	Uttar Pradesh	2923	4448	3093	1355
9.	India	25140	40143	31716	8762
10.	Kerela	782	1500	1431	69

Table 8: Status of Health Workers – (Doctors at PHCs)
(Data source: Rural Health Statistics, 2020-21)

Sl. No.	State	**Nursing staff at PHCs and CHCs in Rural Areas 2021**			
		Required	Sanctioned	In position	Vacant
1.	Bihar	4074	15864	4956	10908
2.	Chhattisgarh	1931	3847	3500	347
3.	Jharkhand	1488	462	1205	NA
4.	Madhya Pradesh	3299	3594	3418	176
5.	Odisha	3927	4469	2279	2190
6.	Rajasthan	6253	11286	9239	2047
7.	Uttarakhand	616	631	383	248
8.	Uttar Pradesh	8194	11251	6512	4739
9.	India	63507	106725	79044	29708
10.	Kerela	2273	3090	2826	264

Table 9: Status of Health Workers – (Nurses at PHCs and CHCs)
(Data source: Rural Health Statistics, 2020-21)

Table 10 shows the shortfall in health infrastructure facilities in rural areas of the EAG states.

Sl. No.	State	**SHORTFALL IN HEALTH FACILITIES AS PER MID YEAR POPULATION (as on 1st July 2021) IN INDIA IN RURAL AREAS**											
		SC				**PHC**				**CHC**			
		R	P	S	% shortfall	R	P	S	% shortfall	R	P	S	% shortfall
1.	Bihar	21933	10258	11675	53	3647	1932	1715	47	911	306	605	66
2.	Chhattisgarh	5415	5115	300	6	858	769	89	10	214	166	48	22
3.	Jharkhand	6925	3848	3077	44	1104	291	813	74	276	171	105	38
4.	Madhya Pradesh	14270	10189	4081	29	2287	1234	1053	46	571	295	276	48
5.	Odisha	8741	6688	2053	23	1403	1288	115	8	350	377	Surplus	Surplus
6.	Rajasthan	13035	13531	Surplus	Surplus	2117	2130	Surplus	Surplus	529	589	Surplus	Surplus
7.	Uttarakhand	1521	1823	Surplus	Surplus	252	245	7	3	63	53	10	16
8.	Uttar Pradesh	35473	20778	14695	41	5905	2923	2982	50	1476	753	723	49
9.	India	192478	156101	46171	24	31505	25140	9115	29	7863	5481	2791	35
10.	Kerela	2041	5234	Surplus	Surplus	338	782	Surplus	Surplus	84	213	Surplus	Surplus

Table 10: Status of Health facilities in Rural Areas
(Data source: Rural Health Statistics, 2020-21)

7. Regression Analysis

A Generalized Linear Model (GLM) approach was used to test factors affecting the IMR. Time series data was considered from 2005 to 2020. A Poisson Regression Model with the IMR values for rural areas was taken as the target variable. The independent variables considered were

female literacy (percentage of females who have completed 15 years of education), percentage shortage of Sub Centres (SCs) and the per capita state domestic products (SDP).

Parameter Estimates

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	4.207	.0351	4.138	4.276	14354.473	1	.000
femlit_rural	-.007	.0013	-.009	-.004	25.773	1	.000
sc_short_rural	.002	.0003	.002	.003	56.951	1	.000
sdp_scaled	-.005	.0002	-.005	-.004	605.115	1	.000
(Scale)	1[a]						

Dependent Variable: rural_total

Model: (Intercept), femlit_rural, sc_short_rural, sdp_scaled

a. Fixed at the displayed value.

Table 11: SPSS output of Poisson Regression Analysis of IMR

From the output (table 11) it can be seen that all three factors are statistically significant in explaining the variations in the IMR. It can be inferred that,

- For a 1 unit increase in female literacy, the estimated IMR increases by a factor of $e^{(-.007)}$ = 0.993024. The higher the percentage of female literacy the lower the IMR value.
- For a 1 unit increase in shortfall of SSc, the estimated IMR increases by a factor of $e^{(.002)}$ = 1.002. The higher the shortfall in SCs, the more the IMR value.
- For a 1 unit increase in SDP, the estimated IMR increases by a factor of $e^{(-.005)}$ = 0.9950 = 0.9950, which means a higher value of the per capita state domestic product will result in lower values of the IMR.

8. Discussion and Conclusions

In a country like India with a large and heterogeneous population, and where states and districts have cultural, political and socio economic differences, analysis of state level data becomes important for policy making and for assessing the impact of such policies. There are differentials in the impact of policy interventions and this fact needs to be recognized while framing policy decisions. From this study it is amply clear that at the state level, infant mortality rates are highly variable as also across the rural urban divide. The current status of the healthcare systems in a majority of the EAG states are still inadequate and require higher levels of improvement. Public healthcare initiatives in India need more focus on health infrastructure and healthcare workforce keeping in mind the diversities and variations in the reach and current levels of accessibility. A positive step in this direction is the identification and recognition of the eight EAG states, the northeastern states and the state of Jammu and Kashmir as ‘special focus states’. The next step

would be to identify districts and villages especially in rural areas, which need special attention and intervention for improving the accessibility to public health care. This will help reduce the inequities currently prevailing in the system.

Strengthening the base of the three tier structure is a must for the overall success of the entire structure and would go a long way in providing more access to basic medical facilities. The sub centres (SCs) are the foundation of the public health infrastructure in India. It is through these centres that more public health programs should be implemented. Infrastructure and availability of medical staff at these centres should be revamped. Incentives for doctors, nurses and other medical staff should be given to encourage them to work in rural areas.

From this study it also appears that female literacy has a direct bearing on infant mortality and improvements in the literacy rate of women will have a positive impact in reducing child mortality. In fact literacy and in particular female literacy is linked to other determinants of infant mortality like seeking institutional care before and after deliveries, recognizing the importance of nutrition which in turn affects the weight of the child at birth and overall empowering her to make informed decisions. In fact female literacy can be considered as a factor that has the maximum impact on improving infant survival.

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