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Impact of health infrastructure facilities on health delivery in rural

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Abstract

In India, the healthcare industry has grown to be one of the biggest in terms of employment and income. Healthcare includes clinical trials, hospitals, medical equipment, telemedicine, outsourcing, medical tourism, health insurance, and medical devices. The Indian healthcare industry is expanding quickly as a result of improved coverage, improved services, and rising public and private sector spending. In the paper titled "Impact of Health Infrastructure Facilities on Health Delivery in Rural," the function of health centers, their facilities, and their effects on the provision of health services are examined, along with the difficulties faced by the residents of Mandya district. The survey method was used by the researcher, and regression analysis was used to assess the impact of the data.

Keywords: Public Health Infrastructure; Health Centers; Health Delivery System; Clinical trials

1. Introduction

In terms of employment and income, the healthcare industry has grown to be one of India's biggest. Hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance, and medical equipment are all included in the healthcare industry. Due to improved coverage, services, and rising public and private sector spending, the Indian healthcare industry is expanding quickly.

The public and private sectors make up the two main parts of India's healthcare delivery system. The state, I. e. The public healthcare system focuses on providing basic healthcare facilities in rural areas through Primary Healthcare Centers (PHCs) and includes a few secondary and tertiary care facilities in major cities. Most secondary, tertiary, and quaternary care facilities are run by the private sector, with a significant concentration in metro areas and tier-I and tier-II cities. India has a huge pool of highly qualified medical professionals, which gives it a competitive edge. When compared to its Asian and Western counterparts, India is also reasonably priced. Surgery in India costs roughly a tenth of what it does in the US or Western Europe. Patients from all over the world are drawn to the nation due to the low cost of medical services, which has increased medical tourism. Furthermore, because clinical research in India is relatively inexpensive, it has become a center for RandD activities for global players.

The Indian healthcare sector, which was supported by both the public and private sectors, grew steadily in 2023 and reached a valuation of US$ 372 billion. At 7.5 million workers, the Indian healthcare industry is one of the country's biggest employers as of 2024. Data analytics, virtual assistants, and telemedicine advancements are predicted to generate 2–3–5 million new tech jobs. The Economic Survey 2022-23 reports that India's public spending on healthcare reached 22.1 percent of GDP in FY22 and 21.1% in FY23, compared to 11.6 % in FY21. From 2024 to 2032, the hospital market in India is expected to grow at a compound annual growth rate (CAGR) of 8.0 %, from its 2023 valuation of US$98.98 billion to its estimated 2032 value of US$193.59 billion.

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2. Health Infrastructure

Being healthy means having the ability to realize one's full potential in addition to not being ill. It serves as a gauge of an individual's wellbeing. Health is an all-encompassing process that is connected to the growth and development of a nation. But *Prasad (2000*) contended that the government's inability to provide sufficient services, rather than the rural population's mistrust of contemporary medications, was the main cause of their difficulties accessing health care services in India. Therefore, in addition to understanding their diverse social spaces, the government must also comprehend the difference between accessibility and availability. Despite a first-of-its-kind worldwide shift in human health during the twentieth century, it can be challenging to characterize a country's health status using a single set of standards. Indicators like life expectancy, nutrition, and the prevalence of both communicable and non-communicable diseases are typically taken into consideration by researchers when assessing people's health.

Health Infrastructure includes physicians, nurses, hospitals, various paramedical specialists, hospital beds and equipment, and a thriving pharmaceutical sector. Developing a nation's health infrastructure can guarantee that its workforce is healthy enough to produce goods and services. It is only feasible when everyone has access to the health infrastructure. With the help of personnel at various levels, India has increased its health infrastructure. In their study, *Baru, Acharya, Acharya, Kumar, and Nagaraj (2010)* evaluated the state of health service delivery in India and found that the Indian health care system was beset by historical injustices, socioeconomic injustices like caste, class, and gender disparities, and inequities pertaining to the availability, use, and affordability of health services.

- The At the village level, the government has established a number of hospitals, also referred to as Primary Health Centers or PHCs.
- Furthermore, the private sector and nonprofit organizations manage a significant number of hospitals. These hospitals are run by professionals and paramedical professionals who have received training in nursing, medicine, and pharmacy.
- Leprosy, polio, and other deadly diseases have all but disappeared from the nation as a result of the development of health infrastructure.
- Health services have been physically provided in much greater numbers since independence.

A key component of the health delivery system is the public infrastructure. Since they are the first referral units, the health centers (PHC, SHC, and CHC) facilitate the delivery of health services in rural areas. Malnutrition, infectious diseases, inadequate sanitation, a lack of personnel, and unequal health care distribution are some of the factors that lead to healthcare service failure in rural areas. In their 2009 study, *Atanu Sengupta and Swadhin Kumar Mondal* discovered that the public healthcare system is an essential component of social welfare, especially in impoverished areas where the majority of the population lives in extreme poverty and deprivation. The lack of personnel and medications at many medical facilities, especially in rural areas, is seriously hurting the Indian healthcare system *(Nardi and Gyurko, 2013).* Many policies, such as funding sources, regulatory barriers, and incentives, have an impact on staff availability in rural areas *(Figueroa, 2016).* Furthermore, a number of scholars have investigated different facets of healthcare system administration, including inpatient-outpatient service management.

Objectives

The objective of the current research encompass-

- To ascertain the importance of health infrastructure in healthcare delivery in rural.
- To investigate the impact of health infrastructure (physical and HR) on health delivery (patients)
- To investigate the challenges encountered in health delivery system

3. Methodology

The scope of the current research is limited to measure the impact of health infrastructure on health delivery in rural particularly Mandya. Health infrastructure aspects considered are limited to Public health centers that are placed in interiors of the Mandya.

For the current research, researcher has done field study adopting survey method where the 250 people have been survey by administering structured questionnaire. These respondents are chosen randomly from the villages that belong to different taluks of Mandya district. The patients that are availing services of public health centers are surveyed to know the facilities available at health centers identify challenges faced and impact of health service delivery by theses

centers. The attributes constitute of both physical and HR infrastructure facilities available at health centers. Primary responses obtained from the respondents have been analyzed with help of descriptive stats and regression analysis to measure the impact.

The population for the current is vast and infinite as the recipients of health services by public health delivery system are numerous. The sample size of 250 patients is arrived by drawing 50 patients from 5 taluks of Mandya district. Firstly Mandya district is divided into taluks using area sampling. From each area of the study, 50 patients that are availing services from public health centers are chosen randomly.

4. Results and discussion

4.1. Demographical status of patients

The respondents profile constitutes of 68% of male and 32% of female that approach PHC for primary medical help. Majority of the patients belong to the age category of 30-40 years followed by 40-50 years, 20-30 years and less than 20 years respectively. Most of the patients have done their primary schooling, followed by matriculation and PUC. Majority of the patients are earning between 1-2 lakhs per annum followed by less than 1lakh and 2-3lakhs per annum income category. Majority of the patients visit PHC for initial medical help and other referral units based on the necessity of the treatment.

4.2. Health Infrastructure facilities at Health centers

Health infrastructure facilities include both physical infrastructure and human resource infrastructure facilities. The results of analysis of health infrastructure facilities at public health centers under the study reveal that the health centers lack sufficient number of staff that includes both medical and paramedical staff, deficient of lab facilities and pharmacy. The health center buildings are not maintained properly and facilities provided are quiet underrated. Patients also revealed that for any kind of emergencies they have relied on private hospitals nearby. Hospital hygiene and sanitization is another prime concern of the patients apart from the road connectivity and communication modes.

4.3. Impact of Health infrastructure facilities on health services delivery

Impact of the infrastructure facilities on health services delivery is measured using regression analysis. The Cronbach's Alpha test is carried out for the reliability and the value obtained is 0.832. The preposition tested to measure impact is-

- $H0_1$: There is no significant impact of Physical and HR infrastructure facilities on health service delivery

Liner Regression is adopted to study the impact of Health infrastructure facilities; physical and HT infrastructure on health service delivery. The mean score of the HSD (Health Service Delivery) is 3.32 and Std.deviation is 1.02. Similarly mean score of Physical infrastructure is 3.19 and Std.deviation is 1.01 and mean score of HR infrastructure is found to be 3.20 and std.deviation is 1.06 (Table-1).

Table 1 Descriptive Statistics

	Mean	**Std. Deviation**	**N**
HSD	3.3261	1.02017	250
Physical Infrastructure	3.1990	1.01561	250
HR infrastructure	3.2051	1.06521	250

Table 2 Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Change Statistics**				
					R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**
1	0.817a	0.667	0.666	0.58919	0.667	784.230	1	391	0.000

a. Predictors: (Constant), Physical and HR infrastructure

The Model summary presented in the Table- 2 elucidates the impact of health infrastructure on health service delivery in rural areas of Mandya. R square value is used to identify the Percentage change of total change in the dependent variable. The determining factor found to be R^2=.666 significant at F value 784.230 indicating 66.6% of impact of health infrastructure on health service delivery.

Table 3 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.701	0.098		7.130	0.000	0.508	0.894
	Physical Infrastructure	0.821	0.029	0.817	28.004	0.000	0.763	0.878
2	HR Infrastructure	0.932	0.31	0.982	29.452	0.021	0.891	0.896

a. Dependent Variable: Health Service Delivery

It is elucidated from the Table-3 that both physical and HR infrastructure (000<0.05), has a significant impact on health service delivery. As p<0.05 for both infrastructure facilities variable under the study, null hypothesis is rejected and alternate hypothesis is accepted indicating that there is a significant impact of health infrastructure facilities on the health service delivery in rural areas of Mandya.

4.4. Challenges encountered by the health delivery system

During the research based on the observations made and interviews with the staff and interaction with patients indicate that the government is allocating funds for the developmental activities that strengthen the health delivery system but funds are not reaching the health centers meaning the staff get standardized response of fund deficiency whether it is repairs, resource acquisition, staff deficiency or lab services. Patients keep complaining of deficiency of infrastructure but health centers staff complains that patients prefer private hospitals over health centers no matter how hard staff convinces them to take treatment in centers. It is also observed that people are ready to bear out of the pocket expenses to get treated in the private hospitals as they are convinced by the availability of the all kinds of services under one roof for 24/7.

4.4.1. Suggestions

The government should take the initiative to create awareness of services provided by the health centers and convince people about the facilities, treatment and associated services rendered par with private hospitals. Government should recruit sufficient number of staff; physicians, nurse, brothers, pharmacist and helpers. The funds allocated should reach health centers and must focus on the physical infrastructure developments. The basic facilities such as lab and pharmacy are to be given highest importance.

5. Conclusion

Current research was carried out with the purpose to measure the impact of the health infrastructure facilities on the health service delivery in rural areas on Mandya. Responses were obtained from the staff, patients through interview and observation. The impact is measured with help of the linear regression model that reveals that there is an impact of health infrastructure on health service delivery. Based on the results, it is suggested to government that funds should reach health centers for the developmental activities and must hire sufficient number of staff that are available 24/7.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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