

Original Research Article

Spatial Pattern of Health and Health Care Facilities in District Anantnag of South Kashmir (J&K, India) - A Geo Medical Analysis

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ABSTRACT

The main objective of this paper is to evaluate the spatial pattern of health and health care facilities in district Anantnag. The study was carried out across five altitudinal zones among different medical blocks in GIS environment. Both primary and secondary data was employed. Distribution and intensity was shown by using Kendal's ranking coefficient method. The results of the study show greater variation in the distribution of health care amenities and intensity of diseases across different altitudinal zones. The impact of this regional disparity was reflected in the intensity of diseases which were found corresponding with the availability of health care facilities. Change in the scenario can be brought by snuff out the regional disparities in the study area.

Key words: health, health care, altitude, intensity, disparity

INTRODUCTION

The levels of health and diseases vary between places and over time. At present, there is a pronounced awareness of importance of understanding the geographic aspects of human health. ^[1] Health is a fundamental human right and is central to the concept of quality of life. ^[2] Health care is a programme of services that should make available all facilities of healthcare and allied services necessary to promote and maintain the health of people. ^[3] The contribution of health care institutions in the health care of an area can be assessed by its different components viz., number of doctors, availability of beds, infrastructure, paramedical staff, technical facilities etc. ^[4] In India health care system is paralyzed because it has to face serious crises in coast, quality of care and equitable distribution of modes and standard services to the population as a whole. ^[5] The distribution of health care services and modern health facilities is highly centralized about 75

percent of Indian population resides in rural areas, only 11 percent physicians practice in these areas. ^[6] Health care, being an integral part of socio-economic conditions, has a major role in the prevention of diseases and promotion of health. ^[7] Regional disparities in health care parameters and disease distribution are very much present in developed as well as developing countries but in the later ones, the problem of disparities is in acute situation due to overwhelming backwardness and existence of few developed pockets at the cost of others. ^[8] This phenomenon of spatially imbalanced regional development within a country is becoming a serious problem for policy makers and planners particularly because the actual purpose of development stands defeated or muted when a section of population remains deprived of its benefits. ^[7] The impact of this regional disparity was reflected in the intensity of diseases which were found corresponding with the availability of health care facilities. ^[9] A

study of disease intensity is useful in understanding the distributional pattern and intensity of diseases in an area because it provides an idea of the relative dominance of different diseases in order of importance. [10] In Jammu and Kashmir State, State Government controls health care delivery system. There are wide regional disparities in the distribution of health and healthcare facilities due to geo physical, economic, socio-cultural, state government policies and political attitudes in terms of priorities of different regions. Parallel to these government organized health care system,

there are number of private enterprises serving the population of the state. The study area is having a mountainous topography and thus showing variation in terms of health care facilities and diseases.

Study area:

Anantnag district is in southern sector of Jhelum valley, between geographical coordinates of 74⁰-30' to 75⁰-35' East longitude and 33⁰-20' to 34⁰-15' North latitude, at an altitude of 5,300 feet (1600 mts) above mean sea level, at a distance of 33 miles (53kms) from main city Srinagar.

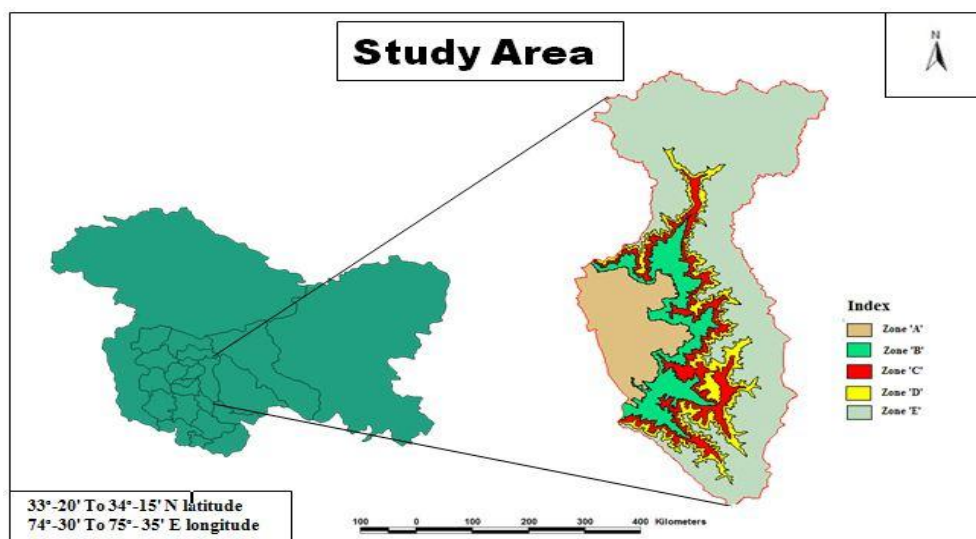


Fig: 1 Location Map of the Study area
Source: Generated from SOI Toposheets, 1971

The entire southern sector of the study area, which is contiguous with tehsils of Reasi, Banihal and Kishtwar of Jammu province, and eastern sector which is contiguous with tehsil Kargil of Ladakh division comprises of thick forests and mountains. The northern and western sides are bounded by Pulwama district while Kulgam district falls in its west. [11,12]

The study area consist of six medical blocks, delineated into five altitudinal zones that were generated from contour DEM as shown in Fig.1, with a contour interval of 250 meters ranging from 1500 meters up to 5385 meters above mean sea level.

MATERIALS AND METHODS

In order to work out the spatial variation in the distribution of health care amenities and disease Patten, the study area was divided into five altitudinal zones, after that health care amenity data was collected from hospitals falling in each altitudinal zone and also from chief medical officers office and block medical officers office. In order to gauge out the incidence of diseases in the study area, data was collected from hospitals, dispensaries and other relevant institutions. Apart from this primary survey was also carried out in all the sample villages falling in each altitudinal zone.

Calculation of Incidence Rate: It may be pointed here that higher the value of z-score means higher the diseases intensity

and lower the value of z-score means lower disease intensity. In the present study the incidence rate of diseases sex wise has been calculated by using the following formula:

$$IR = \frac{\text{Number of new case of a diseases during a given time period}}{\text{Total population at Risk during the same period of time}} \times 1000$$

Measuring Disease Intensity:

For measuring diseases intensity at zone level of the study area standardized score (z-score) method has been applied in order to remove the biasness of scale.

$$z = \frac{x - \mu}{\sigma}$$

Where, 'μ' is the mean of the population and 'σ' is the standard deviation of the population

Distribution of Health Care Facilities:

In the study area there are wide regional imbalances in the availability of different health care facilities. For this purpose Ranking Co-efficient of health care facilities for each zone by taking highest value as one has been employed;

$$Rco = \frac{R_1 + R_2 + R_3 + \dots + R_n}{N} = \sum_{i=1}^N \frac{R_i}{N} \dots [1]$$

Where Rco = Ranking coefficient of each altitudinal zone

R1, R2, R3 = Ranking of each component of Health Care facility

N = Number of Health Care Facilities considered.

On the basis of Ranking Coefficient four levels of health care facilities have been determined viz. (i) very high (ii) medium (iii) low, (iv) very low

Composite Index:

After the removal of the biasness of scale, the transformed or scale free values of the given variables are added up linearly to arrive at the composite index for each altitudinal zone. The mathematical model used was as under is:

Table 1: Altitudinal Zone wise Distribution of Health Care Institutions in District Anantnag

Altitude Zones (meters)	District Hospital	Sub-district Hospital	Primary health Centers	Allopathic Centers	Sub Centers	Total
Zone 'A' (1500-1750)	1	3	20	10	50	84
Zone 'B' (1750-2000)	0	2	7	4	35	48
Zone 'C' (2000-2250)	0	0	4	3	15	22
Zone 'D' (2250-2500)	0	0	0	1	4	05
Total	1	5	31	18	104	159

Source: Chief Medical Officer, Anantnag, 2015.

$$C.I = \sum_{j=1}^n \frac{X_{ij}}{X_j}$$

Here, X_{ij} = value of j^{th} variate for i^{th} altitudinal zone;

n = number of variables, C.I. = Composite Index

After the construction of composite index for each altitudinal zone, the scored values of composite index are classified into three categories which show the level of vulnerability. In the present study, the index for all above said variables has been worked out to see the nutritional status at each altitudinal level and finally altitudinal zone wise nutritional status and food deficit has been mapped.

RESULTS AND DISCUSSION

The levels of distribution of health care facilities in any region manifest itself at the level of health and human well being. The spatial distribution of health care facilities appears to be affected by inter related factors of physiographic constraints, socioeconomic and various demographic characteristics.

Table 1 shows altitudinal zone wise distribution of various health care institutions in the study area. The study further shows that out of 159 health care institutions there was 1 district hospital, 5 sub-district hospitals and 104 sub centers. The district hospital was found in zone 'A' at Lalchowk Anantnag, out of 5 sub-district hospitals 3 were found in zone 'A' at Bijbehara, Mattan and Shangus and remaining 2 were found in zone 'B' at Dooru and Kokarnag. However, in zone 'C' and zone 'D' only 1 allopathic centre and 4 sub centers were found (Fig.2).

Table 2: Altitudinal Zone wise Levels of Health Care Facilities in District Anantnag

Altitudinal Zones (meters)	Ranking Coefficient	Levels of Health care Facilities
Zone 'A' (1500-1750)	3	High
Zone 'B' (1750-2000)	2	Medium
Zone 'C' (2000-2250)	1.2	Low
Zone 'D' (2250-2500)	0.6	Very low

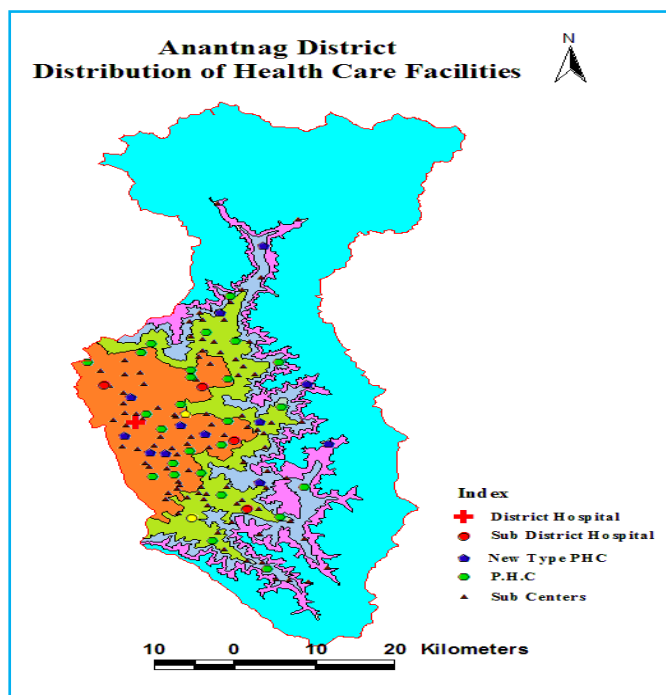


Fig. 2: Altitudinal Zone wise Distribution of Health Care Institutions in District Anantnag

Source: Generated from SOI Toposheets 1971 and Secondary Data, 2015-16

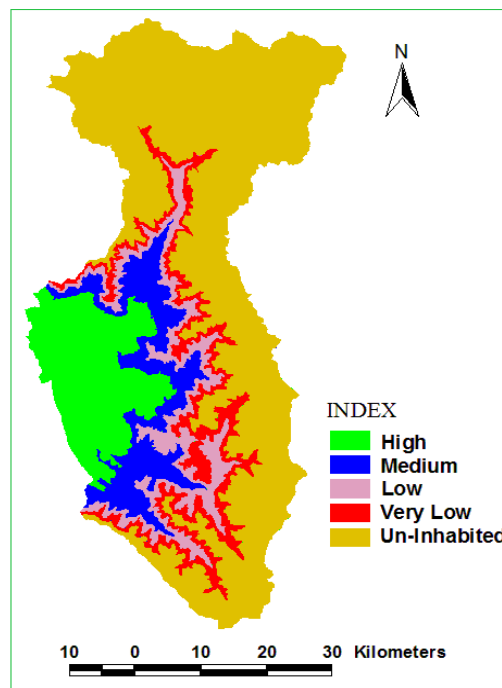


Fig.3: Altitudinal zone wise levels of Health Care Facilities in District Anantnag

Table: 2 and Fig.3 clearly shows that zone 'A' fall under the category of high health care facility while as zone 'B' and 'C' zones fall under the category of medium and low health care facility respectively, however, zone 'D' fall under low category. The study further reveals that health care facility were observed high in developed zones (zone 'A'

and zone 'B') in terms of socio-economic conditions and low in under developed zones (zone 'C' and zone 'D') because of under development in all sectors of socio-economic parameters. It may be remarked that the level of urbanization plays a decisive role in the availability of health care facilities.

Table: 3 Altitudinal Zone wise Population -Doctor, Institution-Population and Population-Bed Ratio in district Anantnag

Altitudinal Zones (meters)	Doctor-Population Ratio	Nurse-Doctor Ratio	Institution-Population Ratio	Population-Bed Ratio	Doctor-Institution Ratio
Zone 'A' (1500-1750)	1: 4328	1:1	1:7781	1509:1	2:1
Zone 'B' (1750-2000)	1: 4422	1:2	1:7781	1596:1	1:1
Zone 'C' (2000-2250)	1: 7793	3:1	1:9092	2727:1	1:2
Zone 'D' (2250-2500)	1: 23077	3:1	1:11538	23077:1	1:2

Source: Computed from Field Survey, 2014 and J&K, Census, 2011

Table: 4 depicts noticeable regional imbalances not only in incidence rate and ranking but also in the intensity of diseases across different altitudinal zones in the study area, which varies from -1.78 in zone

'A' to 2.803 in zone 'D', have been put in three categories i.e. high diseases intensity zone, medium diseases intensity zone, and low diseases intensity zone (Fig.4).

Table 4: Altitudinal Zone Wise Standard Score of Diseases in District Anantnag

Altitude Zones (meters)	Cardiovascular Diseases	Cancer	Diabetes	obesity	Anemia	Osteo-malacia	Respiratory tract infection	Diarrhea	Aggregate Z-score
Zone 'A' (1500-1750)	0.58	-0.462	0.86	0.901	-0.97	-0.691	-0.881	-1.055	-1.718
Zone 'B' (1750-2000)	0.826	-0.327	0.738	0.764	-0.549	-0.539	-0.583	-0.637	-0.307
Zone 'C' (2000-2250)	0.002	-0.694	-0.331	-0.501	0.211	-0.244	0.094	0.686	-0.777
Zone 'D' (2250-2500)	-1.408	1.483	-1.267	-1.164	1.309	1.474	1.37	1.006	2.803

Table: 5 Altitudinal Zone Wise Intensity of Diseases in District Anantnag

Altitude Zones (Meters)	Aggregate Z score	Diseases Intensity Zone
Zone 'D' (2250-2500)	2.803	High Intensity
Zone 'B' (1750-2000)	-0.307	Medium Intensity
Zone 'C' (2000-2250)	-0.777	
Zone 'A' (1500-1750)	-1.718	Low Intensity

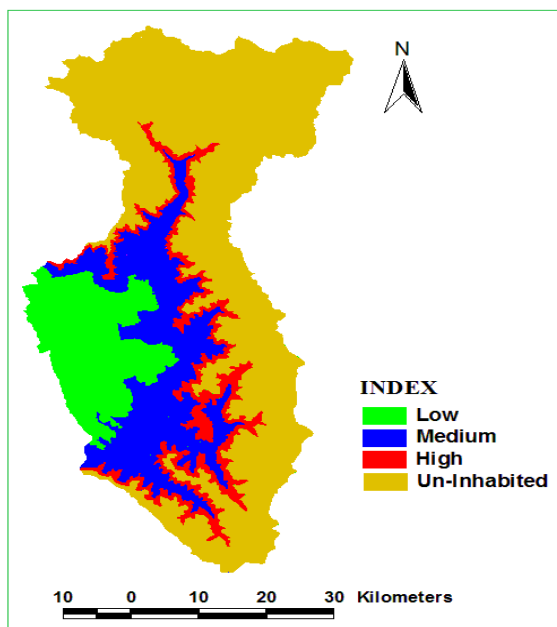


Fig.4: Altitudinal Zone Wise Intensity of Diseases in District Anantnag

Source: Generated from SOI Toposheets and Secondary Data, 2015-16

CONCLUSION

The study highlights that there are wide imbalances in the availability of health

care facilities and incidence of diseases in different altitudinal zones, therefore there should be a proper coordination between availability of health care facilities and disease intensity in order to formulate a successful plan for improvement in the existing health care delivery system in the study area. For this purpose one zone of similarity and three zones of dissimilarity have been identified from both the maps of levels of health care facility and disease intensity.

i) Zone of Similarity: Zone 'B' fall in the zone of similarity in which both intensity of diseases and health care facilities were found at medium level.

ii) Zone of Dissimilarity: Zone 'A', zone 'C' and zone 'D' of the study area falls in this category. In zone 'A' intensity of diseases were very low, but the level of health care facility was found very high, however, in zone 'C' intensity of diseases was found at medium level but the level of health care facility was low and in zone 'D' intensity of diseases were very high, but health care facilities were depicted very low.

The impact of this regional disparity was reflected in the intensity of diseases which were found corresponding with the availability of health care facilities.

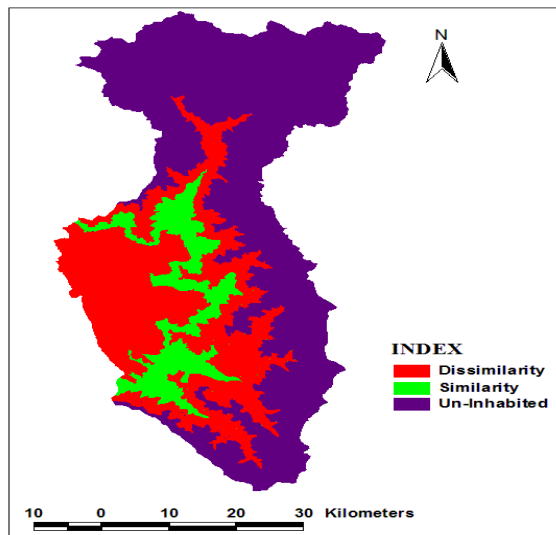


Fig.5: Altitudinal Zone Wise Zones of Similarity and Dissimilarity

Source: Generated after overlay analysis of Fig: 3 and Fig: 4

SUGGESTION

In order to provide better health care to the people in the study area, the disease structure and the health behavior of the population in all zones have to be studied before making any decision of the amount and type of health care for a zone.

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