Asmat Parveen/ Afr.J.Bio.Sc. 6(5) (2024). 5243-5255 **ISSN: 2663-2187**

https://doi.org/ 10.33472/AFJBS.6.5.2024. 5243-5255

African Journal of Biological Sciences

An inter- district analysis of health infrastructure disparities in the Union Territory of Jammu and Kashmir

Asmat Parveen[1], Kirandeep Dhaliwal[2], Imtiyaz Ali[3], Jyoti Sarin[4]
[1]Ph.D. Scholar MMCON, Maharishi Markandeshwar Deemed to be University, Mullana, India.
asmat.parveen@islamicuniversity.edu.in
[2] Principal MM Institute of Nursing &Research, Maharishi Markandeshwar Deemed to be University, Sadopur- Ambala, India. drdhaliwalkd@gmail.com

[3]Former Dean Medical faculty & head, department of community medicine –S. K institute of Medical Sciences Soura Kashmir J&K 190011. imtiyazalibaht@gmail.com

[4]Dean/Principal MMCON, Maharishi Markandeshwar Deemed to be University, Mullana, India.
directormmcn@mmumullana.org
Corresponding,Author email:asmat3419@gmail.com, asmat.parveen@islamicuniversity.edu.in
CTRI/2021/11/037966 [Registered on: 11/11/2021.

Article History
Volume 6, Issue 5, 2024
Received: 15 may 2024
Accepted: 21 may 2024
doi: ***10.33472/AFJBS.6.5.2024. 5243-5255***

Abstract

Aim of the study: This paper offers a thorough examination of healthcare infrastructure, service delivery and Manpower in major three district hospitals in Ganderbal, Bandipora, and Pulwama districts of Kashmir, India.

Methodology: Employing an exploratory methodology, the research utilized a cross-sectional, observational approach to assess the availability of public health services, focusing on physical infrastructure, manpower, supportive and diagnostic services. Data collection adhered to structured instruments based on the Indian Public Health Standards (IPHS) of 2012, with meticulous attention to methodological rigor and ethical considerations.

Results: The study revealed significant disparities in healthcare infrastructure and service provision among the examined districts. Variations were observed in bed capacity, infrastructure completion and amenities across hospitals. Diagnostic and laboratory services varied, with Pulwama hospital leading in facilities compared to Ganderbal and Bandipora. Deficiencies in administrative support, epidemic control, and disaster preparedness were noted. Comparison of staff strength across three hospitals according to IPHS-2012 norms.Revealed Ganderbal hospital had 35 doctors (2.86% excess), 47 nurses (49.46% deficient), 18 paramedics (57.14% deficient), and 55 other staff (61.11% excess). Pulwama has 25 doctors (2.94% deficient), 45 nurses (51.61% deficient), 17 paramedics (59.52% deficient), and 45 other staff (150% excess). Bandipora has 25 doctors (13.79% deficient), 40 nurses (16.67% deficient), 28 paramedics (9.68% deficient), and 31 other staff (72.22% excess).

Conclusion: Our study highlights significant disparities in healthcare infrastructure, service delivery and manpower across Ganderbal, Bandipora and Pulwama districts hospitals of Kashmir, India. The study further underscores the need for targeted recruitment and workforce planning to address gaps. By leveraging technological interventions to empower nursing staff, the patient care outcomes can be enhanced which will contribute to a healthier and more sustainable healthcare system in the region. This approach not only improves efficiency but also reduces errors and overall healthcare costs, ultimately benefiting both patients and healthcare providers.

Introduction:

India is quickly becoming a top healthcare destination in the world because of its affordable healthcare alternatives and high calibre medical staff. In certain regions of the nation, medical tourism is becoming a reality. Various stakeholders are becoming increasingly interested in spending more money in Indian health sector. The nation's economy is expanding, and the quality of life for its citizens is rising [1]. According to studies, World Health Organization (WHO) framework for the health system plays a critical role in bolstering the whole healthcare system and catalyst for reaching global health objectives like the sustainable Development Goals. Evidence showed that the framework is useful for evaluating the effectiveness of national healthcare systems, the effects of national health reforms, the state of health facilities, and particular health issues [2].

In India, public health services are organized into three levels: primary, secondary, and tertiary. Primary healthcare is provided through sub-centres and primary health centres (PHCs), acting as the first point of contact with the National Health System. Secondary healthcare comprises district hospitals, sub-district hospitals, and community health centres, serving as the initial referral point to primary care. Tertiary care is delivered by medical colleges and hospitals, essential components of the district health system. These facilities offer curative, preventive, and promotional healthcare services, with health being a state subject[3,4]. The governmental health sector, the private health sector, and the households that consume health services make up the three main components of the nation's health care system[5,6]. As of 31st March 2021, there are 2426 Sub Centres in rural areas and 45 Sub Centres in the urban area of Jammu & Kashmir. The Estimated mid-year population covered by SCs for rural areas (as on 1st July 2021) is 3872, and an Average number of villages covered by a Sub Centre is 3 [7]. Primary Health Centres (PHCs) act as the first point of contact between rural communities and healthcare professionals, catering to populations of 30,000 in plain regions and 20,000 in hilly or difficult-to-reach areas. They provide comprehensive curative and preventive healthcare services, focusing on preventive and promotive aspects. As of March 31, 2021, there are 891 rural PHCs and 82 urban PHCs in Jammu & Kashmir. These facilities cover an estimated mid-year population of 10,542 in rural areas and 4,047,000 in urban areas. They serve as essential pillars in delivering healthcare to communities, with each PHC covering an average number of villages 8 [8]. Community Health Centres (CHCs) are established by the State Government under the MNP/BMS programme to serve regions with a population of 120,000 or 80,000 in mountainous, difficult-to-reach, and tribal areas. Each CHC must have four medical professionals, including a surgeon, physician, gynaecologist/obstetrician, and paediatrician, along with 21 paramedical and support workers. These facilities feature 30 beds, an operation room, X-ray room, labour room, and lab equipment, providing obstetric care and expert consultations. They also serve as referral facilities for nearby PHCs. As of March 31, 2021,

Jammu & Kashmir has 63 rural CHCs and 16 urban CHCs, covering an estimated mid-year population of 149,095 in rural areas. Each CHC covers a certain number of villages, contributing significantly to healthcare delivery in the region [9]. District hospitals play a critical role in a region's healthcare system, acting as gatekeepers for patients with less prevalent conditions and ensuring service efficiency. As of March 31, 2021, there are 16 district hospitals and 8 medical colleges in Jammu & Kashmir. These hospitals are expected to have a complement of 3408 paramedical staff (with 2578 in position) across various disciplines according to WHO standards, including primary care, obstetrics, mental health, geriatrics, orthopaedics, trauma surgery, eye care, and rehabilitation. They provide round-the-clock treatment and are deeply integrated with the district health system, offering services such as district-level health data management, policy adoption for primary and secondary healthcare, and assistance with administration and logistics for healthcare initiatives. Additionally, they provide curative and chronic treatment for patients referred from peripheral units, ensuring seamless communication and continuity of care[9].

WHO recognizes healthcare access inequalities as a pressing global issue, emphasizing the importance of inclusive and accessible healthcare systems. Patient satisfaction, increasingly emphasized since the 1980s, correlates with improved health outcomes. It reflects individual perceptions of the quality of the care and responsiveness to personal needs. As healthcare organizations prioritize patient-centric care, measuring and analyzing satisfaction levels are vital for service evaluation and enhancement. Despite the significance of understanding healthcare utilization, primary research on healthcare delivery in Kashmir remains scarce. Previous studies relied on secondary sources, underscoring the need for comprehensive research to assess healthcare availability across district hospitals in central, north, and south Kashmir. Despite the high per capita income in Kashmir, health indicators remain unsatisfactory. Through primary research, this study aims to provide insights into healthcare delivery in the region, enabling informed decision-making and service improvements. Furthermore, there is a dearth of primary data on healthcare utilization, particularly within the nursing discipline, both nationally and specifically in Jammu & Kashmir. Our study aims to provide the first comprehensive analysis from the nursing discipline in India, particularly in Jammu & Kashmir.

Methodology:

The exploratory approach involves a comprehensive investigation to assess the current state of affairs in the three major district hospitals of the Kashmir Valley of India. The research utilized a cross-sectional, observational approach to assess the availability of public health services, focusing on physical infrastructure, manpower, supportive and diagnostic services. Multistage cluster sampling was utilized for the selection of hospital sites and settings, ensuring a comprehensive representation across various healthcare facilities. This methodological

approach not only facilitated a nuanced understanding of the research phenomenon but also ensured a diverse and inclusive representation of public health care services within the healthcare ecosystem. Structured questionnaire was devised to explore various facets of the present study. The formulation of questions within these questionnaire was meticulously crafted based on a thorough literature review and adherence to the Indian Public Health Standards (IPHS) of 2012.

Procedure of data collection: The investigator collected all the data from selected hospitals. Permission from Directorate health services of Kashmir was obtained first. Then permission from medical superintendents of each selected district hospital was taken. Data from subjects from the three district hospitals was collected from June 22 to May 2023 on every week end. Ethical clearance was obtained from IEC IUST. Permission was obtained from directorate of Health services and medical superintendent of the study hospitals.

Statistical analysis: The Structured questionnaires were collected and coded in a MS Excel database and analysed by using the SPSS statistical package, version 26.0. Descriptive and inferential statistics were performed . The collected data information has been compiled and put in the form of maps and tables for further analysis.

Results:

Availability of Facilities and Services at District Hospitals

The Ganderbal hospital, situated in Ganderbal district, serves a population of 707,874 individuals. This hospital is equipped with 200 beds to accommodate patients. Whereas, Pulwama District Hospital is Located near the Degree College Road in Pulwama, the Pulwama hospital offers services to a total population of 665,000. Despite this, the hospital provides a total of 200 beds, indicating coverage for 7% more population as per IPHS-2012 standards. The Bandipora hospital, positioned near the bus stand in Bandipora, caters to a population of 396,000. Despite the relatively smaller population, the hospital offers services with 100 beds, covering 20% more population as per IPHS-2012 guidelines **(Fig: 1 & 2)**.

Size and Location: The hospitals in Ganderbal, Bandipora, and Pulwama districts vary in size and location, with each facing distinct challenges and strengths in their infrastructure. Ganderbal and Bandipora hospitals are fully constructed, while Pulwama hospital remains incomplete. Bandipora and Pulwama hospitals have well-maintained facilities, such as intact walls and good flooring, compared to Ganderbal.

Departments/Clinical OPD Area: In terms of services, all hospitals offer basic departments like medical, ophthalmic, and dental care. However, Bandipora and Pulwama have additional services like surgical and obstetrics/gynaecology departments, lacking in Ganderbal. Pulwama also offers specialized services like de-addiction, which are absent in Ganderbal and Bandipora. Accessibility is a concern, with Ganderbal lacking facilities like separate pharmacies and

intensive care units for male and female patients, which are available in Bandipora and Pulwama. Moreover, Bandipora and Pulwama have better disaster preparedness infrastructure compared to Ganderbal.

Diagnostic Services: In the hospitals of Ganderbal, Bandipora, and Pulwama districts, diagnostic services such as X-Ray, Ultrasound, ECG, and Endoscopy are available across all facilities. However, only Pulwama hospital offers CT scan services, which are lacking in Ganderbal and Bandipora, as recommended by IPHS-12 standards. Pulwama also houses a Clinical Laboratory, whereas Ganderbal and Bandipora lack this facility. Clinical pathological lab services are present in all hospitals, but Ganderbal lacks stool analysis services, which are available in Bandipora and Pulwama. Specific micro-biology investigations, ENT, radiology, and endoscopy services are exclusive to Pulwama, aligning with IPHS guidelines. Investigation services like serology and bio-chemistry are consistent across all hospitals. Bandipora and Pulwama provide cardiac investigations and ophthalmology laboratory services, lacking in Ganderbal, which are deemed desirable per IPHS-12. Hospital kitchen and central sterile & supply department services are absent in all hospitals. Pulwama offers laundry services, while general stores, mortuary, ambulance, waste disposal system, and staff rooms are available in Bandipora and Pulwama but not in Ganderbal. Medico-legal/post-mortem rooms, water/electricity maintenance rooms, drainage & sanitation supervisor rooms, and maintenance & repair services are present in all three hospitals.

Manpower/Administrative Service: In context of administrative services, the obtained data shows that Bandipora and Pulwama hospitals have various sections – finance, medical records, procurement, personnel, and grievance redressed services. Whereas these sections are not available there in Bandipora and Pulwama hospitals. The services of housekeeping & sanitation, education & training, and inventory management are given by Bandipora hospital while other two do not possess these facilities. The Ganderbal and Bandipora hospitals have the management information system manual whereas in Pulwama hospital, it is not there.

Total Manpower: In our study, we also examined the staffing levels in healthcare facilities across three districts: Ganderbal, Pulwama, and Bandipora. The analysis includes the total number of doctors, nurses, paramedics, and other staff in each district, comparing them to the IPHS-2012 norms for hospitals of similar bed capacity.

In Ganderbal, there are a total of 35 doctors, representing a percentage deviation of 2.86% (excess by 1) from the IPHS norm of 34 doctors for a 200-bedded hospital. The number of nurses is 47, with a deviation of 49.46% (deficient by 43) from the norm of 93 nurses. Paramedics total 18, indicating a deviation of 57.14% (deficient by 24) from the expected 42. The count of other staff stands at 55, exceeding the norm by 61.11% (excess by 11) **(Fig: 3)**.

In Pulwama, there are 25 doctors, which is 2.94% (deficient by 4) lower than the IPHS norm for a 200-bedded hospital. The number of nurses is 45, showing a deviation of 51.61% (deficient

by 48) from the expected 93. Paramedics total 17, indicating a deviation of 59.52% (deficient by 25) from the norm of 42. The count of other staff is 45, exceeding the norm by 150% (excess by 10) **(Fig: 3)**.

In Bandipora, there are 25 doctors, which is 13.79% (deficient by 4) lower than the IPHS norm for a 100-bedded hospital. The number of nurses is 40, showing a deviation of 16.67% (deficient by 8) from the expected 48. Paramedics total 28, indicating a deviation of 9.68% (deficient by 3) from the norm of 31. The count of other staff is 31, exceeding the norm by 72.22% (excess by 16) **(Fig: 4)**.

These percentages provide a comprehensive understanding of the staffing situation in each district relative to the IPHS 2012 norms, highlighting areas of excess and deficiency in personnel.

Discussion

While discussing the overall infrastructure and availability of healthcare facilities in district hospitals across selected districts of Kashmir, juxtaposed with the Indian Public Health Standards (IPHS) of 2012, it encompasses various aspects such as population coverage, physical infrastructure, departmental services, diagnostic and supportive services, manpower, and administrative services. Additionally, the study evaluates staffing levels of doctors, nurses, paramedics, and other personnel in relation to IPHS norms. Results reveal notable variations in facility provision among Ganderbal, Pulwama, and Bandipora hospitals, with discrepancies observed in infrastructure certification, environmental compliance, accessibility, and service offerings. Furthermore, the study underscores significant deviations in staffing levels across all districts relative to IPHS 2012 norms. These findings highlight the imperative for targeted interventions to address gaps in healthcare infrastructure and manpower, thereby enhancing the quality and accessibility of healthcare services in the region. Looking at population coverage and hospital bed capacity across Ganderbal, Pulwama, and Bandipora district hospitals in Jammu and Kashmir, it was observed that Ganderbal Hospital, serving a population of 707,874, has 200 beds. Pulwama Hospital, serving 665,000 people, also offers 200 beds, meeting IPHS-2012 standards. Bandipora Hospital, catering to 396,000 individuals, provides 100 beds, exceeding IPHS-2012 guidelines. These disparities affect healthcare access and service utilization, with Ganderbal potentially facing challenges due to higher patient loads, Pulwama possibly experiencing issues with patient flow, and Bandipora potentially benefitting from better patient-to-bed ratios. These results are contrary with the study findings of V Minutha on the study of public healthcare facility distribution, where it was observed that the location of the District Hospital was strategically chosen for economic feasibility. The hospital boasts a total bed capacity of approximately 1050 and serves a population of 301,127. It offers specialized departments including general medicine, general surgery, ENT, ophthalmology, urology, plastic surgery, and psychiatry. However, the study also unveiled an unequal distribution of healthcare

centers throughout the region, resulting in shortages of infrastructure and workforce availability. The findings emphasized the pressing need for additional attention and resource allocation to address the gaps in healthcare access and delivery within the study area.[10] The study is consistent with Md Mutaqum, mentioned in his study the disparities have significant implications for healthcare access and outcomes for both rural and urban populations in Murshidabad district. Rural residents bear the brunt of inadequate healthcare infrastructure, facing barriers to accessing essential medical services. As a result, health outcomes may be poorer in rural areas compared to urban areas where healthcare facilities are relatively more accessible. Addressing these disparities in health infrastructure is critical for improving healthcare access and outcomes for all residents of Murshidabad district. Efforts to increase the presence of healthcare professionals in rural areas, expand hospital facilities, and enhance infrastructure capacity can help bridge the gap between rural and urban healthcare services, ultimately leading to better health outcomes for the entire population.[11]

In our study disparities in compliance with environmental regulations and accessibility for individuals with disabilities exist among Ganderbal, Pulwama, and Bandipora hospitals in Jammu and Kashmir. Ganderbal and Pulwama hospitals hold environmental clearance certificates and adhere to Disability Act provisions, while Bandipora lacks both certifications. Infrastructural variations include incomplete construction of Pulwama Hospital, lack of compound walls in Ganderbal, and absence of certain amenities like waiting spaces and critical departments in Ganderbal Hospital compared to Bandipora and Pulwama hospitals. These findings were in tune with research conducted by, Aabid Ahmad Koka and Muddasir Ali Mir, who identified substantial variations in health infrastructure development across districts in Kashmir. While certain districts exhibit advanced infrastructure, others significantly lag behind. The analysis unveiled pronounced inequalities in health infrastructure development indices among districts, highlighting the urgent requirement to overhaul public policies influencing healthcare development in the Kashmir Valley. Rectifying these imbalances is imperative to guarantee equitable access to healthcare services throughout the region[12]. Another study by Koerber D, *et al* shed light on the disparities in healthcare infrastructure between rural and urban India, emphasizing the urgent need for infrastructure development in healthcare institutions. The findings emphasize necessity of enhancing healthcare delivery in the region, aligning with previous studies advocating for improved infrastructure in healthcare facilities[13].

In our present study the availability of diagnostic and supportive services varies across the hospitals. While all three hospitals offer basic diagnostic services like X-ray, ultrasound, and ECG, Pulwama Hospital stands out for providing CT scan services, which are lacking in Ganderbal and Bandipora hospitals. Additionally, Bandipora and Pulwama hospitals offer specialized services like clinical pathology labs and cardiac investigations, which are not available in Ganderbal Hospital. IPHS standards already provide guidelines for having

diagnostic lab services and imaging facilities at District hospitals with different bed strength, hence differences observed in the present study underscore the need for enhancing diagnostic capabilities and service offerings across all hospitals to meet comprehensive healthcare needs. The study is consistent with the findings based on data from the Government's NITI Aayog observations, Study findings of NITI Ayog, revealed that only 21 hospitals across States/UTs met the criteria for comprehensive diagnostic testing services. Among the states, Karnataka boasted the highest proportion (28.6%) of hospitals with all support services, followed by Telangana (19%), Andhra Pradesh (14%), and Gujarat (9.5%). Meanwhile, Balangir District Hospital in Odisha offers various specialized and non-specialized clinical OPD services along with 24x7 casualty and emergency services.[14]

In the present study looking at the Manpower and Administrative Services in Bandipora and Pulwama hospitals, it was evident to demonstrate stronger administrative structures, with various sections for finance, procurement, and personnel management. In contrast, Ganderbal Hospital lacks such administrative divisions, indicating potential gaps in administrative efficiency and resource management. Additionally, Bandipora Hospital offers additional services like housekeeping, education, and training, which contribute to overall hospital management and service delivery. Our study examined the staffing levels in healthcare facilities across Ganderbal, Pulwama, and Bandipora districts, comparing them against the IPHS-2012 norms. The analysis revealed variations in the number of doctors, nurses, paramedics, and other staff in each district relative to the expected norms. These variations indicate areas of excess and deficiency in personnel across different categories. In Ganderbal, while the number of doctors slightly exceeds the IPHS norm, there are significant deficiencies in the number of nurses and paramedics. Conversely, Bandipora exhibits deficiencies in the number of doctors and nurses but exceeds the norm in other staff categories. Pulwama also shows deficiencies in doctors, nurses, and paramedics, with an excess of other staff.

Presence of manpower is a key element of hospital functionality which ensures the delivery of efficient and effective medical services to the patient satisfaction. As an important component of any hospital functioning, the present investigation while assessing the availability of doctors, Nurses and paramedical staff in the target hospitals clearly demonstrated variation in the manpower strength among these hospitals. It is worth mentioning here that at national level, there is shortage of 21.9% doctors and 17.5% paramedical staff that adversely affects the full immunization programme in India[15]. Further, as per NITI Aayog data report, the staff availability across the district health centres fail to meet standard numbers as suggested by Indian Public Health Standards (IPHS) of 2012[14]. Similar to these observations, Karan et al. also found that inadequacy in the healthcare workforce in India[16]. In addition, another study conducted by Rifat Jan *et al*., assessing services at Primary Health Centres in Northern Kashmir according to Indian Public Health Standards, it was observed that not all centres were meeting

the required service standards. The study indicated a necessity to enhance infrastructure and manpower to improve service delivery at these center[17]. The findings from NITI Aayog, reveal that a significant number of district hospitals across India fail to meet staffing requirements outlined in the Indian Public Health Standards (IPHS) of 2012. While 189 hospitals satisfy the doctor-to-bed ratio, only 88 have an adequate number of staff nurses, and 399 meet the paramedical staff ratio.[14] Karan *et al*., study echoes this inadequacy in the healthcare workforce in India[16]. Even the findings of Gulshan Kumar A. and Reshmi R.S. B about man power resources in districts of Jharkhand, Bihar, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, and the North-Eastern states and found a less staff availability as compared to the national average.[18]

Comment [U1]:

Conclusion:

Addressing staffing deficiencies in healthcare institutions is crucial for maintaining quality care and reducing unnecessary referrals. The shortage of nurses globally, including in India, necessitates targeted interventions by authorities to optimize resource allocation and bridge staffing gaps. Leveraging technology-driven interventions can enhance nursing effectiveness and mitigate workload, contributing to a more resilient healthcare system. Our Phase II study focuses on empowering nursing staff through technology, aiming to streamline processes and improve patient care while reducing nurse fatigue and burnout. Meeting WHO guidelines for nurse-to-population ratios is essential for ensuring quality healthcare delivery. Equipping nurses with training in innovative technological solutions can lead to various benefits, including reduced medication errors, lower patient mortality, and decreased healthcare costs.

References:

1. Tabish SA. Healthcare Delivery in Jammu and Kashmir.
2. Khanam A, Dar SA, Wani ZA, Shah NN, Haq I, Kousar S. Healthcare Providers on the Frontline: A Quantitative Investigation of the Stress and Recent Onset Psychological Impact of Delivering Health Care Services During COVID-19 in Kashmir. *Indian J Psychol Med*. 42(4):359–67.
3. Atkuri R, Zachariah A, D'Souza R. The health situation in Jammu and Kashmir: What is the obligation of health professionals? *Indian J Med Ethics*. 2019;4 NS)(4):261-264. doi:10.20529/IJME.2019.061
4. Kepros JP, Opreanu RC. A new model for health care delivery. *BMC Health Serv Res*. 2009;9:1-5. doi:10.1186/1472-6963-9-57
5. Dixon BE, Zimet GD, Xiao S, et al. An Educational Intervention to Improve HPV Vaccination: A Cluster Randomized Trial. *Pediatrics*. 2019;143(1). doi:10.1542/peds.2018-1457
6. Piña IL, Cohen PD, Larson DB, et al. A framework for describing health care

delivery organizations and systems. *Am J Public Health*. 2015;105(4):670-679. doi:10.2105/AJPH.2014.301926

7. Eldredge JD, Hall LJ, McElfresh KR, et al. Rural providers' access to online resources: a randomized controlled trial. *J Med Libr Assoc*. 2016;104(1):33-41. doi:10.3163/1536-5050.104.1.005
8. Bhandari N, Mazumder S, Taneja S, Sommerfelt H, Strand TA. Effect of implementation of Integrated Management of Neonatal and Childhood Illness (IMNCI) programme on neonatal and infant mortality: cluster randomised controlled trial. *BMJ*. 2012;344:e1634. doi:10.1136/bmj.e1634
9. Government of India M. Rural Health Statistics 2019-20. Published online 2020:1-153.
10. V M. Accessibility of Public Healthcare Services in Mysore City- A GIS Approach. *Int J Heal Sci Res*. 2021;11(5):290-298. doi:10.52403/ijhsr.20210546
11. Pradesh M, Fund I. DISPARITIES OF HEALTH INFRASTRUCTURE DEVELOPMENT IN RURAL AREAS OF MURSHIDABAD DISTRICT , WEST BENGAL , INDIA : 2023;22(1):60-69.
12. Koka AA, Mir MA. Inter District Disparities in Health Infrastructure Development in Kashmir : A Principal Component Analysis. 2018;(1):1562-1567.
13. Koerber D, Khan S, Shamsheri T, Kirubarajan A, Mehta S. Accuracy of Heart Rate Measurement with Wrist-Worn Wearable Devices in Various Skin Tones: a Systematic Review. *J Racial Ethn Heal Disparities*. Published online 2022. doi:10.1007/S40615-022-01446-9
14. Niti Aayog 2021. *Best Practices in the Performance Of.*; 2021.
15. Department of Emergency Medicine - AIIMS. Emergency and Injury Care at District Hospitals in India: A Report of Current Status on Country Level Assessment. *NITI Aayog*. Published online 2020.
16. Karan A, Negandhi H, Hussain S, Zapata T, Mairembam D, Graeve H. Size, composition and distribution of health workforce in India: why, and where to invest?
17. Jan R, Hassan Khatana G, Salim M, Jeelani W. Assessment of services at Primary Health Centres of Northern Kashmir as per Indian Public Health Standards. *Sch J Appl Med Sci Sch J App Med Sci*. 2015;3(9C). www.saspublisher.com
18. Ara G, Sanin KI, Khanam M, et al. A comprehensive intervention package improves the linear growth of children under 2-years-old in rural Bangladesh: a community-based cluster randomized controlled trial. *Sci Rep*. 2022;12(1):21962. doi:10.1038/s41598-022-26269-w

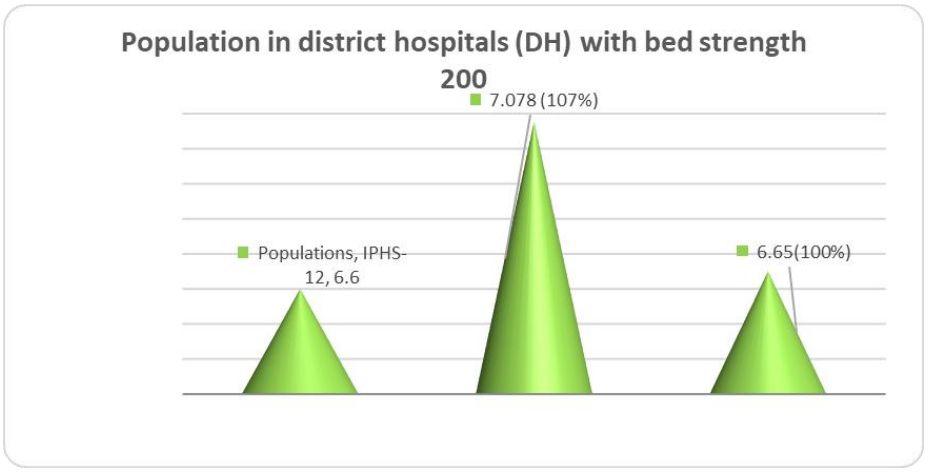

Fig: 1. Population strength of district hospital with bed strength 200

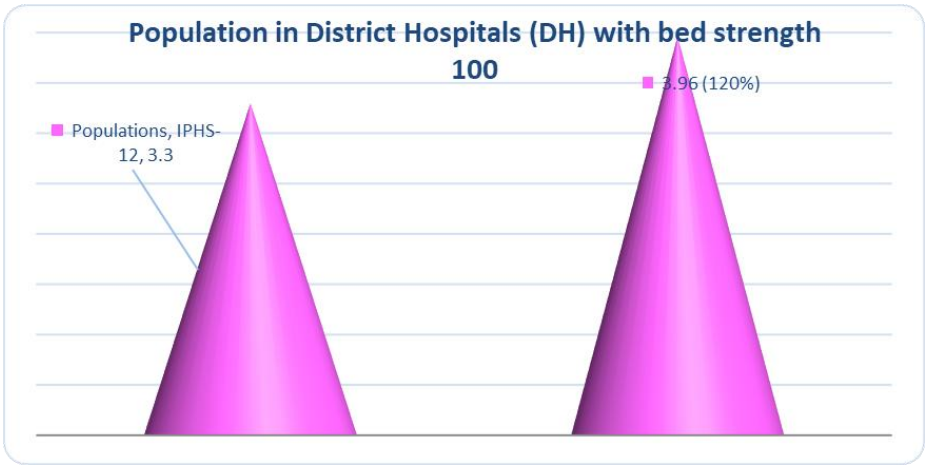

Fig: 2. Population strength of district hospital with bed strength 100

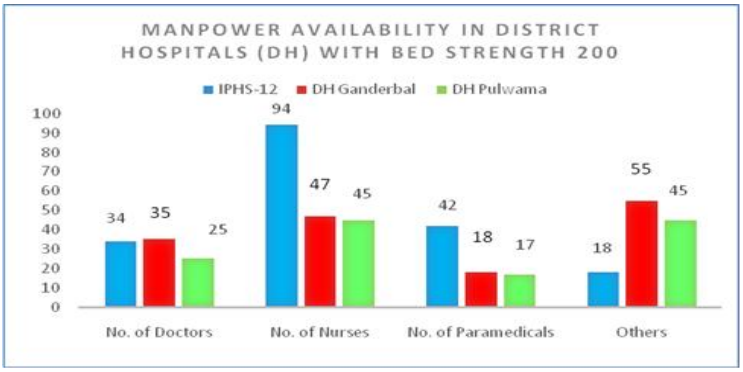

Fig: 3. Manpower availability in district hospital with bed strength 200

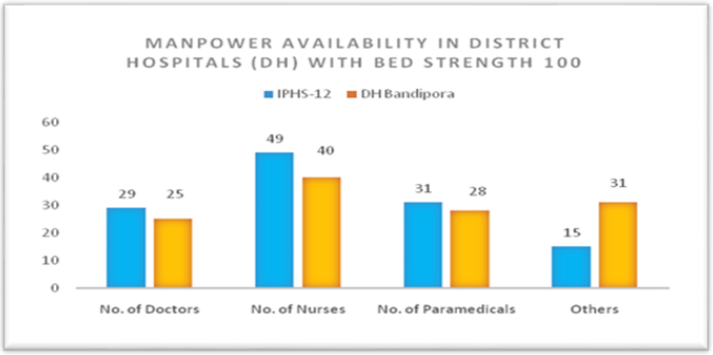

Fig: 4. Manpower availability in district hospital with bed strength 100