Abstract

Context: Tamil Nadu’s Chief Minister’s Comprehensive Health Insurance Scheme (CMCHIS) aims at reducing inequity by making the health service affordable and available by roping in both the public and private providers. Aims: This study aims to find if there exist any inter-district disparity in the distribution of hospitals empaneled and utilization of services under the CMCHIS scheme. Settings and Design: A secondary data analysis was done using the CMCHIS data on hospitals empanelled and number of claims made in the scheme for the year 2018. Subjects and Methods: The districts were classified into high-developed district (HDD), middle-developed district (MDD), and low-developed district (LDD) based on the Human Development Index. Availability of hospital services was calculated as the number of empanelled hospitals/100,000 families enrolled. Utilization was calculated as the number of claims made by people living in the district per one lakh families enrolled and number of claims made by hospitals under CMCHIS/100,000 enrolled. Statistical Analysis Used: The relationship between enrolment ratio, hospital availability, number of claims made, and Human Development Index across districts was examined using the Pearson’s Correlation analysis. Results: Enrolment was highest in the LDDs (22.8%), followed by MDDs (21.9%) and HDDs (18.7%). The number of hospitals per 100,000 families enrolled was the highest in HDDs (8.0) and lowest in LDDs (4.6). The utilization was the highest in HDD followed by MDD and lowest in LDD. Conclusions: The disparity in the hospitals availability and utilization between districts should be addressed by adopting a targeting approach giving priorities to empaneling hospitals in the less-developed districts.

Keywords: Chief Minister’s Comprehensive health insurance scheme, geography, equity spatial equity

INTRODUCTION

Tamil Nadu’s Chief Minister’s Comprehensive Health Insurance Scheme (CMCHIS) launched in the year 2012 is an effort by the Government of Tamil Nadu toward achieving Universal Health Coverage. The scheme aims to provide financial risk protection to poor and other vulnerable population of the state against expensive therapeutic and surgical health conditions. The scheme runs through various empaneled hospitals and to get the benefit of CMCHIS, one has to avail the services in these empaneled hospitals. Thus, distribution of hospitals in the state is an indicator which measures the availability of services under the scheme. While various studies had looked upon the impact of CMCHIS on reducing OOPE, there are no studies available on the distribution of the availability of services under the scheme.

This study is an attempt to find:
- If there exist any interdistrict disparity in the distribution of hospitals empaneled under the CMCHIS scheme
- If such difference correlates with the overall development of the district
- If there exists any correlation between the availability of hospitals per district with the utilization of services.

This will provide insight for prioritizing and channelizing investment of resources for establishing and empaneling new hospitals in these districts.

SUBJECTS AND METHODS

A secondary data analysis was done to assess the relationship between development indicators of district and insurance...
coverage and hospital availability under CMCHIS. Tamil Nadu has 32 districts all of which were included in the study. The development of districts is measured using the Human Development Index (HDI) which is a composite index calculated using the per capita income as a determinant of Living standard Index, life expectancy at birth as health indicator and literacy rate, gross enrolment ratio at primary and secondary levels as an indicator for education.[6] HDI data for each district was obtained from the Tamil Nadu Human Development Report 2017 published by the State Planning Commission, Government of Tamil Nadu.[6] Based on HDI, districts were ranked and grouped into tertiles and categorized as high, middle, and low development groups which is denoted as high-developed district (HDD), middle-developed district (MDD), and low-developed district (LDD), respectively, in this article.

Data on empaneled hospitals were obtained from the CMCHIS website.[7] The inclusion of hospitals under CMCHIS is done through a process called empanelment. The hospitals whichever volunteers to provide services under CMCHIS will be screened and inspected by the Empanelment and Disciplinary Committee.[1] As on December 2018, a total of 972 hospitals were empaneled under the scheme which includes both private and public hospitals.[7]

The enrolment and claims for the financial year 2017–2018 in Tamil Nadu were accessed from the state implementing agency. Under CMCHIS, family enrolment is done for any family whose annual income is Rs. 72,000 or less. Overall enrolment is calculated by multiplying family enrolment data with 2.7 to adjust for the family size. CMCHIS enrolment rate is computed per 100,000 population for each district. Availability of hospital services is calculated as the number of empaneled (public and private) hospitals/100,000 families enrolled. Utilization is calculated in two ways. One is services availed/100,000 families enrolled in each district. The other one is the number of claims made by hospitals under CMCHIS/100,000 enrolled. The reason for considering these two indicators is the services for the claims made by people in a particular district could have been obtained from the hospitals of other districts.

The relationship between enrolment ratio, hospital availability, services availed, and HDI across districts was examined using the Pearson’s Correlation analysis. Similar correlation matrix was built for public and private, respectively. Significance was assessed at 0.05 levels. A comparative analysis of the three development groups (HDD, MDD, and LDD) was done with respect to enrolment ratio, hospital availability, and number of claims made in the districts, using ratio. Ratios for LDD: HDD and MDD: HDD were calculated for each indicator.

**Results**

Among the 32 districts, Kanyakumari topped in the overall HDI, whereas Ariyalur had the least HDI. With respect to living standards indicator, Kanyakumari and Ariyalur had the highest and least scores, respectively. Chennai had the highest score in health indicator and Tiruppur the least. Kanyakumari also had the highest score in education indicator and Erode the least score.

Descriptive statistics on the district-wise details of CMCHIS related indicators are shown in Table 1. In 2018, a total of 972 hospitals were empaneled under CMCHIS in Tamil Nadu. Of these, 239 (24.5%) and 733 (75.4%) were public and private hospitals, respectively.

Erode district had the highest proportion of population enrolled under the scheme and Chennai had the least proportion. Regarding hospital availability/100,000 enrolled families, Coimbatore had the highest and Thiruvannamalai the least. On further disaggregating, Coimbatore had the highest number of private hospitals empaneled/100,000 families and Ramanathapuram had the least. On the contrary, Ramanathapuram had the highest number of public hospitals empaneled per 1 lakh families enrolled and Salem the least.

Utilization as measured by the number of people, who availed services in each district, depicts that Chennai had the highest number per 1 lakh families enrolled and Nilgiris had the least. With regard to services received in public hospitals, Chennai had the highest and Erode had the least. Madurai had the highest number of services received from private hospitals, whereas Nagapattinam had the least.

The Pearson correlation between HDI and insurance indicators showed a negative correlation between the proportion of population enrolled and the HDI, which was also similar in the individual three components of HDI, as shown in Table 2. Hospital availability per 1 lakh families enrolled depicted a significant positive correlation with overall HDI, health indicator, and living standard indicator. The private hospitals availability per one lakh families enrolled was showing a significant positive correlation with overall HDI and living standard index, whereas public hospitals availability was significantly correlating with education index. The claims made by hospitals per 1 lakh enrolled showed a negative correlation with HDI and living standard indicator, though not statistically significant.

As shown in Table 3, enrolment rate was the highest in LDDs (22.8%), followed by MDDs (21.9%) and HDDs (18.7%). The number of hospitals per 100,000 families enrolled was the highest in the HDDs (8.0) and lowest in the LDDs (4.6). The availability of public hospitals was similar across the MDD and LDD district groups, with slightly higher availability in HDDs (2.2 in HVDs, 1.6 in MDDs and LDDs per 100,000 enrolled). In contrast, there was variation in availability of private hospitals (5.9 in HDDs, 4.8 in MDDs and 3.8 in LDDs per 100,000 enrolled).[Table 3]. The number of claims raised by hospitals was also calculated across district groups. There was no difference in this indicator across the district groups. When disaggregated by sector, the number of claims (per 100,000 enrolled) raised by the public sector was high among HDD and MDD compared to LDD, but the
private claims across district groups were similar. There was a significant difference in the number of availed services between the three groups of districts, with the highest number in HDD followed by MDD and LDD the least. This pattern was also observed in services received in public hospitals. However, there was no such pattern observed in services received in private hospitals.

Table 4 shows the correlation between the availability of hospitals and the number of people who availed services in each district. There was a significant positive correlation between availability of private hospitals and services received in private hospitals. Figure 1 shows the mismatch between the demand (number of people who availed services in each district) and supply (number of claims raised by hospitals) in the respective district. Districts such as Chennai, Madurai, and Trichy had been supplying more than the demand. On further exploration, in all the districts, there was a proportion of claims made in districts other than their original district. In Thiruvarur, 80% of the people who availed services received it from other districts.

**Discussion**

It is observed that there exists difference in the enrolment rate and hospitals empanelled between different development groups. Insurance enrolment was tended toward low development, with LDD districts having a high proportion of population enrolled under the scheme. The difference observed between different district groups based on the development is essential as the CMCHIS itself is designed for being pro poor. In a similar study conducted in Chhattisgarh found that the enrolment under insurance schemes to be pro poor with highly vulnerable districts having a high enrolment and vice versa.[9]

While the enrolment under the scheme seems to be pro poor, the availability of hospitals in the districts follow a regressive
pattern. HDD had the higher number of hospitals empanelled compared to MDD and LDD. The difference was more pronounced with private hospitals. However, in these districts, the total number of hospitals available itself was less, of which most of them were empanelled under the scheme.

It was also found in this study that hospital availability to be significantly correlating with overall HDI, health index, and living standard index. On further disaggregating sector wise, it showed that the number of private hospitals empanelled was found to be significantly correlating with overall HDI and living standard index, whereas public hospitals empanelment was significantly correlating with education index. Such unequal concentration of hospitals is not unique to Tamil Nadu. Such spatial inequities have also been established in other developed and developing countries, wherein the most developed part of their region has concentrated hospitals, while less developed region has sparse distribution of hospitals.[9,10]

In India, similar pattern was also observed in the study done in Chhattisgarh, which was quoted as “Inverse Care Law”.[8] Inverse Care Law as proposed by Hart states that the availability of good medical care tends to vary inversely with the need of the population served.[11] Literature had shown that geographical areas with poor development usually have the worst health indicators, and therefore, have higher health needs.[12-14] Hence, in Tamil Nadu, also we can relate to this phenomenon of “Inverse Care Law” wherein districts which having a high demand is provided with lesser supply.

Utilization of CMCHIS by the population is measured as the number of availed services per one lakh families enrolled in each district. HDD had significantly high number compared to MDD and LDD. It is evident from the literature available that areas with poor development have the worst health indicators, and therefore, have higher health needs.[12-14] Hence, in Tamil Nadu, also we can relate to this phenomenon of “Inverse Care Law” wherein districts which having a high demand is provided with lesser supply.
Table 4: Correlation between hospitals availability and claims made

| Services availed/1 lakh families enrolled | Services availed in public hospitals/1 lakh families enrolled | Services availed in private hospitals/1 lakh families enrolled |
|-----------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| Number of hospitals available per 1 lakh families enrolled | Pearson correlation 0.343 | 0.034 | 0.536** |
| Significant (two-tailed) | 0.055 | 0.854 | 0.002 |
| Availability of public hospitals per 1 lakh families enrolled | Pearson correlation 0.148 | 0.337 | −0.236 |
| Significant (two-tailed) | 0.418 | 0.060 | 0.193 |
| Availability of private hospitals per 1 lakh families enrolled | Pearson correlation 0.294 | −0.076 | 0.612** |
| Significant (two-tailed) | 0.102 | 0.681 | 0.000 |

**Correlation is significant at the 0.01 level (two-tailed)

needs. However, these districts had a lesser number of availed services under CMCHIS compared to HDD which could be either because they were not aware of availing services under CMCHIS or they had difficulty in access owing to lesser availability of hospitals or the required speciality. Otherwise, this could be because of overutilization of services by people in most developed districts. This unequal distribution could also be explained by a phenomenon called “inverse equity hypothesis” which states that any new interventions initially reach the socioeconomically more well-off, while the majority of the poor benefit only later in time. Such unequal distribution in the utilization of services under the scheme could be explained by this phenomenon, and therefore, it may take some years for the scheme to have an equitable distribution.

Under CMCHIS, there is no restriction to access services based on geographical boundaries. Anyone can avail service from any empanelled hospital under the scheme irrespective of which district they belong to. This gives people a choice to choose the services from a wide range of hospitals across the state. This was also depicted in Figure 1, which shows the percentage of people who moved out of the district for getting the services. Higher the development of the district, there was a lesser proportion of people who migrated to avail services. The World Health Organization has identified the availability of services as an important factor which either pull or push people across national borders for availing medical services. This is also evident in this study as the number of people who availed services is positively correlating with the number of hospitals available. It should also be noted that the location of health services is very important for access, especially for the poor, as transport cost and distance act as the barriers to access. “Close to client services” has been established as an effective intervention in providing universal coverage and Thailand has been successful in implementing the same.

Conclusions

This study highlights the potential area in which the government should focus to reduce inequity and promote universal coverage. To address this inverse equity, targeting
is identified as a potential strategy. Hence, the scheme may take up targeting approach by giving priorities to empanelling hospitals in the less developed districts if available. In case of less private providers available in these districts, government should establish these services including speciality services.

Limitations
In this study, the number of hospitals was considered as an indicator of availability of services. This might be a crude measurement, because this does not take into consideration the number of beds available in the hospitals, which may vary with each hospital. Similarly, availability of hospitals does not mean that they are available for providing all the services under CMCHIS. There are hospitals which are empanelled for single speciality. Therefore, there is a possibility that the indicator that has been used in this study could be an over estimation.

Acknowledgment
The authors sincerely acknowledge the Project Director, Tamil Nadu Health System Project, for giving permission to use the CMCHIS data.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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