A COMPARATIVE GEOGRAPHICAL STUDY OF INEQUALITY IN DISTRIBUTION OF PUBLIC HEALTHCARE FACILITIES IN KHED, AMBEGAON, AND JUNNAR TEHSILS IN PUNE DISTRICT, MAHARASHTRA

Gopale Ramesh Narayan[1] Dr. Patil Vilas Vasant[2]

[1]Research Student, Prof. Ramkrishna More Art's, Commerce & Science College Akurdi, Pune
[2]Professor & Head, Department of Geography, Shri Shahu Mandir Mahavidyalaya Parvati Pune

Abstract

This paper examined the comparative geographical study of inequality in the distribution of Public Health Care facilities in Khed, Ambegaon, and Junnar tehsils in the Pune District. Required data were obtained from various sources, secondary data from the census, gazette, government action plan, reports and magazines, and socio-economic abstract of the Pune district were used for this study. GIS tool was used for preparing maps with QGIS 3.8.1 software, and Microsoft Excel is used for calculation and making graphs. In this study, results show whether public healthcare facilities are adequate or not in the study area. In this data, we analyzed a comparatively geographical study of inequalities in the public healthcare facilities in the Khed, Ambegaon, and Junnar tehsils. Recently medical field is taking the lead to understand the role played by geographically distributed healthcare facilities in people's health maintenance. The paper has studied inequalities in the spatial distribution of healthcare facilities in Khed, Ambegaon, and Junnar tehsils.

Keywords – Inequality, Health Workforce, Healthcare, Health, GIS, and Medical Geography

Introduction

Geography of Health is one of the major sub-branch of human geography and biogeography. Nowadays medical field is emerging very rapidly in the world. More scholars, researchers, and academicians researching the problems regarding health disease, environmental dimensions of health, and its spatial distribution in the respective region. The health scenario has been changing from time to time and recently it has abruptly changed during the last decade. Health is the basic need of all human beings with the quality of life and HDI (Human Development Index). Medical geography investigates the spatial patterns of disease, the spatial patterning of physical and human environmental features that cause good or bad health, and the spatial patterning and utilization of healthcare delivery systems to combat disease and health risks (Mishra 2007).

In the world, biogeographical knowledge is necessary to give help man keep himself comfortable with the help of medicine which is related to the natural environment. The geography of health has been wide scope in the world. Well, known geographers can contribute their knowledge in the field of medical geography to understand the spatial structure of health, and their situation scenario at a global, national, and local level. The main attention is health geography and the health care system. Many geographical components influence and time to time determine animals, humans, and life from health conditions. Spatial distribution of health centers and health care facilities analysis has been strongly used to prepare a plan for the health delivery system and strategy for improving the health efficiency of that geographical region. The main aim of public health care and preventive medicines with precaution is that remove inequalities and barriers in delivering health care facilities in different parts of the remote rural community (Mishra 2007). Healthcare program is giving services for health facilities and regarding services to maintain a healthy mind and body. For this program, they considered physical, social, and family environment atmosphere for taking prevention and precaution of diseases and recovering health (Agnihotri R.C. 1995). The disparity or inequality highly observed in the distribution of healthcare facilities are well known. It is found that highly

concentrated. About 80 percent of people live in rural parts of India, but only 11 percent of health staff (physicians, practitioners, nurses, and others) function in these areas (Banerjee and Joshi 1985). Primary health care is playing a crucial role to give focusing on the health of people (Perry Gesler 2000). Good Health is one of the major indicators of human beings which plays a key role in the development of any region (Minutha V. 2014). The spatial locations of healthcare facilities in rural areas of Spiti Valley are largely influenced by road links (Nikita 2018).

The distribution of public healthcare facilities and their health workforce in the Khed, Ambegaon, and Junnar tehsils were detailed in this paper. The main aim of this paper is to study the inequalities among the healthcare facilities in the study region.

Figure 1 Location Map of Study Area
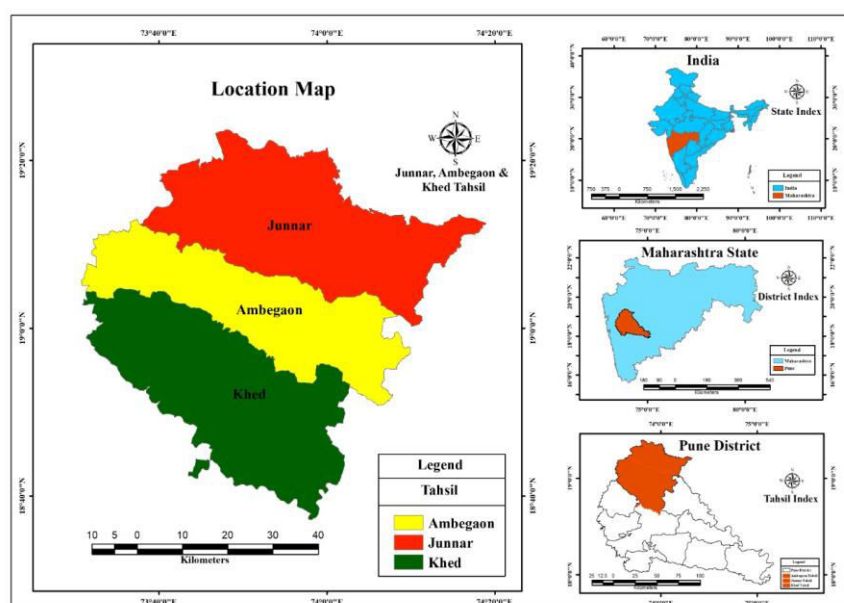
Study Area

Khed, Ambegaon, and Junnar are the most important tehsils located in the northern part of the Pune District. It is bounded in the north Akole and Sangamner tehsils of Ahmednagar district, in the south by Maval and Haveli tehsils of Pune district, in the east by Shirur tehsil, and in the west by Karjat and Murmad tehsil of Raigarh and Thane district respectively. Khed, Ambegaon, and Junnar are located between $18^0 37^{'}$ N to $19^0 24^{'}$ N latitude and $73^0 32^{'}$ E to $74^0 18^{'}$ E longitude. It has the highest point in the study region and is located in the northwestern corner of Junnar tehsil which is Harishchandragad. The total population of the study area is 1085428. The total geographical area of this study region is 3828 sq. km. It has 5 towns and 510 villages located in the study region.

Objectives of the study

To study the comparative geographical study of inequality in the distribution of Public Health Care facilities in Khed, Ambegaon, and Junnar Tahsils in Pune District, Maharashtra.

Methodology

This study is based on inequalities of primary health care centers at the tehsil level, the required data related to population, and health care data obtained from the District Health Office and District Census Handbook of Pune District and Social Economic Abstract of Pune district. The tehsil-wise ratio between population and health workforce has been carried out the results in health care facilities in the study region. The obtained data were used in the GIS tool to highlight the variations in the distribution of healthcare centers and the health workforce.

Distribution of healthcare facilities

The distribution of healthcare facilities is not uniformly distributed in the study areas. Western side rural remote areas of the study region don't have to get better health facilities. The study region consists of five towns and 510 villages. The total geographical area is 3828 sq. km and has a 1085428 population.

Table No. 1 Distribution of Public Healthcare Facilities

Sr. No	Tehsil	Area Sq.km	Population	SDH	CHC	CHC Pop. Served	PHC	PHC Pop. Served	SC	SC Pop. Served
1	Khed	1400	447373	-	3	149124	10	44737	61	7334
2	Ambegaon	1043	237290	1	1	237290	07	33898	48	4943
3	Junnar	1385	400765	-	2	200382	12	33397	74	5416
	Total	**3828**	**1085428**	**1**	**6**	**180904**	**29**	**37428**	**183**	**5931**

(Source – District Statistical Abstract 2020 - Pune District)

The total healthcare centers in the study region are included one sub-district hospital having 100 beds capacity which is located in Manchar city of Ambegaon tehsil, 6 CHC, 29 PHC, 183 Sub Centers (Table No.1). All these healthcare centers function with the help of 108 doctors, 281 nurses, and 454 beds capacities health workforce.

Figure No. 2 Distribution of Healthcare Centers in the Study Area
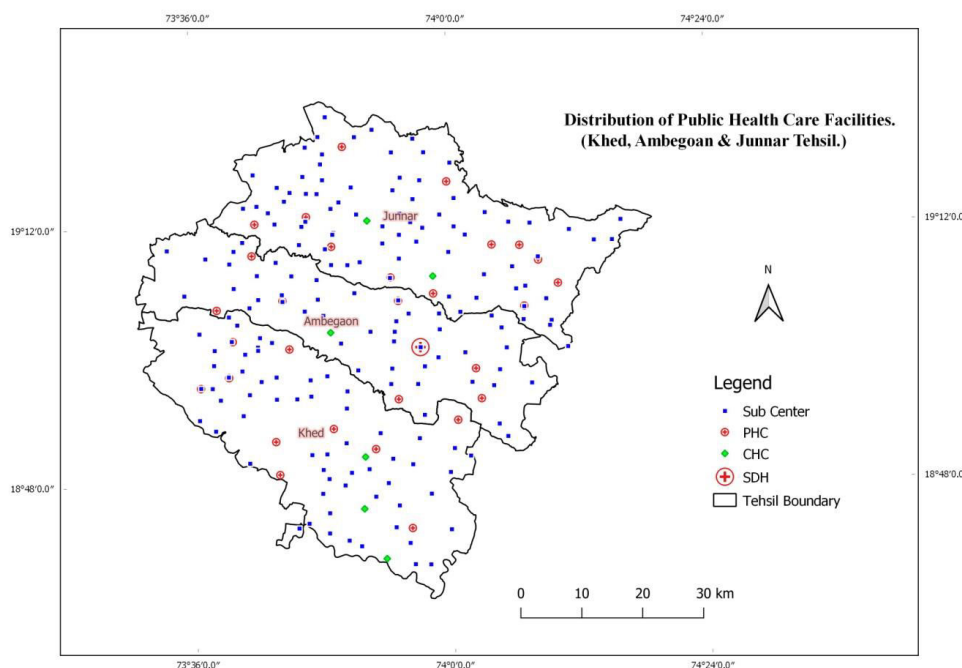
As per the Government of India, NRHM (National Rural Health Mission) has decided the policy of population and healthcare centers norms for Sub Centers, Primary Health Centers, and Cumulative Health Centers in respective plain, hilly and tribal areas. As per the criterion or norms 5000, 30000, and 120000 populations suggest Sub Centers, Primary Health Centers, and Cumulative Health Centers in plain areas respectively, whereas the 3000, 20000, and 80000 populations suggest Hilly or Tribal regions respectively.

High concentrations of PHCs are found in Junnar tehsil (12) surviving a population ratio of 1:33397, followed by Khed tehsil (10) with a surviving population ratio of 1: 44737, Ambegaon has 7

PHCs each of them surviving population ratio of 1:33898. The highest and lowest Sub Center numbers are located in Junnar (74) and Khed (61) tehsils which are 1: 5416 and 1:7334 population ratios respectively. Ambegaon has 48 Sub Centers with surviving 1:4943 population ratio (Table No 1). Though there are regional disparities found among the Khed, Ambegaon, and Junnar tehsils in the distribution of healthcare centers as per the NRHM norms (Table No. 2).

Table No. 2 As per NRHM norms Requirement of Public Healthcare Facilities

Sr. No	Tehsil	CHC (Present)	CHC (Required)	CHC (Diff.)	PHC (Present)	PHC (Required)	CHC Diff.	SC (Present	SC (Required)	SC Diff.
1	Khed	3	4	-1	10	15	-5	61	89	-28
2	Ambegaon	1	2	-1	07	08	-1	48	47	+1
3	Junnar	2	3	-1	12	13	-1	74	80	-6
	Total	**6**	**9**	**-3**	**29**	**36**	**-7**	**183**	**216**	**-33**

(Source – computed by author)

Health Workforce

The health system is important for health workers which are improving healthcare services all over the world. It covers the health right for everyone to reach the level of happiness with health standards dependent on its quality, accessibility, functionality, availability, and acceptability of health (who). The health workforce means those people who are engaged in the field of medicine or health taking action for enhanced health of people. Health workers are playing a key role in the field of the health sector in improving access and quality healthcare facilities for common people.

Table No.3 Population and Health Workforce

Sr. No	Tehsil	Population	Doctor	DP Ratio	Nurses	NP Ratio	Bed	BP Ratio
1	Khed	447373	32	13980	89	5026	150	2982
2	Ambegaon	237290	46	5158	91	2607	172	1379
3	Junnar	400765	30	13359	101	3968	132	3036
	Total	**1085428**	**108**	**10050**	**281**	**3863**	**454**	**2391**

(DP*= Doctor Population Ratio, NP* Nurses Population Ratio, BP* Bed Population Ratio)
(Source – District Statistical Abstract 2020 - Pune District)

The average ratio between population and health workforce among the doctors, nurses, and beds are 1:13980, 1:5158, and 1: 13359 respectively (table no. 3). Among the three tehsils, the highest population concentration in Khed tehsil (447373). The health workforce has been working 32 doctors, 89 nurses, and 150 beds with a ratio of 1:13980, 1:5026, and 1:2982 respectively. Khed tehsil is followed by Junnar tehsil having a 400765 population.

Figure No. 3 Health Workforce in Study Area
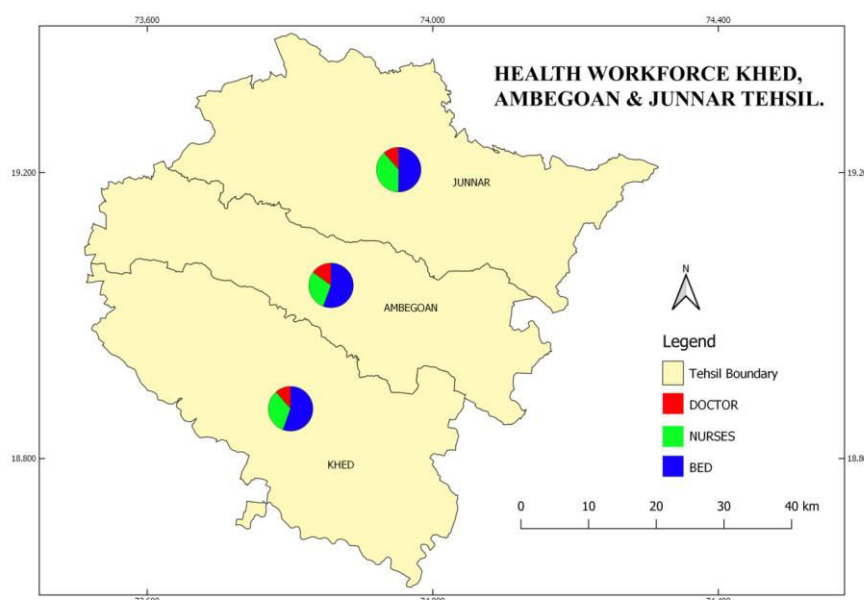
The health workforce of Junnar tehsil includes 30 doctors, 101 nurses, and 132 beds with the ratio of 1:13359, 1:3968, and 1:3036 respectively. Ambegaon tehsil has the smallest area with a population of 237290. The health workforce includes 46 doctors, 91 nurses, and 172 beds with a ratio of 1:5158, 1:2607, and 1:1379 respectively. Among all three tehsils, Ambegaon tehsil has a better health workforce and human resources as compared to others like Khed and Junnar tehsils.

Spatial Distribution of Public Health Care Centres in Pune District

WHO (World Health Organisation) health means "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". In geographical localities, healthcare facilities and their quality indicated the health prosperity with the quality of life of human beings. Figure 3 shows the number of doctors, nurses, and beds, and figure 2 shows the number of hospitals across the various tehsils of the Pune district. In this study area, only one sub-district hospital is present in Manchar city. Which served 100 beds capacity. The public health care centers are hierarchically ordered like sub-centers, primary health centers, cumulative health centers, general hospitals, sub-district hospitals, and district hospitals which are at primary, secondary, and tertiary level functioning. (Delamater 2012).

Table No. 4 Government (NRHM) Norms and Ratio between Populations and Health Centres

Sr. No	Tahsil	Population (2011)	CHC	CHC/ Population Ratio (1:120000)	PHC	PHC/ Population Ratio (1:30000)	Sub Centre	Sub Centre/ Population Ratio (1:5000)
01	Junnar	400765	2	200382.50	12	33397.08	74	5415.74
02	Ambegaon	237290	1	237290.00	07	33898.57	48	4943.54
03	Khed	447373	3	149124.33	10	44737.30	61	7333.98
	Total	**1085428**	**6**	**180904.66**	**29**	**37428.55**	**183**	**5931.30**

(Source – District Statistical Abstract 2020 - Pune District and computed by the researcher)

Sub Centre – sub-center is the initial first contact health services point functioning between the PHC and the people. Sub-centers are providing basic medicines for minor ailments required for taking health care. 183 sub-centers are functioning in the study area. PHC is play a key role between the sub-center and main medical officer. PHC is providing an integrated curative preventive and precaution of health care. PHCs are established functionally and maintained by the state government under the scheme of the MNP

(Minimum Needs Programme) and BMS (Basic Minimum Services) Programme. 29 PHC are working in the study region.

Table No 5 Government Criteria to allotment the Health Centers

Sr. No	Health Centres	Hilly/ Tribal Area	Plain Area
1	Sub Centres	3000	5000
2	PHC	20000	30000
3	CHC	80000	120000

Source – Government of India, National Rural Health Mission (NRHM - 2018)

CHC is the contact between PHC and highly sophisticated hospitals. It is served four PHCs and provides modern amenities for health care. 6 CHC centers are working in the study area.

Conclusion

In this study area, we tried to find out some difficulties and disparities in the distribution of the medical healthcare system and whatever existing healthcare services. In this result, we identified that healthcare facilities are not increasing as per the population growth from time to time. This creates an imbalance or gap between healthcare facilities and the population ratio of the study area.

The healthcare facilities in the Ambegaon tehsil survive very well compared to other tehsils. They provide satisfactory healthcare services which are very close to NRHM norms. There is a need to increase healthcare facilities in Khed tehsils like 1 CHC, 4 PHC, and 28 Sub centers as per population growth. Healthcare facilities in Junnar tehsil are slightly lesser than the NRHM norms, they required 1 CHC, 1 PHC, and 6 Sub Centers with a population ratio.

The Healthcare facilities in Khed tehsil serve more population while Ambegaon tehsil serves less population. There is one positive thing is that one (100 beds capacity) Sub District Hospital is available in Manchar City in Ambegaon tehsil. But no major high-tech hospitals in the study area. There are difficulties of deficiency in the sophisticated technologies for the instant services in the tehsil hospitals. Healthcare facilities must need to upgrade in Khed tehsil as per population demand and requirements. All the above requirements if fulfilled strongly, it is possible to tune Khed, Ambegaon, and Junnar tehsils will be as the best healthcare services in the Pune district.

References

1. Agnihotri, R.C. (1995) "Geomedical Environment and Health Care" Rawat Publication, Jaipur Pp. 193,195,198. Geographical Review of India, Vol. 47, No.4, P57.

2. Akhtar, R. and Khan, A.Q. (1993). "Spatial organization of health facilities in Jammu and Kashmir". Annals of the National Association of Geographers, India, 13(2), 29-38.

3. Banerjee Guha, S. and Joshi, S. (1985) "Health Facilities in Pune", Geographical Review of India, Vol. 47. No.4, P.57.

4. Delamater PL, Messina JP, Shortridge AM, Grady SC. (2012), " Measuring geographic access to health care: raster and network-based methods", International Journal of Health Geographics. 2; 15; 11(1):15.

5. Divya S, Javaid Ahmad Tali and Chandrashekara B. (2012) "A Geographical Study of Inequality in Distribution of Public Healthcare Centres in Hunsur Taluk, Mysuru" International Journal of Environmental Sciences Vol. 1 No. 4. 2012. ISSN: 2277-1948 Pp. 294-298

6. Gopale Ramesh and Patil Vilas (2022) "Spatial Distribution Of Public Health Care Centres In Pune District Using Gis Technique", Bengal, Past and Present, UGC Care Group 1 Journal ISSN : 0005-8807 Vol. 118, Issue: (I) January – March 2022 Pp 136 -142.

7. Javaid Ahmad Tali, Divya S, and Asima Nusrath (2017) "Spatial Distribution of Health Centers: A Study of District Pulwama (Jammu and Kashmir)", International Journal of Health Sciences & Research Vol.7; Issue: 11; November 2017 www.ijhsr.org ISSN: 2249-9571.

8. Jingyuan Chen, Yuqi Bai, Pei Zhang, Jingyuan Qiu, Yichun Hu, Tianhao Wang, Chengzhong Xu, and Peng Gong (2020) "A Spatial Distribution Equilibrium Evaluation of Health Service Resources at Community Grid Scale in Yichang, China" Sustainability 2020, www.mdpi.com/journal/sustainability

9. Lokhande T.N, and Kale V.P. (2014), "Spatial Distribution of Health care Facilities in Nanded District (Maharashtra) India", Online International Interdisciplinary Research Journal, {Bi-Monthly}, ISSN2249-9598, Volume-IV, Issue I, Jan – Feb 2014. Pp 316-325.

10. Minutha. V and Subash. S. Sannasiddanannavar (2014), "Spatial Distribution of Public Health Center in Mysore District", Golden Research Thoughts Original Article ISSN:- 2231-5063 Volume 4, Issue 2, August 2014 pp 1-5.

11. Mishra, R. P. (2007), "Geography of Health" – A treatise on Geography of life and Death in India. World Health Organization (WHO Report 1946) Chang, K. (2001). "Introduction to Geographic Information System", McGraw Hill.

12. Mukhtar Khalifa U., Ahmed Abubakar, Musbahu Jibrin A., Aminu Hussaini, Suleman Mukhtar, & Samir Shehu Danhassan, (2018), "Spatial Analysis of Health Care Facilities in Babura Local Government Area of Jigawa State, Nigeria", IIARD – International Institute of Academic Research and Development, International Journal of Geography and Environmental Management ISSN 2504-8821 Vol. 4 No. 5 2018 www.iiardpub.org pp 18-29.

13. Nitika, and Rakesh Sharma, (2018) "The Spatial Distribution of Healthcare Facilities in Spiti Valley of Himachal Pradesh" Journal of Emerging Technologies and Innovative Research (JETIR) September 2018, Volume 5, Issue 9 www.jetir.org (ISSN-2349-5162).

14. Perry, Gesler (2000) "Physical access to primary health care in Andean Bolivia", Social science and medicine 2000, 50 (9) 1177-1188.

15. R. V. Hajare & B. B. Ghurake (2018) "Inter-Tahsil Variation In Health Services In Kolhapur District, Maharashtra" 'RESEARCH JOURNEY' International Multidisciplinary E- Research Journal, Special Issue 80 [B]: UGC Approved Journal, ISSN: 2348-7143 December-2018. www.researchjourney.net

16. Report on "Tribal Health in Madhya Pradesh Road Map" Atal Bihari Vajpayee Institute of Good Governance and Policy Analysis.

17. Shawky Mansour (2016), "Spatial analysis of public health facilities in Riyadh Governorate, Saudi Arabia: a GIS-based study to assess geographic variations of service provision and accessibility", Geo-spatial Information Science, ISSN: 1009-5020 (Print) 1993-5153 (Online) VOL. 19, NO. 1, 26–38.

18. Socio-Economic Abstract of Pune district, (2020) published by Directorate of Economics and Statistics Government of Maharashtra.

19. V.A. Uwala (2020), "Spatial Distribution and Analysis of Public Health Care Facilities in Yewa South Local Government, Ogun State", International Journal of Scientific Research in Multidisciplinary Studies, E-ISSN: 2454-9312 Vol.6, Issue.7, pp.12-17, July (2020) P-ISSN: 2454-6143 pp 12-17.

20. Yi Wang and Changyou Wu. (2021) "Research on the spatial distribution and accessibility of medical institutions in Wuhan based on GIS", IOP Conference Series: Earth and Environmental Science 825 (2021) 012028.