



An analysis of health indicators and infrastructure in Karnataka

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Abstract

This study provides a comprehensive analysis of health indicators and healthcare infrastructure across the state of Karnataka, India, over the recent years. Key health metrics such as birth rate, death rate, total fertility rate, maternal mortality rate, and infant mortality rate were examined to assess the progress made in public health. The study also evaluates the distribution and availability of healthcare resources, including hospitals, community health centers, doctors, medical shops, and blood banks, across different districts of Karnataka.

The findings reveal significant improvements in health indicators, particularly a steady decline in birth and death rates, as well as reductions in maternal and infant mortality rates. However, these improvements are not uniformly distributed across the state. The data indicates a pronounced concentration of healthcare infrastructure in urban areas, particularly in Bengaluru Urban, which hosts a large share of the state's medical professionals and facilities. Conversely, rural and less developed districts such as Yadgiri, Chikkaballapur, and Kodagu are observed to have limited healthcare resources, leading to potential disparities in healthcare access and quality.

This analysis highlights the challenges of ensuring equitable healthcare access across Karnataka. It emphasizes the need for targeted policy interventions to address regional disparities by improving healthcare infrastructure and resource allocation in under-served areas. By addressing these gaps, Karnataka can achieve more balanced health outcomes, thereby enhancing the overall well-being of its population.

Keywords: Health, infrastructure, indicators, infant mortality rate (IMR), maternal mortality rate (MMR)

Introduction

The Government of Karnataka has given significant importance to the health sector and Provision of good health care to the people is an essential component of the health strategy adopted by the State. The State has made substantial progress in building credible health infrastructure at different levels (Karnataka Government Health Reports). The Sustainable Development Goals (SDGs) adopted by the UN Summit on 25 September 2015, by member countries include a set of 17 Goals all of which have direct connection in ensuring healthy lives and promote well - being for all at all ages. The Goal 3 specifically addresses the health dimension. The targets under this include the desire to reduce maternal and child mortality, prevalence of communicable diseases etc. There is a need for renewed efforts to achieve these goals in the State (Karnataka Human Development Report 2022). Developing the health sector in terms of infrastructure, human resource is essential to provide quality health care

service. The Government of Karnataka has given due importance in developing the health sector and provision of good health care is a vital component of it. The strength of the Health & Family welfare system in Karnataka is evident from the successful management of covid-19 in the State (Karnataka Human Development Report 2022). The State has a wide institutional network providing health services both in urban and rural areas. Karnataka has performed in population control with total fertility rate reaching 1.7 by 2020 (As per NFHS 2019-20). The infant mortality has declined faster during the last few years and has reached 23 in 2020 (As per SRS 2018) from 35 in 2011 which is almost 12units reduction per 1000 live births in a span of 12 years (Karnataka Government Health Report). The State offers an excellent family welfare programme operating through the existing health infrastructure. The main objective of the programme is to provide better health services in general and family planning services in particular to check the rapid growth of population (Karnataka Government Health

Report). The state effort in the management of the pandemic is commendable which was made possible by the strong health infrastructure at different levels in both rural and urban areas. This has also shown a significant positive impact on demographic and health indicators in the state (Karnataka Human Development Reports 2022).

Review of Literature

The presence of robust public health infrastructure and indicators, such as access to medical facilities, is essential for maintaining a good health status among the population. Numerous researchers have investigated the existing health infrastructure, health indicators, care system patterns, and the overall health status of people. In the Indian context, several recent studies have focused on the healthcare system and the utilization patterns of healthcare services, including works by various scholars, Hanagodimath S. V (2012) [6]: The study found a positive correlation between the health infrastructure index and the health status index, although this relationship does not reach a high level of statistical significance. It is evident that public health expenditure needs to be increased to enhance health infrastructure and improve the overall health status of the population. Additionally, it is crucial to raise awareness about balanced nutrition, maintaining good hygiene, proper childcare, and fostering good mental and physical health. Virupakshappa Mulagund and P.M. Honaker (2016) [7]: This paper aims to analyze the state of healthcare before and after the implementation of the NRHM program, as well as the functioning of health centers under NRHM in Karnataka. Another key focus is to study the prevalence of health issues under the NRHM in Karnataka. The research relies entirely on secondary data and employs simple statistical tools like averages and percentages. The study evaluates the health status in Karnataka from 2000-01 to 2013-14. It also observes that IMR, MMR, TFR, CBR, and CDR have shown declining trends during the period from 2001-02 to 2013-14. Navneet Kaur, Shazada Ahmad and Adnan Shakeel (2023) [3]: This study examines the disparities in health infrastructure across districts in the newly established Union Territory of Jammu and Kashmir. By employing principal component analysis, the research developed a district-level health infrastructure index (HII) for the year 2018–2019. The findings reveal significant inter-district variations in health infrastructure within the Union Territory. Among the districts, Doda ranks highest in HII and is classified as a 'developed' district. Consequently, it is clear that the Jammu division possesses superior health infrastructure compared to the Kashmir division. Koushik Kumar Hati and Rajarshi Majumder (2013) [2]: This paper explores the connection between health infrastructure and health outcomes, as well as the relationship between health status and economic well-being. It examines the relative positions of districts within states to identify the

determinants of health status using a straightforward econometric approach. The study reveals a strong link between primary health infrastructure and both preventive and curative health achievements. The close connection between a district's health and its economic well-being highlights the importance of health in shaping the socioeconomic condition of a region. The study also estimates and highlights the gaps in health infrastructure that need to be addressed to fully realize the region's economic potential.

Statement of the problem

Despite significant advancements in healthcare over recent decades, India continues to face considerable challenges in achieving equitable and effective health outcomes across its diverse population. The country's health indicators, such as Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR), and life expectancy, vary widely across different states and regions. These disparities often reflect the uneven distribution and quality of health infrastructure, such as hospitals, clinics, and medical staff, which play a critical role in determining the overall health status of the population.

Objectives

- Analyze trends in health indicators from 2015 to 2020.
- Investigate the relationship between health outcomes and the availability of healthcare infrastructure various districts in Karnataka.

Scope of the study

This study aims to investigate the health indicators and infrastructure in the state of Karnataka, India. The research will focus on analyzing key health indicators such as infant mortality rate, maternal mortality rate, life expectancy. Additionally, the study will assess the availability and distribution of healthcare infrastructure, including hospitals, primary health centers, and healthcare personnel across urban and rural areas of Karnataka.

The geographical scope of the study is limited to Karnataka, with a specific focus on comparing health outcomes and infrastructure in rural versus urban districts within the state. The time frame for the analysis will cover data from 2015 to 2020, allowing for the examination of trends and developments over a significant period.

Research Methodology

The reliability of this paper is based upon secondary mode of data collection from Karnataka at Glance Reports 2023 and Karnataka Economic Survey 2023. The facts and figures stated have been gathered from various websites, articles, and journal articles official website.

Data analysis and interpretation

Table 1: Achievement of the demographic and Health indicators

Sl. No.	Indicator	2015	2016	2017	2018	2019	2020
1	Birth Rate (for 1000 Population)*	17.9	17.6	17.4	17.2	16.9	16.5
2	Death Rate (for 1000 Population)*	6.6	6.7	6.5	6.3	6.2	6.2
3	Total fertility rate**	1.8	1.8	1.8	1.8	1.7	1.7
4	Maternal Mortality Rate (for every 100000 live births)*	97	92	83	69	69	69
5	Infant Mortality Rate (per 1000 Live births)*	28	24	25	23	21	19

6	Under-Five Mortality Rate (per 1000 children) *	31	29	28	28	26	21
7	Eligible Couples protected (%)*	63	63	63	63	63	68.7
8	Average life expectancy (years)*						
	Male	67.9	67.9	67.9	67.9	67.9	67.9
	Female	70.9	70.9	70.9	70.9	70.9	70.9

Source: Karnataka at Glance Reports

The table presents a range of demographic and health indicators from 2015 to 2020, reflecting trends in population dynamics, fertility, mortality, and health outcomes. A consistent decrease over the years, indicating a gradual reduction in the number of births per 1,000 people. The birth rate has steadily declined from 17.9 in 2015 to 16.5 in 2020. The death rate showed a slight fluctuation, with a rise from 6.6 in 2015 to 6.7 in 2016, followed by a steady decline to 6.2 in 2019 and remaining constant in 2020. The overall decline in the death rate suggests improvements in healthcare services, better disease management, and possibly a reduction in mortality from major health issues.

The total fertility rate remained stable at 1.8 from 2015 to 2018, before slightly decreasing to 1.7 in 2019 and 2020. The slight reduction in the fertility rate indicates a gradual shift towards smaller family sizes, which is often associated with urbanization, increased education, and access to reproductive health services. The maternal mortality rate (MMR) decreased significantly from 97 in 2015 to 69 in 2018, and it remained stable at 69 through 2020. The infant mortality rate (IMR) decreased from 28 in 2015 to 19 in 2020. A notable reduction in IMR indicates improvements in neonatal and infant healthcare, better immunization coverage, and enhanced maternal health services.

Table 2: Taluk, District, Autonomous & Teaching & other Hospitals 2022 (in numbers)

SL. NO	District	Taluk Hospitals		District Hospitals		Other Hospitals under HFW		Autonomous & Teaching Hospitals	
		Nos	Beds	Nos	Beds	Nos	Beds	Nos	Beds
1	Bagalkote	5	500	1	400	0	0	0	0
2	Ballari	2	200	1	210	7	0	1	1050
3	Belagavi	9	1000	1	750	0	0	0	0
4	Bengaluru R	4	400	0	0	4	24	0	0
5	Bengaluru U	4	400	0	0	5	1375	16	6700
6	Bidar	7	490	1	750	2	130	1	750
7	Chamarajanagar	3	410	1	350	3	90	2	800
8	Chikkaballapur	5	665	1	300	0	0	0	0
9	Chikkamagaluru	7	560	1	400	0	0	0	0
10	Chitradurga	5	530	1	500	0	0	5	910
11	Dakshina Kannada	4	400	2	1177	1	100	8	6707
12	Davanagere	4	400	2	1080	6	10	2	1956
13	Dharwad	3	300	1	295	3	232	2	1620
14	Gadag	4	400	1		1	100	1	350
15	Hassan	7	980	0	0	0	0	1	750
16	Haveri	6	600	1	250	0	0	0	0
17	Kalburgi	6	600	1	650	9	604	4	2382
18	Kodagu	2	359	1	410	0	0	1	410
19	Kolar	6	650	1	500	2	305	0	0
20	Koppal	3	300	1	300	0	0	1	300
21	Mandya	6	600	0	0	0	0	1	850
22	Mysuru	6	660	1	250	1	50	3	1940
23	Raichur	4	400	1		0	0	2	1600
24	Ramanagara	3	300	1	100	0	0	0	0
25	Shivamogga	7	710	0	0	3	3	1	950
26	Tumakuru	9	900	1	400	0	0	0	0
27	Udupi	2	200	1	350	0	0	0	0
28	Uttara Kannada	10	1000	1	0	2	80	1	500
29	Vijayanagara	5	500	0	0	2	0	0	0
30	Vijayapura	4	400	1	621	2	130	2	1960
31	Yadgiri	2	200	1	300	0	0	0	0

Source: Karnataka at Glance Reports

The table provided offers a detailed breakdown of the distribution of different types of hospitals across various districts in Karnataka in 2022, including Taluk Hospitals, District Hospitals, Other Hospitals under the Health and Family Welfare Department (HFW), and Autonomous & Teaching Hospitals. Most districts have Taluk Hospitals, with the number ranging from 2 (e.g., Ballari, Kodagu, Yadgiri) to as many as 10 (Uttara Kannada). The bed

capacity varies significantly, with some districts like Belagavi and Uttara Kannada having 1,000 beds, indicating a substantial infrastructure presence, while others like Yadgiri have only 200 beds. The highest number of Taluk Hospitals is in Uttara Kannada with 10 hospitals (1,000 beds), and the lowest in districts like Kodagu and Yadgiri with 2 hospitals. Most districts have one district hospital, with some exceptions like Dakshina Kannada and

Davanagere, which have 2 each. The bed capacity ranges from 0 (in districts like Bengaluru Rural and Mandya) to as high as 1,177 beds in Dakshina Kannada. Dakshina Kannada and Davanagere have the highest district hospital bed capacities, with 1,177 and 1,080 beds respectively. Some districts have additional hospitals under the Health and Family Welfare (HFW) department, such as Bengaluru Urban with 5 hospitals and 1,375 beds, and Kalburgi with 9 hospitals and 604 beds. These facilities augment the existing

healthcare infrastructure. The most substantial presence is seen in Bengaluru Urban, with 16 autonomous and teaching hospitals totaling 6,700 beds. Dakshina Kannada also has a significant number of these hospitals, with 8 hospitals and 6,707 beds. Other districts like Davanagere, Mysuru, and Vijayapura also have notable capacities. Many districts, including Bagalkote, Belagavi, Chikkaballapur, and others, do not have any autonomous or teaching hospitals.

Table 3: Taluk, District, Autonomous & Teaching & other Hospitals 2022

SL. NO	District	Community Health Centres		Primary Health Centres		No. of Sub Primary Care Centres
		Nos	Beds	Nos	Beds	
1	Bagalkote	8	260	48	288	233
2	Ballari	6	180	38	228	139
3	Belagavi	16	480	139	834	621
4	Bengaluru R	2	60	50	360	199
5	Bengaluru U	5	150	96	644	281
6	Bidar	5	150	59	348	275
7	Chamarajanagar	3	150	60	458	255
8	Chikkaballapur	2	60	61	360	203
9	Chikkamagaluru	5	150	91	670	402
10	Chitradurga	11	360	86	516	343
11	Dakshina Kannada	8	330	77	366	430
12	Davanagere	4	120	90	504	268
13	Dharwad	0	0	52	380	173
14	Gadag	2	100	42	234	190
15	Hassan	15	450	138	828	486
16	Haveri	5	150	71	352	322
17	Kalburgi	16	480	102	645	335
18	Kodagu	7	270	30	171	196
19	Kolar	2	60	73	465	266
20	Koppal	9	270	47	282	173
21	Mandya	10	300	115	812	410
22	Mysuru	9	270	147	919	510
23	Raichur	6	180	50	300	213
24	Ramanagara	4	120	62	416	240
25	Shivamogga	7	210	108	648	357
26	Tumakuru	4	120	150	876	572
27	Udupi	6	180	64	378	336
28	Uttara Kannada	3	110	85	485	344
29	Vijayanagara	7	210	54	354	225
30	Vijayapura	9	270	67	342	310
31	Yadgiri	6	180	44	246	169

Source: Karnataka at Glance Reports

The table provides detailed information on the distribution of healthcare facilities across different districts in Karnataka for the year 2022, specifically focusing on Community Health Centres (CHCs), Primary Health Centres (PHCs), and Sub Primary Care Centres (SPCs). The number of CHCs varies significantly across districts, ranging from none in Dharwad to as many as 16 in Belagavi and Kalburgi. The bed capacity also varies, with Belagavi and Kalburgi both having the highest capacity at 480 beds. Belagavi and Kalburgi lead with 16 CHCs each, while Dharwad has no CHCs, indicating a potential gap in mid-level healthcare services in Dharwad. PHCs are more widely distributed, with the number of PHCs ranging from 30 in Kodagu to 150 in Tumakuru. The bed capacity of these PHCs also varies widely, with Mysuru having the highest

capacity at 919 beds, followed closely by Tumakuru with 876 beds. Tumakuru has the highest number of PHCs at 150, providing a substantial healthcare network in the district. In contrast, Kodagu has the lowest number with 30 PHCs, which might indicate a need for more primary healthcare infrastructure in this district. The number of SPCs also varies across districts, with the highest being in Belagavi (621) and the lowest in Yadgiri (169). The number of SPCs generally correlates with the size and population of the district, with larger and more populous districts like Belagavi and Tumakuru having a higher number of SPCs. This suggests that these districts have a more extensive network of basic healthcare facilities, which is critical for early diagnosis and preventive care.

Table 4: No. of Hospitals Doctors and Beds

SL. NO	District	No. of Doctors				Medical Shops	Blood Banks
		Govt.	Private	Total	% to State total		
1	Bagalkote	134	863	997	1.79	1262	10
2	Ballari	118	686	804	1.45	698	3
3	Belagavi	405	2070	2475	4.45	2546	16
4	Bengaluru R	104	628	732	1.32	864	0
5	Bengaluru U	164	22817	22981	41.31	17643	91
6	Bidar	161	336	497	0.89	1364	3
7	Chamarajanagar	119	208	327	0.59	254	2
8	Chikkaballapur	89	177	266	0.48	623	6
9	Chikkamagaluru	146	259	405	0.73	454	4
10	Chitradurga	193	538	731	1.31	681	4
11	Dakshina Kannada	149	4903	5052	9.08	1445	15
12	Davanagere	206	880	1086	1.95	931	8
13	Dharwad	582	2057	2639	4.74	1908	12
14	Gadag	260	567	827	1.49	478	3
15	Hassan	493	922	1415	2.54	788	8
16	Haveri	274	579	853	1.53	733	3
17	Kalburgi	226	865	1091	1.96	1353	10
18	Kodagu	222	48	270	0.49	196	1
19	Kolar	115	518	633	1.14	696	6
20	Koppal	95	383	478	0.86	685	4
21	Mandya	220	702	922	1.66	797	3
22	Mysuru	243	1928	2171	3.9	2353	14
23	Raichur	204	438	642	1.15	1185	7
24	Ramanagara	149	140	289	0.52	482	3
25	Shivamogga	247	913	1160	2.09	847	8
26	Tumakuru	285	1087	1372	2.47	1587	8
27	Udupi	118	1574	1692	3.04	721	3
28	Uttara Kannada	159	550	709	1.27	543	4
29	Vijayanagara	105	327	432	0.78	643	3
30	Vijayapura	90	1321	1411	2.54	1570	11
31	Yadgiri	64	204	268	0.48	221	3

Source: Karnataka at Glance Reports

The table provides data on the number of doctors (both government and private), medical shops, and blood banks across various districts in Karnataka. The total number of doctors varies significantly across districts. Bengaluru Urban stands out with a massive 22,981 doctors, which accounts for 41.31% of the state's total, reflecting its status as a major metropolitan hub. In contrast, districts like Yadgiri (268) and Chikkaballapur (266) have far fewer doctors, indicating potential challenges in healthcare access. The number of private doctors is generally higher than government doctors across most districts. This disparity is particularly noticeable in Bengaluru Urban (22,817 private vs. 164 government doctors). In smaller districts like Kodagu, the number of private doctors (48) is significantly lower, which may suggest a reliance on government healthcare services or a lack of private healthcare infrastructure. Medical Shops Bengaluru Urban leads with 17,643 medical shops, which is unsurprising given its large population and urban setting. Districts like Belagavi (2,546) and Mysuru (2,353) also have a high number of medical shops, reflecting robust healthcare infrastructure. On the other hand, smaller districts such as Kodagu (196) and Yadgiri (221) have fewer medical shops, which might indicate limited access to pharmaceuticals and medical supplies. Blood Banks Bengaluru Urban, as expected, has the highest number of blood banks (91), followed by Dakshina Kannada (15) and Dharwad (12). This is critical for managing emergencies and providing essential

healthcare services. Several districts have very few blood banks, with Bengaluru Rural and Chamarajanagar having just 0 and 2 blood banks, respectively, which could be a significant limitation in emergency medical care.

Conclusion

The analysis of health indicators and infrastructure in Karnataka reveals a complex landscape of healthcare development, characterized by significant regional disparities. While the state has made commendable progress in improving key health indicators such as birth rate, death rate, and infant mortality rate over recent years, these gains are unevenly distributed across districts. Urban centers like Bengaluru Urban dominate in terms of healthcare infrastructure, with a high concentration of doctors, medical facilities, and advanced healthcare services. This is reflected in the substantial proportion of the state's total doctors and healthcare infrastructure being located in these areas. Conversely, rural and less developed districts such as Yadgiri, Chikkaballapur, and Kodagu show a relative shortage of healthcare resources, including medical professionals, health centers, and blood banks.

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