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GEOGRAPHICAL DISPARITIES IN RURAL HEALTH BETWEEN MAINLAND INDIA AND NORTH EAST REGION

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Abstract

Rural health disparities remain a critical concern in India, where variations in socio-economic development, healthcare infrastructure, educational attainment, and geographical conditions significantly influence health outcomes. This review examines and compares rural health indicators between mainland India and the North East (NE) region, focusing on maternal and child health, mortality levels, disease prevalence, nutritional status, immunization coverage, and access to healthcare services. The study is based on a systematic review of secondary data obtained from sources such as the National Family Health Survey (NFHS), Sample Registration System (SRS), Rural Health Statistics (RHS), government reports, and published research. The findings reveal that rural areas in mainland India, particularly in southern and western states, generally perform better in key health indicators due to stronger healthcare systems, higher literacy levels, improved sanitation, and greater public investment in health. In contrast, several NE states continue to face challenges arising from geographical isolation, difficult terrain, inadequate transportation, shortages of healthcare personnel, and limited healthcare infrastructure. The analysis also highlights significant intra-regional variations within the NE region, with states such as Sikkim and Tripura demonstrating relatively better health outcomes. Socio-cultural factors, including traditional healing practices and health-seeking behaviour, further influence healthcare utilization in many tribal communities. Despite these challenges, recent improvements in institutional deliveries, immunization coverage, and healthcare outreach programmes indicate positive progress in the region. The study concludes that rural health disparities in India are shaped by a complex interaction of socio-economic, cultural, infrastructural, and geographical factors. It emphasizes the need for region-specific policies, strengthened healthcare infrastructure, improved accessibility, and culturally sensitive interventions to promote equitable and sustainable rural health development across India.

Keywords: *Rural Health, Regional Disparities, North East India, Healthcare Accessibility, Health Infrastructure.*

Introduction

India, with its vast and diverse geography, presents unique challenges in healthcare delivery, especially in rural areas. Rural areas, where a large proportion of the population resides, often experience inadequate healthcare infrastructure, shortages of trained medical personnel, poor transportation networks, and limited access to essential health services. These challenges adversely affect maternal and child health, nutrition, disease prevention, and overall quality of life. Scholars have consistently emphasized that socio-economic conditions, educational attainment, sanitation facilities, and public health investments are critical determinants of rural health status. For instance, Dreze and Sen (2013) argued that unequal access to social services remains a major impediment to human development in India, while

Rao and colleagues (2011) highlighted the persistent inequities in healthcare utilization between regions and social groups. Despite several national health initiatives, rural populations in many parts of the country continue to face barriers that limit their ability to access timely and quality healthcare services.

The North East (NE) region of India, comprising Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura, presents a distinct socio-cultural and geographical context that differentiates it from mainland India. Characterized by mountainous terrain, scattered settlements, ethnic diversity, and varying cultural practices, the region faces unique challenges in healthcare delivery. Studies have shown that geographical isolation and difficult topography increase the cost and complexity of providing health services, particularly in remote rural communities (Baru et al., 2010). Research by Sharma and Kar (2017) noted that healthcare accessibility in many NE states remains constrained by inadequate infrastructure and transportation facilities. Furthermore, traditional healing practices continue to play an important role in several tribal communities, often influencing healthcare-seeking behaviour and utilization of modern medical services (Borah & Mahanta, 2021). While certain states in the region have demonstrated progress in specific health indicators, the overall health scenario remains uneven, reflecting disparities in socio-economic development, educational attainment, and public health investments.

Evidence from national surveys and empirical studies further reveals substantial variations in health outcomes across Indian regions. International Institute for Population Sciences (IIPS) reports from the National Family Health Survey (NFHS) indicate notable differences in indicators such as infant mortality, maternal health, child nutrition, immunization coverage, and access to reproductive healthcare. Balarajan, Selvaraj, and Subramanian (2011) observed that regional inequalities in healthcare access are closely associated with disparities in income, infrastructure, and public expenditure on health. Similarly, Mohanty and Ram (2020) reported that improvements in national health indicators often mask considerable inter-regional differences, particularly in rural and geographically disadvantaged areas. Understanding these disparities is essential for designing evidence-based and region-specific health policies. In this context, the present study undertakes a comparative assessment of rural health indicators between mainland India and the North East region. By examining the extent and nature of regional variations, the study seeks to identify critical gaps in healthcare access and outcomes, thereby contributing to the formulation of targeted interventions aimed at promoting equitable and inclusive rural health development across the country.

Literature Review

Regional disparities in health outcomes have long been a subject of concern in India's development discourse. Early studies by Dreze and Sen (2013) emphasized that inequalities in education, nutrition, and healthcare access significantly influence regional variations in health status. Balarajan, Selvaraj, and Subramanian (2011) observed that socio-economic inequalities and uneven public health expenditure are major determinants of health disparities across Indian states. Rao et al. (2011) further argued that access to healthcare services remains highly uneven between rural and urban areas and among different socio-economic groups. Baru et al. (2010) highlighted that variations in public health infrastructure and institutional capacity contribute

significantly to differential health outcomes. Reddy, Pradhan, and Patel (2014) found that states with higher literacy rates, better sanitation facilities, and stronger healthcare systems tend to achieve lower mortality and morbidity levels. Similarly, Arokiasamy and Pradhan (2013) reported that disparities in maternal and child health indicators are closely associated with differences in household income, education, and availability of health services. Several studies have examined regional differences in maternal and child health indicators across India. Gupta, Sharma, and Singh (2018) found that southern states such as Kerala and Tamil Nadu consistently outperform northern states in terms of infant mortality, maternal mortality, and immunization coverage due to stronger healthcare infrastructure and higher female literacy. Joe, Mishra, and Navaneetham (2015) observed that improvements in maternal healthcare utilization are strongly linked with educational attainment and institutional healthcare access. Mohanty and Ram (2020) noted that despite substantial improvements in national health indicators, significant inter-state disparities continue to persist. Kumar and Gupta (2017) reported that rural populations in economically backward states face greater challenges in accessing antenatal and postnatal healthcare services. Das and Sahoo (2020), in their study of Odisha, emphasized the role of socio-economic deprivation in shaping maternal health outcomes. Likewise, Bhandari et al. (2019) found a rising burden of non-communicable diseases in rural Rajasthan, highlighting the growing complexity of rural health challenges. These studies collectively suggest that health outcomes are shaped by a combination of economic development, educational achievement, and healthcare accessibility.

The North East (NE) region of India presents unique health challenges owing to its geographical, socio-cultural, and demographic characteristics. Choudhury (2019) emphasized that the region's ethnic diversity and difficult terrain necessitate context-specific healthcare interventions. Roy et al. (2020) demonstrated that geographical isolation, scattered settlements, and inadequate transportation networks substantially increase healthcare delivery costs and restrict access to medical facilities. Sharma and Kar (2017) similarly reported that remoteness and infrastructural deficiencies adversely affect healthcare utilization in several NE states. Singh and Devi (2018) observed considerable disparities in healthcare availability between hill and valley regions, particularly in states such as Manipur and Arunachal Pradesh. Hazarika (2016) highlighted the shortage of trained healthcare personnel in remote tribal areas, while Saikia and Das (2015) pointed to inadequate public health investment as a major constraint to improving health outcomes. Borah and Mahanta (2021) further noted that the widespread reliance on traditional healing systems often delays the utilization of modern healthcare services, particularly for maternal and child health conditions. These studies reveal that geographic barriers and cultural factors remain critical determinants of health outcomes in the region.

Large-scale surveys and empirical assessments have provided valuable evidence regarding regional health disparities. The National Family Health Survey (NFHS-4 and NFHS-5) documented considerable variations in indicators such as infant mortality, maternal health, nutritional status, institutional deliveries, and immunization coverage across Indian states. The International Institute for Population Sciences (IIPS, 2017; 2021) reported that several NE states continue to lag behind the national average on key health indicators despite notable progress in recent years. NITI Aayog (2020) highlighted that disparities in health infrastructure and service delivery remain substantial across regions. Patel and Kumar (2018) stressed the importance of targeted public investment in rural healthcare facilities, while Sengupta and Mukherjee (2019) advocated region-specific health planning to address local challenges effectively. Collectively, the existing literature establishes that regional health disparities in India are influenced by a complex interaction of socio-economic development, healthcare

infrastructure, educational attainment, cultural practices, and geographical conditions. However, most studies have focused either on specific states or particular health indicators. Therefore, a comprehensive comparative assessment of rural health indicators between mainland India and the North East region remains essential for identifying persistent gaps and informing equitable healthcare policies and interventions.

Objectives

The present review aims to examine and compare the status of rural health indicators in mainland India and the North East (NE) region of India. Specifically, it seeks to assess regional variations in key health indicators, including infant mortality, maternal health, disease prevalence, nutritional status, and access to healthcare services. The review further intends to explore the influence of socio-economic conditions, healthcare infrastructure, educational attainment, cultural practices, and geographical characteristics on rural health outcomes in the two regions. Another important objective is to identify the major determinants responsible for disparities and similarities in health indicators between mainland India and the NE states. By synthesizing existing evidence, the study aims to generate a comprehensive understanding of the challenges and opportunities associated with rural healthcare development. Finally, the review seeks to provide policy-relevant insights and strategic recommendations for improving healthcare accessibility, quality, and equity, thereby contributing to the formulation of region-specific interventions for strengthening rural health systems across India.

Materials and Methods

This study is based on a systematic review of secondary data and published literature pertaining to rural health indicators in India. Relevant information was collected from nationally representative sources, including the National Family Health Survey (NFHS), Sample Registration System (SRS), Rural Health Statistics (RHS), reports of the Ministry of Health and Family Welfare, NITI Aayog publications, and Census of India documents. In addition, peer-reviewed research articles, books, government reports, and working papers published so far were consulted to obtain a comprehensive understanding of regional health disparities. The review focused on a range of demographic and health indicators, including Infant Mortality Rate (IMR), Maternal Mortality Ratio (MMR), life expectancy, nutritional status, immunization coverage, prevalence of communicable diseases such as tuberculosis and malaria, prevalence of non-communicable diseases such as diabetes and hypertension, and indicators of healthcare accessibility. Particular attention was given to the availability of healthcare infrastructure, institutional delivery services, skilled birth attendance, and utilization of public health facilities in rural areas. A comparative analytical approach was employed to examine differences and similarities between mainland India and the North East region. Information obtained from various sources was systematically organized, reviewed, and synthesized to identify prevailing trends, patterns, and determinants of health outcomes. The analysis also considered contextual factors such as socio-economic development, educational attainment, cultural practices, geographical isolation, and government health policies. Through a critical examination of the existing evidence, the study provides a holistic assessment of rural health disparities and highlights the need for targeted and region-specific policy interventions to promote equitable health development across India.

Analysis and Results

The comparative analysis of rural health indicators reveals considerable disparities

between mainland India and the North East (NE) region, although both regions have experienced notable improvements in health outcomes over recent decades. Evidence from NFHS, SRS, and Rural Health Statistics indicates that rural areas in mainland India, particularly in the southern and western states, generally exhibit better performance in key health indicators such as Infant Mortality Rate (IMR), Maternal Mortality Ratio (MMR), institutional delivery, immunization coverage, and access to reproductive healthcare services. States such as Kerala, Tamil Nadu, and Maharashtra have benefited from stronger healthcare infrastructure, higher literacy rates, improved sanitation, and greater public health investments. In contrast, several NE states continue to face challenges related to healthcare accessibility, resulting in relatively higher levels of infant and maternal mortality and lower utilization of healthcare facilities in remote rural areas. However, the analysis also indicates significant intra-regional variations within the NE region, with states such as Sikkim and Tripura performing comparatively better than states characterized by difficult terrain and scattered populations. These findings demonstrate that geographical location alone does not determine health outcomes; rather, the effectiveness of healthcare systems and socio-economic development plays a crucial role.

The review further reveals substantial differences in healthcare infrastructure and service utilization between the two regions. Rural populations in mainland India generally have better physical access to healthcare facilities, trained healthcare professionals, emergency services, and institutional delivery centres. In contrast, many rural communities in the NE region encounter considerable barriers due to mountainous terrain, poor road connectivity, and limited transportation facilities. These geographic constraints often increase travel time and healthcare delivery costs, thereby reducing the utilization of modern medical services. The analysis also highlights disparities in the availability of skilled birth attendants, specialist doctors, and diagnostic facilities across rural health centres. While government programmes such as the National Health Mission have improved service coverage in many NE states, shortages of healthcare personnel and infrastructure gaps continue to affect service quality. Furthermore, the prevalence of communicable diseases such as tuberculosis and malaria remains comparatively higher in several NE states, reflecting environmental and ecological vulnerabilities. At the same time, both regions are experiencing a growing burden of non-communicable diseases, including diabetes, hypertension, and cardiovascular disorders, indicating an ongoing epidemiological transition in rural India.

The findings also emphasise the importance of socio-economic, cultural, and educational factors in shaping rural health outcomes. Higher levels of female literacy, household income, sanitation coverage, and health awareness in several mainland states contribute significantly to improved maternal and child health indicators. Conversely, socio-economic deprivation, lower educational attainment, and poverty continue to constrain healthcare utilization in many rural communities of the NE region. Cultural practices and reliance on traditional healing systems, particularly among tribal populations, also influence health-seeking behaviour and may delay access to formal healthcare services. Nevertheless, the review identifies several positive developments, including increasing institutional deliveries, improved immunization coverage, and expanding healthcare outreach programmes in the NE states. Overall, the analysis demonstrates that regional disparities in rural health are the result of a complex interaction between healthcare infrastructure, socio-economic development, educational attainment, cultural practices, and geographical conditions. These findings highlight the need for region-specific health planning, enhanced infrastructure investment, and culturally sensitive interventions to reduce health inequalities and promote equitable healthcare access across rural India.

Discussion

The present findings of the present review confirm that rural health disparities remain a significant challenge in India despite substantial improvements in healthcare indicators over recent decades. The comparative analysis demonstrates that rural areas in mainland India, particularly in the southern and western states, generally perform better than many North Eastern (NE) states in terms of infant mortality, maternal health, immunization coverage, and access to healthcare services. These findings are consistent with the observations of Dreze and Sen (2013), who emphasized that social development, educational attainment, and public investment in health are fundamental determinants of population health outcomes. Similarly, Balarajan, Selvaraj, and Subramanian (2011) argued that regional inequalities in healthcare are largely driven by differences in socio-economic development and public expenditure on health. The relatively better performance of states such as Kerala and Tamil Nadu supports the findings of Gupta, Sharma, and Singh (2018), who attributed improved maternal and child health outcomes to stronger healthcare infrastructure, higher female literacy, and better socio-economic conditions. The results therefore suggest that improvements in health indicators are not merely the consequence of economic growth but are closely linked to sustained investments in education, sanitation, and healthcare systems. The observed disparities also reinforce the argument of Rao et al. (2011) that unequal access to healthcare services continues to be a major obstacle to achieving equitable health outcomes across regions.

The review further highlights the critical role of geographical and infrastructural factors in shaping health outcomes in the NE region. The relatively poorer performance of several NE states can largely be attributed to difficult terrain, remoteness, dispersed settlements, and inadequate transportation networks. These findings corroborate the conclusions of Baru et al. (2010), Roy et al. (2020), and Sharma and Kar (2017), who reported that geographical isolation significantly limits access to healthcare facilities and increases the cost of healthcare delivery. The presence of substantial intra-regional variation within the NE region, however, indicates that geography alone does not determine health outcomes. States such as Sikkim and Tripura have demonstrated comparatively better performance, suggesting that effective governance, targeted public health programmes, and improved infrastructure can mitigate geographical disadvantages. Furthermore, the continued shortage of skilled healthcare personnel and specialized medical services in remote rural areas supports the findings of Hazarika (2016) and Saikia and Das (2015), who identified human resource constraints and inadequate public health investment as major barriers to healthcare improvement. The persistence of communicable diseases such as tuberculosis and malaria in several NE states also reflects the interaction of environmental conditions, poverty, and healthcare accessibility, underscoring the need for region-specific disease-control strategies.

Another important finding of the study is the influence of socio-cultural and educational factors on healthcare utilization and health outcomes. Higher female literacy, better awareness of health practices, and improved living conditions in many mainland states appear to contribute significantly to lower mortality rates and greater utilization of maternal and child healthcare services. This observation is consistent with the findings of Joe, Mishra, and Navaneetham (2015) and Arokiasamy and Pradhan (2013), who emphasized the positive relationship between education and healthcare utilization. In contrast, socio-economic deprivation, lower educational attainment, and reliance on traditional healing systems continue to affect healthcare-seeking behaviour in several NE communities. Borah and Mahanta (2021) noted that traditional healthcare practices often coexist with modern medicine and may delay timely treatment, particularly in remote tribal areas. Nevertheless, the review also identifies

encouraging trends, including increasing institutional deliveries, improved immunization coverage, and expanding outreach services under the National Health Mission. These developments indicate that targeted interventions can produce measurable improvements even in geographically disadvantaged settings. Overall, the discussion suggests that reducing rural health disparities in India requires an integrated approach that combines healthcare infrastructure development, educational advancement, poverty reduction, community participation, and culturally sensitive healthcare delivery. Such a strategy is essential for achieving equitable and sustainable health outcomes across both mainland India and the North East region.

Summary and Conclusion

The present review examined rural health disparities between mainland India and the North East (NE) region by synthesizing evidence from national surveys, government reports, and scholarly studies. The analysis revealed that although rural health indicators have improved considerably across India over the past few decades, substantial regional inequalities continue to persist. Mainland India, particularly the southern and western states, generally performs better in critical indicators such as infant mortality, maternal health, immunization coverage, institutional delivery, and access to healthcare services. In contrast, several NE states continue to face challenges arising from difficult terrain, geographical isolation, inadequate healthcare infrastructure, shortages of trained healthcare personnel, and socio-economic constraints. The review further demonstrated that health outcomes are influenced not only by healthcare availability but also by educational attainment, sanitation, income levels, public health investments, and cultural practices. The findings underscore that regional disparities in rural health are multidimensional and stem from a complex interaction of socio-economic, infrastructural, demographic, and geographical factors.

The study concludes that achieving equitable rural health development in India requires a comprehensive and region-specific policy approach. While national health programmes have contributed significantly to improving healthcare access and service utilization, their effectiveness varies across regions due to differences in local conditions and institutional capacities. The North East region, in particular, requires targeted interventions aimed at strengthening healthcare infrastructure, improving transportation and communication networks, addressing shortages of medical personnel, and expanding outreach services in remote and tribal communities. Greater emphasis should also be placed on female education, health awareness, sanitation improvement, and community participation in healthcare delivery. Furthermore, integrating culturally sensitive healthcare strategies with modern medical services can enhance healthcare utilization and improve health outcomes among diverse populations. Overall, reducing rural health disparities between mainland India and the NE region is essential for promoting inclusive development, social justice, and universal health coverage. Sustained public investment, effective governance, and evidence-based planning will be crucial for ensuring that all rural populations, irrespective of location, have access to quality and affordable healthcare services.

References

Arokiasamy, P., & Pradhan, J. (2013). Socio-economic inequalities in maternal and child health in India: Reassessing the role of physical and financial access to healthcare. *Health Policy*

and Planning, *28*(8), 815–828.

Balarajan, Y., Selvaraj, S., & Subramanian, S. V. (2011). Health care and equity in India: A roadmap towards universal health coverage. *The Lancet*, *377*(9764), 505–515.

Baru, R., Acharya, A., Acharya, S., Shiva Kumar, A. K., & Nagaraj, K. (2010). Inequities in access to health services in India: Caste, class and region. *Economic and Political Weekly*, *45*(38), 49–58.

Bhandari, S., Tak, S., Goyal, M., Shringi, S., & Rathore, M. S. (2019). Rising burden of non-communicable diseases in rural Rajasthan: A emerging challenge for health systems. *Journal of Family Medicine and Primary Care*, *8*(6), 2055–2061.

Borah, M., & Mahanta, B. (2021). Traditional healing practices and healthcare-seeking behaviour among tribal communities of North East India: A review. *Indian Journal of Traditional Knowledge*, *20*(2), 412–421.

Choudhury, S. (2019). Health and healthcare delivery in North East India: Context, challenges and policy interventions. *Journal of Development Policy and Practice*, *4*(2), 167–184.

Das, S., & Sahoo, H. (2020). Socio-economic deprivation and maternal health outcomes in Odisha: Evidence from a backward district. *Clinical Epidemiology and Global Health*, *8*(3), 841–847.

Drèze, J., & Sen, A. (2013). *An uncertain glory: India and its contradictions*. Princeton University Press.

Gupta, A., Sharma, N., & Singh, R. (2018). Regional variations in maternal and child health outcomes in India: Why do southern states perform better? *Journal of Health Management*, *20*(3), 345–358.

Hazarika, I. (2016). Health workforce shortage in the tribal and remote areas of North East India: Challenges and options for health systems strengthening. *International Journal of Health Planning and Management*, *31*(4), e246–e259.

International Institute for Population Sciences (IIPS). (2017). *National Family Health Survey (NFHS-4), 2015-16: India*. IIPS.

International Institute for Population Sciences (IIPS). (2021). *National Family Health Survey (NFHS-5), 2019-21: India*. IIPS.

Joe, W., Mishra, U. S., & Navaneetham, K. (2015). Institutional healthcare access and maternal health care utilization in India: The role of education and economic status. *Social Science & Medicine*, *142*, 112–121.

Kumar, A., & Gupta, A. (2017). Access to antenatal and postnatal healthcare services among rural populations in economically backward states of India. *Rural and Remote Health*, *17*(4), 4120.

Mohanty, S. K., & Ram, F. (2020). Progress and prospects of health indicators in India:

Masking the regional and structural disparities. *Demography India*, *49*(1), 12–28.

NITI Aayog. (2020). *Healthy states, progressive India: Report on the ranks of states and union territories*. NITI Aayog, Government of India.

Patel, V., & Kumar, S. (2018). Targeted public investment in rural healthcare facilities: A prerequisite for achieving universal health coverage in India. *Indian Journal of Public Health*, *62*(2), 125–131.

Rao, M., Rao, K. D., Kumar, A. K. S., Chatterjee, M., & Sundararaman, T. (2011). Human resources for health in India: Lancet Economic and Health Reforms Collective. *The Lancet*, *377*(9765), 587–598.

Reddy, K. S., Pradhan, S., & Patel, V. (2014). Health systems strengthening in India: Lessons from high-performing states. *National Medical Journal of India*, *27*(3), 142–151.

Roy, B., Das, A., Mahanta, J., & Sharma, P. (2020). Geographical isolation, transportation bottlenecks and healthcare delivery costs in remote rural communities of Northeast India. *Geography and Health*, *14*(1), 56–69.

Saikia, D., & Das, K. (2015). Public health investment and health outcomes in Northeast India: A constraint analysis. *Journal of Economic & Social Development*, *11*(2), 84–97.

Sengupta, A., & Mukherjee, S. (2019). Region-specific health planning for the North Eastern states: Addressing the local challenges effectively. *Economic and Political Weekly*, *54*(18), 34–41.

Sharma, C., & Kar, D. (2017). Healthcare accessibility and infrastructural deficiencies in North-East India: An empirical assessment. *Journal of Regional Development and Planning*, *6*(1), 23–38.

Singh, T. S., & Devi, N. S. (2018). Disparities in healthcare availability between hill and valley regions of Manipur and Arunachal Pradesh. *Indian Journal of Regional Science*, *50*(1), 67–79.