

## A Critical Analysis on Rural Health Infrastructure in India

B. Muniswamy\*<sup>1</sup>, R. Vijaya Krishna<sup>2</sup> and K. Nagendra Kumar<sup>3</sup>

**Abstract:** Good health is a state of physical and mental wellbeing necessary to live a meaningful and productive life. Long healthy life is the basic aspiration of human development. Hence, health has become an important indicator of human development. Health infrastructures are “the basic services or social capital of a country” structures that support public health, having both tangible and intangible aspects and existing inside and outside the government sector. Health infrastructure is an important indicator for understanding the health care policy and welfare mechanism in a country. Primary Health Care in rural is a vital strategy which is a backbone of Health Service delivery for our country. India was one of the first few countries to recognize the importance of Primary Health Care Approach for rural segment. After a critical analysis on rural health infrastructure in India to fulfil the gap between required and actual available rural health infrastructure in India the present study proposes comprehensive strategies for the overall development of health infrastructure in rural areas in particular and in India in general. It is recommended to know the actual need of health infrastructure in rural areas through a comprehensive study. Both central and state governments should try to reduce the gap between the actual number of available health centres and required number of health centres like sub- centres, primary health centres and community health centres in providing rural health infrastructure. The position of highly populated states and union territories is behind the position of least populated states and union territories in terms rural health infrastructure in this context more focus should be given to the highly populated states and union territories.

**Key words:** Rural Health Infrastructure, Sub Centres, Primary Health Centres and Community Health Centres.

### Introduction

Good health is a state of physical and mental wellbeing necessary to live a meaningful and productive life. Long healthy life is the basic aspiration of human development. Hence, health has become an important indicator of human development. Health infrastructures are “the basic services or social capital of a country” structures that support public health, having both tangible and intangible aspects and existing inside and outside the government sector. Health infrastructure is an important indicator for understanding the health care policy and welfare mechanism in a country. Primary Health Care in rural is a vital strategy which is a backbone of Health Service delivery for our country. India was one of the first few countries to recognize the importance of Primary Health Care Approach for rural segment (Kapur, 2019). India’s National Health Policy, 2017 envisions the goal of attaining highest possible level of health and well-being for all and for all ages through a preventive and promotive health care orientation in all developmental policies and universal access to good quality health care services without financial hardship to the citizens. The gains of India in many health related indicators helped the country to make progress in achieving Millennium Development Goals (MDGs). More efforts, however, are required to reach the goals of

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\* Corresponding Author

<sup>1</sup> Director, Population Research Centre, Visakhapatnam. Email: munistats@gmail.com

<sup>2</sup> Research Fellow-II, Population Research Centre, Visakhapatnam. Email: sriramavijay97@gmail.com

<sup>3</sup> Research Fellow-I, Population Research Centre, Visakhapatnam. Email: nagendra.stat@gmail.com

Universal Health Coverage and those envisioned in Sustainable Development Goals (SDGs). (India's National Health Policy, 2017)

### ***Rural Health Care System – the structure and current scenario***

The health care infrastructure in rural areas has been developed as a three-tier system (see Chart 1) and is based on the following population norms:

Table 1: Population Norms for Health Infrastructure in India

Centre	Plain Area	Hilly/Tribal/Difficult Area
Sub-Centre	5,000	3,000
Primary Health Centre	30,000	20,000
Community Health Centre	1,20,000	80,000

Source: Rural Health Statistics; Rural Health Care System India final

## **Review of Literature**

Ramani and Mavalankar (2006) made an attempt to see those building health systems that are responsive to community needs, particularly for the poor. This working paper identified the roles and responsibilities of various stakeholders for building health systems that are responsive to the community needs, particularly for the poor. Saikia (2014) focused on the progress in physical infrastructure, available health care facilities, status of existing manpower, etc. and highlights the challenges faced by the rural health care sector in the region. The results found that there has been significant improvement in the health care infrastructure after the implementation of NRHM in 2005 and suggested need for rigorous State policies to strengthen the rural health care infrastructure in the region. Lyngdoh (2015) studied is to understand the rural public healthcare system in North East India. The study concluded that there is an urgent need to address the shortcomings faced by the public healthcare system in the north eastern states. Barman and Roy (2018) examined healthcare facilities, development and problems of public health situation in Koch Bihar district using geographic information system (GIS). The results found that the health care system the service in rural areas is neglected. It is largely service based on urban areas. Although, there are number of RHs and PHCs in rural areas but infrastructure is less in the district. Sana Pathan and Fulwari (2019) were examined changes in health indicators against the backdrop of rural health infrastructure in India. There is definite improvement in the health indicators even as the situation in physical and human infrastructure has not improved as much as desired.

## **Statement of the Problem**

Even after India's Independence, its population is still brewing under the scourge of degraded health system. There are nearly 716 million rural people who are constantly battling for basic healthcare services in their habitat. This condition has been aggravated by worsening living conditions of rural habitats. Nearly 75 per cent of health infrastructure and other health resources are concentrated in urban areas. The poor state of the health system in rural areas is not the outcome of a particular occurrence but a consolidated outgrowth of degraded system. It signifies not only lacunae in existing policy and infrastructure but blockage in potential development also. The rural public health facilities are battling with the problems of inadequate manpower. There exists shortfall across all cadres in rural health system. The deficiency of trained doctors and medical professionals has paralyzed the rural health facilities (Jaysawa: 2015)

### **Need for the Study**

The National Rural Health Mission seeks to provide effective affordable healthcare to rural population throughout the country with special focus on 18 States, which have weak public health indicators and/or weak infrastructure. These 18 States are Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Jammu & Kashmir, Manipur, Mizoram, Meghalaya, Madhya Pradesh, Nagaland, Odisha, Rajasthan, Sikkim, Tripura, Uttarakhand and Uttar Pradesh. NRHM aims to undertake architectural correction of the health system to enable it to effectively handle increased allocations and promote policies that strengthen public health management and service delivery in the country. It has as its key components provision of a female health activist in each village; a village health plan prepared through a local team headed by the Village Health, Sanitation & Nutrition Committee (VHS&NC) of the Panchayat; strengthening of the rural hospital for effective curative care and made measurable and accountable to the community through Indian Public Health Standards (IPHS); integration of vertical health & family welfare programmes, optimal utilization of funds & infrastructure, and strengthening delivery of primary healthcare. It seeks decentralization of programmes for district management of health and to address the inter State and inter-district disparities, especially among the 18 high focus States, including unmet needs for public health infrastructure. It also seeks to improve access of rural people, especially poor women and children, to equitable, affordable, accountable and effective primary healthcare. Besides above focus, in a fast growing economy, importance of healthcare could not be underestimated. There is an immense need to address to rural health challenges and work on solutions. There is a need to develop infrastructure, rural health workforce, and basic health resources to empower rural health growth. In this context, the proposed study aimed to evaluate key indicator of rural health infrastructure in terms of physical and human during 2005-2019 in Indian states.

### **Objectives**

The main objective of the study is to analyse the gap between required and available health infrastructure in rural India. The specific objectives of the study are:

1. To know the trends in rural health infrastructure across the sample states.
2. To analyse gap between required and actual available rural health infrastructure.
3. To suggest measures that may be useful to the policy makers both at the micro and macro levels for the improvement of health infrastructure and key demographic indicators in India.

### **Data**

The study is mainly based on secondary data obtained from annual reports of Rural Health Statistics published by Ministry of Health and Family Welfare, Government of India. The study covered all annual reports of Rural Health Statistics published by Ministry of Health and Family Welfare website from 2005 to 2019. Among all states and union territories of India 9 highly populated states and union territories and 9 least populated states and union territories based on census population of 2011 have been selected for the study. The time period of study is 15 years from 2005 to 2019 which is divided into 3 phases viz., phase -I (2005-2009), phase-II (2010-2014) and phase-III (2015-2019) for analysis. To identify the difference between the actual and required health centres, the study has applied census population of 2011 and norms for establishing health centres in the plain areas. The following are sample states.

Table 2: List of Selected States and Union Territories for the Study

State	Population
Uttar Pradesh	199812341
Maharashtra	112374333
Bihar	104099452
West Bengal	91276115
Madhya Pradesh	72626809
Tamil Nadu	72147030
Rajasthan	68548437
Karnataka	61095297
Gujarat	60439692
Arunachal Pradesh	1383727
Puducherry	1247953
Mizoram	1097206
Chandigarh	1055450
Sikkim	610577
Andaman & Nicobar Islands	380581
Dadra & Nagar Haveli	343709
Daman & Diu	243247
Lakshadweep	64473

Source: Census of India, 2011.

### Sub-Centres

The Sub Centre is the most peripheral and first contact point between the primary health care system and the community. Sub Centres are assigned tasks relating to interpersonal communication in order to bring about behavioural change and provide services in relation to maternal and child health, family welfare, nutrition, immunization, diarrhoea control and control of communicable diseases programmes. It is observed from the table-3 that all selected states and union territories are facing the problem of shortage in the available sub- centres in the study. In 2005 Uttar Pradesh is showing more shortage in the available sub- centres with 38437 followed by Maharashtra, Bihar, West Bengal, Tamil Nadu, Madhya Pradesh, Gujarat, Karnataka and Rajasthan with 12748, 10483, 7899, 5747, 5690, 4814, 4076 and 3784. This trend continues up to 2019. By the end of 2019 the above said states in the same order are facing shortage problem in the available sub- centres with 19180, 11807, 10871, 7898, 5716, 4299, 2922, 2461 and 198.

Difference between actual and required sub- centres in least populated selected states and union territories have been presented in the underneath table-4. Interestingly, among least populated selected states and union territories some states report surplus number in the availability of sub- centres like Arunachal Pradesh with 99, 9, 9 and 108, Mizoram with 132, 151, 151 and 151, Sikkim with 25, 25, 25 and 54, Andaman & Nicobar Islands with 31, 38, 46 and 48 and Lakshadweep with 1, 1, 1 and 1 in 2005, 2010, 2015 and 2019 respectively. Pondicherry with 175, 197, 196 and 196, Chandigarh with 198, 195, 195 and 211 and Daman & Diu with 28, 23, 23 and 26 are reported shortage in available sub-centres in 2005, 2010, 2015 and 2019. Dadra & Nagar Haveli initially faces the shortage problem with 31, 19 and 13 in 2005, 2010 and 2015 but by the end of 2019 it recorded surplus in the available sub-centres.

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Table 3: Difference between Actual and Required Sub Centres in Highly Populated Selected States and Union Territories

State	Required Centres*	Actual Number in 2005	Shortage/ Surplus	Actual Number in 2010	Shortage/ Surplus	Actual Number in 2015	Shortage/ Surplus	Actual Number in 2019	Shortage/ Surplus
Uttar Pradesh	39962	1525	-38437	20251	-19711	20521	-19441	20782	-19180
Maharashtra	22475	9727	-12748	10580	-11895	10580	-11895	10668	-11807
Bihar	20820	10337	-10483	9696	-11124	9729	-11091	9949	-10871
West Bengal	18255	10356	-7899	10356	-7899	10357	-7898	10357	-7898
Madhya Pradesh	14525	8835	-5690	8869	-5656	9192	-5333	10226	-4299
Tamil Nadu	14429	8682	-5747	8706	-5723	8706	-5723	8713	-5716
Rajasthan	13710	9926	-3784	11487	-2223	14407	697	13512	-198
Karnataka	12219	8143	-4076	8143	-4076	9264	-2955	9758	-2461
Gujarat	12088	7274	-4814	7274	-4814	8063	-4025	9166	-2922

\*Required centres are calculated based on 2011 census population and population norms for establishing sub-centres.

Table 4: Difference between Actual and Required Sub-Centres in Least Populated Selected States and Union Territories

State	Required Centres	Actual Number in 2005	Shortage/ Surplus	Actual Number in 2010	Shortage/ Surplus	Actual Number in 2015	Shortage/ Surplus	Actual Number in 2019	Shortage/ Surplus
Arunachal Pradesh	277	376	99	286	9	286	9	385	108
Puducherry	250	75	-175	53	-197	54	-196	54	-196
Mizoram	219	351	132	370	151	370	151	370	151
Chandigarh	211	13	-198	16	-195	16	-195	0	-211
Sikkim	122	147	25	147	25	147	25	176	54
Andaman & Nicobar Islands	76	107	31	114	38	122	46	124	48
Dadra & Nagar Haveli	69	38	-31	50	-19	56	-13	71	2
Daman & Diu	49	21	-28	26	-23	26	-23	23	-26
Lakshadweep	13	14	1	14	1	14	1	14	1

\*Required centres are calculated based on 2011 census population and population norms for establishing sub-centres.

### Primary Health Centres

The PHCs were envisaged to provide an integrated curative and preventive health care to the rural population with emphasis on preventive and promotive aspects of health care. The PHCs are established and maintained by the State governments under the Minimum Needs Programme (MNP)/ Basic Minimum Services (BMS) Programme. Difference between actual and required primary health centres in highly populated selected states and union territories have been presented in the following table-5. In 2005 Uttar Pradesh is showing more shortage in the available primary health centres with 3020 followed by Maharashtra, West Bengal, Bihar, Madhya Pradesh, Tamil Nadu, Gujarat, Rajasthan and Karnataka with 2552, 1870, 1822, 1227, 1025, 945, 610 and 358. This trend continues up to 2019. By the end of 2019 excluding Karnataka with 90 surplus number of available primary health centres the above remaining states and union territories are facing shortage problem in the available primary health centres in the order Uttar Pradesh with 3724, West Bengal with 2135, Maharashtra

with 1918, Bihar with 1571 and Madhya Pradesh, Tamil Nadu, Gujarat and Rajasthan with 1222, 983, 539 and 203.

Table 5: Difference between Actual and Required Primary health Centres in Highly Populated Selected States and Union Territories

State	Required Centres*	Actual Number in 2005	Shortage/ Surplus	Actual Number in 2010	Shortage/ Surplus	Actual Number in 2015	Shortage/ Surplus	Actual Number in 2019	Shortage/ Surplus
Uttar Pradesh	6660	3640	-3020	3692	-2968	3497	-3163	2936	-3724
Maharashtra	3746	1194	-2552	1816	-1930	1811	-1935	1828	-1918
Bihar	3470	1648	-1822	1863	-1607	1833	-1637	1899	-1571
West Bengal	3043	1173	-1870	909	-2134	909	-2134	908	-2135
Madhya Pradesh	2421	1194	-1227	1155	-1266	1171	-1250	1199	-1222
Tamil Nadu	2405	1380	-1025	1283	-1122	1372	-1033	1422	-983
Rajasthan	2285	1675	-610	1504	-781	2083	-202	2082	-203
Karnataka	2037	1679	-358	2193	156	2353	316	2127	90
Gujarat	2015	1070	-945	1096	-919	1247	-768	1476	-539

\*Required centres are calculated based on 2011 census population and population norms for establishing primary health centres.

It can clearly understand from the below table-6 that the shortage between actual and required Primary health centres in least populated selected states and Union territories is very less. Only Puducherry with a lack of 13, 13, and 13 in 2010, 2015 and 2019, Chandigarh with 20, 18, 20 and 20 in 2005, 2010, 2015 and 2019 and Dadra & Nagar Haveli with 2, 2 and 1 in 2005, 2010 and 2015 are lacking in the available primary health centres in study period.

Table 6: Difference between Actual and Required Primary Health Centres in Least Populated Selected States and Union Territories

State	Required Centres*	Actual Number in 2005	Shortage/ Surplus	Actual Number in 2010	Shortage/ Surplus	Actual Number in 2015	Shortage/ Surplus	Actual Number in 2019	Shortage/ Surplus
Arunachal Pradesh	46	78	36	97	55	117	75	143	101
Puducherry	42	39	2	24	-13	24	-13	24	-13
Mizoram	37	57	22	57	22	57	22	59	24
Chandigarh	35	0	-20	2	-18	0	-20	0	-20
Sikkim	20	24	11	24	11	24	11	29	16
Andaman & Nicobar Islands	13	20	9	19	8	22	11	22	11
Dadra & Nagar Haveli	11	6	-2	6	-2	7	-1	9	1
Daman & Diu	8	3	1	3	1	3	1	4	2
Lakshadweep	2	4	4	4	4	4	4	4	4

\*Required centres are calculated based on 2011 census population and population norms for establishing primary health centres.

### Community Health Centres

Community health centres are being established and maintained by the State government under MNP/BMS programme. As per minimum norms, a CHC is required to be manned by four medical specialists i.e. surgeon, physician, gynaecologist and paediatrician supported by 21 paramedical and other staff. It has 30 in-door beds with one OT, X-ray, labour room and laboratory facilities. The Table 7 expresses the difference between actual and required community health centres in highly populated selected states and union territories. In

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2005 Uttar Pradesh is presenting more shortage in the available community health centres with 1371, followed by Bihar, Maharashtra, West Bengal, Tamil Nadu, Madhya Pradesh, Rajasthan, Karnataka and Gujarat with a deficiency of 766, 709, 666, 566, 378, 273, 256 and 233. This trend continues up to 2019. By the end of 2019 excluding Rajasthan with no difference between actual and required number of available community health centres the above remaining states and union territories are facing shortage problem in the available community health centres in the order Uttar Pradesh followed by Bihar, Maharashtra, West Bengal, Karnataka, Madhya Pradesh, Tamil Nadu and Gujarat with deficiency of 986, 717, 572, 413, 311, 296, 216 and 142 accordingly.

Table 7: Difference between Actual and Required Community health Centres in Highly Populated Selected States and Union Territories

State	Required Centres*	Actual Number in 2005	Shortage/ Surplus	Actual Number in 2010	Shortage/ Surplus	Actual Number in 2015	Shortage/ Surplus	Actual Number in 2019	Shortage/ Surplus
Uttar Pradesh	1665	294	-1371	515	-1150	773	-892	679	-986
Maharashtra	936	227	-709	365	-571	360	-576	364	-572
Bihar	867	101	-766	70	-797	70	-797	150	-717
West Bengal	761	95	-666	348	-413	347	-414	348	-413
Madhya Pradesh	605	227	-378	333	-272	334	-271	309	-296
Tamil Nadu	601	35	-566	256	-345	385	-216	385	-216
Rajasthan	571	298	-273	368	-203	568	-3	571	0
Karnataka	509	253	-256	325	-184	206	-303	198	-311
Gujarat	504	271	-233	290	-214	320	-184	362	-142

\*Required centres are calculated based on 2011 census population and population norms for establishing community health centres.

Difference between actual and required community health centres in least populated selected states and union territories have presented in the following table-8 that Puducherry with 6, 7, 7 and 8, Chandigarh with 8, 7, 7 and 9, Sikkim with 1, 5, 3 and 3 and Dadra & Nagar Haveli with 2, 2, 2 and 1 are facing the shortage problem in 2005, 2010, 2015 and 2019 respectively. It is a dangerous sign observed that there is no any community health centres in Daman & Diu. The remaining states and union territories are having surplus number of available community health centres more in Arunachal Pradesh followed by Mizoram and others.

Table 8: Difference between Actual and Required Community health Centres in Least Populated Selected States and Union Territories

State	Required Centres*	Actual Number in 2005	Shortage/ Surplus	Actual Number in 2010	Shortage/ Surplus	Actual Number in 2015	Shortage/ Surplus	Actual Number in 2019	Shortage/ Surplus
Arunachal Pradesh	12	31	19	167	155	52	40	63	51
Puducherry	10	4	-6	3	-7	3	-7	2	-8
Mizoram	9	12	3	9	0	9	0	9	0
Chandigarh	9	1	-8	2	-7	2	-7	0	-9
Sikkim	5	4	-1	0	-5	2	-3	2	-3
Andaman & Nicobar Islands	3	4	1	4	1	4	1	4	1
Dadra & Nagar Haveli	3	1	-2	1	-2	1	-2	2	-1
Daman & Diu	2	1	-1	2	0	2	0	0	-2
Lakshadweep	1	3	2	3	2	3	2	3	2

\*Required centres are calculated based on 2011 census population and population norms for establishing community health centres.

## Summary and Conclusions

It is concluded from the study that all selected states and union territories are facing the problem of shortage in the available sub- centres in the study. In 2005 Uttar Pradesh is showing more shortage in the available sub- centres with 38437 followed by Maharashtra, Bihar, West Bengal, Tamil Nadu, Madhya Pradesh, Gujarat, Karnataka and Rajasthan with 12748, 10483, 7899, 5747, 5690, 4814, 4076 and 3784. This trend continues up to 2019. By the end of 2019 the above said states in the same order are facing shortage problem in the available sub- centres with 19180, 11807, 10871, 7898, 5716, 4299, 2922, 2461 and 198.

It is summarised from the study that interestingly, among least populated selected states and union territories some states reports surplus number in the availability of sub-centres like Arunachal Pradesh with 99, 9, 9 and 108, Mizoram with 132, 151, 151 and 151, Sikkim with 25, 25, 25 and 54, Andaman & Nicobar Islands with 31, 38, 46 and 48 and Lakshadweep with 1, 1, 1 and 1 in 2005, 2010, 2015 and 2019 respectively. Pondicherry with 175, 197, 196 and 196, Chandigarh with 198, 195, 195 and 211 and Daman & Diu with 28, 23, 23 and 26 are reported shortage in available sub-centres in 2005, 2010, 2015 and 2019. Dadra & Nagar Haveli initially faces the shortage problem with 31, 19 and 13 in 2005, 2010 and 2015 but by the end of 2019 it recorded surplus in the available sub-centres.

Uttar Pradesh in 2005 is showing more shortage in the available primary health centres with 3020 followed by Maharashtra, West Bengal, Bihar, Madhya Pradesh, Tamil Nadu, Gujarat, Rajasthan and Karnataka with 2552, 1870, 1822, 1227, 1025, 945, 610 and 358. This trend continues up to 2019. By the end of 2019 excluding Karnataka with 90 surplus number of available primary health centres the above remaining states and union territories are facing shortage problem in the available primary health centres in the order Uttar Pradesh with 3724, West Bengal with 2135, Maharashtra with 1918, Bihar with 1571 and Madhya Pradesh, Tamil Nadu, Gujarat and Rajasthan with 1222, 983, 539 and 203.

It can clearly understand from the study that the shortage between actual and required Primary health centres in least populated selected states and Union territories is very less. Only Puducherry with a lack of 13, 13, and 13 in 2010, 2015 and 2019, Chandigarh with 20, 18, 20 and 20 in 2005, 2010, 2015 and 2019 and Dadra & Nagar Haveli with 2, 2 and 1 in 2005, 2010 and 2015 are lacking in the available primary health centres in study period.

Uttar Pradesh in 2005 is presenting more shortage in the available community health centres with 1371, followed by Bihar, Maharashtra, West Bengal, Tamil Nadu, Madhya Pradesh, Rajasthan, Karnataka and Gujarat with a deficiency of 766, 709, 666, 566, 378, 273, 256 and 233. This trend continues up to 2019. By the end of 2019 excluding Rajasthan with no difference between actual and required number of available community health centres the above remaining states and union territories are facing shortage problem in the available community health centres in the order Uttar Pradesh followed by Bihar, Maharashtra, West Bengal, Karnataka, Madhya Pradesh, Tamil Nadu and Gujarat with deficiency of 986, 717, 572, 413, 311, 296, 216 and 142 accordingly.

The study summarises that Puducherry with 6, 7, 7 and 8, Chandigarh with 8, 7, 7 and 9, Sikkim with 1, 5, 3 and 3 and Dadra & Nagar Haveli with 2, 2, 2 and 1 are facing the shortage problem in 2005, 2010, 2015 and 2019 respectively. It is a dangerous sign observed that there is no any community health centres in Daman & Diu. The remaining states and



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union territories are having surplus number of available community health centres more in Arunachal Pradesh followed by Mizoram and others.

### **Recommendations**

After studying gap between required and actual available rural health infrastructure in India the present study proposes comprehensive strategies for the overall development of health infrastructure in rural areas in particular and in India in general. It is recommended to know the actual need of health infrastructure in rural areas through a comprehensive study. Both central and state governments should try to reduce the gap between the actual number of available health centres and required number of health centres like sub- centres, primary health centres and community health centres in providing rural health infrastructure. The position of highly populated states and union territories is behind the position of least populated states and union territories in terms rural health infrastructure in this context more focus should be given to the highly populated states and union territories.

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