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**Does the distribution of providers have an impact on the utilization of services under CMCHIS?**

**Introduction:**

Tamilnadu is often ranked as one of the best performing state in terms of health indicator.1Various initiatives in health sector has been proposed by the state to improve the health status of the people which has definitely benefitted the public. There are differences in health performances within the state which occur across different social determinants like caste, religion, gender etc. Such differentials also exist between districts within the state. 2Having progressed in most of the health indicators, the state has now shifted its focus on addressing this inequity and strives towards achieving Universal Health Coverage (UHC) which is also one of the Sustainable Development Goals.3 UHC includes financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.4 Providing financial protection through publicly funded health insurance scheme which is mainly targeted towards the poor and vulnerable population is identified as an important strategy by WHO in progressing towards UHC5. Many developing countries have used tax revenues to finance health insurance schemes and extend subsidized health insurance to their respective poor population, thereby providing financial cover during catastrophic health shocks.

Tamil Nadu’s Chief Minister’s Comprehensive Health Insurance Scheme (CMCHIS) implemented by Tamilnadu Health System Project (TNHSP), launched in the year 2012 is an effort in this direction by the State Government of Tamil Nadu towards 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.6 CMCHIS, government funded state health insurance scheme aims at reducing the inequity by making the health service affordable by reducing the out of pocket health expenditure and also increases the availability of health services by roping in both the public and private providers. 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 (EDC).6 As on December 2018, a total of 972 hospitals has been empaneled under the scheme which includes both private and public hospitals.7

Access is a complex concept. It is defined by the 5 A’s notion which includes Availability, Adequacy, Accessibility, AffordabilityandAppropriateness.8 If services are available and there is an adequate supply of services, then the opportunity to obtain health care exists, and population may 'have access' to services.9 CMCHIS is a scheme which 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 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.10–12

This study is an attempt

* to find if there exist any inter district disparity in the distribution of hospitals empaneled under the CMCHIS scheme
* to find if such difference correlates with the overall development of the district.
* to explore if there exist any correlation between the availability of hospitals per district with utilization of services.

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

**Methods:**

A secondary data analysis was done to assess the relationship between development indicators of district and insurance coverage and hospital availability under CMCHIS in Tamilnadu was conducted. Tamilnadu has 32 districts all of which were included in the study. The development of districts is measured using Human Development Index(HDI) which is a composite index developed by UNDP calculated using per capita income as a determinant of the 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.13 HDI data for each district was obtained from the Tamilnadu Human Development Report 2017 published by the State Planning Commission, Government of Tamilnadu.14 The HDI for each districts was calculated based on the data provided by the Government of Tamilnadu from various departments for the year 2013-14.14 Based on HDI, the districts were then ranked and grouped into tertiles and categorized as high, middle and low development groups which is denoted as HDD, MDD, LDD respectively in this paper.

Data on empaneled hospitals was obtained from the CMCHIS website.7The enrolment and claims for the financial year 2017 -18 in Tamilnadu were accessed from the state implementing agency. First, the relationship between HDI and health insurance indicators was examined across the 32 districts of the state. Under CMCHIS, any family whose annual income is Rs 72,000 or less is enrolled. Family includes the eligible member and his or her family, which includes 1. the legal spouse, 2. children of the eligible person till they get employed or married or attain the age of 25 years, whichever is earlier, and who are dependent on the eligible person, and 3. Dependent parents of the eligible person. Thus the enrolment data that is available in the CMCHIS is the family enrolment.Overall enrolment is calculated by multiplying family enrolment data with 2.7 to adjust for the family size. CMCHIS enrolment rate was computed per 100,000 population for each district. Availability of hospital services was calculated as the number of empaneled (public and private) hospitals per 100,000 families enrolled. Utilization is calculated in two ways. One is number of claims made by people living in the district per one lakh families enrolled. The other one is the number of claims made by hospitals under CMCHIS per 100,000 enrolled. The reason for considering these two indicators is because the services for the claims made by people in a particular district could have been obtained from hospitals of other districts.

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

**Results:**

Descriptive statistics on the district wise details of CMCHIS related indicators and development indicators is shown in Table 1. In 2018, a total of 972 hospitals were empaneled under CMCHIS in Tamilnadu. Of these, 239 (24.5%) and 733(75.4%) were public and private hospitals respectively. Among the 32 districts, Kanyakumari topped in the overall HDI while Ariyalur had the least HDI. With respect to living standards indicator, Kanyakumari and Ariyalur had the highest and least score 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.

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

With regard to utilization of services under the scheme, which is measured in terms of claims made by the hospitals per district, Chennai had the highest claims per1 lakh families enrolled and Nilgiris the least. On further disaggregating the data, Madurai had the highest number of claims made by private hospitals per 1 lakh families enrolled while Nagapattinam had the least. On the other hand, Chennai had the highest number of claims made by public hospitals per 1 lakh enrolled and Erode the least.

Utilization as measured by the number of claims made by people in each district, depicts that Chennai had the highest number of claims made per 1 lakh families enrolled and Nilgiris had the least. With regards to Claims made in public hospitals, Chennai had the highest number and Erode had the least. Madurai had the highest number of claims made in private hospitals while Nagapattinam had the least.

Table 2, shows the 5 high performing and low performing districts which are further shaded based on their development group.(High performing and low performing is determined with respect to each insurance indicator and it varies for each indicator). With regard to Proportion of Population enrolled in the scheme all the 5 low performing districts belonged to HDD, and 3 out of 5 high performing districts belonged to LDD. Based on the hospital availability per 1 lakh families enrolled, 4 out of 5 low performing districts belonged to LDD, which was very similar in the private hospitals availability. With regards to the claims made by hospitals, of the 5 high performing districts in private claims 3 belonged to LDD, whereas in public claims 3 out of 5high performing districts belonged to HDD.

The Pearson Correlation between HDI and insurance indicators showed a negative correlation between proportion of population enrolled and the HDI, which was also similar in the individual 3 components of HDI as shown in Table 3. 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.

Enrolment was highest in the LDDs (22.8%), followed by MDDs (21.9%) and LDDs (18.7%). The number of hospitals per 100,000 families enrolled was 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 5). The number of claims made by hospitals was also calculated across district groups. There was no difference in this indicator across district groups. When disaggregated by sector, the number of claims (per 100,000 enrolled) made by the public sector across was high among HDD and MDD compared to LDD, but the private claims across district groups was similar. There was a significant difference in number of claims made by people between the 3 groups of districts, with the highest number made by people living in HDD followed by MDD and LDD the least, This pattern was also observed in claims made in public hospitals. However, there was no such pattern observed in claims made in private hospitals.

Table 5 shows the correlation between availability of hospitals and the number of claims made in each district. There was a significant positive correlation between the availability of private hospitals and the claims made in private hospitals. Figure 1 shows the mismatch between the demand( number of claims made by people) and supply (number of claims made by hospitals)in the respective district. Districts like Chennai, Madurai, Trichy had been supplying more than the demand. While most of the other districts, supplied lesser 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 Thiruvallur services for almost 80% of the claims made are obtained from other districts

Discussion:

It is observed from the above data that there exist difference in the proportion of population enrolled and hospitals empaneled between different development groups. Insurance enrolment was tended towards low development, with LDD districts having a high proportion of population enrolled under the scheme and HDD had the lowest proportion of people enrolled. CMCHIS is a scheme which is targeted towards poor people who have yearly income of less than Rs.72, 000/-. Therefore the difference observed between different district groups based on development is essential as the scheme itself is designed for being pro poor. In a similar study conducted to look at the geographical inequality in the universal insurance schemes in Chhattisgarh, the districts of Chhattisgarh were classified into vulnerability tertiles based on various criteria like agricultural economy, caste, rural–urban divide, gender inequality and infrastructure availability.15 In this study also they found that the enrolment under insurance schemes to be pro poor with highly vulnerable districts having a high enrolment and vice versa.

While the enrolment under the scheme, seems to be pro poor, the availability of hospitals in the districts follow a regressive pattern. HDD had higher number of hospitals empaneled compared to MDD and LDD. The difference was more pronounced with private hospitals. In districts which are poorly developed there are lesser number of empaneled hospitals in both public and private. However, in these districts the total number of hospitals available itself was very low, of which most of them were empaneled 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 number of private hospitals empaneled was found to be significantly correlated with overall HDI and living standard index, whereas public hospitals empanelment was found to significantly correlate with education index. Such unequal concentration of hospitals is not unique to Tamilnadu. Such spatial inequities has 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. 16,17 In India, similar pattern was also observed in the study done in Chhattisgarh, with less vulnerable districts having more number of hospitals empaneled while the highly vulnerable ones with lesser hospitals, wherein they have quoted this pattern as ‘Inverse Care Law’15.(ref) Inverse Care Law as proposed by Hart that the availability of good medical care tends to vary inversely with the need of the population served. 18Literature had shown that geographical areas with poor development usually have the worst health indicators, and, therefore, have higher health needs.19–21Hence in Tamilnadu also we can relate to this phenomenon of “Inverse Care Law” wherein districts which having a high demand is provided with lesser supply. Limited number of hospitals within the districts gives the people a limited choice to choose.

Utilization of CMCHIS by population is measured as number of claims made by people per one lakh families enrolled in each district. HDD had significantly high number of average claims made per one lakh families compared to MDD and LDD. Similarly MDD also had high number of claims compared to LDD. This was very much similar to the pattern of availability of hospitals in the districts. It is evident from the literature available that areas with poor development have the worst health indicators.19–21 This is also evident from the difference in health index, which is one of the component used for computing HDI. (The mean health index for HDD was 0.9, MDD- 0.6, LDD -0.5) Therefore, these districts tend to have higher health needs. However, these districts had lesser claims under CMCHIS compared to HDD which could be either because they were not aware of availing services under CMCHIS or could be because 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 socio-economically more well-off, while the majority of the poor benefit only later in time.17CMCHIS is less than a decade old scheme, therefore relatively a new one. 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 be have an equitable distribution.

Under CMCHIS, there is no restriction to access services based on geographical area. Anyone can avail service from any empaneled hospital under the scheme irrespective of which district they belong to. This gives people a choice to choose 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 migration of people to avail services. Seven of the top 10 districts which had higher proportion of people moving out was from less developed districts. The reason for such migration seeking health care out of their districts could be due to pull or push factors. World Health Organization has identified the following pull and push factors that have facilitated movement of patients across national borders for availing medical services. The push factors include unavailability of appropriate services, poor quality services or shortage of health care providers. Pull factors which attract patients to cross borders include availability of services at ease, with shorter waiting time, availability of advanced technology, availability of speciality health services and skilled heath care providers.17Thus availability of hospitals is considered as an important factor which either pull or push people out of their districts to avail services. This is also evident in this study as the number of claims made 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 barriers to access. 22 At present the scheme is trying to bear the transport cost, as it reimburses the cost incurred towards transport. However this which will reflect in the form of reduced number of claims made by people. 6

This study clearly states that there is an unequal distribution of hospitals across districts which is correlating with the development status. There is also an unequal distribution of claims made by people under CMCHIS which also follows a regressive pattern. This unequal distribution of claims from the districts is further perpetuating the inequity across districts.

“Close to client services” has been established as an effective intervention in providing universal coverage and Thailand has been successful in implementing the same.23 Hence, it is clear that spatial equity is essential for UHC and 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.24,25 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 has the responsibility of establishing these services including required specialities in these less developed districts. Such measure may reduce the inequity in terms of utilization and further reduce the burden of these population from moving out of their own district for availing services.

In this study number of hospitals were 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 hospitals. Similarly, availability of hospitals does not mean that they are available for providing all the services under CMCHIS. There are hospitals which are empaneled for single speciality. Therefore there is a possibility that the indicator that has been used in this study could be an over estimation.

**Conclusion:**

Tamilnadu in its goal towards achieving Universal Health Coverage, should adopt a targeted approach in empanelling hospitals under CMCHIS to make sure that the scheme is reaching the unserved.Overall development is essential for heakth development.

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Table 1. District wise details on Development and insurance indicator

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| district | Living  Standard  Index | Health  Index | Education  Index | Overall Index | Proportion Of Population Enrolled | Hospital Availability  /1lakh Families Enrolled | Public Hospital Availability / 1 Lakh Families enrolled | Private Hospital Availability/  1 Lakh Families Enrolled | Claims Made By Population /1 Lakh Enrolled | Public Claims/1 Lakh Enrolled | Pvt Claims/Enrolled | Claims Made By Hospital /1 Lakh Families Enrolled | Claims By Public Hospitals/1 Lakh Enrolled | Claims By Private Hospitals/Enrolled |
| ARIYALUR | 0.062 | 0.653 | 0.552 | 0.282 | 61.1 | 2.9 | 1.2 | 1.8 | 3190.1 | 1586.6 | 1603.5 | 1169.7 | 857.1 | 312.6 |
| CHENNAI | 0.782 | 1 | 0.778 | 0.847 | 35.5 | 13.1 | 2.9 | 10.2 | 5633.3 | 3644.1 | 1989.2 | 17175.9 | 12727.1 | 4448.7 |
| COIMBATORE | 0.877 | 0.884 | 0.775 | 0.844 | 50.8 | 13.2 | 2.0 | 11.2 | 3152.9 | 1138.7 | 2014.2 | 5984.5 | 1691.5 | 4293.0 |
| CUDDALORE | 0.686 | 0.734 | 0.738 | 0.719 | 60.3 | 4.1 | 1.4 | 2.8 | 3021.9 | 1178.4 | 1843.4 | 1183.4 | 784.0 | 399.5 |
| DHARMAPURI | 0.686 | 0.653 | 0.596 | 0.644 | 68.4 | 4.5 | 1.3 | 3.1 | 3126.6 | 1521.0 | 1605.6 | 2118.0 | 1380.4 | 737.6 |
| DINDIGUL | 0.687 | 0.711 | 0.675 | 0.691 | 56.2 | 8.0 | 1.1 | 6.9 | 3431.5 | 1271.4 | 2160.1 | 1876.8 | 461.9 | 1414.8 |
| ERODE | 0.86 | 0.717 | 0.378 | 0.616 | 71.0 | 8.3 | 1.0 | 7.3 | 2805.0 | 716.6 | 2088.4 | 3236.6 | 588.9 | 2647.7 |
| KANCHEEPURAM | 0.979 | 0.804 | 0.767 | 0.845 | 47.8 | 6.9 | 1.0 | 5.9 | 4548.2 | 2254.3 | 2293.9 | 5080.3 | 1469.1 | 3611.2 |
| KANYAKUMARI | 1 | 0.948 | 0.886 | 0.944 | 58.7 | 8.6 | 1.2 | 7.4 | 4621.5 | 1881.4 | 2740.1 | 5286.6 | 1933.0 | 3353.6 |
| KARUR | 0.829 | 0.601 | 0.598 | 0.668 | 67.9 | 5.6 | 1.5 | 4.1 | 2754.6 | 1071.8 | 1682.9 | 1552.2 | 677.2 | 875.0 |
| KRISHNAGIRI | 0.808 | 0.879 | 0.69 | 0.788 | 59.6 | 4.3 | 1.0 | 3.4 | 2447.9 | 1184.1 | 1263.8 | 1443.9 | 762.9 | 681.0 |
| MADURAI | 0.79 | 0.51 | 0.812 | 0.689 | 54.3 | 10.0 | 1.1 | 8.8 | 4650.9 | 1833.9 | 2817.0 | 9333.8 | 3152.9 | 6180.9 |
| NAGAPATTINAM | 0.503 | 0.503 | 0.859 | 0.601 | 54.4 | 4.6 | 3.1 | 1.5 | 2981.2 | 1920.5 | 1060.7 | 1022.3 | 991.9 | 30.4 |
| NAMAKKAL | 0.799 | 0.746 | 0.673 | 0.738 | 58.9 | 8.8 | 1.6 | 7.2 | 3541.2 | 1028.5 | 2512.7 | 1807.6 | 636.4 | 1171.2 |
| NILGIRIS | 0.636 | 0.443 | 0.861 | 0.624 | 57.4 | 5.1 | 3.2 | 1.9 | 2404.3 | 990.5 | 1413.8 | 704.0 | 617.7 | 86.3 |
| PERAMBALUR | 0.191 | 0.653 | 0.715 | 0.447 | 66.6 | 5.7 | 0.7 | 5.0 | 3895.0 | 1440.4 | 2454.6 | 5019.0 | 1269.6 | 3749.4 |
| PUDUKOTTAI | 0.54 | 0.648 | 0.719 | 0.631 | 64.9 | 4.4 | 2.3 | 2.1 | 2771.9 | 1292.4 | 1479.5 | 949.5 | 591.2 | 358.3 |
| RAMANATHAPURAM | 0.55 | 0.659 | 0.769 | 0.653 | 57.2 | 4.5 | 3.5 | 1.0 | 3849.5 | 2008.6 | 1840.9 | 1503.7 | 1341.9 | 161.8 |
| SALEM | 0.71 | 0.694 | 0.607 | 0.669 | 60.3 | 7.7 | 0.6 | 7.1 | 3612.9 | 1263.0 | 2350.0 | 4237.9 | 1474.8 | 2763.0 |
| SIVAGANGAI | 0.622 | 0.636 | 0.766 | 0.671 | 56.3 | 6.8 | 2.1 | 4.7 | 4368.4 | 1923.9 | 2444.5 | 2845.5 | 1584.9 | 1260.6 |
| THANJAVUR | 0.596 | 0.573 | 0.823 | 0.655 | 58.4 | 5.8 | 1.2 | 4.6 | 2763.5 | 1443.2 | 1320.3 | 2932.1 | 1774.4 | 1157.7 |
| THENI | 0.483 | 0.445 | 0.727 | 0.539 | 61.8 | 6.3 | 1.8 | 4.6 | 3655.9 | 1598.8 | 2057.1 | 2465.3 | 1401.3 | 1064.0 |
| TIRUCHIRAPALLI | 0.858 | 0.659 | 0.819 | 0.774 | 53.0 | 9.5 | 2.1 | 7.5 | 3233.1 | 1501.8 | 1731.3 | 4164.3 | 1531.0 | 2633.3 |
| TIRUNELVELI | 0.742 | 0.861 | 0.808 | 0.802 | 50.0 | 6.1 | 3.3 | 2.8 | 3823.0 | 2377.7 | 1445.3 | 3661.2 | 2727.3 | 934.0 |
| TIRUPUR | 0.952 | 0.393 | 0.695 | 0.627 | 59.0 | 5.7 | 0.7 | 5.0 | 2870.2 | 789.0 | 2081.2 | 974.8 | 340.2 | 634.6 |
| TIRUVALLUR | 0.918 | 0.74 | 0.755 | 0.801 | 50.8 | 4.0 | 1.1 | 2.9 | 4822.1 | 3094.8 | 1727.3 | 1399.1 | 559.6 | 839.5 |
| TIRUVANNAMALAI | 0.508 | 0.694 | 0.601 | 0.596 | 55.2 | 2.2 | 1.0 | 1.2 | 4117.7 | 2643.3 | 1474.4 | 1597.6 | 1066.4 | 531.2 |
| TIRUVARUR | 0.402 | 0.561 | 0.813 | 0.568 | 63.3 | 3.0 | 1.3 | 1.7 | 2902.9 | 1677.2 | 1225.7 | 2160.8 | 1522.1 | 638.7 |
| TUTICORIN | 0.854 | 0.884 | 0.82 | 0.852 | 46.4 | 6.3 | 3.3 | 3.0 | 4750.5 | 2798.8 | 1951.7 | 2801.5 | 1985.9 | 815.5 |
| VELLORE | 0.754 | 0.78 | 0.695 | 0.742 | 51.3 | 4.1 | 1.7 | 2.4 | 3823.2 | 2266.4 | 1556.8 | 2378.6 | 1338.2 | 1040.5 |
| VILLUPURAM | 0.412 | 0.763 | 0.563 | 0.561 | 61.2 | 2.7 | 0.9 | 1.8 | 3659.3 | 1531.7 | 2127.6 | 1483.6 | 956.2 | 527.5 |
| VIRUDHUNAGAR | 0.944 | 0.85 | 0.78 | 0.855 | 53.3 | 7.8 | 2.9 | 5.0 | 4039.7 | 1504.6 | 2535.1 | 2183.6 | 878.9 | 1304.7 |

Table 2: Top and Bottom 5 districts in Insurance Indicators

|  |  |  |
| --- | --- | --- |
| Insurance Indicators | Top 5 High performing districts | Bottom 5 low performing districts  ( from lowest to highest) |
| Proportion of population enrolled | ERODE | CHENNAI |
| DHARMAPURI | TUTICORIN |
| KARUR | KANCHEEPURAM |
| PERAMBALUR | TIRUNELVELI |
| PUDUKOTTAI | COIMBATORE |
| Hospital Availability per 1 lakh families enrolled | CHENNAI | NILGIRIS |
| TIRUVALLUR | KRISHNAGIRI |
| TUTICORIN | KARUR |
| MADURAI | THANJAVUR |
| KANYAKUMARI | PUDUKOTTAI |
| Public hospital availability/ 1 lakh families enrolled | RAMANATHAPURAM | SALEM |
| TIRUNELVELI | PERAMBALUR |
| TUTICORIN | TIRUPUR |
| NILGIRIS | VILLUPURAM |
| NAGAPATTINAM | KRISHNAGIRI |
| Private hospital availability/ 1 lakh families enrolled | COIMBATORE | RAMANATHAPURAM |
| CHENNAI | TIRUVANNAMALAI |
| MADURAI | NAGAPATTINAM |
| TIRUCHIRAPALLI | TIRUVARUR |
| KANYAKUMARI | ARIYALUR |
| Number of claims per 1 lakh families enrolled | CHENNAI | NILGIRIS |
| TIRUVALLUR | KRISHNAGIRI |
| TUTICORIN | KARUR |
| MADURAI | THANJAVUR |
| KANYAKUMARI | PUDUKOTTAI |
| Number of claims in private hospitals per 1 lakh enrolled | MADURAI | NAGAPATTINAM |
| KANYAKUMARI | TIRUVARUR |
| VIRUDHUNAGAR | KRISHNAGIRI |
| NAMAKKAL | THANJAVUR |
| PERAMBALUR | NILGIRIS |
| Number of claims in public hospitals per 1 lakh enrolled | CHENNAI | ERODE |
| TIRUVALLUR | TIRUPUR |
| TUTICORIN | NILGIRIS |
| TIRUVANNAMALAI | NAMAKKAL |
| TIRUNELVELI | KARUR |
| Number of claims made by hospitals per 1 lakh families enrolled | CHENNAI | NILGIRIS |
|  | MADURAI | PUDUKOTTAI |
|  | COIMBATORE | TIRUPUR |
|  | KANYAKUMARI | NAGAPATTINAM |
|  | KANCHEEPURAM | ARIYALUR |
| Number of claims made by public hospitals per 1 lakh families enrolled | CHENNAI | TIRUPUR |
|  | MADURAI | DINDIGUL |
|  | TIRUNELVELI | TIRUVALLUR |
|  | TUTICORIN | ERODE |
|  | KANYAKUMARI | PUDUKOTTAI |
| Number of claims made by Private hospitals per 1 lakh families enrolled | MADURAI | NAGAPATTINAM |
|  | CHENNAI | NILGIRIS |
|  | COIMBATORE | RAMANATHAPURAM |
|  | PERAMBALUR | ARIYALUR |
|  | KANCHEEPURAM | PUDUKOTTAI |

\*- Red shade indicates Low Development Group, Yellow shade indicates Middle Development Group, Green indicates High Development Group

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Development index |  | Proportion Of Population Enrolled | Hospital Availability  /1lakh Families Enrolled | Public Hospital Availability / 1 Lakh Families enrolled | Private Hospital Availability/  1 Lakh Families Enrolled | Claims Made By Population /1 Lakh Enrolled | Public Claims/1 Lakh Enrolled | Pvt Claims/Enrolled | Claims Made By Hospital /1 Lakh Families Enrolled | Claims By Public Hospitals/1 Lakh Enrolled | Claims By Private Hospitals/Enrolled |
| Overall HDI | Pearson Correlation | -.361\* | .516\*\* | 0.073 | .492\*\* | 0.23 | 0.062 | 0.302 | 0.213 | 0.097 | 0.307 |
| P value | 0.042 | 0.003 | 0.692 | 0.004 | 0.206 | 0.737 | 0.093 | 0.241 | 0.599 | 0.088 |
| Health Index | Pearson Correlation | -.473\*\* | .351\* | 0.138 | 0.306 | .486\*\* | .430\* | 0.203 | .405\* | .401\* | 0.279 |
| P value | 0.006 | 0.049 | 0.45 | 0.089 | 0.005 | 0.014 | 0.264 | 0.021 | 0.023 | 0.121 |
| Education index | Pearson Correlation | -.538\*\* | 0.22 | .512\*\* | 0.053 | 0.257 | 0.328 | -0.037 | 0.211 | 0.221 | 0.128 |
| P value | 0.001 | 0.226 | 0.003 | 0.774 | 0.155 | 0.067 | 0.84 | 0.246 | 0.223 | 0.484 |
| LIVING STANDARD INDEX | Pearson Correlation | -.584\*\* | .528\*\* | 0.283 | .435\* | .419\* | 0.325 | 0.242 | 0.348 | 0.286 | 0.32 |
| P value | 0 | 0.002 | 0.116 | 0.013 | 0.017 | 0.069 | 0.182 | 0.051 | 0.112 | 0.074 |

Table 3. Correlation matrix between development index and insurance indicators

Table 4. Insurance indicators according to Development Group

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | HDD | MDD | LDD | P value  (ANOVA test) | Ratio between MDD and HDD | Ratio between LDD and HDD |
| Enrolment in % | 50.59439 | 59.0373 | 61.45986 | <0.001\* | 1.166874 | 1.214756 |
| Empaneled hospitals per 1 lakh enrolled | 8.00005 | 6.355645 | 4.632156 | 0.012\* | 0.794451 | 0.579016 |
| Empaneled public hospitals per 1 lakh enrolled | 2.08554 | 1.563911 | 1.564321 | 0.312 | 0.749883 | 0.75008 |
| Empaneled private hospitals per 1 lakh enrolled | 5.91451 | 4.791734 | 3.067835 | 0.047\* | 0.810166 | 0.518696 |
| Claims per 1 lakh enrolled | 4107.219 | 3540.373 | 3204.879 | 0.025\* | 0.861988 | 0.780304 |
| Claims made in public hospitals per 1 lakh enrolled | 2138.031 | 1528.179 | 1471.545 | 0.038\* | 0.71476 | 0.688271 |
| Claims made in private hospitals per 1 lakh enrolled | 1969.188 | 2012.194 | 1733.334 | 0.327 | 1.021839 | 0.880228 |
| Claims made by hospitals per 1 lakh enrolled | 4918.083 | 2888.132 | 1889.394 | 0.080 | 0.587248 | 0.384173 |
| Claims made by public hospitals per 1 lakh enrolled | 2626.632 | 1327.898 | 927.5057 | 0.167 | 0.505552 | 0.353116 |
| Claims made by private hospitals per 1 lakh enrolled | 2291.451 | 1560.234 | 961.8878 | 0.136 | 0.680893 | 0.419772 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | claims | Claims made in Public hospitals | Claims made in Private hospitals |
| No of hospitals available per one lakh families enrolled | Pearson Correlation | .343 | .034 | .536\*\* |
| Sig. (2-tailed) | .055 | .854 | .002 |
| Availability of public hospitals per 1 lakh families enrolled | Pearson Correlation | .148 | .337 | -.236 |
| Sig. (2-tailed) | .418 | .060 | .193 |
| Availability of private hospitals per 1 lakh families enrolled | Pearson Correlation | .294 | -.076 | .612\*\* |
| Sig. (2-tailed) | .102 | .681 | .000 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | |

Table 5.Correlation between hospitals availability and claims made.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Low developed districts |  | Medium developed districts |  | High developed districts |