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Rural health infrastructure: A study with reference to India

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Abstract
Quality of life of the people heavily relies upon the healthcare system in the country. The health care delivery has vital role to play in case of both urban and rural communities. The health services largely are market-centered. The rural areas lack the necessary health care delivery. Of late, there are new dimensions added through tele-healthcare, mobile health units and community-based health insurance and the like. The present paper tries to identify the gaps in the rural health care delivery system and also suggests measures to gear up the present rural health care market.

Keywords: Rural health care, schemes, welfare

Introduction
The healthcare services are divided under State list and Concurrent list in India. While some terms such as public health and hospitals fall in the State list, others such as population control and family welfare, medical education, and quality control of drugs are included in the Concurrent list. The Union Ministry of Health and Family Welfare (UMHFW) is the central authority responsible for implementation of various programmes and schemes in areas of family welfare, prevention, and control of major diseases (Laveesh Bhandari and Siddhartha Dutta, 2007) [16].

The health of populations is a distinct key issue in public policy discourse in every mature society often determining the deployment of huge society. They include its cultural understanding of ill health and well-being, extent of socio-economic disparities, reach of health services and quality and costs of care. Health care covers not merely medical care but also all aspects pro preventive care too. Nor can it be limited to care rendered by or financed out of public expenditure within the government sector alone but must include incentives and disincentives for self-care and care paid for by private citizens to get over ill health (Health Care in India, 2020) [12].

For the development of health status of the citizens of the country there is a need of adequate health care infrastructure. According to Rural Health Statistics (RHS) 2018-19, Government of India, the total number of Sub Centres (SCs) is 160713 (157411 rural + 3302 urban) and they are functioning. Similarly, 30045 Primary Health Centres (PHCs) is functioning in India (24855 rural + 5190 urban) and there are 5685 Community Health Centres (CHCs) (5335 rural + 350 urban) functional in the country. But the current numbers of SCs, PHCs & CHCs are not as per IPHS norm.

The healthcare sector in India is booming in terms of revenue generation and employment creation. In India, healthcare is divided into two segments - public and private. The public healthcare segment is responsible for maintaining the primary health requirements in rural and urban areas and is funded by the government. The private healthcare segment in India is mainly focused in urban centres.

Urban versus rural healthcare [1]
In India, 75% of the healthcare infrastructure is concentrated in urban areas where only 27% of the total Indian population is living. The remaining 73% of the country's population is is lacking proper primary healthcare facilities. Private healthcare has been witnessing steady growth whereas there is a serious degradation in the quality

or infrastructure in the public healthcare sector. The rural healthcare in India is characterized by under-staffed facilities with bad infrastructure and low availability of medicines. According to a KMPG report, "74% of Indian doctors are catering to the needs of the urban population.

Rural Health is one of vital elements of rural life. India being a nation of villages requires an intensive approach towards rural health. Nearly 75 per cent of health infrastructure and other health resources are concentrated in urban areas. Even if several government programmes for growth of rural healthcare have been initiated, the procedural delay in implementation leads to its ineffectiveness. Rural areas have been infected with various contagious diseases like diarrhea, amoebiasis, typhoid, infectious hepatitis, worm infestations, measles, malaria, tuberculosis, whooping cough, respiratory infections, pneumonia and reproductive tract infections. The insanitary conditions of households aggravate expansion of these diseases which is further promoted by apathy of people and government [2].

Structure of Rural Healthcare in India [3]

The healthcare facilities in rural areas under the National Rural Health Mission (as part of the National Health Mission) have been developed as a three-tier system. It includes Sub-Centres (SCs), Primary Health Centres (PHC) and Community Health Centres (CHC). An SC being the first contact point, has one male and one female healthcare worker and a health advisor is entrusted with the task of supervising six SCs. One SC is envisaged to serve up to 5,000 people. PHC units consist of a medical officer supported by 14 paramedical staff and are equipped with six patient beds and other basic facilities. The PHCs have been envisaged to provide an integrated curative and preventive health care with an emphasis on preventive and pro-motive aspects of health care. A PHC is equipped to serve up 20,000-30,000 people.

Table 1: Status of Health Infrastructure in village

Infrastructure / services	% Villages
Connected with Roads	73.9
Having any health provider	95.3
Having Anganwadi worker	74.2
Having a doctor(private & visiting)	43.5
Having a private doctor	30.5
Having a visiting doctor	25.0

Note: Any Health Provider includes: Private doctor, visiting doctor, Unani doctor, Ayurvedic doctor, Homeopathic doctor, Sidha doctor, traditional healer, village health guard(VGH), Trained birth attendents, dai, ICDS /Anganwadi woker and others.
(***Source:*** RCHS Round II, 2002-4).

CHCs have four medical specialists (surgeon, physician, gynecologist and pediatrician) supported by 21 paramedical staff and are equipped with 30 patient beds with one Operation Theatre, X-ray, labour room and laboratory facilities. A CHC covers approximately 80,000-120,000 people. An existing CHC (or a District Hospital, Sub-divisional Hospital) can be declared a fully operational First Referral Unit (FRU) only if it is equipped to provide round-the-clock services for emergency obstetric and New Born Care, in addition to all emergencies that any hospital is required to provide.

The establishment of these health centres is based on certain population norm, which further is different for Plain areas and Hilly/Tribal/Desert areas. The population norm in Plain areas is 5000 per Sub Centre, 30000 per PHC and 120000 per CHC; whereas that for Hilly/Tribal/Desert areas is 3000 per Sub Centres, 20000 per PHC and 80000 per CHC. Further, there will be six Sub Centres per PHC and four PHCs per CHC. The population norm for a female health worker at Sub Centre & PHC and a male health worker at Sub Centre are fixed at 5000 for Plain areas and 3000 for Hilly/ Tribal/Desert areas (GOI, 2011b) [4].

Review of Literature

Dilip Saikia (2014) [14] examines the current status of health care infrastructure in the rural areas of north-eastern region of India. The focus is specifically looks at the progress in physical infrastructure, available health care facilities, status of existing manpower and the like. It highlights the challenges faced by the rural health care sector in the region. The role of health of the people of a nation in economic growth is universally recognised. While well-developed health care infrastructure is the key determinant of good health, the health care infrastructure in India is quite unsatisfactory, especially in rural areas, even after the National Rural Health Mission (NRHM) launched in 2005 has emphasized on strengthening the rural health care infrastructure. In this light the present study (Dilip Saikia, July, 2014) [14].

Neelmani Jaysawal (2015) [2] analyse the data collected through secondary sources like books, journal articles, government records and NGO reports. Research seeks to pinpoint key challenges of rural health system and possible strategies taken by the state for overcoming them. Although unit level institution under rural healthcare takes care of sanitation through its outreach services yet, there is a long milestone to upgrade our health scenario. Rural Health Care services in India are mainly based on Primary health care, which envisages attainment of healthy status for all. The Primary Health Centre (PHC) has been stated to be prime location for diagnosis and first referral of these patients. The coordination between primary and tertiary level institutions needs to be strengthened for overcoming present challenges [5].

(Nenavath Sreenu, 2018) [19] focus on the role of rural health infrastructure development in India. Currently the health infrastructure development of India is poor and it needs fundamental reforms to deal with new emerging challenges. The role of private providers is increasing but simultaneously healthcare facilities are becoming costly. The study surveys the present position of rural health care infrastructure growth, the development of infrastructure, health care facilities, position of human resource, and quality of service delivery.

The researcher suggests future challenges of Indian healthcare infrastructure development in rural area, as the burden of disease, financial deficiency in a large section of the population, vaccination policy and poor access to health care. Longevity, literacy and per capita income are further considerations

Table 2: Average rural population covered by SCs, PHCs and CHCs

Sl. No	State	Rural population 2011 census	Estimated mid-year population 2019 (As on 1st July 2019) in rural areas	Average rural population (Mind-year population as on 1st July2019) covered by a		
				SC	PHC	CHC
1	Arunachal Pradesh	1066358 (77.06)*	1133000 (75.18)*	2,943	7,923	17,984
2	Assam	26807034 (75.90)*	29208000 (84.88)*	6,291	30,875	1,65,017
3	Manipur	2021640 (70.93)*	2132000 (68.53)*	4,351	23,689	92,696
4	Meghalaya	2371439 (73.93)*	2569000 (79.48)*	5,386	21,771	91,750
5	Mizoram	525435 (47.88)*	547000 (45.77)*	1,478	9,271	60,778
6	Nagaland	1407536 (71.170)*	1281000 (59.44)*	2,958	10,167	61,000
7	Sikkim	456999 (74.84)*	389000 (58.49)*	2,210	13,414	1,94,500
8	Tripura	2712464 (73.83)*	2595000 (64.84)*	2,670	24,028	1,44,167
9	India	833748852 (68.85)*	884021000 (66.09)*	5,616	35,567	1,65,702

Note: *Percentage share of population to the total population
(**Source:** Rural health statistics 2018-19, Government of India)

Shortcomings [6]

Most people in rural India opt for government healthcare facilities because of monetary issues and as transport options to the urban centres are not very affordable. Despite that, only 11% sub-centres, 13% Primary Health Centres (PHCs) and 16% Community Health Centres (CHCs) in rural India meet the Indian Public Health Standards (IPHS). Only one allopathic doctor is available for every 10,000 people and one state run hospital is available for 90,000 people.

The most important factor is turning a deaf ear to the patients or their relatives. Their innocence is exploited and they are not allowed to know their rights. Poor literacy is a factor. The doctor in the rural set up is rarely available; most of the centres are run by unskilled or semi-skilled paramedics. In a situation which is beyond control, the patients are sent to the tertiary care hospital where they get more confused and get easily cheated by a group of health workers and middlemen.

Non-availability of basic drugs is a persistent problem of India's rural healthcare. If there are two or three doctors in a rural hospital, they usually share their duties on mutual basis for 1-2 days per week and the rest is managed by a pharmacist or a nurse. In many rural hospitals, the number of nurses is much less than required."

Apart from these, there are certain other constraints that work impede the rural healthcare sector

Infrastructure: The biggest concern for the rural healthcare system is the lack adequate infrastructure. Satnam Singh, AGM, Smile Foundation, told BE, "The existing healthcare centres in rural areas are under-financed, uses below quality equipment, are low in supply of medicines and lacks qualified and dedicated human resources. On top of it, underdeveloped roads, railway systems, poor power supply are some of the major disadvantages that make it difficult to set up a rural healthcare facility."

Doctor: Patient and Nurse: Doctor Ratio: Both these ratios contribute collectively to the inadequacy of the rural healthcare system. Every doctor needs a nurse to cater to their patients. The rural healthcare infrastructure is three-tiered and includes a sub-centre, a PHC and a CHC. PHCs are short of more than 3,000 doctors, with the shortage up by 200% over the last 10 years to 27,421 as per a report by India Spend. A patient is not always treated on time in rural India since the doctors are less in number.

Insurance: Insurance is something that is severely lacking in rural healthcare. India has one of the lowest per capita healthcare expenditures in the world. The government has only contributed to about 32% for the insurance in healthcare sector in India which is sufficient.

Affordability: This is a constraint since people cannot afford the upmarket health services when they need to visit private hospitals. With the advancement of technology, healthcare is also becoming increasingly costly. The cost of diagnostic facilities is also going up. Along with that, there are commissioned charges that most people do not understand.

Lack of Awareness: Awareness about proper healthcare is insufficient in India. The population needs to be educated appropriately on basic issues like the importance of sanitation, health, nutrition, hygiene and on healthcare policies, importance of medical services, their rights, financial support options, the need for proper waste disposal facilities. It is very important to inculcate a health seeking behaviour in them.

Lack of Medical Stores: Medicines are often unavailable in rural areas. Supply of basic medicine is irregular in rural areas. The fair price shops (PPP model) are located in tertiary care and secondary care hospitals. These fair price shops charge differently in different locations. Discounts vary from 50% to 70% by the same provider on the same medicine.

Key Highlights

As on 31st March, 2020, there are 155404 and 2517 Sub Centres (SC), 24918 and 5895Primary Health Centres (PHCs) and 5183 and 466 Community Health Centres (CHCs) respectively which are functioning in rural and urban areas of the country.

Sub Centres (SCs)

At national level there is an increase of 9378 numbers of SCs from the year 2005. The significant increase in SCs has been observed in the States of Rajasthan (2968), Gujarat (1888), Chhattisgarh (1387), Madhya Pradesh (1352) and Karnataka (1045).

- There are a total of 2517 Sub Centres in the urban areas as on 31st March 2020.
- There are a total of 29745 Sub Centres in the tribal areas as on 31st March 2020.

Primary Health Centres (PHCs)

- At national level, there is an increase of 1682 PHCs in 2020 with comparison to the year 2005. The increase in PHCs from year 2005 has been observed in the States of Jammu & Kashmir (589), Karnataka (495), Gujarat (407), Rajasthan (381) and Chhattisgarh (275).
- There are a total of 5895 PHCs in the urban areas as on 31st March 2020.
- There are a total of 4203 PHCs in the tribal areas as on 31st March 2020.

Community Health Centres (CHCs)

- At national level there is increase of 1837 number of CHCs from the year 2005. The increase in CHCs from year 2005 has been observed in the States of Tamil Nadu (350), Uttar Pradesh (325), West Bengal (253), Rajasthan (222) and Odisha (146).
- There are a total of 466 CHCs in the urban areas as on 31st March 2020.
- There are a total of 1035 CHCs in the tribal areas as on 31st March 2020.

First Referral Units (FRUs)

As on 31st March 2020, there are 3313 FRUs functioning in the country. Out of these, 1706, 821, 668 and 118 are at the level of CHC, SDH, DH and Medical College respectively.

Health & Wellness Centres (HWCs)

As per the Health & Wellness Centre portal data, there are total of 38595 HWCs functional in India as on 31st March 2020. Total 18610 SCs have been converted into HWC-SCs. Also at the level of PHC, a total of 19985 PHCs have been converted into HWC-PHCs. Out of total 19985 HWC-PHCs, total 16635 PHCs has been converted into HWCs in rural areas and 3350 in urban areas.

Changes on the Manpower position

- The number of ANMs at Sub Centres and PHCs has increased from 133194 in 2005 to 212593 in 2020 which amounts to an increase of about 59.6%. As on 31st March, 2020 the overall shortfall (which excludes the existing surplus in some of the States) in the posts of HW(F) / ANM is 2% of the total requirement as per the norm of one HW(F) / ANM per Sub Centre and PHC. There is vacancy of 14.1% HW (Female)/ ANM (at SCs +PHCs) when compared with the sanctioned posts.
- The allopathic doctors at PHCs have increased from 20308 in 2005 to 28516 in 2020, which is about 40.4% increase. There is shortfall of 6.8% of allopathic doctors at PHC, out of the total requirement at all India level.
- The specialist doctors at CHCs have increased from 3550 in 2005 to 4957 in 2020. Moreover, as compared to requirement for existing infrastructure, there is a shortfall of 78.9% of Surgeons, 69.7% of Obstetricians & Gynecologists, 78.2% of Physicians and 78.2% of Pediatricians. Overall, there is a shortfall of 76.1% specialists at the CHCs as compared to the requirement for existing CHCs.
- In addition to the specialists, about 15342 General Duty Medical Officers (GDMOs) Allopathic and 702 AYUSH Specialists along with 2720 GDMO AYUSH is also available at CHCs as on 31st March, 2020. In addition to this there are 890 Anaesthetists and 301 Eye Surgeons are also at CHCs as on 31st March 2020.
- A total of 1193 Sub Divisional/Sub District Hospital and 810 District Hospitals (DHs) are functioning as on 31st March, 2020 throughout the country. There are 13399 & 22827 doctors and 29937 & 80920 paramedical staffs are available at SDH and DH respectively.
- There are total 143538 and 287025 numbers of beds available at the level of SDH and DH.

Coverage of Rural Health Infrastructure as per Rural Health Statistics 2019-20 report (As on 31st March, 2020)

Average rural population covered by health facility (based on the mid-year population as on 1st July 2020):

Health Facility	Norm	Average rural population covered
Sub Centre	300-5000	5729
Primary health Centre (PHC)	20000-30000	35730
Community health Centre (CHC)	80000-120000	171779

Average rural area (Sq. Km) covered by

Sub Centre	19.87
Primary Health Centre (PHC)	123.93
Community Health Centre (CHC)	595.82

Average radial distance (Km) covered) by

Sub Centre	2.51
Primary Health Centre (PHC)	6.28
Community Health Centre (CHC)	13.77

Average number of villages covered by

Sub Centre	4
Primary Health Centre (PHC)	27
Community Health Centre (CHC)	128

Improvements in Rural Healthcare Availability, Accessibility and Affordability [7]

Well planned, clean and safe surroundings

For efficacy in rural healthcare, clean, practical and safe facilities such as clean water, hygiene, sanitary environment and simple but efficient waste management methods are all important factors for maintaining quality healthcare services. All requirements such as medicines and the appropriate equipment must be in abundant supply for all those who need to avail of them.

A professional and committed health workforce

It is important that all the rural healthcare hospitals be manned by competent medical staff qualified in all the various medical sciences and their treatments. These should be made available 24/7 to manage the rural populace as well as any unexpected medical emergencies.

Patient centric health management

The needs and expectations of rural patients are very different from the urban healthcare landscape. That is why healthcare services need to be tailored to patients and their community's needs and expectations. Excellent rural healthcare should emphasise on sound medical systems and

procedures. Services such as patients' overall well-being, encouraging family participation in patient care, appropriate linguistic communication and simple to understand treatment are key indicators of a successful strategy to combat challenges in rural healthcare.

Last mile rural healthcare initiatives

Decentralisation of financial resources will vastly increase the efficiency of health care. In the mid-1990s, India started the trend of decentralisation of health care and by 1999, systemic changes in all of the Indian states called for the transfer of administrative and financial duties for the management of healthcare facilities at the district level. Major policy decisions were taken that helped increase medical management at the grass roots level. They allowed for a higher budget allocation for rural healthcare and focused on encouraging community participation in all decision-making for better rural health care reforms. Some of these measures were eventually included in the National Rural Health Mission (NRHM), started in 2005.

State of the art hospitals

Another key success factor to address rural healthcare challenges in improving the quality of treatment and welfare for all patients in rural India, as well as overcoming all challenges to last mile delivery in the rural healthcare system. These hospitals should be able to provide routine medical care as well as have the facilities to treat patients with acute and chronic health problems 24/7. The infrastructure should be equipped with specialised equipment and managed by a multidisciplinary team of doctors, a skilled nursing staff and medical technicians.

Emergency treatment, planned procedures, labour and delivery services, diagnostic tests, lab work, and patient education need to be made available at all these hospitals. This gives the rural populace the option of inpatient or outpatient care, depending on their medical condition. This provides better, quicker, flexible and less expensive healthcare, which is the need of the hour for rural India.

Fixing the doctor-patient ratio

For several decades, the doctor to patient ratio in India has been inadequate and more so in rural healthcare schemes. Even today this remains one the biggest challenges in quick and effective healthcare in rural India. In 2017, 1.8 million registered medical graduates were serving 1.33 billion Indians, which amounted to a ratio of 1.34 doctors per 1,000 Indian population. Understanding and accepting this as an important paradigm to shift healthcare from adequate to exceptional, India aims to build 200 new medical institutions within the next 10 years. This should be done to satisfy a projected 600,000 doctor deficit.

Laying the foundation for increase in Medical Colleges

Another significant contributor in addressing the challenges to rural healthcare delivery is to increase the number of medical hospitals which can improve the doctor -patient ratio. Here, the Indian medical school system is making significant inroads, successfully doubling the number of MBBS graduate (modern medicine training) posts. With over 479 medical schools, India can now accommodate 67,218 MBBS students per year in medical colleges governed by the Medical Council of India. India also generates medical graduates who are trained in the "traditional Indian system of medicine," governed by the Central Council for Indian Medicine.

Models of Governance of Rural Healthcare Delivery [8]

The RURBAN initiative of developing villages can be gainfully used for innovative medical manpower management in primary healthcare. Thus, the concept of Model Group Housing at block level/PHC level should be considered where government employees of all the departments namely Medical and Health, PWD, School Education, Police, Electricity, Bank, Jaldaya Vibhag, BDO, Road & Transport, Post & Telegraph and the like could be provided accommodation where required. Facilities like school, playground, community centre, supermarket etc. could be provided in the neighborhood. This would take care of the "Doctors Deficiency" argument very often put forward as an excuse for non-availability of medical and health facilities. This concept would allow holding, retaining and recruiting fresh talent by facilitating their stay and improvising their quality of life comparable with their counterparts in the city. Thus, the feeling of being deprived and frustrated could be compensated.

The critics might argue that it is a very optimistic project and shall require long time to complete while consuming a lot of resources. While one has waited for solutions including conditional provisions of rural posting, increased allowances or even making the rural services compulsory to doctors or other skilled workers, for more than several decades, the project looks worth serious consideration. The resources under RURBAN model, the funds from Prime Minister Exchequer, Member of Parliament, Village Development Project and those under the National Rural Health Mission with low cost housing along with several other projects could be merged to give impetus to the newer solutions.

The model housing township should also harbor the first referral unit (FRU) consisting of a gynecologist, anesthesiologist, pediatrician and surgeon with facility of ICU. Such team effort would provide cohesive and coordinated medical services. The primary health centre physicians could also stay at the model township and may be allowed to run the OPDs and the National health programmes or other specific responsibilities by a 'to and fro' movement every day. The initial phase of populating such hospitals in such model villages (or townships) can happen by way of temporary deployment of skilled manpower from larger govt hospitals or tertiary care centres that feed such rural areas. Emergencies at the PHCs can be either handled through ambulance 108, or the mobile surgical services stationed at the model township which can periodically conduct camps and handle necessary medical, surgical, emergency and blindness control programme. The sub centres could remain connected to FRU by the ASHA worker or the incharge, who could be from the AYUSH staff. The proposal to effectively mainstream AYUSH in present rural health delivery systems would go a long way and also pave way for looking into the deep rooted indigenous system of medicine well accepted among people. There could be value addition of services by AYUSH staff if they are trained for national health programmes, identifying emergencies in facilitating a decrease in IMR, MMR and IFR. Needless to state, the huge work force of AYUSH is available with majority of the states in India. Further, to reduce the out of pocket expenses, innovative insurance

model combining the RSBY with "TOP UP" Scheme created by UNICEF and is proposed by the author as means to bring change under his leadership.

Conclusion

The present rural healthcare delivery system combats issues of disparities, reach, quality and cost issues. The healthcare infrastructure is a very important public expenditure where the Government needs to be proactive in assessment and apportionment of health care infrastructure impartially to the rural and urban areas. Quality and affordable healthcare is a basic human right as well as a worldwide social aim. Health is a factor that influences a country's overall economic growth rate, because excellent health is a sign of a country's economic progress. Smile Foundation, through its campaign, 'Health Cannot Wait' provides under-privileged people affordable healthcare, preventive medicine, health emergency preparedness and support at their doorstep across urban slums and rural areas of India. After all, health is wealth [9].

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