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Original Article

THE CONTRAST BETWEEN RURAL HEALTH SERVICES IN BIHAR AND KERALA

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ABSTRACT

This article evaluates the rural healthcare systems of Bihar and Kerala, two states of India at opposite ends of the health index, as per the report of Niti Aayog (2021). This article presents a comparative assessment of the rural healthcare systems of these two states of India. Bihar is at the bottom, and Kerala ranks the highest in the health index. This study examines the availability of health centres, building positions, the number of health workers (ANM), doctors, pharmacists, radiographers, laboratory technicians, and nursing staff at different levels of the rural healthcare system in Bihar and Kerala. This study analyses the number of required, sanctioned, in-place, and vacant posts for medical personnel such as medical workers, doctors, specialists, radiographers, pharmacists, laboratory technicians, and nursing staff. This paper also highlights the shortage of these medical personnel at different levels of the rural healthcare system. The comparison also considers the national context, focusing on the disparities and challenges associated with the rural healthcare system in India. This article basically attempts to make a comparative analysis associated with the shortfall of infrastructure and manpower.

Keywords: Health Index, Health Workers, Infrastructure, Rural Healthcare System

INTRODUCTION

The healthcare system of India is three-tiered based on primary, secondary, and tertiary levels. At the primary level, there is a primary health centre; a community health centre is at the secondary level; and a district hospital is at the tertiary level. Similarly, the rural healthcare system of India has also been developed as a three-tier system and can be classified as a sub-centre, a primary health centre, or a community health centre. This classification has been done based on population norms. As of March 31st, 2022, a total of 157935 subcentres (SCs), 24935 primary health centre (PHCs), and 5480 community health centres (CHs) are functioning in India. Out of which, 3894 subcentres (SCs), primary health centres (PHCs), and 584 community health centres (CHs) are operating in rural areas. At the national level, the total number of ANMs working at SCs and PHCs in rural areas has increased from 133194 in 2005 to 207587 in 2022, making up a significant increase of about 55.9%, whereas 21501 ANMs are employed in PHCs situated in urban areas. In rural areas, a sharp increase of 50.9% has also been seen in the number of allopathic doctors at PHCs in rural areas. This shows the number of allopathic doctors has increased from 20308 in 2005 to 30640 in 2022 at rural PHCs. On the other hand, at all levels in India, there are 7315 allopathic doctors working at PHCs in urban areas. As on 31st March, 2023, At the India level, the average rural population covered by subcentres, primary health centres, and community health centres is 5691, 36049, and 164027, respectively. And at the national level, the average number of villages covered by the SCs, PHCs, and CHCs is 4, 27, and 121, respectively. In India, the number of specialist doctors has increased from 3550 in 2005 to 4485 in 2022 at CHCs located in rural

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areas. As compared to the existing requirement of specialists in CHCs in rural regions, there is a shortage of 79.5% of specialists. Overall, there is a shortage of 83.2% of surgeons, 81% of pediatricians, 79.1% of physicians, and 74.2% of obstetricians and gynecologists in CHCs in rural areas. The total number of 1278 specialists (surgeons, obstetricians and gynecologists, physicians, and pediatricians) is positioned within the CHCs of urban regions of India. The development of the rural healthcare system is important for the inclusive growth of the country. In India, there is a disparity in access to health services between rural and urban areas. People who reside in urban areas get various health facilities due to easy access to public health services, whereas people in rural areas don't get such kinds of public health facilities in their areas due to a lack of availability of health centres, infrastructure, manpower, equipment, diagnosis facilities, medicines, etc. Therefore, rural people are underprivileged in accessing good healthcare services in their areas. They have to migrate to get better healthcare services. India is still facing challenges in providing sufficient healthcare services in rural areas. The distribution of health services is ineffective and inefficient in rural areas. There is a need to provide better health care services in rural areas in order to reduce disparities in healthcare between rural and urban areas. This can only be possible by improving healthcare infrastructure, hiring and giving training to the healthcare workforce, providing health education, making people aware of health, promoting women and children's health, providing better sanitation and safe drinking water facilities, and addressing mental health.

As per the 2011 census, Bihar ranks third among the largest states of India in terms of population. In terms of size, it ranks 12th with a 94,163 km2 area. And 15th in terms of GDP in 2021. It can emerge as a developed state of the country by efficiently utilizing its population. But it becomes a challenge for Bihar to provide basic health facilities to the fastest rising population. The demand created by the population is lacking to meet the supply of these healthcare facilities, especially in rural or underserved areas of the state. There is a shortage of infrastructure and manpower, including doctors, nurses, specialists, etc. This leads to inefficiency in the proper distribution of healthcare services in the state, particularly in rural areas. Thus, Bihar is performing worst among the Indian states in providing proper healthcare facilities to the bulk of its population. However, the government provides funds to develop and enhance the quality of healthcare services through the Clinical Establishment Act of 2010, And the National Health Mission, and the creation of Empowered Action Group (EAG). According to the 2011 census, Kerala ranks 13th in terms of population among the states of India. In terms of GDP, it ranks 11th. it is the 12th largest state in terms of area. As per the NITI Aayog's report on the Health Index for 2019–2020, Bihar is ranked 18th out of 19 states with a score of 31. This index measures the overall health performance of the state based on 24 indicators. In contrast, Kerala ranked first with a score of 82.20.

LITERATURE REVIEW

Ahmed (2024), in his study, has discussed the role of socio-economic determinants in healthcare in five states of India, which are Jharkhand, UP, Odisha, and Madhya Pradesh. This study shows how the variation in socio-economic determinants across states determines healthcare access in these states. The data for this study have been extracted from the health data of the National Sample Survey (75th round). A comparative analysis has been done to determine the percentage of non-access to healthcare across different determinants such as age, gender, income, religion, caste, etc. To determine the significant factor in accessing healthcare in these states, a logistics-regression model is used. The result reveals that Bihar has the highest number of cases of non-access to healthcare, followed by Odisha and Jharkhand, and it further indicates that income and caste are significant determinants of access to healthcare, and these vary from state to state. Anand (2014), in her paper, discusses the health status and healthcare services of Uttar Pradesh and Bihar. This study is based on the analysis of secondary data taken from the Annual Health Survey (2011) and the Statistical Diary (2011). She has done a comparative evaluation in this study based on the health status and healthcare services in these two states. Composite indices of health status have been used in the analysis by employing Maher's normalization technique and principal component analysis. The result of this research shows low disparities in the health status of Uttar Pradesh compared to Bihar. Gurram and Mokanpally (2022), in their studies, have mentioned that the population's health is essential for the socio-economic wellbeing of the people. In this work, they have done a comparative analysis of Kerala and Bihar based on the sociology of health. However, these two states have been selected for the study just because of their performance in Niti Aayog's report on health. Kerala has the highest health index score, whereas Bihar is lacking in it. The decadal data for the study is extracted from the NFHS of Bihar and Kerala. This study addressed the fact that improvement in health is affected by a large number of coexisting sociological factors, and these factors must be encountered through various programs. This study further reveals that there are a significant number of cases of malnutrition among women and children, despite having a good health index. This paper suggests that for the improvement of health in Bihar and Kerala, inter-sectoral activities must be taken into consideration. Popham and Iannelli (2021), in their paper, have explained comprehensive education on health inequalities. Their study is based on the hypothesis that health inequalities in adulthood could be reduced with a more equitable and comprehensive education system. Hypotheses are tested by companies based on data related to the inequalities in health outcomes of two birth cohorts (1958 and 1970). The inverse probability weighting technique is used in this analysis to test the hypothesis. Sweta and Bhattacharya (2024), in their research paper, have done a comparative analysis based on maternal and child health status in Bihar, Jharkhand. The data for the study has been taken from the National Family Health Survey of Bihar and Jharkhand. This study reveals the variation in public health expenditure on health and family welfare in these states and also highlights the disparities in maternal and child health conditions in Bihar and Jharkhand. This study further suggests that more expenditure and planning are required to change the health status of women and children in these two states.

OBJECTIVE OF THE STUDY

1) To draw a complete picture of disparities in terms of availability of health centres, building positions, the number of health workers (ANM), doctors, pharmacists, radiographers, laboratory technicians, and nursing staff at different levels of the rural healthcare system in Bihar and Kerala

METHODOLOGY

This study is completely based on the secondary data. These data have been extracted from a report on Rural Health Statistics, 2021-2022, published by the Ministry of Health and Family Welfare. These data have been presented through tables and graphs. The presentation, analysis and interpretation of data have been done by using different statistics related to the number of health centres, building positions, availability of manpower, demography and socio-economic factors. The two states (Bihar and Kerala) are selected for the study based on their incremental health score.

RESULTS

Table 1

Table 1 Number of SCs, PHCs, CHCs Functioning in Rural Areas

State	2005			2022		
	SCs	PHCs	CHCs	SCs	PHCs	CHCs
Bihar	10337 (7.07)	1648 (7.09)	101 (3.01)	9375 (5.9)	1492 (5.98)	269 (4.90)
Kerala	5094 (3.4)	911 (3.92)	106 (3.16)	4933 (3.12)	780 (0.31)	211 (3.85)
India	146026	23236	3346	157935	24935	5480

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket Are % Share of Overall India

In rural areas of Bihar, there were 10337 SCs, 1648 PHCs, and 101 CHCs in 2005. In 2022, there were 9375 SCs, 1492 PHCs, and 269 CHCs in the rural areas of Bihar. This shows there is a shortfall in the number of SCs and PHCs, but the number of CHCs increased by more than double. A similar pattern has been seen in Kerala. Kerala had 5094 SCs, 911 PHCs, and 106 CHCs in 2005. In 2022, there were 4933 SCs, 780 PHCs, and 211 CHCs in the rural regions of Kerala. However, at the national level, there were 146026 SCs, 23236 PHCs, and 3346 CHCs in 2005, which increased to 157935 SCs, 24935 PHCs, and 5480 CHCs in 2022.

Table 2

Table 2 Building Positions for Sub Centres in Rural Areas

State	2005				2022			
	Total no. of SCs	Govt. Building	Rental Building	Rent Free Panchayat / Vol. Society Buildings	Total no. of SCs	Govt. Building	Rental Building	Rent Free Panchayat / Vol. Society Buildings
Bihar	10337 (7.07)	NA	NA	NA	9375 (5.93)	3370 (3.08)	2732 (12.97)	3273 (11.79)
Kerala	5094 (3.48)	2986 (4.67)	1098 (2.18)	1010 (7.06)	4933 (3.12)	3170 (2.90)	444 (2.10)	1324 (4.77)
India	146026	63901	50338	14295	157935	109131	21051	27753

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of Overall India

In Bihar, out of a total of 9375 SCs, 3370 were located in government buildings. 2732 SCs were located in rented buildings, and the remaining 3273 SCs were located in rent free Panchayat/Voluntary Society buildings in 2022. Data related to building positions in 2005 is unavailable. Whereas, in 2005, out of 5094 SCs in Kerala, 2986 SCs were located in government buildings. 1098 SCs were located in rented buildings, and the remaining 1010 SCs were located in rent-free Panchayat/Voluntary Society buildings. In 2022,

out of 4933 SCs, 3170 SCs were located in government buildings. 444 SCs were located in rented buildings, and the rest, 1324 SCs, were located in rent-free Panchayat or Voluntary Society buildings. Aggregately, there were 146026 SCs in India during 2005. Out of which, 63901 were located in government buildings. 50338 were located in rented buildings, and the 14295 SCs were located in rent-free Panchayat/Voluntary Society buildings. Similarly In 2022, India had a total of 15,7935 SCs. Out of these, 109,131 were located in government buildings. 21051 SCs were located in rented buildings, and the rest, 27753 SCs, were located in rent-free Panchayat/Voluntary Society buildings.

Table 3

Table 3 Building Position for PHCs in Rural Areas

State	2005				2022			
	Total no. Of PHCs	Govt. Buildings	Rented Buildings	Rent free Panchayat/ Vol. Society Buildings	Total no. PHCs	Govt. Building	Rental Building	Rent free Panchayat/ Vol. Society Buildings
Bihar	1648 (7.09)	NA	NA	1492 (88.44)	1492 (0.059)	815 (3.58)	266 (41.30)	411 (25.93)
Kerala	911 (3.92)	837 (5.22)	34 (1.20)	40 (2.37)	780 (3.12)	755 (3.32)	6 (0.93)	19 (1.19)
India	23236	16023	2826	1687	24935	22706	644	1585

Source Compiled by the Author based on Secondary data

Note Figures in Bracket are % Share of Overall India

In rural Bihar, there were 1648 PHCs in 2005. However, in 2022, there were 1492 PHCs in rural areas out of the total 4933 SCs in Kerala. Out of which, 815 PHCs were located in government buildings, and the remaining 266 PHCs were located in rented buildings. There were a total of 911 PHCs in rural areas of Kerala in 2005. Out of which, 837 were located in government buildings, and the remaining 34 were functional in rented buildings. Consequently, in 2022, there were a total of 780 PHCs in rural Kerala. Out of these, 755 PHCs were located in government buildings, and 6 were functional in rented buildings. Additionally, Total 23236 PHCs were functional in rural India in 2005. Out of which, 16023 PHCs were located in government buildings, and 2826 PHCs were located in rented buildings. On the other hand, in 2022, there were a total of 24935 PHCs in rural India. Out of which, 22706 PHCs were located in government buildings, and the remaining 644 PHCs were located in rented buildings.

Table 4

Table 4 Building Position for CHCs in Rural Areas

	2005				2022			
State	Total no. Of CHCs	Govt. Building	Rented Buildings	Rent free Panchayat/Vol. Society Buildings	Total no. Of CHCs	Govt. Building	Rental Buildings	Rent free Panchayat/ Vol. Society Buildings
Bihar	101 (3.01)	NA	NA	NA	269 (4.90)	224 (4.21)	0	45 (30.80)
Kerala	106 (3.16)	105 (3.72)	0	1 (0.39)	211 (3.85)	209 (3.93)	0	2 (1.36)
India	3346	2822	5	254	5480	5312	22	146

Source Compiled by the Author based on Secondary Data

Note Figures in Bracket are % Share of Overall India

There were a total of 101 CHCs in the rural areas of Bihar during 2005. In 2022, there were 269 CHCs in rural Bihar. Out of which, 224 CHCs were located in government buildings. and 45 CHCs were located in rent free Panchayat/Vol. Society buildings. Similarly, there were 106 CHCs in the rural areas of Kerala in 2005. Out of which, 105 CHCs were located in government buildings, and the rest were located in rent free Panchayat/Vol. Society buildings. On the other hand, in rural India, there were a total of 3346 CHCs in 2005. Out of which, 2822 CHCs were located in government buildings, 5 CHCs were located in rented buildings, and the remaining 254 CHCs were located in rent free Panchayat/Vol. Society buildings. In 2022, rural India had a total of 5480 CHCs. Out of which, 5312 CHCs were located in government buildings. 22 CHCs were located in rented buildings, and the remaining 146 CHCs were located in rent free Panchayat or Vol. Society buildings.

Table 5

Table 5 Health Worker [Female] / ANM at Sub Centres and PHCs in Rural Areas

	2005					2022				
	Health worker [Female]/ANM					Health worker [Female]/ANM				
State	Required	Sanctioned	In position	Vacant	Shortfall	Required	Sanctioned	In position	Vacant	Shortfall
	[R]	[S]	[P]	[S-P]	[R-P]	[R]	[S]	[P]	[S-P]	[R-P]
Bihar	11985 (7.08)	NA	NA	NA	NA	10867 (5.94)	20626 (8.57)	19519 (0.09)	*	*
Kerala	6005 (3.54)	5675 (4.26)	5565 (4.17)	110 (1.65)	440 (2.27)	5713 (3.12)	6885 (2.86)	5840 (2.81)	1045 (3.02)	*
India	169262	139798	133194	6640	19311	182870	240518	207587	34541	6443

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of Overall India

This table shows the availability of health workers (female) / ANM at SCs and PHCs in rural areas of Bihar and Kerala during the period of 2005 and 2022. In 2005, the required number of health workers (female) / ANM was 11985 in Bihar. In 2022, the required number of health workers/ ANM was 10867. There were a total of 20626 sanctioned posts, whereas 19519 health workers (Female)/ ANM were working in 2022. In 2005, there were a total of 6005 required health worker females / ANM, 5657 sanctioned posts, and 5565 HW (female) working in Kerala. There were a total of 110 vacant posts for HW (female) / ANM and there were 440 shortfalls for HW (female)/ ANM in Kerala. Additionally, in 2022, there were a total of 6885 sanctioned posts. 5840 HW (female)/ ANM were working, and the remaining 1045 posts were vacant. Aggregately, in India, there were 139798 sanctioned posts. 133194 HW (female) / AHM were working, 6640 posts were vacant, and there was a shortfall of 19311 HW (female) / ANM in rural India. Likewise, Aggregately Rural India had a total of 240518 sanctioned posts for HW/ ANM. 207587 were working. 34541 posts were vacant. There was a shortage of 6443 female health workers/ ANMs.

Table 6

Table 6 Doctors at PHCs in Rural Areas

	2005					2022				
	Doctors at PHCs					Doctors at PHCs				
State	Required	Sanctioned	In position	Vacant	Shortfall	Required	Sanctioned	In position	Vacant	Shortfall
	[R]	[S]	[P]	[S-P]	[R-P]	[R]	[S]	[P]	[S-P]	[R-P]
Bihar	1648 (7.09)	NA	NA	NA	NA	1492 (5.99)	3595 (9.06)	1538 (5.01)	2057 (21.76)	*
Kerala	911 (3.92)	1345 (5.49)	949 (4.67)	396 (9.24)	*	780 (3.12)	1564 (3.94)	1503 (4.90)	61 (0.64)	*
India	23236	24476	20308	4282	1004	24935	39669	30640	9451	776

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of Overall India

This table shows the availability of doctors at PHCs in rural areas of Bihar and Kerala. In 2005, the required number of doctors at PHCs in rural Bihar was 1648. The data related to the total number of sanctioned posts, positioned posts, vacant posts, and shortage of doctors was not available during that time period. In 2022, the total number of required doctors at PHCs in rural areas was 1492. The total number of sanctioned posts for the same period was 3595. The number of in-position doctors was 3595, and the total number of vacant posts was 2057. Likewise, in Kerala, the required number of doctors at PHCs in rural Kerala was 911. The total number of sanctioned posts was 1345. The total number of doctors working at that time was 949, and the remaining vacant seats were 396. But in 2022, the required number of doctors was 780. The total number of sanctioned posts for doctors at PHCs was 1564. The number of in-position doctors was 1503. The remaining vacant posts were 61. Aggregately, at the national level, the required number of doctors was 23236, sanctioned posts were 24476, positioned doctors were 20308, vacant posts were 4282, and

there was a shortage of 1004 doctors at PHCs in rural India during 2005. Whereas, in 2022, the required number of doctors was 24935. The total number of sanctioned posts was 39669. The total number of doctors working at that time was 30,640. The availability of total vacancies was 9451, and there was a shortage of a total 776 doctors in 2022.

Table 7

Table 7 Total Specialists at CHCs in Rural Areas

	2005					2022				
State	**Surgeon, OB and GY Physician and Paediatricians**					**Surgeon, OB and GY Physician and Paediatricians**				
	Required	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**	**Required**	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**
	[R]	[S]	[P]	[S-P]	[R-P]	[R]	[S]	[P]	[S-P]	[R-P]
Bihar	404 (3.01)	NA	NA	NA	NA	1076 (4.90)	1281 (9.29)	322 (7.17)	959 (10.26)	754 (4.32)
Kerala	424 (3.16)	424 (5.5)	82 (2.30)	342 (9.66)	342 (5.59)	844 (3.85)	50 (0.36)	48 (1.07)	2 (0.021)	796 (4.56)
India	13384	7582	3550	3538	6110	21920	13787	4485	9343	17435

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of Overall India

The availability of total specialists at CHCs in rural areas of Bihar and Kerala has been displayed in this table. In 2005, there were a total of 404 specialists required in CHCs in rural Bihar. During that time period, there was no available data regarding the overall number of sanctioned posts, positioned posts, empty posts, and shortages of specialists. In 2022, there were a total 1076 required posts for specialists. The total number of sanctioned posts during that time period was 1281. The number of positioned specialists was 322. The total number of empty seats for specialists at CHCs was 959. There was a shortage of 754 specialists at CHCs in rural Bihar. Similarly, in 2005, there were a total 424 required posts for specialists at CHCs in rural Kerala. The total number of sanctioned posts was 424 at that time period. The number of positioned specialists was 82. The total number of vacancies for specialists was 324, and there was a shortage of 342 specialists. In 2022, the required number of specialists was 844; sanctioned posts for specialists were 50. There were a total of 48 specialists working, along with a shortage of 796 specialists. Additionally, 2 posts were empty at CHCs in rural Kerala during 2022. However, in 2022, at the national level, there were a total 13384 required specialists at CHCs in rural India. The total number of sanctioned posts was 7582, and the number of in-position specialists was 3550. The number of vacancies was 3538, and there was a shortage of 6110 specialists at CHCs in rural India. Although in 2022, there were a total of 21,920 required posts for specialists at CHCs in rural India. The number of total sanctioned posts and positioned posts was 13787 and 4485, respectively. There were a total 9343 vacant posts, along with a 17435 shortage of specialists at CHCs in rural India, during 2022.

Table 8

Table 8 Radiographers at CHCs in Rural Areas

	2005					2022				
State	**Radiographer**					**Radiographer**				
	Required	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**	**Required**	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**
	[R]	[S]	[P]	[S-P]	[R-P]	[R]	[S]	[P]	[S-P]	[R-P]
Bihar	101 (3.01)	NA	NA	NA	NA	269	175 (4.33)	29 (1.18)	146 (8.96)	240 (7.48)
Kerala	106 (3.16)	17 (1.01)	16 (1.19)	1 (0.30)	90 (7.65)	211 (3.85)	17 (0.42)	13 (0.53)	4 (0.24)	198 (6.17)
India	3346	1669	1337	332	1176	5480	4039	2448	1628	3206

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of overall India

This table shows the availability of radiographers at CHCs in rural areas of Bihar and Kerala. Data indicates that in 2005, the required number of radiographers at CHCs in rural Bihar was 101. The data related to the number of sanctioned posts, positioned posts, vacant posts, and shortages of radiographers during that period was not accessible. In 2022, there were a total of 269 required radiographers at CHCs in rural Bihar. There were a total of 175 sanctioned posts for radiographers, 29 in-positioned posts, and 146 vacant posts, along with a shortage of 240 radiographers at CHCs in rural Bihar. In contrast, in 2005, there were a total of 106 required posts for radiographers at CHCs in rural Kerala. There were 17 sanctioned posts, 16 in-position posts, and 1 vacant post, in addition to a shortage of 90 radiographers at the same time. On the other hand, in 2022, there were a total of 211 required radiographers at CHCs in rural areas of Kerala. There were a total of 17 sanctioned posts, 13 in-positioned posts, and 4 vacancies for radiographers at CHCs in rural Kerala, together with a shortage of 198 radiographers at the same time. However Nationally, there were a total of 3346 required posts, 1669 sanctioned posts, 1337 in-positioned posts, and 332 empty posts for radiographers at CHCs in rural areas of India during the period of 2005. Data indicates that there was a shortage of 1176 radiographers during that time period. On the other hand, in 2022, there were a total of 5480 required posts, 4039 sanctioned posts, 2448 in-positioned posts, and 1628 vacant posts, as well as a shortage of 3204 posts for radiographers at CHCs in rural India.

Table 9

Table 9 Pharmacists at PHCs and CHCs in Rural Areas

	2005					2022				
State	**Pharmacist**					**Pharmacist**				
	Required	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**	**Required**	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**
	[R]	[S]	[P]	[S-P]	[R-P]	[R]	[S]	[P]	[S-P]	[R-P]
Bihar	1749 (6.57)	NA	NA	NA	NA	1761 (5.78)	1577 (4.62)	424 (1.56)	1153 (15.76)	1337 (24.65)
Kerala	1017 (3.82)	1038 (4.92)	858 (4.84)	180 (0.53)	159 (5.56)	991 (3.25)	1199 (3.51)	1189 (4.38)	10 (0.136)	*
India	26582	21072	17708	3380	2858	30415	34066	27135	7315	5423

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of Overall India

The availability of pharmacists at PHCs and CHCs in rural areas of Bihar and Kerala has been displayed in the above-mentioned table. The table shows that in 2005, the required number of pharmacists at PHCs and CHCs in rural Bihar was 1749. The data related to the number of sanctioned posts, positioned posts, vacant posts, and shortages of pharmacists during that period was not available. In 2022, there were a total of 1761 required pharmacists at PHCs and CHCs in rural Bihar. There were a total of 1577 sanctioned posts for pharmacists, 424 in-position posts, and 1153 vacant posts, along with a shortage of 1337 pharmacists at PHCs and CHCs in rural Bihar. On the contrary, in 2005, there were a total of 1017 required posts for pharmacists at PHCs and CHCs in rural Kerala. There were 1038 sanctioned posts, 858 in-position posts, and 180 vacant posts, in addition to a shortage of 159 pharmacists at both levels. Although, in 2022, the required number of pharmacists was 991 at PHCs and CHCs in rural areas of Kerala. There were a total of 1199 sanctioned posts, 1189 in-positioned posts, and 10 vacant posts for pharmacists at PHCs and CHCs in rural Kerala. Data regarding the shortage of pharmacists was unavailable. However, at the national level, there were a total of 26582 required posts, 21072 sanctioned posts, 17708 in-positioned posts, and 3380 empty posts, along with a shortage of 2858 pharmacists at both levels of the rural healthcare system of the country during the period of 2005. On the other side, in 2022, there were a total of 30415 required posts, 34066 sanctioned posts, 27135 in-positioned posts, and 7315 vacant posts, together with a shortage of 5423 pharmacists at PHCs and CHCs in rural India.

Table 10

Table 10 Laboratory Technicians at PHCs and CHCs in Rural Areas

	2005					2022				
State	**Lab Technician**					**Lab Technician**				
	Required	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**	**Required**	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**
	[R]	[S]	[P]	[S-P]	[R-P]	[R]	[S]	[P]	[S-P]	[R-P]

Bihar	1749 (6.57)	NA	NA	NA	NA	1761 (5.78)	1606 (5.31)	908 (3.98)	698 (8.86)	853 (10.59)
Kerala	1017 (3.82)	368 (2.52)	358 (2.91)	10 (0.43)	659 (9.11)	991 (3.25)	732 (2.42)	716 (3.14)	16 (0.20)	275 (3.41)
India	26582	14571	12284	2287	7226	30415	30227	22772	7873	8050

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of Overall India

The above-given table shows the availability of laboratory technicians at PHCs and CHCs in rural areas of Bihar and Kerala. This table indicates that in 2005, the required number of laboratory technicians at PHCs and CHCs in rural Bihar was 1749. The data related to the number of sanctioned posts, positioned posts, vacant posts, and shortage of laboratory technicians during that period was unavailable. In 2022, there were a total of 1761 required laboratory technicians at PHCs and CHCs in rural Bihar. There were a total of 1606 sanctioned posts, 908 in-positioned posts, and 698 vacant posts, along with a shortage of 853 laboratory technicians at PHCs and CHCs in rural Bihar. Contrary to this, in 2005, there were a total of 1017 required posts, 368 sanctioned posts, 358 in-positioned posts, and 10 vacant posts, in addition to a shortage of 659 for laboratory technicians at both levels in rural areas of Kerala. Although, in 2022, the required number of laboratory technicians was 991 at PHCs and CHCs in rural areas of Kerala. There were a total of 732 sanctioned posts, 716 in-positioned posts, 16 empty posts, and 275 vacant posts for laboratory technicians at PHCs and CHCs in rural Kerala. Aggregately, at the national level, there were a total of 26582 required posts, 14571 sanctioned posts, 12284 in-positioned posts, and 2287 vacant posts, as well as a shortage of 7226 laboratory technicians at both levels of the rural healthcare system of the country during the period of 2005. However, in 2022, there were a total of 30415 required posts, 30227 sanctioned posts, 22772 in-positioned posts, and 7873 vacant posts, along with a shortage of 8050 laboratory technicians at PHCs and CHCs in rural India.

Table 11

Table 11 Nursing Staff at PHCs and CHCs in Rural Areas

	2005					2022				
	Nursing Staff					**Nursing Staff**				
State	**Required**	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**	**Required**	**Sanctioned**	**In Position**	**Vacant**	**Shortfall**
	[R]	[S]	[P]	[S-P]	[R-P]	[R]	[S]	[P]	[S-P]	[R-P]
Bihar	2355 (14.13)	NA	NA	NA	NA	3375 (5.33)	8223 (8.22)	4956 (6.20)	3267 (14.84)	*
Kerala	1653 (9.92)	2811 (8.25)	2578 (8.91)	233 (4.41)	*	2257 (3.56)	3167 (3.16)	2940 (3.67)	227 (1.03)	*
India	16658	34061	28930	5280	13352	63295	100008	79933	22014	5472

Source Compiled by the Author Based on Secondary Data

Note Figures in Bracket are % Share of Overall India

The availability of total nursing staff at PHCs and CHCs has been displayed in this table. In 2005, there were a total of 2355 required nurses at PHCs and CHCs in rural Bihar. The data with regard to sanctioned posts, in-place posts, vacant posts, and shortages of nursing staff during that time period was not available. Likewise, in 2022, the total number of required nursing staff was 3375. There were a total of 8223 sanctioned posts, 4956 in-positioned posts, and 3267 empty posts for nursing staff in rural Bihar at that time period. On the contrary, in 2005, there were a total of 1653 required seats for nursing staff. There were a total of 2811 sanctioned posts, 2578 in-position posts, and 233 vacant posts for the nursing staff in rural Kerala during 2005. The data related to the shortage of nursing staff during that period was unavailable. However, in 2022, the required number of nursing staff was 2257. There were a total of 3167 sanctioned posts, 2940 in-positioned posts, and 227 vacant posts for nursing staff at PHCs and CHCs in rural Kerala. The data related to the shortage of nursing staff in 2022 was not unavailable. On a countrywide level, in 2005, there were a total of 16658 required posts for nursing staff in rural India. There were a total of 34061 sanctioned posts, 28930 in-positioned posts, 5280 vacant posts, and a shortage of total 13352 nursing staff at PHCs and CHCs in rural India during that time period. Although, in 2022, there were a total of 63295 required posts, 100008 sanctioned posts, 79933 in-positioned posts, and 22014 vacant posts, as well as a shortage of 5472 nursing staff at PHCs and CHCs in rural India.

CONCLUSION

This study shows there is a significant contrast between the rural healthcare systems of Bihar and Kerala in terms of infrastructure, manpower, and the overall performance of health centres. Kerala has a more extensive and highly efficient network of health centres as compared to Bihar. Kerala had less area and population, but in spite of this, Kerala has a significant number of public health centres in rural areas, which makes healthcare services easily accessible for the underserved and underprivileged population. Conversely, Bihar is one of the largest states in terms of population as well as area, but Bihar has fewer per-capita health centres, and these health centres are also far and sparsely located from the higher density areas, which creates difficulty, especially for rural people, to access healthcare services. Kerala has a better healthcare building position along with well-maintained and well-equipped health facilities. In Kerala, most healthcare centres are located in government buildings rather than rented buildings. However, Bihar struggles with inadequate and poorly maintained healthcare infrastructure. Most of the health centres in Bihar are located in rented buildings, which hampers the effective delivery of healthcare services. Kerala has a significant proportion of medical workers, including doctors, health workers (ANM), specialists, pharmacists, radiographers, laboratory technicians, and nursing staff. This leads to the proper and efficient distribution of medical services to rural people. Whereas, Bihar faces a significant shortage of medical personnel. This results in inadequate patient care and the ineffective distribution of health facilities in rural areas.

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