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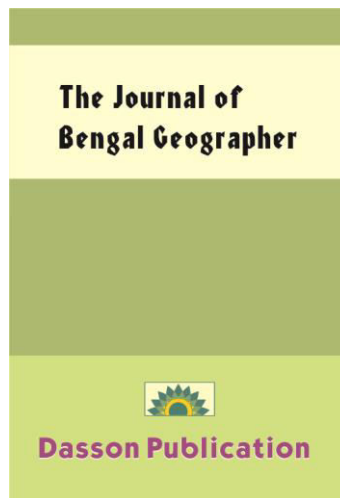
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Analysis of Micro Level Disparities in Healthcare Infrastructure in Allahabad District, Uttar Pradesh, India

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Abstract

For over past sixty years health has been among the few issues in India. Health is the basic and primary need of people and good health. It is also a major resource for social, economic and personal development. It prepares a background for any nation to progress in socio-economic, scientific, educational and other spheres. Therefore, it should not be viewed in isolation from other goals of development. The progress of any country or society greatly depends on the quality of life of its people. The present study is an attempt to analyse the block level disparity in health attainment in Allahabad district at two times period 2004-05 and 2014-15. To analyse the regional disparities in twenty blocks of the district, nine variables have been selected and have been measured by using the Development Index. In the analysis, it has been observed that some blocks are found to be stagnant; others are either moving forward or going backward in the district during 2004-05 and 2014-15. The overall condition is worst in 2014-15 in comparison to previous years.

Keyword: 1.Disparities, 2.Healthcare infrastructure, 3.Quality of life.

Introduction

Health is not just the absence of disease. It represents both physical and mental capability to enjoy living. Health is an important dimension of well being and it is one of the most important factors of development. Knowledge and understanding of health services usage are necessary for health resource allocation and planning (Joseph and Phillips, 1984). Health care is a social determinant as it influenced by social policies. One of the basic objectives of eleventh five year plan is to achieve good health for people, especially the poor and the unprivileged. In view of this, the department of Health and Family Welfare has focused its attention on improving the primary health services by channelizing adequate financial and manpower resources for making the health services more accessible and affordable to the poor people.

The regional inequality in India exists at all levels. It is now a matter of serious concern amongst the policy makers and researchers even though the basic goal of our economic planning has been to identify undernourished sector and eliminating regional imbalances for balanced development of the country. The variation in different indicators of development in different regions may be attributed to the variation in policy perspectives, historical background, and uneven distribution of the resources (Dadibhavi et al. 2006). A plethora of studies have been conducted dealing with regional disparities and level of development at micro and macro levels by using a number of development indicators. Debapriya & Mohanthy, (2000), analyse the variation in level of development and found glaring disparities in socio-economic sector at inter and intra-regions. Wang (2007) used a composite index and various social and economic indicators to measure the level of development for the different provinces of China. Shaban & Bhole (1999) used principle component method to assess the level of development of different districts of Maharashtra, using different indicators and variables. In fact, after independence of

the country, the health infrastructure of Allahabad district has expanded manifold, still the physical health infrastructures are inadequate to extend quality health services to all the people. The present paper attempts to investigate micro level (block) disparities in availability of healthcare facilities in Allahabad district. The study is likely to be helpful for administrators, policy makers and planners to curb the existing problem and promote the balanced development particularly at micro level.

Literature review

Health is an essential input for the development of human resources and the quality of life and in turn the social and economic development of the nation (WHO, 1978). The health care as a constitutive element of well-being and yet it has been one of the most neglected aspects of development in India (Dreze and Sen, 2005). Just as health status is influenced by the socio-economic factors, similarly health services are shaped by the socioeconomic and political factors of any region (Baru et. al, 2010). Inequality in the distribution of health care facility is a common manifestation of these factors and a general feature of health care system in India. According to Rajeshwari and Sinha (2004), the distribution of health care institutions in India is guided by locational preference. Public health is nothing but, the practice of preventing disease and promoting good health within groups of people, from small communities to entire countries (Pradad, 2013). Gill (2009) in their study concluded that the National Rural Health Mission is on the right track of addressing the rural health care with the institutional changes it has brought within the health system. But there are problems in implementation, so that delivery is far from what it ought to be with respect to physical infrastructure, medicines and funding. Lewando Hundt et. al. (2012) found in their study that there are issues of accessibility in terms of distance, and of acceptability in relation to the lack of local and female staff, lack of cultural competencies and poor communication. Also they found that provision of accessible acceptable health care in rural areas poses a challenge to health care providers and these providers of health care have a developing partnership that could potentially address the challenge of provision to this rural area. In this context, an attempt is made to examine the spatial distribution of health care infrastructure in Allahabad district. It is not surprising that there is a tremendous pressure on existing health care system to meet the need of vast population. Hence an assessment of available resources is imperative for proper allocation and efficient utilization of health care services.

Study Area

The district of Allahabad is extend between $24^0 47'$ N and $25^0 47'$ N latitudes and between $81^0 19'$ E and $82^0 30'$ E longitudes. It covers an area of 5,246 km^2. Allahabad district is in the southern part of Uttar Pradesh. The northern part of the district is in the Gangetic Plain and southern part is in Vindhyan Plateau. To its south and southeast is the Bagelkhand region, to its north and northeast is the Awadh region, and to its west along with Kaushambi it forms the part of Doab i.e. the lower Doab region. Allahabad District is surrounded by district Bhadohi and Mirzapur in the east, Kaushambi and Banda in the west, Pratapgarh and Jaunpur in the north and Banda and Madhya Pradesh are in the south. River Ganga and Yamuna flow through the district. The mainstay of economy is agriculture, primarily Paddy cultivation. The region is characterized by developmental constraints in terms of rapidly growing population, lack of appropriate transportation, modern energy services, adequate health care delivery and education.

Objectives

In the light of above facts, an attempt has been made to discuss some aspects of inequalities found in healthcare infrastructure in this paper. The major objectives of this study are as follow:

- To highlight the existing infrastructure available for health care services in Allahabad district.
- To show the inter-block variations in health care facilities in the study area.
- To find out the regional pattern in the distribution of health care infrastructure of Allahabad district.
- To examine whether the block level disparities in health sector has decreased over time or remain unchanged.

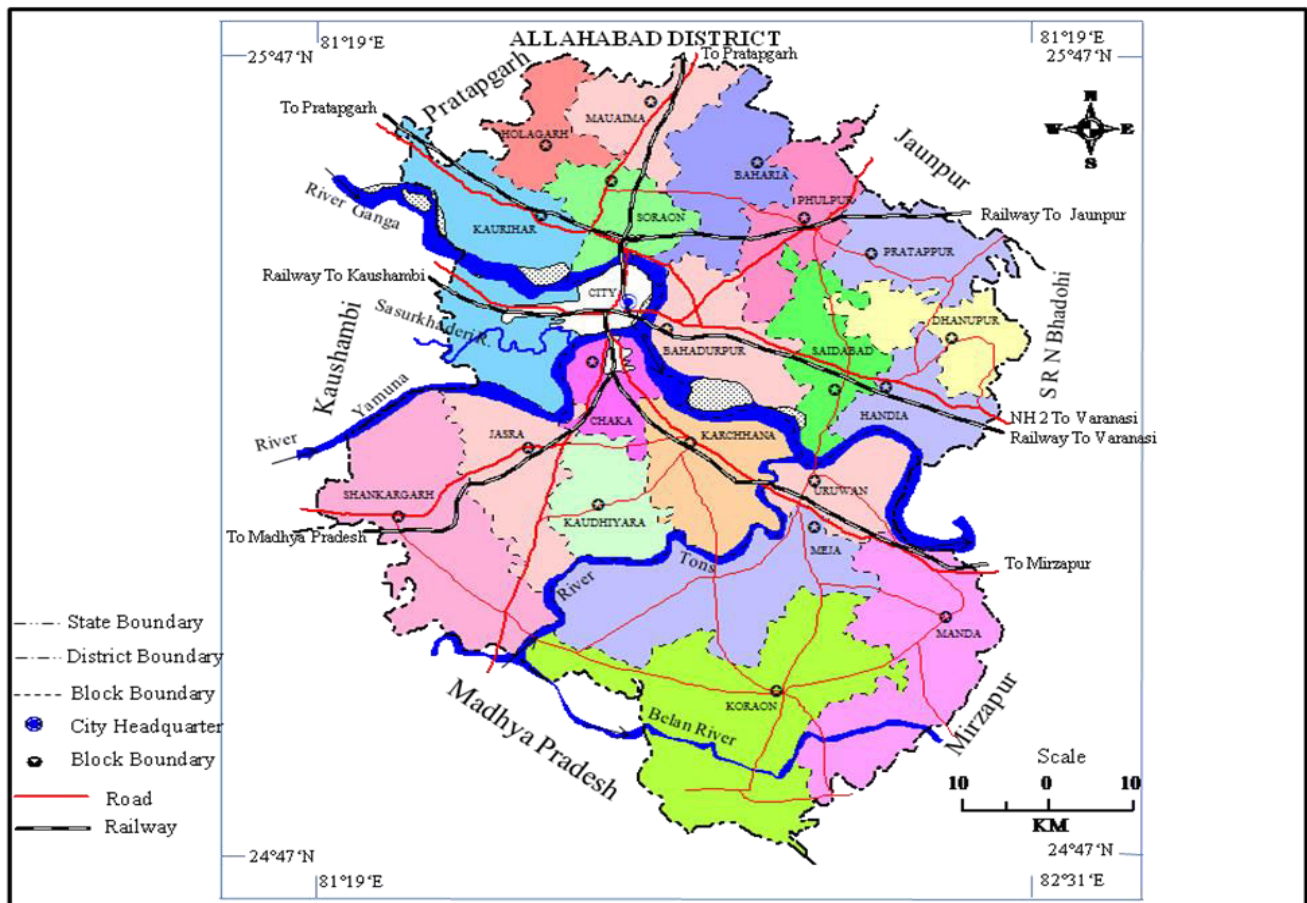**Location and Extent of Allahabad District**

Fig.1

Selection of Indicators

Studies conducted for the measurement of regional disparities have used different indicators for classifying reasons for assessing relative level of development. The indicators are different and heterogeneous across the community development blocks of the district. Block level data on the variables has always been governed by the availability of information. For the identification of the level of development following nine indicators have been used, which represent different aspects of healthcare development in the study area.

X_1 = Number of Allopathic Hospitals/Dispensaries per ten thousand of Population.

X_2 = Number of Community Health Centre per ten thousand of Population.

X_3 = Number of Primary Health Centre per ten thousand of Population.

X_4 = Number of Family and Mother Child Welfare Centre (FMCWC) per ten thousand of Population.

X_5 = Number of Family and Mother Child Welfare Sub-Centre (FMCWSC) per ten thousand of Population.

X_6 = Number of Beds in Allopathic Hospitals/Dispensaries per ten thousand of Population.
X_7 = Number of Doctors available on per ten thousand of Population.
X_8 = Number of Para medicals per ten thousand of Population.
X_9 = Number of other medical staff per ten thousand of Population.

Data Base and Methodology

The data for the present analysis have been obtained from the secondary sources like, population census and district statistical handbook. The study computes composite indices for health. This index system focuses on the relative position of each block. We assume that X_{id} is the value of the 'i_{th}' indicator in the 'd_{th}' block (i = 1, 2, 3 ….n).
So that,

$$Y_{id} = \frac{(X_{id} - MinX_{id})}{(MaxX_{id} - MinX_{id})}$$

Where Min X_{id} and Max X_{id} are respectively the minimum and maximum of $X_1, X_2, X_3,…,X_9$.
The above transformation is based on the assumption that X_i is based on the assumption that X_i is positively correlated with development. Y_{id} is the new, rescaled, index number representation with a value varies between '0' and '1'.
Now it is assumed that the measures of the stage of sectoral development of the 'd'$_{th}$ district (Y_d) is a weighted linear function of Y_{id}'s and it is constructed as:

$$\overline{Y_d} = W_1 Y_{1d} + W_2 Y_{2d} + \cdots + W_m Y_{md}$$

Where $0 < W_i < 1$ and $\sum_{i=m}^{m} Wi = 1$ and W_1 to W_m are the weight of Y_{id}s.

Since different indicators considered for the study do not have equal importance in the improvement in healthcare facilities of a district, it is necessary to assign unequal weights to different indicators at the time of construction of indices. In practice, the weights assigned are dependent on the value judgment of the researchers; such process appears to be arbitrary. In some other cases, the contribution of each indicator towards the sectoral net product is considered as the most suitable weight. But such data are generally not available. So, in the absence of such methods and data as mentioned above, for the purpose of the present study statistical weights are assigned with the assumption that the weights are equal with the individual Var (Yi)/∑ Var (Yi) in the respective indicators of healthcare facilities.

Table 1: Variance (Yi) and Other Related Statistics at Two Point of Time (i.e. for the year 2004-05 and 2014-15).

Indicator	2004-05		2014-15	
	Var (Yi)	Wi	Var (Yi)	Wi
X1	0.0047	0.0015	0.0022	0.0018
X2	0	0	0.0008	0.0006
X3	0.0101	0.0033	0.0045	0.0037
X4	0.0018	0.0006	0.0005	0.0004
X5	0.0807	0.0269	0.0987	0.0804
X6	2.7397	0.9159	0.7325	0.5971
X7	0.0621	0.0207	0.0481	0.0392
X8	0.0275	0.0091	0.1026	0.0836
X9	0.0643	0.0215	0.2365	0.1928

Source: Calculated by the author.

The advantage of such statistical weights lies in the fact that large variations in any one of the indicators do not undermine the contribution of other indicators and distort block level comparisons. Var (Yi) and the corresponding weights are calculated for all the indicators at the two point time i.e. 2004-5 and 2014-15 as presented in Table 1 given above.

By multiplying the individual weights with individual indicators we find the index of health development of different blocks of the district. Based on these, weighted indices of health attainment for all the twenty blocks of the district for years 2004-05 and 2014-15 are calculated and presented according to their ranks as shown in Table 2.

Table 2: Index of Healthcare Facilities of Different Blocks of Allahabad District at Two Time Period

Rank	2004-05		Rank	2014-15	
	Name of the Block	Index		Name of the Block	Index
1	Soraon	0.6259	9	Soraon	0.2015
2	Shankargarh	0.5480	3	Shankargarh	0.2451
3	Jasara	0.5198	1	Jasara	0.2702
4	Manda	0.5139	6	Manda	0.2109
5	Meja	0.4096	7	Meja	0.2058
6	Kaudhiyara	0.4002	5	Kaudhiyara	0.2191
7	Uruwan	0.3800	10	Uruwan	0.1935
8	Handia	0.3629	4	Handia	0.2206
9	Koraon	0.3186	13	Koraon	0.1390
10	Karchhana	0.2960	11	Karchhana	0.1879
11	Chaka	0.2790	8	Chaka	0.2030
12	Phulpur	0.1984	12	Phulpur	0.1793
13	Kaurihar	0.1508	20	Kaurihar	0.0711
14	Saidabad	0.1285	18	Saidabad	0.0882
15	Mauaima	0.1283	2	Mauaima	0.2499
16	Bahadurpur	0.1241	16	Bahadurpur	0.0997
17	Holagarh	0.1215	14	Holagarh	0.1086
18	Pratappur	0.1154	15	Pratappur	0.1059
19	Dhanupur	0.0871	17	Dhanupur	0.0884
20	Baharia	0.0742	19	Baharia	0.0848

Source: Calculated by the author.

Though the composite indices and their ranking speak eloquently about relative position of the blocks in the development scale, it cannot indicate the particular stage of health development in a particular block. Therefore, the method of classifying the development levels into five groups, namely, Highly Developed, Developed, Developing, Backward and Highly Backward has invariably been that of standard deviation and mean. In this method, level of health attainment by district has been arranged in ascending order and their mean and standard deviations have been calculated. By using the formula (mean ± standard deviation) the cut off points in our case comes out to be $t_1 = 0.0875$, $t_2 = 0.2289$, $t_3 = 0.3703$, and $t_4 = 0.5992$ for both the years. With the help of above $t_1..t_4$ values the blocks are classified into different stages of development as shown in Table 3.

Table 3: Classification of Blocks into Different Stages of Development at Two Time Period

Stages of Development	2004-05	2014-15
	Name of the Block	Name of the Block
Highly Developed	Soraon	-------
Developed	Shankargarh Jasara Manda Meja Kaudhiyara Uruwan	-------
Developing	Handia Koraon Karchhana Chaka	Jasara Mauaima Shankargarh
Backward	Phulpur Kaurihar Saidabad Mauaima Bahadurpur Holagarh Pratappur	Handia Kaudhiyara Manda Meja Chaka Soraon Uruwan Karchhana Phulpur Koraon Holagarh Pratappur Bahadurpur Dhanupur Saidabad
Highly Backward	Dhanupur Baharia	Baharia Kaurihar

Analysis

The analysis throws deep focus on the spatial pattern of disparities of levels of health development among different blocks of Allahabad district (20 Blocks) at two points of time with a gap of one decade (i.e. 2004-05 and 2014-15). Table 1 reveals the variance and weights calculated pertaining to each of the indicators under study. Table 2 shows the developmental indices of health sector in different blocks. Table 3 groups different blocks into five developmental stages. Table 4 presents a brief view of the developmental transformation at a decadal gap of different blocks under study. There are some important observations that can be made.

The relative change that had taken place during a decade under study (i.e. 2004-05 and 2014-15) in the development of healthcare facilities in Allahabad district is shown in Table 4.

Table 4: Movement of Blocks under Different Stages of Development during 2004-05 and 2014-15.

Stages of Development	2004-05 Number of Blocks	2014-15 Number of Blocks	Number of Blocks Found Common in 2014-15	Number of Blocks move Forward in 2014-15	Number of Blocks move Backward in 2014-15
Highly Developed	01	00	00	00	00
Developed	06	00	00	00	02 (Developed to Developing)
Developing	04	03	00	00	04 (Developed to Backward) 04 (Developing to Backward)
Backward	07	15	05	01 (Backward to Developing)	01 (Highly Developed to Backward) 01 (Backward to Highly Backward)
Highly Backward	02	02	01	01 (Highly Backward to Backward)	00
Total	20 (100%)	20 (100%)	06 (30% of total blocks)	02 (10% total blocks)	12 (60% total blocks)

What is really surprising and shocking is that most of the blocks that have done very well in terms of health attainment in 2004-05 have performed worse in 2014-15. The overall performance of the district is worse. The value of index is not very high in previous years and it has also declined over the years. The highest index of healthcare facilities that was 0.6259 in 2004-05 is declined up to 0.2702 in 2014-15. This is indeed a very critical position for the district.

The analysis reveals that the quantum of disparity in health sector development in the district found in both the extreme ends are 0.6259 for Soraon block and 0.0742 for Baharia during the period 2004-05 but during the period 2014-15 it is found as 0.2702 for Jasara and 0.0711 Kaurihar blocks. Further, ranks of almost all the blocks are found changing during the period 2014-15 compared to 2004-05. This shows the variation in the development of health attainment of different blocks of Allahabad district within this given period.

Only one block i.e., Soraon has been identified as highly developed during 2004-05 but there is totally absence of blocks falling under highly developed and developed categories in the year 2014-15. There is little improvement in some blocks like Mauaima which was in backward and Dhanupur was in highly backward category in the year 2004-05 and they achieve developing and backward categories

respectively in the year 2014-15. There are seven blocks in backward category during 2004-05 of which five are found common in 2014-15. Soraon which was highly developed and Manda, Meja, Kaudhiyara and Uruwan belongs to developed category in the same year comes under backward category in 2014-15.

The developmental level of health attainment of six blocks out of 20 blocks (i.e. 30%) have not changed during the period 2014-15 as compared to the period 2004-05. Only two blocks of the total blocks (i.e. 10%) have move forward as depicted in Table 4. Similarly, the developmental levels of twelve blocks (i.e. 60%) have move backward.

Conclusion

The present study brings into sharp focus on the spatial and temporal variations in the level of development of health infrastructure across different blocks of Allahabad district. There are wide micro-regional imbalances in the distribution of healthcare facilities. Rural healthcare services suffer from a shortage in public sector infrastructure. The government's budgetary allocation for health sector could not keep pace with the growth of population which has led to the gradual decline of the level of health development in the study area. The existing situation is not merely because of population growth. It is a combined effect of socio-political reasons and poor planning process. The data revels that there is urgent need to give big boost to health sector. It is important that the government makes region specific planning and adopts regional development strategy after proper research.

The present study only focuses on the infrastructural facilities of health care system of Allahabad district. Nevertheless, this study provides valuable information on recent health care situation of Allahabad district. It focuses on the extreme shortages of health care institutions and manpower in the public health system. As majority of people in Allahabad district depend on public health care system, the most important thing is to recruit the required number of doctors and staffs in the public health institutions. Access to services is an important determinant in meeting the healthcare needs of the people, especially living in remote areas. Ambulance service to transport the serious patients to referral centres is very important. Irregular and infrequent availability of Public transportation from remote areas to healthcare facilities and private transport is very expensive. Telephones or wireless communications system is not operational in many CHCs/PHCs. Local transports should be leased and attached to each PHC for transporting referred cases to the nearest accessible BPHCs/CHCs. There is urgent need to strongly emphasize the process of strengthening the infrastructural facilities at CHCs/PHCs to utilize their full potential. Additional 19 CHC, 81 PHCs and 335 Sub- centres should be opened in the Allahabad district to reduce the gap between existing and required facilities. All the PHCs should be renovated and equipped according to their need. It is also proposed that the BPHCs of seven priority blocks (Holagarh, Mauaima, Bahariya, Pratappur, Dhanupur, Saidabad and Kotwan) are upgraded to provide basic EMoC and neo-natal services with an aim to make them full-fledged FRU in the long run. Availability of doctors (including lady doctor) and para medical staffs at sub- centres, primary health centres and community health centre must be ensured by making adequate number of postings and constructing residential quarters. A vigorous attempt would be made to meet the shortage of doctors and allied manpower at the PHCs, especially those which are deemed to serve people living in the least accessible region. The ongoing efforts of the government to build up private-public partnership and involve the panchayats more effectively in the participatory management of health services are expected to ensure better health care services.

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