A STUDY ON MANAGEMENT OF HEALTHCARE INFRASTRUCTURE DEVELOPMENT IN INDIA: FINDING FINANCIAL GAP IN INDIAN HEALTHCARE SYSTEM

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ABSTRACT

This study examine the role of healthcare infrastructure development and critical analysis of financing gap in India The concept of health care infrastructure development in India is very poor condition. However in countries like India, which adopted this concept (infrastructure financing development) although its implementation has been riddled with complex ongoing problems, there are not sufficient grounds to throw away it completely. These problems are mainly due to the slow implementation, which has left a vast rural population with little or no access to healthcare. Rural health care (means PHCs) strongly promotes equity of access hence is vital in many developing nations. And develop the healthcare infrastructure and financing in rural and urban areas. The health infrastructure Development of India is in dismal condition, it needs essential reforms to deal with new rising challenges. On the one hand the role of private players is continuously increasing in healthcare sector, but simultaneously healthcare facilities are getting costly, and becoming non-accessible for the poor. The government hospitals are facing the problem of lack of financing availability and infrastructure; there are inadequate number of beds, rooms, and medicines. In this research paper the study have discussed the present scenario of healthcare facilities and personnel. On the part of government there is lack of monitoring of the funds and resources, which are devoted towards the improvement of healthcare sector. The study has suggested a model healthcare infrastructure development plan which develops around preparing a long term strategy for qualitative as well as quantitative improvements in healthcare infrastructure and financing availability. In the end the study suggest that there is a urgent need to make the proper plan to improve the medical facilities for a vast population as of India, but the central government must take actions from all sides along with the help of other actors like state governments, NGOs, and media. Investment in healthcare sector to the tune of two to five percent of GDP is inevitable but insufficient to bring in radical changes in this connection the methodology has been adopted for this study. The following methodology was adopted literature survey, for analysis in India with use of specific questionnaire for collecting primary data.

INTRODUCTION

Being in India, with a population of 1.21 billion out of which 26.1% is below the poverty line, is extensive with many challenges - high income disparity, lack of basic infrastructure and the incidence of diseases. As a result delivery of quality affordable healthcare is an massive challenge. Improvements in the infrastructure and delivery system of health care, provision of manpower, equipments and drugs, improved inter-sector coordination, monitoring and evaluation, and other innovative approaches have been undertaken in order to improve the basic indicators of healthcare. Recognizing the need to progressively address the challenges in achieving sustainable reforms, maintaining the required quality of care and accelerating human development, the central government has accorded priority to all three aspects of healthcare - prevention, treatment, promoting and discovery. However, this will require financing in different forms by stakeholders involved - as healthcare payer, as funding agency (private equity, long term debt, venture capital), as subsidy, as incentives, and as grants. This financing will need to overcome certain challenges:

1. Infrastructure creation and intensification (hospitals, diagnostics, specialty, telemedicine clinics to provide access to quality healthcare to both rural and urban masses)

2. Enhancing access through insurance (government as a payer)

3. Medical education and training; and

4. Innovation and indigenization (focus on implants and high-value medical consumables).

An analysis of the current healthcare profile of India indicates the gaps and deficiencies in terms of service outreach, available resources, infrastructure and affordability as well as government expenditure, when compared to other developing nations. The emerging PPP models and innovations in healthcare financing outlined here concentrate on key areas affecting important indicators hoping that the success of these initiatives will have far-reaching implications towards better health of the common people. The focus of this report is to improve the synergy between public and private funding in order to overcome existing challenges and clear the way for adoption of a bigger role by the government in developing this social sector at a faster pace. Health infrastructure is an important indicator for understanding the health care policy and welfare mechanism in a country. It signifies the investment priority with regards to the creation of health care facilities. India has one of the largest populations in the world; coupled with this wide spread poverty becomes a serious problem in India. The country is geographically challenged; this is due to its tropical climate which acts both as a boon and a bane, a Sub Tropical Climate is conducive to agriculture however it also provides a ground for germination of diseases. Due to a cumulative effect of poverty, population load and climatic factors India's population is seriously susceptible to diseases. The Infrastructure has been described as the basic support for the delivery of public health activities. Five components of health infrastructure can be broadly classified as: skilled workforce; integrated electronic information systems; public health organizations, resources and research. When we talk about health infrastructure we are not merely talking about the outcomes of health policy of a particular country, but the focus is upon material capacity building in the arena of public health delivery mechanisms.

1.0. Infrastructure indicators

The healthcare infrastructure indicator(s) help us understand the healthcare delivery provisions and mechanisms in India and signify the investments and priority accorded to creating the infrastructure in public and private sectors. In the past few years India has made good progress with respect to both the service infrastructure as well as the educational infrastructure, which is evident from the facts revealed in the National Health Profile 2010, conducted by the Central Bureau of Health Intelligence: (1). There are 12,760 hospitals having 5,76,793 beds in the country. Under the department of AYUSH there are 24,465 dispensaries and 3,408 hospitals in April 2010. (2). There were 148,124 sub-centers, 23,887 PHCs and 4,809 CHCs as per Ministry of Health and Family Welfare, Government of India, 2011

2.0. Healthcare infrastructure development

Providing for quality healthcare services is highly capital intensive where the cost of building a secondary care and tertiary care hospital could be as high as 25 lakhs and 40 lakhs per installed bed, respectively. The industry also requires highly skilled resources ranging from doctors to other medical support staff like nurses, lab technicians, pharmacists etc. India faces a severe resource shortage on both capital invested and manpower as shown. India suffers from an acute shortage of hospital beds with a bed ratio of 0.7 per 1,000 of population. Regional variations exist with some areas in economically advanced states having excess capacity, but shortage in other regions contributes to the shortfall at a national level. This is very much below the average ratio of 1 bed per 1,000 among the low income countries (as defined by WHO). To reach to the average level of 1 bed per 1,000, India needs about 3 lakh beds as additional installed capacity. At an average cost per bed of 25 lakhs for a secondary care hospital, the total investment required amounts to INR 75,000 crores.

In setting up and running a healthcare unit, capital costs form significant proportion of the total costs. Land and building development accounts for 40-65 percent of capital invested, with land accounting for 15 percent

and building development for the remaining 50 percent. Government help in land acquisition helps to significantly reduce project costs and the benefit of the same can be incorporated into the costing of services to reduce the financial burden of the beneficiary. Equipment costs from the other major component in the project cost with tertiary hospitals typically importing 75-80 percent of their equipment. Maintenance and operation of these specialized and high-end medical equipments requires skilled management and personnel where involvement of private parties can be sought.

3.0. Healthcare finance indicators

The healthcare finance indicators provide an understanding of patterns of investments, expenditure, sources of funding and proportion of allocation against the total allocation. They also help us understand the health outcomes in relation to the expenditure. The below table shows the pattern of central allocation on a five-year plan outlay: The below data shows that the percentage of allocation for the health sector against the total planned investment in the country by the central government has increased to some extent in the Eleventh Plan when the Health Research Department was created and the NRHM schemes were started.

5.0   Financing mechanisms

The present inefficiencies and inequities in the public healthcare system in India have pushed forward the need for creative thinking and innovative solutions. Crippling health problems have raised a need for change in the existing structure of health service provision and risk pooling, both in public and private sectors. On a national level, there have been several efforts to reform the health system to improve the access to quality services for the poor. However all the central govt. efforts at influencing public health have focused on the five-year plans. On the other hand, the reforms brought on by the economic policies of the 1990's, helped India attract a lot of interest and investment from foreign sources. Private equity, venture capital, external commercial borrowings, etc brought in new funding options besides long-term debt which was used as the primary mechanism to finance hospitals in India. Given the flurry of activity in the health care sector which includes the setting up green field projects, expanding existing hospitals and acquiring brown field facilities, there is a dire need for innovative funding mechanisms. Considering the huge need gap, rapid rate of growth and capital-intensive nature of hospitals, many players are looking for funding mechanisms beyond the conventional borrowing route. Currently the investment landscape in health care is predominantly characterized by debt financing. In addition, many private sector banks have developed a separate health care portfolio.

6.0   Statement of the problems

1. Insufficiency of Hospital Beds: There are 12,760 hospitals having 576,793 beds in the country. Out of these 6795 hospitals are in rural area with 149,690 beds and 3,748 hospitals are in urban area with 399,195 beds. Average Population served per Government Hospital is 90,972 and average population served per government hospital bed is 2,012.

2. Dismal Number of Healthcare Centers: There are 1,45,894 Sub Centers, 23,391 Primary Health Centers and 4,510 Community Health Centers in India as on March 2009.   These figures are insufficient keeping in mind the model of 2005 National Commission on Macroeconomics and Health,

3. Non-Availability of Urgently Needed drugs and medical equipments.

4. The expenditure is particularly skewed toward salaries in some of the poor performing states. For example, wages and salaries constituted around 83 and 85 percent of total health spending in the states of Madhya Pradesh and Orissa the two states with the worst health indicators.

5. The nature of public spending has resulted in a grossly inadequate health infrastructure. The number of allopathic doctors, nurses, and midwives in India (when adjusted for their qualification) is less than a fourth of the WHO benchmark (Rao and others, 2011).

7.0. **Objective of the study**

1. To examine the status and problems of healthcare infrastructure development and financial gap for delivery services in India;

2. To examine the quality of health infrastructure services and delivery services in India

3. To suggest appropriate recommendations to revamp health financial policy and provision of institutional mechanisms to improve access and quality of health services and infrastructure development in India

8.0. **Research methodology**

The paper largely depends upon secondary sources of data. The various sources of data include reports of the Union Ministry of Health and Family Welfare, the National Planning Commission, National Rural Health Mission, National Health Policies (2000 and 2012), Primary data from an ongoing Project undertaken and provider at healthcare centres and government district level hospital has been used to supplement the findings arrived at from the secondary data. Data about health services has been collected from 152 households comprising 197 from the rural areas and 54 from the urban areas. For data analysis the suitable statistical techniques have been used. The methodology that has been followed is to first assess the current state of healthcare in India: the socio-economic and health indicators in India, infrastructure and resource deficiencies, and the central government interventions including health programmes, schemes and funds, partnership with World Bank, DFID, Asian Development Bank and European Commission, and the various PPP initiatives currently undertaken. This is followed by the various modes and areas of financing from the private sector for the growth and development of healthcare in India. A section is also dedicated to the emerging PPP models in healthcare and the trends of various channels to infuse funds in this sector. These formed the basis to identify the most appropriate avenues for healthcare financing.

8.0. Data analysis and interpretation

8.1. A Study on Healthcare Infrastructure and Financing Development in India

The findings illustrated some interesting differences in user perception regarding infrastructure development, financial services and service quality how they varied between different healthcare centres and according to the demographic status of patients. It was observed that:

1. 'Healthcare delivery' and 'financial and physical access to care' significantly impacted the perception among men while among women it was 'healthcare delivery' and 'health personnel conduct and drug availability'.

2. With improved income and education, the expectations of the respondents also increased. It was not merely the financial and physical access that was important but the manner of delivery, the availability of various facilities and the interpersonal and diagnostic aspect of care as well that mattered to the people with enhanced economic earnings.

3. What was the most finding that the overall quality of healthcare services in Primary Healthcare in Inadequate availability of doctors and medical equipments, poor clinical examination and poor quality of drugs were the important drawbacks reported at PHCs?

The current study demonstrates that the instrument of study was reliable and possessed the power to discern differences in the opinion of people on the basis of demographic factors and point out the quality differences in different healthcare centers. It could be study to evaluate infrastructure development, financial services availability and healthcare quality perception in other rural areas regions of the Andhra Pradesh and to assess the perception of users towards private healthcare centres. Further, research could be conducted on infrastructure-quality relationship. The government and policy makers are urged to consider the perceptions of

patients as well in order to affect improvement in the quality of services and subsequently increase their utilization.

8.2. Factor Analysis

Factor analysis technique was examining the structure of the relationship among variables representing the perceived quality dimensions of healthcare services in India. Prior to running the factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were performed. The generated score of KMO was 0.92 and highly significant Bartlett's test of sphericity supported the appropriateness of using factor analysis to explore the underlying structure of perceived quality of primary healthcare delivery services. An "Eigen value greater than 1" criterion was employed for determining the number of factors. Factor loadings of 0.5 or greater on a factor were regarded as significant. For the present data KMO value is 0.856 (from the table mentioned below) therefore factor analysis is appropriate for data.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.648
Bartlett's test of sphericity	Approx. chi-square	3241.264
	df	56
	Sig.	0.532

Bartlett's test is not satisfied according to the table. The Bartlett's test assumes that the null hypothesis that the original correlation matrix is an identity matrix. For factor analysis to work we need some relationship between variables and if the R-matrix were an identity matrix then all correlation co-efficient would be greater than 0.05 therefore this value is insignificant (i.e significant value greater than 0.05). a significance test tells us that the R matrix is an identity matrix; therefore is a no relation between the variables and very few variables are contain relation for the present data the Bartlett's test is highly insignificant (p>0.532) and therefore factor analysis can be applied. There are 50% factors deduced from a set of 21 factors which are mention blow table with respective variances.

Total variance explained

To Analysis Variance in linear components (factor) eigen values are used. The total column gives the Eigen or amount of variances in the original variables accounted for by each component. The 46.088% gives the percentage of variances accounted the first 8 components. The same table list Eigen values associated with each linear components before extractions. After extraction, and after rotation. Before extraction 21 linear components are displayed, there are many components as variables and in a correlations analysis the sum of the Eigen values equals the number of components. The study has given the command to extract the Eigen values that are greater than 1. So in the initial solution the first five principal components are extracted. Table also displays the Eigen values in terms of percentage of variance explained by each factor (factor 1 explains 11.119 of total variance). The Eigen values associated with these factor are again displayed in the columns labels 'extraction sum of squared loading '. The extracted vales in this part of the table are the same as the value before extraction, except that the values for the discarded factor are ignored. In the table labeled 'rotation sum of squared loadings'. The Eigen value of the factors after rotation is displayed.

Rotation has the effect of optimizing the factor structure and one consequence for these data is that the relative importance of the four factors is equalized. Before rotation, factor 1 accounted for considerably more variances than the remaining (11.119%). In the similar those 8 factors account for the variance in lesser percentages and altogether those five factors account for 46.08% of variability in the choice of the healthcare delivery process.

Item s	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of varian ce	Cumulati ve %	Total	% of varian ce	Cumul ative %	Total	% of variance	Cumula tive %
1	2.335	11.119	11.119	2.335	11.119	11.119	1.681	8.005	8.005
2	1.459	6.946	18.066	1.459	6.946	18.066	1.648	7.845	15.850
3	1.295	6.169	24.235	1.295	6.169	24.235	1.475	7.024	22.874
4	1.282	6.105	30.340	1.282	6.105	30.340	1.245	5.930	28.804
5	1.171	5.578	35.918	1.171	5.578	35.918	1.200	5.713	34.517
6	1.137	5.416	41.334	1.137	5.416	41.334	1.189	5.661	40.178
7	1.028	4.897	46.231	1.028	2.897	42.231	1.161	2.530	42.708
8	1.020	4.857	51.088	1.020	3.857	46.088	1.130	3.380	46.088
9	.982	4.679	55.766						
10	.939	4.471	60.237						
11	.926	4.411	64.648						
12	.894	4.256	68.905						
13	.844	4.020	72.925						
14	.820	3.904	76.829						
15	.811	3.861	80.689						
16	.726	3.455	84.145						
17	.713	3.397	87.542						
18	.696	3.313	90.855						
19	.655	3.120	93.975						
20	.638	3.037	97.012						
21	.627	2.988	100.000						

Rotated Component Matrix

As shown in Table the factor analysis of the 21-item scale on the basis of principal component extraction by using Varimax rotation converged in sixteen iterations and resulted in five homogeneous sub-scales with the Eigen values of 4.127, 2.250, 2.690, 1.915 and 2.029. The total variance explained after rotation was 74.216 per cent with the communalities after extraction ranging from 0.592 to 0.729. The factors so obtained were named in accordance with the nature of their underlying construct keeping in mind the statements that had higher loading on a specific factor. Subsequently, they were named 'healthcare delivery,' 'interpersonal and diagnostic aspect of care,' 'facility,' 'health personnel conduct and drug availability,' and 'financial and physical access to care.' The first subscale with Cronbach alpha 0.82 included seven items related to 'healthcare delivery' (HCD): adequate availability of doctors, good diagnosis, satisfaction over prescriptions, quality of drugs, recovery/ cure, sufficient time to patients, and payment arrangements. The second subscale, 'interpersonal and diagnostic aspect of care' (IDC) with Cronbach alpha 0.71 comprised five items: overall reception facility, good clinical examination, follow-up/monitoring of patients, adequate medical equipment. The third subscale, 'facility' with Cronbach alpha 0.75, included five items: adequacy of rooms, adequate availability of doctors for women, neat and clean hospital premises, clean appearance of staff, and proper disposal of waste. The fourth subscale with Cronbach alpha 0.74 contained three items related to 'health personnel conduct and drug availability' (HPCDA): compassion and support, adequate respect to patients, and availability of all drugs. The last subscale, 'financial and physical access to care' (FPAC) with Cronbach alpha 0.61, comprised three items: financial feasibility of treatment, ease of obtaining drugs, and easy approachability. The scale was tested for reliability. It had an overall Cronbach's alpha value of 0.96 that ranged from 0.706 to 0.919 for the subscales. The reliability was highest for 'interpersonal and diagnostic aspect of care' (0.92) and lowest for 'financial and physical access to care' (0.71). The overall mean score was 1.782.

Items	Components/Factors					Communalities after Extraction
	1	2	3	4	5	
Primary Healthcare Delivery						
Adequate availability of doctors	0.490	0.421	0.466	0.141	0.031	0.655
Good diagnosis	0.541	0.472	0.458	0.321	0.018	0.828
Satisfaction over prescriptions	0.436	0.313	0.138	0.408	0.162	0.715
Quality of drugs	0.598	0.273	0.486	0.339	- 0.041	0.785
Recovery/ cure	0.683	0.307	0.260	0.182	0.112	0.820
Sufficient time to patients	0.580	0.194	0.027	0.133	0.339	0.778
PHCs Interpersonal and Diagnostic Aspect of Care						
Overall reception facility	0.218	0.539	0.234	0.450	0.177	0.745
Good clinical examination	0.390	0.574	0.231	0.232	0.250	0.776
monitoring of patients	0.180	0.646	0.342	0.321	0.291	0.755
Adequate medical equipment	0.200	0.391	0.387	0.104	- 0.051	0.829
Primary healthcare centres providing Facility						
Adequacy of rooms	0.367	0.219	0.519	0.180	0.173	0.628
Availability doctors for women	0.284	0.519	0.425	0.147	- 0.188	0.797
Neat and clean hospital premises	0.102	0.193	0.329	0.275	0.110	0.667
Clean appearance of staff	0.338	0.158	0.562	0.226	0.293	0.592
Proper disposal of waste	0.007	0.313	0.455	0.005	0.332	0.779
PHCs Health Personnel Conduct and Drug Availability						
Compassion and support	0.279	0.382	0.112	0.656	0.102	0.819
Adequate respect to patients	0.221	0.267	0.267	0.696	0.164	0.703
Availability of all drugs	0.453	0.374	0.407	0.463	0.004	0.725
Financial and Physical Access to Care						
Financial feasibility of treatment	0.463	-0.014	0.163	0.036	0.660	0.678
Ease of obtaining drugs	0.188	-0.120	0.279	0.503	0.543	0.675
Easy approachability	0.028	0.283	0.059	0.120	0.826	0.781
Percentage variance explained by factor after rotation	16.945	15.595	15.512	13.554	9.610	
Extraction Method: Principal Component Analysis with four factor extraction. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 16 iterations.						

9.0. Finding and suggestions

1. The lack of standardization of concerns about quality. It is observed that the standard of service in terms of cost, diagnostic procedures treatments differs with different providers. This disparity increases with the urban-rural and expressway divide, resulting in low customer satisfaction, unethical practices such as longer hospital stays expensive treatments and drugs. One of the most effective approaches to manage with this disparity is to bring in standardization of rule as well as costs through authorization

2. Investments in the private healthcare sector have not been guided by the need and demand for health services but are based on availability of financial capital for the healthcare sector. This in turn has resulted in development of health infrastructure for services, which are considered financially profitable by the private providers.

3. To the needs of the local communities. Increasing awareness and enhanced paying capacity of the patients, calls for a more rational approach to plan investment in private healthcare infrastructure. The

government has, with the objective to promote health infrastructure in underserved and unserved areas, offered a five year tax holiday, to hospitals with a bed capacity of 100 or more. Though it has been argued by many that this is too little to promote private investment in healthcare,

4. The improve the management and accountability of public healthcare services the government has to substantially improve the management system and accountability mechanism so that the healthcare professional perform their function adequately. This will require improving the management capacity in the healthcare system and various level.

5. The Overall the healthcare infrastructure in rural and urban India is deficient, in terms of the adequacy and availability of healthcare services. Unfortunately, most of the infrastructure, especially in the private sector is unregulated and invariably has unacceptably lower quality standards.

10.0. Conclusion

The task of ensuring the availability of infrastructure resources for health in rural areas and building their capacity for public health is a real challenge. The overall shortage of infrastructure and financial resources are aggravated by slanted distribution within the country, even within the states, movement of personnel from rural to urban areas and from public sectors to private sectors. The solution for meeting the challenges in infrastructure development for health include strategic planning for infrastructure resource for public health at state/national level. State specific infrastructure and financial gap development and training policy, reorientation of medical and paramedical education, ensuring proper utilization of the trained manpower and standardization of trainings, effective infrastructure resource management information systems are also important. Based on the current state of healthcare financing in Indian States through Government sponsored schemes, private sector interventions and the recent string of PPP Projects, it is understood that there is still a long way to go in terms of uplifting of the healthcare sector and reaching the desired health goals. It is very much evident that huge investment will be required in developing/upgrading of healthcare infrastructure, in order to improve accessibility and quality of care. The government at the same time needs to understand the issues faced by private sector currently (working independently or in the existing PPP programmes) and take measures to improve the investment climate in the respective states. The states will need to put in place clear policies and guidelines in the healthcare sector which will enable to attract large private investments in the health care industry.

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