

Healthcare Accessibility and Social Inequality in Rural India: A Geographical Analysis

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Abstract

Healthcare accessibility in rural India is shaped not only by the physical presence of medical facilities but also by distance, human-resource availability, affordability, social position and the quality of care that can actually be obtained. This paper examines the geographical relationship between healthcare accessibility and social inequality in rural India through a secondary-data-based analytical approach. It draws principally on the National Family Health Survey-5 (2019–21), Health Dynamics of India: Infrastructure and Human Resources 2022–23, National Health Accounts 2022–23, and peer-reviewed research on spatial accessibility, healthcare markets and social inequity. The analysis combines the concepts of spatial accessibility, healthcare fit and patient-centred access to examine how territorial disadvantage interacts with poverty, caste and tribal marginalisation, gender and uneven health-system capacity. The findings show substantial deficits in rural Sub-Centres, Primary Health Centres and Community Health Centres relative to population norms, together with an especially serious shortage of specialist personnel. Rural–urban gaps remain visible in antenatal and institutional maternity care, while local evidence demonstrates that the costs of distance fall disproportionately on poorer populations. At the same time, expanded public financing has reduced the long-term share of household out-of-pocket spending, although financial protection remains incomplete. The paper argues that numerical expansion of facilities alone cannot achieve healthcare equity. Rural health planning needs to integrate travel distance, functional staffing, service quality, social deprivation and household capacity to reach and use care. A geographical equity approach is therefore essential for progressing towards effective universal health coverage in India.

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Introduction

Access to healthcare is a fundamental component of population well-being, yet access is neither spatially uniform nor socially neutral. In a geographically extensive and socioeconomically differentiated country such as India, the availability and use of health services vary significantly between metropolitan centres, small towns, accessible rural settlements and remote villages. Rural healthcare is consequently a geographical question as much as a medical or administrative one. Settlement dispersion, transport connectivity, terrain, distance from higher-order centres, location of health facilities and the distribution of trained personnel influence whether residents can obtain timely and appropriate treatment. These spatial conditions operate simultaneously with household income, caste and tribal position, gender relations, education and the capacity to bear direct and indirect costs of treatment.

A narrow definition of accessibility based simply on whether a facility exists within an administrative area can therefore be misleading. Penchansky and Thomas (1981) conceptualised access as the degree of fit between users and the healthcare system, encompassing dimensions such as availability, accessibility, affordability, accommodation and acceptability. Andersen's (1995) behavioural model similarly emphasises that healthcare use depends on predisposing characteristics, enabling resources and healthcare need. Levesque et al. (2013) extended this understanding by locating access at the interface between characteristics of health systems and the abilities of individuals to perceive needs, seek care, reach services, pay for them and engage in treatment. These approaches are particularly relevant to rural India because geographical distance can become a greater barrier when households lack income, transport, information or social autonomy.

India has significantly extended its rural public-health network, but recent official evidence indicates that population coverage and functional capacity remain uneven. In 2022–23, the average rural population covered by a Sub-Centre, Primary Health Centre (PHC) and Community Health Centre (CHC) exceeded corresponding Indian Public Health Standards population norms. National rural requirements simultaneously indicated substantial shortfalls in the numbers of Sub-Centres, PHCs and CHCs, and the gap was even more severe for specialists at rural CHCs (Ministry of Health and Family Welfare, 2024).

The problem is therefore not simply insufficient infrastructure. A building without the required doctor, specialist, diagnostic service, medicine, referral transport or reasonable travel connection may provide considerably less effective access than its administrative classification suggests. Conversely, even where services are nominally available without user fees, marginalised communities may experience cultural, institutional or informational obstacles. This distinction between physical provision and effective accessibility is central to understanding rural health inequality.

National Family Health Survey-5 (NFHS-5, 2019–21) demonstrates that considerable improvements in service utilisation coexist with rural–urban inequalities. Institutional births reached 86.7% in rural India compared with 93.8% in urban India. The percentage of mothers receiving at least four antenatal-care visits was 54.2% in rural areas compared with 68.1% in urban areas; first-trimester antenatal care was also lower in rural areas, at 67.9% compared with 75.5% in urban areas (IIPS & ICF, 2021). Such differences suggest that increased aggregate coverage should not be interpreted as equivalent access across places and social groups.

Existing scholarship has established important dimensions of Indian health inequality. Studies have examined caste, class and regional inequalities; rural health-workforce distribution; informal healthcare markets; geographical distance; and the consequences of poverty for quality and utilisation. Nevertheless, these issues are frequently analysed separately. There remains value in bringing spatial supply, human-resource capacity, utilisation, affordability and social disadvantage into one geographical framework using the latest compatible official evidence. This paper addresses that gap by treating accessibility as a relational outcome produced through the interaction of where services are located, what capacities they possess, and which social groups have the resources to use them.

Accordingly, the study has four objectives: to examine the spatial adequacy and interstate variation of rural public-health infrastructure; to assess how health-workforce shortages influence effective accessibility; to analyse rural–urban and socioeconomic differences in healthcare utilisation and affordability; and to interpret how geographical disadvantage interacts with social inequality to produce unequal healthcare opportunities. The corresponding research questions are: How adequate and spatially balanced is the rural public-health network? To what extent do workforce shortages weaken nominal infrastructure accessibility? How do rural residence and socioeconomic position influence realised healthcare access? Finally, what policy approach can more effectively integrate spatial and social equity in rural health planning?

Literature Review

Health-services research has progressively moved from equating access with service availability towards understanding it as a multidimensional process. Penchansky and Thomas (1981) provided an influential formulation in which accessibility constitutes one dimension of the broader fit between health services and users. Andersen (1995) shifted attention towards individual and household characteristics influencing utilisation, while Levesque et al. (2013) explicitly connected supply-side characteristics to users' capacities to reach and benefit from care. These frameworks collectively imply that geographical proximity is necessary but insufficient: accessibility may fail at multiple points between recognition of illness and receipt of appropriate treatment.

Research on India demonstrates the importance of embedding this conceptual approach in a broader structure of inequality. Balarajan et al. (2011) identified socioeconomic position, geography and gender as major dimensions of healthcare inequality in India and highlighted the role of household expenditure in reinforcing inequity. Baru et al. (2010) similarly conceptualised Indian healthcare inequality through caste, class and regional differences, linking social stratification to unequal availability, utilisation and affordability of services. These studies remain important because they challenge an interpretation of rural healthcare deprivation based solely on aggregate shortages: unequal access is produced through both health-system organisation and historically embedded social relations.

A second strand of literature focuses on provider availability and quality. Karan et al. (2021), using the National Health Workforce Account 2018 and Periodic Labour Force Survey 2017–18, documented substantial variation in the size, composition and distribution of India's health workforce. Their analysis reinforces the distinction between the aggregate number of trained workers and their geographical distribution. A country can increase medical education and the total stock of health personnel while continuing to experience shortages in particular rural and peripheral regions.

Research on rural healthcare markets further complicates the public-infrastructure perspective. Das and Mohpal (2016), studying households in villages in Madhya Pradesh, found substantial dependence on private providers and demonstrated that poorer communities received particularly low-quality primary care. Das et al. (2022), drawing on a survey of 1,519 villages in 19 states, found that most rural providers were private and that a large proportion of the overall provider population was informal. They also identified striking interstate variations in provider quality and cost. These findings show that having a provider nearby cannot automatically be interpreted as receiving qualified or high-quality care.

Geographical health research provides direct evidence of the importance of spatial separation. Ranga and Panda (2014) applied a Three-Step Floating Catchment Area approach to inpatient healthcare in rural districts of Uttar Pradesh and Bihar and demonstrated significant spatial inequalities in access, with proximity to urban agglomerations exerting an important influence. More recent work by Lefebvre et al. (2025), using the Longitudinal Ageing Study in India 2017–19, found that poor hypertensive adults aged 45 years and above were less likely to be aware of their hypertension when a PHC was farther away. Distance, consequently, is not merely a geometric measure: its effects vary by economic resources.

Qualitative evidence adds an important sociocultural dimension. George et al. (2020), studying Indigenous communities in Attapadi, Kerala, found that free services and physical provision did not necessarily translate into effective access. Their work identified barriers operating through cultural relationships, institutional practices and interactions between health services and

Indigenous communities. This is significant for health geography because it shows that relatively favourable state-level health indicators may coexist with highly localised exclusion among particular populations.

The literature therefore converges on three propositions: health access is multidimensional; rural India contains major geographical and provider-quality inequalities; and social disadvantage modifies the capacity to convert healthcare provision into actual use. However, methodological fragmentation remains. National surveys are strong in measuring utilisation but relatively limited in local travel-time analysis; administrative statistics count facilities and personnel but do not necessarily measure functionality or patient experience; GIS studies frequently cover restricted geographical areas; and qualitative studies provide depth but cannot establish national prevalence. The present study addresses this gap through triangulation rather than claiming that any single dataset can provide a complete measure of accessibility.

Research Methodology

The study adopts a descriptive, analytical and comparative secondary-data research design. The geographical unit of interpretation varies according to the available evidence: national rural–urban comparison is used for selected utilisation indicators, while interstate comparisons are used for infrastructure and human-resource inequalities. Findings from district- and community-level peer-reviewed research are incorporated to interpret mechanisms that national averages cannot reveal.

The principal empirical sources are NFHS-5 (2019–21), the Ministry of Health and Family Welfare’s Health Dynamics of India (Infrastructure & Human Resources) 2022–23, and the National Health Accounts (NHA) 2022–23. NFHS-5 provides comparable rural–urban measures of selected maternal-health utilisation and household characteristics. Health Dynamics supplies rural facility requirements, availability and workforce information as of 2022–23. NHA 2022–23 provides official expenditure estimates including government health expenditure and household out-of-pocket expenditure.

Accessibility is operationalised through four linked dimensions. Spatial availability refers to facility-population coverage and shortages of Sub-Centres, PHCs and CHCs. Functional availability considers health personnel, particularly specialist shortages. Realised accessibility is assessed through selected utilisation indicators such as antenatal visits and institutional delivery. Socioeconomic accessibility concerns affordability, household financial burden and evidence that poverty or social marginalisation alters the consequences of distance and provider choice.

The analysis uses descriptive percentage comparison, rural–urban comparison, selected interstate contrasts and interpretive triangulation with peer-reviewed research. It does not estimate causal effects from aggregate data, generate a new composite accessibility index or

undertake original GIS network modelling. The conceptual interpretation combines Penchansky and Thomas's access dimensions with Levesque et al.'s population–health-system interface. Geographical distance is consequently treated as a relational constraint whose effect depends upon service capacity and household resources.

Several limitations require emphasis. The datasets refer to different periods and cannot be merged as though collected simultaneously. NFHS-5 reflects 2019–21 conditions, infrastructure data describe 2022–23, and financial accounts refer to 2022–23. Administrative counts may not reveal opening hours, medicine availability or actual service quality. State averages conceal substantial district, block, tribal and village-level inequalities. Finally, the absence of individual-level microdata analysis means that the paper identifies associations and mechanisms supported by previous research rather than independently estimating causal relationships.

Analysis and Discussion

Spatial Distribution of Rural Health Infrastructure

The rural public-health system is organised hierarchically, with Sub-Centres providing the most local level of contact, PHCs providing primary medical care and CHCs supplying referral and specialist functions. The geographical logic of this system is important: each progressively higher-order facility covers a larger population and territory. Accordingly, shortages at higher levels can greatly increase the distance required for diagnostic, emergency or specialist services.

Official 2022–23 requirements show that rural India needed 194,133 Sub-Centres, 31,770 PHCs and 7,930 CHCs under prevailing population norms. Available rural facilities numbered 165,639 Sub-Centres, 25,354 PHCs and 5,491 CHCs, corresponding to notable shortfalls. Average populations served also exceeded prescribed norms: approximately 5,450 persons per Sub-Centre against a norm of 5,000; 35,602 per PHC against 30,000; and 164,388 per CHC against 120,000 (Ministry of Health and Family Welfare, 2024). The widening divergence as the system moves towards referral-level care suggests that geographical accessibility deteriorates precisely where service complexity increases.

Table 1. Selected Indicators of Rural Healthcare Accessibility in India

Indicator	Rural/latest value	Comparator	Interpretation
Rural Sub-Centre shortfall, 2022–23	22%	—	Deficit in first-contact infrastructure
Rural PHC shortfall, 2022–23	30%	—	Greater deficit at medical primary-care level
Rural CHC shortfall, 2022–23	36%	—	Stronger constraint at referral level
Specialist shortfall at	~80%	—	Major functional-

rural CHCs, 2022–23			capacity deficit
Mothers with ≥ 4 ANC visits, NFHS-5	54.2%	Urban: 68.1%	Persistent utilisation gap
Institutional births, NFHS-5	86.7%	Urban: 93.8%	High coverage but incomplete convergence
Institutional births in public facilities, NFHS-5	65.3%	Urban: 52.6%	Greater rural dependence on public provision
OOPE share of total health expenditure, 2022–23	43.4% nationally	64.2% in 2013–14	Long-term improvement; household burden remains

Sources: IIPS & ICF (2021); Ministry of Health and Family Welfare (2024); National Health Systems Resource Centre (2026).

Human-Resource Geography: From Facility Availability to Functional Access

The existence of a health facility does not guarantee its ability to provide the service for which it was designed. This problem is especially visible at rural CHCs, where specialist vacancies remain severe. The contrast between infrastructure and human resources is analytically revealing: physical availability and clinical capability are distinct dimensions of access. A facility may reduce straight-line distance while patients must still travel to another centre when appropriate personnel are unavailable. The resulting secondary distance is often missing from simple facility-density measures.

Karan et al. (2021) similarly showed that India's health-workforce challenge involves distribution and skill mix, not merely total numbers. Their estimates based on national workforce datasets demonstrate why increases in medical training cannot be assumed to eliminate rural inequalities without mechanisms for geographical deployment and retention. Workforce geography also has implications for continuity of care as India experiences a growing need for long-term management of non-communicable diseases. Unlike a single episode of acute treatment, chronic conditions require repeated screening, follow-up, medication and referral.

Rural–Urban Differences in Realised Healthcare Utilisation

Utilisation indicators provide an important test of whether nominal availability is converted into received care. NFHS-5 shows that 67.9% of rural mothers received a first-trimester antenatal check-up compared with 75.5% of urban mothers. The rural–urban difference was wider for at least four antenatal visits: 54.2% compared with 68.1%. Consumption of iron and folic acid for at least 100 days was reported for 40.2% of rural mothers and 54.0% of urban mothers. Postnatal care for mothers within two days of delivery reached 75.4% in rural areas compared with 84.6% in urban areas (IIPS & ICF, 2021).

Institutional delivery presents a somewhat more favourable but still unequal picture. NFHS-5 reported institutional births for 86.7% of rural deliveries and 93.8% of urban deliveries. Importantly, 65.3% of rural births occurred in public facilities compared with 52.6% in urban areas. This higher rural public-sector share indicates the central role of government infrastructure where private alternatives may be financially or geographically less accessible. It also means that weaknesses in rural public facilities are likely to have distributionally unequal consequences.

These statistics should not be interpreted causally. Lower rural utilisation may reflect facility distance and staffing, but it may also be influenced by income, education, transport, household decision-making, perceived quality and social norms. The conceptual significance lies in their combined operation. A 10-km journey has different implications for a household possessing a vehicle, disposable income and flexible employment than for a landless worker dependent on daily wages and unreliable public transport. Accessibility must therefore be measured as the ability to convert geographical opportunity into actual healthcare use.

Poverty and the Social Production of Distance

Distance is often represented in health geography as kilometres or travel time, but social inequality changes the meaning of that distance. Direct transport expenditure, lost wages, childcare responsibilities, the need for an accompanying family member and uncertainty about whether a doctor will be available can increase the effective cost of a healthcare journey. Consequently, the same physical distance produces unequal burdens across households.

Lefebvre et al. (2025) provide particularly relevant evidence. Using LASI 2017–19, they found that poorer hypertensive adults were less likely to know that they had hypertension when the nearest PHC was farther away. The finding demonstrates an interaction between economic status and geographical accessibility: distance was not merely an independent spatial obstacle but an exclusionary cost concentrated among poorer households.

Socioeconomic inequality also affects the quality of services available within local healthcare markets. Das and Mohpal's (2016) Madhya Pradesh study found that people in poorer communities received particularly low-quality care and that access to more knowledgeable providers increased with socioeconomic status mainly through differences between communities. This suggests a form of place-based socioeconomic sorting: disadvantaged households may live not only farther from formal services but also in local health markets with lower-quality providers.

Das et al. (2022) expanded this argument nationally. Across 1,519 villages in 19 states, they identified substantial reliance on private and informal providers and marked interstate variation in both quality and cost. Their results challenge the assumption that a high local provider count

necessarily represents strong healthcare accessibility. Rural residents may have nearby choices while still lacking access to qualified, affordable and clinically appropriate services.

Caste and tribal marginalisation add further layers to this geography. Baru et al. (2010) placed caste, class and region at the centre of Indian healthcare inequality, arguing that social inequalities are reflected in availability, utilisation and affordability. The Attapadi study by George et al. (2020) demonstrates why physical or financial provision alone may not eliminate exclusion among Indigenous populations. Even where services were nominally free, sociocultural and institutional barriers continued to affect healthcare engagement. Gender must likewise be understood relationally, because rural women may encounter health-system barriers together with constraints in household resources, mobility and decision-making.

Financial Accessibility and the Continuing Household Burden

Geographical access cannot be separated from affordability. Even where public services are nominally free, households may pay for transport, medicines unavailable at the facility, diagnostic tests, food, accommodation or private consultations. Financial constraints also influence whether patients bypass local providers, postpone treatment or discontinue follow-up.

India's long-term health-financing indicators show important progress. According to National Health Accounts estimates for 2022–23, government health expenditure increased substantially compared with 2013–14, while out-of-pocket expenditure declined as a share of total health expenditure. Government health expenditure accounted for 43.7% of total health expenditure and household out-of-pocket expenditure for 43.4% in 2022–23 (National Health Systems Resource Centre, 2026). The evidence supports a conclusion of substantial long-term improvement in financial protection, although a large household burden remains.

This distinction matters particularly for rural inequality. Financial protection mechanisms can reduce the cost of hospital treatment, but they do not automatically correct the geographical distribution of providers or eliminate transport and opportunity costs. Insurance without locally accessible providers may finance treatment while leaving the distance burden substantially intact. Conversely, nearby public primary care can provide substantial financial protection by reducing both medical and travel-related costs before illnesses require hospitalisation.

Towards Effective Rather Than Nominal Accessibility

Taken together, the evidence suggests that rural healthcare accessibility in India should be conceptualised as a chain rather than a single indicator. The chain begins with the spatial presence of a facility but continues through staffing, medicines and diagnostics, transportation and referral, affordability, social acceptability, perceived quality and successful utilisation. Failure at any stage can convert nominal access into practical exclusion.

The evidence demonstrates national deficits at the principal rural facility levels and pronounced interstate variation. Staffing shortages show that counting facilities can substantially overstate effective referral capacity. National utilisation data and peer-reviewed studies further show that poverty, community socioeconomic status and social marginalisation alter both the capacity to reach care and the quality of available alternatives. Increasing facility numbers remains necessary in deficient areas but cannot by itself secure equitable access.

A more geographically sensitive policy framework should therefore allocate resources according to effective service deficits rather than administrative facility counts alone. Planning could combine population size with travel time, road conditions, facility workload, specialist availability and local deprivation. District and block-level accessibility mapping would be especially valuable because state averages conceal substantial intra-state inequality. GIS-based network analysis can identify settlements for which emergency or referral services remain beyond reasonable travel-time thresholds.

Workforce policies also need stronger geographical targeting. Recruitment alone will not address rural inequality unless deployment, housing, working conditions, professional support, career progression and retention are considered together. Telemedicine can reduce selected informational and consultation barriers, but it should complement rather than substitute physical primary-care capacity, because diagnostics, emergencies, maternity services and many treatments require in-person provision.

Finally, socially marginalised populations require more than spatial proximity. Community health workers, culturally appropriate communication, reliable medicines, transparent referral systems and accountable treatment environments can help convert formal entitlement into usable care. In tribal and remote regions, accessibility planning should explicitly incorporate cultural acceptability and transport barriers. The underlying policy principle is straightforward: equality in the number of facilities does not necessarily produce equity in the opportunity to obtain effective healthcare.

Conclusion

This study demonstrates that healthcare inequality in rural India is simultaneously spatial, institutional, economic and social. Rural health infrastructure has expanded substantially, yet official 2022–23 data continue to show significant shortages relative to population requirements, particularly at PHC and CHC levels. More importantly, the large shortage of specialists at rural CHCs reveals a major difference between the existence of infrastructure and its functional capacity. Interstate comparisons further show that rural India cannot be treated as a homogeneous geographical category.

NFHS-5 indicates substantial achievements in institutional delivery and other maternal-health services, but rural–urban differences remain in antenatal visits, institutional delivery and postnatal care. The comparatively high dependence of rural deliveries on public institutions emphasises why the quality and geographical distribution of government services remain central to equity. Evidence from rural healthcare markets additionally demonstrates that nearby private or informal providers cannot automatically be equated with adequate care.

The central finding is that social inequality transforms geographical distance into unequal effective access. Poorer households face greater opportunity and transport costs, have fewer options for bypassing weak local facilities and may live in communities where provider quality itself is lower. Evidence concerning Indigenous populations further demonstrates that free provision and physical proximity may still fail to overcome cultural and institutional exclusion. Thus, healthcare accessibility emerges from the interaction between territory and social position rather than from distance alone.

India has made meaningful long-term progress in public health financing: government expenditure constitutes a substantially larger share of total health expenditure than a decade earlier, while the household out-of-pocket share has fallen. Nevertheless, an out-of-pocket expenditure share of 43.4% of total health expenditure in 2022–23 confirms that affordability remains an important component of accessibility (National Health Systems Resource Centre, 2026).

Policy should consequently move from nominal accessibility towards effective accessibility. Priority should be given to underserved geographical clusters, functional staffing of existing institutions, specialist availability, dependable referral transport, district- and block-level travel-time mapping, financial protection against non-medical costs and socially responsive services for marginalised communities. Future research could combine geocoded facility information, road-network travel times, facility functionality, household-level socioeconomic data and health outcomes to produce fine-scale measures of accessibility.

Healthcare equity in rural India will therefore depend on more than bringing a facility physically closer to a village. It requires ensuring that the facility is functional, affordable, socially acceptable and capable of providing appropriate care, and that residents possess the practical means to reach and use it. Health geography offers a valuable framework for making these inequalities visible and for directing resources towards populations for whom distance and disadvantage continue to reinforce one another.

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