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HEALTH INFRASTRUCTURE DEVELOPMENT IN RURAL MAHARASHTRA

[1]PROF. (DR.) P. S. KAMBLE & [2]MR. AMBEDKAR VISHAL VISHNU/ [2]MR. OVHAL VISHAL VISHNU

[1]Professor, Department of Economics, Shivaji University, Kolhapur

[2]Research Student, Department of Economics, Shivaji University, Kolhapur

[1]psk_eco@unishivaji.ac.in

ABSTRACT

This research paper makes a detailed study of the availability of healthcare facilities in rural Maharashtra. This has been studied, are the government health services available in rural Maharashtra adequate? During the study, it was noticed that the number of government hospitals and beds available in Maharashtra is far less than the demand of the population. But through the National Rural Health Mission, it was observed that primary health centres were set up in every village. This has made health services available to rural people on time and at reasonable rates. The modern and populous Maharashtra needs a large number of hospitals and beds not only in rural but in urban areas also.

KEY-WORDS- Rural Health, Health Infrastructure, PHCs, CHCs, and Health Expenditure

INTRODUCTION

Health and Medical facilities are very much important social services (Bhate-Deosthal, P., Khatri, R., etc., 2011. p.24). It is, therefore, is considered as one of the important sub-sectors of the social sector. It is expected that the government should play a very important role in the development of health and medical facilities. The role the government of Maharashtra has been playing by incurring its public expenditure have discussed in the article. Here it is time to examine the physical quantity of the health in the Rural Maharashtra. This article highlights different parameters and indicators of public health such as government expenditure on health, Public healthcare services like sub-centres, community health centres, primary health centres, availability of beds etc.,

PUBLIC HEALTH

Public health is generally defined as the science that guarantees safety and improves people and communities' health by preventing disease and injury and the science that uses strategic strategies and research (Bihari, B. D.,

Gupta, S., Sital, S., etc., 2015.p.3). But this definition of public health may vary from person to person. If you want to run a laboratory to improve people's health, do research, or work directly with the community on health issues. So there are good opportunities for you in this area. Similarly, as a public health professional, you will be able to work around the world (Dhingra, A. 2018).

REVIEW OF RESEARCH LITERATURE

Researcher has studies several research articles, monographs, reports and M.Phil/Ph.D research work on present article topic. Researcher found that very small so far as their scope is concerned. Hence there is an urgent need to undertake a large scope and in-depth research study on the topic into our consideration. A researcher did not find the more specific health-related study in the social sciences and considered the study area of the present research article. Such type of study is totally lacking in the context of Maharashtra. Hence, the present research study is essential in public economics and public finance in order frame health policy of rural Maharashtra.

STATEMENT OF THE RESEARCH PROBLEM

The Maharashtra government's focus on public health is increasing day by day. But the reality is showing something different. This has come to the notice of the people of the state in the Corona epidemic. Despite the rising expenditure on public health in the state, it has been observed during rural field visits that adequate medical facilities are not available in rural Maharashtra. Most of the rural and urban areas do not even have the required beds in public dispensaries and hospitals (Kamble, P. S., Ovhal, V. V., 2018.p.8). This is causing great inconvenience to the rural masses. The growth rate (C.G.R.) of hospitals in rural areas was minus 3.10 per cent while in urban areas it was positive 8.23 per cent. Similarly, there is a big difference between the maximum and minimum number of hospitals in rural and urban areas. E.g. Min 273 and Max 735 were seen in rural areas and Max 127 level Max 1037 was seen in urban areas (Ovhal, V. V., 2019.p.6). Similarly, there is a big difference in the number of hospital beds in rural and urban areas. During the above period, the average number of beds in rural hospitals was 12416 while the average number of beds in urban hospitals was 52921. The coefficient of variation (C.V) in the number of hospital beds in rural and urban areas between 2005 and 2019 was 12 and 84 respectively. This meant more fluctuation found in the number of hospital beds of urban areas. Its growth rate (C.G.R.) was 4.61 per cent. Similarly, the number of beds in rural areas was Min 10384 and Max 15380 and the number of beds in urban areas was Min 19,356 and Max 1,51,445 (Ovhal, V. V., 2022. p.213). The research paper has been written with the objective of finding a solution to these problems as a researcher.

OBJECTIVES OF THE RESEARCH STUDY

1. To study the government expenditure on health.
2. To study the scenario of health infrastructure in Rural Maharashtra.

HYPOTHESIS OF THE RESEARCH STUDY

1. H_0-There is no significantly improved health infrastructure in rural Maharashtra.
2. H_0-There is no significant relationship between government hospitals and beds in rural Maharashtra.

RESEARCH METHODOLOGY

Sample Design

The present analytical research paper is depends on primary data as well as secondary database.Researchers have used the TARO YAMANE formula for sample selection. This formula is used to select the appropriate size of the sample from known populations. Here the same researcher did know the exact population of purposively selected five districts of Western Maharashtra (Pune, Kolhapur, Sangli, Satara and Solapur). The total population of the five districts was 23,449,049. The researcher has used the following TARO YAMANE formula to get the right sample size from this.

$$n = \frac{N}{1 + N(e)^2}$$

Following are some important things that a researcher should consider when using the above formula.

i. Margin of error is 5 percent

ii. confidence level is 95 percent

$$n = \frac{23449049}{1 + 23449049(0.05)^2}$$

$$n = \frac{23449049}{1 + 23449049 * 0.0025}$$

$$n = \frac{23449049}{1 + 58622.6225}$$

$$n = \frac{23449049}{58623.6225}$$

$$Recommended\ sample\ size\ is\ (n) = 399.9931768$$

But in actually the researcher has selected 500 respondents which are greater than recommended sample size of 399.9931768 by Prof. Taro Yamane Sample Measurement Formula. If the selected sample size is greater than the recommended sample size of Prof. Yamane then the no problem with data inferences. But if the actual size is smaller than the suggested sample size, the research results may be biased. Hence, in order to give proper representation to each social class and to get good research results, the researcher has selected 500 respondent

families instead of recommended 399 for the study. These 500 samples out of 100 selected from each of the selected districts.

Study Indicators

Researcher has selected following three health infrastructure indicators for measuring health development in study area.

i. Number of Govt. Hospitals (SCs, PHCs and CHCs)
ii. Availability of beds in dispensaries and hospitals
iii. Distance from medical and hospital services

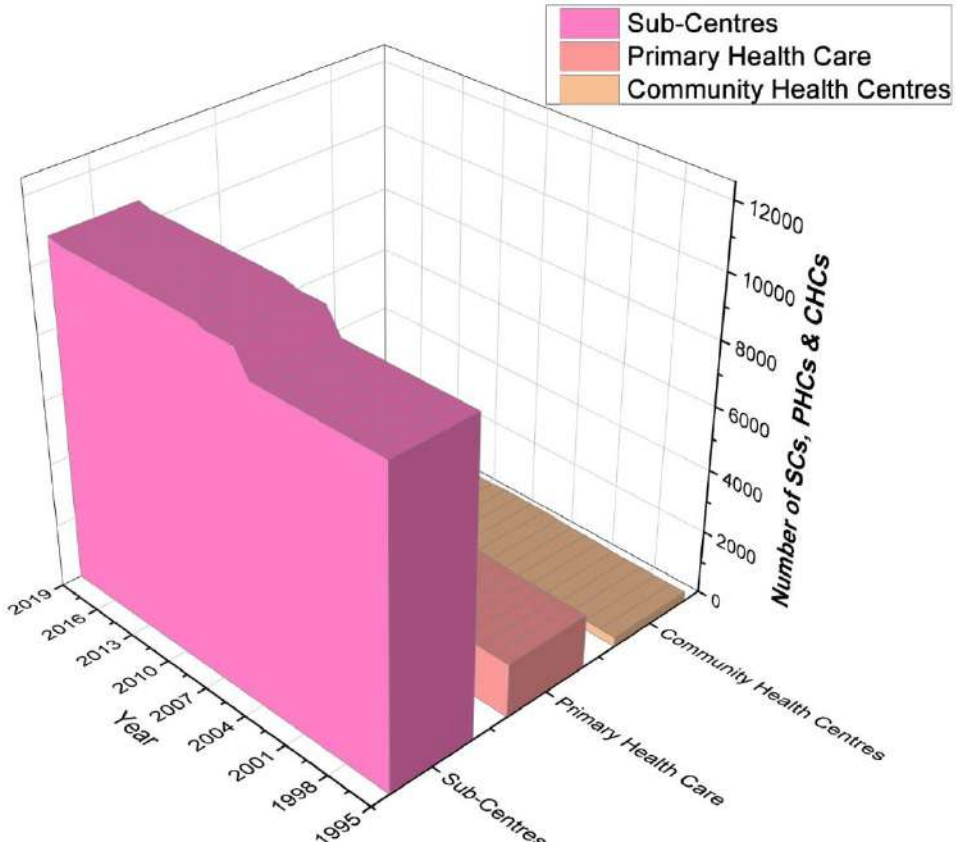
1. HEALTH INFRASTRUCTURE IN MAHARASHTRA

Table No.8.1: Total Number of Sub-Centres, PHCs and CHCs in Maharashtra

Sr. No	Year	Sub-Centres (SCs)	Primary Health Care (PHCs)	Community Health Centres (CHCs)
		Figure in Numbers		
1.	1995	9725	1695	295
2.	1996	9725	1695	295
3.	1997	9725	1695	300
4.	1998	9725	1699	308
5.	1999	9725	1699	308
6.	2000	9725	1699	308
7.	2001	9725	1768	351
8.	2002	9725	1768	351
9.	2003	9725	1768	351
10.	2004	9727	1780	382
11.	2005	10453	1800	407
12.	2006	10453	1800	407
13.	2007	10453	1800	407
14.	2008	10579	1816	407
15.	2009	10579	1816	376
16.	2010	10580	1816	365
17.	2011	10580	1809	365
18.	2012	10580	1811	363
19.	2013	10580	1811	361
20.	2014	10580	1811	360
21.	2015	10580	1811	360
22.	2016	10580	1811	360
23.	2017	10580	1814	360
24.	2018	10580	1814	360
25.	2019	10,668	1828	364
	Average	**10226**	**1777**	**355**
	C.V	**4.00**	**3.00**	**10**
	C.G.R	**0.50**	**0.33**	**0.81**
	Min	**9725**	**1695**	**295**
	Max	**10668**	**1828**	**407**

Source: Pocket Book of Health Statistics and Economic Survey of Maharashtr

Graph No.8.1: Number of Sub-Centres, PHCs and CHCs in Maharashtra



The government made several attempts from time to time to bridge this gap. Different types of government hospitals were set up at different levels to provide health facilities in rural areas, such as Sub-Centers, P.H.C.s, and C.H.C.s. The above table no. 8.1 and graph no.8.1 illustrate that the number of Sub-Centres, PHCs and CHCs in rural Maharashtra. In 1995, the number of Sub-Centres, Primary Health Centers and Community Health Centers was 9725, 1695 and 295 respectively. Researcher found that there was no growth in SCs, PHCs and CHCs from 1995 to 2004. However, in 2005 the number increased to 10453, 1800 and 407. Since then, from time to time, the number of each type of hospital under the National Rural Health Mission has increased and reached 10668, 1828 and 364 in 2019 respectively. From 1995 to 2019, the average number of Sub-Centers, PHCs, CHCs, was 10226, 1777, 355, respectively. During the same period, the growth rate (C.G.R) of these hospitals was 0.5 percent, 0.33 percent and 0.81 percent, respectively, while the coefficients of variation (C.V) were found to be 4 percent, 3 percent and 10 percent. On the other hand, there seems to be a big difference between the Min and Max in the number of first three types of hospitals. ***In summary, the number of Health Sub-Centers, Primary Health Centers and Community Health Centers, in Rural Maharashtra seems to have increased significantly under the National Rural Health Mission.***

Table No.8.2: Number of Hospitals and Beds in (Rural & Urban) Maharashtra

Sr. No	Year	Govt. Hospitals in Rural	Govt. Beds in Rural	Govt. Hospitals in Urban	Govt. Beds in Urban	Total Govt. Hospitals	Total Govt. Beds
		(Figures in Numbers)					
1	2005	424	15380	242	30593	666	45973
2	2006	424	15380	242	30593	666	45973
3	2007	365	10950	127	19356	492	30306
4	2008	365	10950	127	19356	492	30306
5	2009	376	11280	389	38299	765	49579
6	2010	735	13376	1037	36627	1772	50003
7	2011	523	11672	843	56282	1366	67954
8	2012	309	10384	864	36833	1173	47217
9	2013	450	12420	135	151445	585	163865
10	2014	450	12420	135	151445	585	163865
11	2015	273	12398	438	39048	711	51446
12	2016	273	12398	438	39048	711	51446
13	2017	273	12398	438	39048	711	51446
14	2018	309	10384	864	36833	1173	47217
15	2019	309	10384	864	36833	1173	47217
Average		**403**	**12416**	**420**	**52921**	**823**	**65337**
C.V		**31**	**12**	**74**	**84**	**46**	**68**
C.G.R		**-3.10**	**-1.34**	**8.23**	**4.61**	**2.67**	**3.07**
Min		**273**	**10384**	**127**	**19356**	**492**	**30306**
Max		**735**	**15380**	**1037**	**151445**	**1772**	**163865**

Source: Health Statistics and EPW Research Foundation

Above table no. 8.2 analyse the number of hospitals and beds available in rural and urban areas of Maharashtra. Between 2005 and 2019, the number of hospitals in rural and urban areas was almost the same (on average 403 in rural areas and 420 in urban areas). However, the coefficient of variation (C.V) in the number of hospitals in urban areas seems to be higher (74) as compared to rural areas (31). The growth rate (C.G.R.) of hospitals in rural areas was minus 3.10 per cent while in urban areas it was positive 8.23 per cent. Similarly, there is a big difference between the maximum and minimum number of hospitals in rural and urban areas. E.g. Min 273 and Max 735 were seen in rural areas and Max 127 level Max 1037 was seen in urban areas. Similarly, there is a big difference in the number of hospital beds in rural and urban areas. During the above period, the average number of beds in rural hospitals was 12416 while the average number of beds in urban hospitals was 52921. The coefficient of variation (C.V) in the number of hospital beds in rural and urban areas between 2005 and 2019 was 12 and 84 respectively. This meant more fluctuation found in the number of hospital beds of urban areas. Its growth rate (C.G.R.) was 4.61 per cent. Similarly, the number of beds in rural areas was Min 10384 and Max 15380 and the number of beds in urban areas was Min 19,356 and Max 1, 51,445. The last two columns show the total number of government hospitals and beds in entire Maharashtra. In Maharashtra, the number of hospitals and beds are on averagely 823 and 65337 increasing at 2.67 and 3.07 compound growth rates. Moreover, in entire Maharashtra (Rural and Urban) huge differences were found between Max and Min of government hospitals and

beds due to more fluctuation were in the actual working of hospitals and beds. Min and Max of total government hospital were gradually 492 and 1772 and Min and Max of total government bed were gradually 30306 and 163865. ***Summary as the number of government hospitals and beds in Maharashtra more drastically fluctuate, hence there are doubts about the availability of government health services. Similarly, there is a big difference between the number of hospitals and beds in urban and rural areas of Maharashtra.***

Table No.8.3: Availability of Beds in Government Hospital

Sr. No	Availability of Government Hospital Beds	Rural	Urban	Total
1	Never	52 (21%)	57 (23%)	109 (22%)
2	Rarely	63 (25%)	74 (30%)	137 (27%)
3	Sometimes	58 (23%)	67 (27%)	125 (25%)
4	Often	32 (13%)	23 (9%)	55(11%)
5	Always	45 (18%)	29 (12%)	74 (15%)
	Total	**250 (100%)**	**250 (100%)**	**500 (100%)**

Source: Field Survey, 2021-22

Table 8.3 illustrates the statistics to answer the question of whether beds are available on time in government hospitals. According to 27 per cent of the total 500 households, the availability of beds in government hospitals is 'Rare'. Following that, according to 25 per cent of the families, the availability of beds in the hospital is 'Occasional or Sometimes'. According to 23 per cent of urban families, beds are 'Never' available in government hospitals. In contrast, only 9 per cent and 12 per cent of urban households, respectively say that the availability of beds in government hospitals is seen to be 'Often' and 'Always'. ***In summary, according to urban families, beds in government hospitals are often unavailable.***

2. HYPOTHESIS TESTING

i. H_0-There is no significantly improved health infrastructure in rural Maharashtra.

A researcher has used the one sample t-test for testing whether the health infrastructure is significantly improved in rural Maharashtra. For that researcher has used secondary time series data from 2005 to 2019 about the availability of government hospitals and beds in Maharashtra (table no.222). Various services and facilities are involved in health infrastructure like hospital building, bed, operation machineries, availability of human resources, health education facilities etc,. But here researcher has focused on only factors of health infrastructure are availability of government hospitals and beds in rural Maharashtra. Hence, researcher has divided major first hypothesis in to two sub hypotheses as following.

Table No.9.1: T-Test Results.

One sample t-test (Two tailed test) at 95 Percent Confidence Interval							
Sr. No	**Sub-Hypothesis**	**Degrees of Freedom**	**T-Calculated Value**	**T-Table Value**	**P-Value**	**Mean Difference**	**Decision (Accept or Reject)**
			Equal variances assumed				
1	**H_0-** There is no significant increase government hospitals in rural Maharashtra.	14	2.109	2.145	0.053 (P<0.05)	203.40	**H_0- Accept**
	H_a- There is significant increase government hospitals in rural Maharashtra						H_a- Reject
2	**H_0-** There are no significant increase beds in government hospitals in rural Maharashtra	14	1.566	2.145	.140 (P<0.05)	16947.86	**H_0- Accept**
	H_a- There are significant increase beds in government hospitals in rural Maharashtra						H_a- Reject

Above statistics of table no. 9.1 summarized that formulated both of null hypotheses are accepted. Because of t-calculated values (2.109 and 1.566) are greater than the t-table values (2.145) along with both of P-values (0.053 and 0.140) are also greater than the 0.05 percent significant level for 14 degree of freedom. In such a situation, the researcher can accept the null hypothesis and reject the alternative hypothesis. This means that statistically proved that available health infrastructure is not adequate for modernized and populous Maharashtra. Moreover, researcher also observed in field work; government hospitals are so far from the poor section of the society and government beds were not available in time to rural and urban patient. But here, one constraint is that this result is application to only selected indicators of availability of government hospitals and their beds.

3. CORRELATION ANALYSIS

In this correlation analysis, the researcher tries to find out the correlation between the number of government hospitals available in rural Maharashtra and the number of beds available in them.

ii. H_0-There is no significant relationship between government hospitals and beds in rural Maharashtra- Accepted

Table No.10.1: Descriptive Statistics

H_0-There is no significant relationship between government hospitals and beds in rural Maharashtra-**Accepted** H_1-There is significant relationship between government hospitals and beds in rural Maharashtra-**Rejected**			
Descriptive Statistics			
	Mean	Std. Deviation	N
Government Hospitals in Rural Maharashtra	869.4000	373.53137	15
Beds in Government Hospitals	62920.8667	41906.71326	15

The above table shows the Mean and Standard Deviation of Government Hospitals in Maharashtra and the availability of Beds in them. The researcher has taken the data of available Government Hospitals and the beds in them from above table No. 5 for hypotheses testing.

Table No.10.2: Correlations Matrix

Correlations			
		Government Hospitals in Rural Maharashtra	Beds in Government Hospitals
Government Hospitals in Rural Maharashtra	Pearson Correlation	1	-.194
	Sig. (2-tailed)		.488
	N	15	15
Beds in Government Hospitals	Pearson Correlation	-.194	1
	Sig. (2-tailed)	.488	
	N	15	15

Above table no. 10.2 shows that correlations matrix of government hospitals and beds. The statistics show that minus .194 correlations have between Government Hospitals and Beds of Government Hospitals. Sig. (2-tailed) value is .488 which higher than 0.05 percent significant level for 15 observations. In this situation, researcher can accept the null hypothesis. This means that there is no positive correlation between number of hospitals and beds in Maharashtra.

CONCLUSIONS AND SUGGESTIONS

The researcher has observed that the number of Health Sub-Centers, Primary Health Centers and Community Health Centres, in Rural Maharashtra seems to have increased significantly under the National Rural Health Mission. Similarly, the number of government hospitals and beds in Maharashtra more drastically fluctuate; hence there are doubts about the availability of government health services. Moreover, there is a big difference between the number of hospitals and beds in urban and rural areas of Maharashtra. According to the field survey, beds in government hospitals are often unavailable in not only in rural but urban area also.

In order to provide medical services to every section of the society in the rural areas of Maharashtra, it is necessary to provide some important medical services and infrastructure in the rural areas such as providing adequate beds in government hospitals at the rural level. Similarly, to create a public-private partnership to increase the number of beds. It is imperative for the government to increase spending on medical health facilities under NRHM. The government should allow any one private hospital in each village as a representative of a government hospital and provide them with the necessary facilities for this dispensary or hospitals. Thus, if the government implements these measures at the rural level, positive changes will take place in the rural areas.

Concluding Remarks

This research article guides for formulating policy on health care and infrastructure and to what extent budgetary health provisions should be made? It is also useful for understanding the current state of health facilities and infrastructure. This study will go a long way in understanding the state of rural Maharashtra in terms of access to health services. Once the demand for health facilities in rural areas is realized, it will be much easier for the government and policymakers to decide the policy of social services in the state.

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