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Geographical Accessibility to Public Healthcare Services in Tribal and Rural Areas: A Review with Special Reference to Kanker District, Chhattisgarh, India

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Abstract- Equitable access to public healthcare is a major concern in rural and tribal regions, where settlement dispersion, transport constraints, socio-economic conditions and uneven distribution of health facilities may influence the ability of people to obtain timely care. This paper reviews the geographical dimensions of access to public healthcare, with special reference to Kanker district in Chhattisgarh, India. It adopts a focused narrative review approach based on published research, established conceptual literature and publicly available government reports. No new household survey, facility audit or GIS-based measurement is claimed. The paper discusses the distinction between the availability of health facilities and people's effective ability to use them; the role of distance, transport, terrain and settlement pattern; and the importance of facility staffing, infrastructure and service readiness. Existing research on Kanker, particularly the study by Majhi and Baghel (2021) on the accessibility and service areas of 31 primary health centres, provides a local evidence base. The review argues that geographical access should be understood as a multidimensional issue rather than as distance alone. It also identifies the need for updated district-level evidence on facility functionality, transport barriers, referral arrangements and people's experiences of accessing care. The paper concludes that strengthening public healthcare in Kanker requires context-sensitive planning, improved primary-level

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services, reliable referral and transport systems, and greater attention to settlements that face multiple forms of disadvantage.

Keywords- Health geography; geographical accessibility; public healthcare; tribal regions; rural health; Kanker district; regional inequality; Chhattisgarh

I. Introduction

Access to healthcare is an essential component of human development and social well-being. The presence of a health institution in a district does not necessarily mean that all residents can obtain timely and appropriate services. People's ability to reach and use healthcare may be influenced by the distance between settlements and facilities, the availability and cost of transport, road conditions, physical terrain, household resources, awareness, cultural factors and the quality of services provided. These concerns make healthcare access an important subject within health geography.

Geographical accessibility is especially significant in rural and tribal regions. Settlements may be dispersed over large areas, transport services may be limited, and roads may be difficult to use during particular seasons. In such circumstances, even a basic health facility may be difficult to reach. The problem is not simply whether a facility exists, but whether people can reach it when they need care and whether the facility can provide the required service. A nearby institution with inadequate staff or medicines may not meet local needs, while a more distant facility may be difficult to access because of transport and referral constraints.

Kanker district, also known as North Bastar Kanker, is located in Chhattisgarh and provides a relevant setting for examining these issues. The district includes rural and tribal populations and settlements distributed across varied physical and socio-

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economic settings. Census of India 2011 district-level information indicates a substantial Scheduled Tribe population and a predominantly rural settlement structure. Such characteristics make it important to understand healthcare access in relation to settlement geography, social conditions and the distribution of public health services.

A directly relevant study was undertaken by Majhi and Baghel (2021), who examined the accessibility and service areas of 31 primary health centres (PHCs) in North Bastar Kanker district. Their work provides a district-specific starting point for discussing the spatial dimension of primary healthcare. The existence of this study also requires any subsequent paper to avoid presenting the same PHC accessibility exercise as a new contribution.

The present paper therefore takes the form of a focused narrative review. It examines the geographical factors that influence access to public healthcare in rural and tribal regions and discusses their relevance to Kanker district. It does not claim to present new field data, a new GIS analysis or a fresh measurement of healthcare coverage. Its purpose is to bring together conceptual perspectives and existing evidence, identify issues that require further attention, and discuss implications for district-level healthcare planning.

II. Conceptual Understanding of Healthcare Accessibility

Healthcare accessibility is a multidimensional concept. Penchansky and Thomas (1981) explained access through interrelated dimensions such as availability, accessibility, accommodation, affordability and acceptability. This approach is useful because it distinguishes the existence of a service from the ability of people to use it. In geographical analysis, the physical relationship between population and health facilities is important, but it is only one part of the wider concept.

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Availability refers to the presence of health facilities, personnel, medicines and services in relation to population needs. Accessibility refers to the effort required to reach a facility, including distance, travel time and transport conditions. Accommodation concerns how the organization of services corresponds to users' needs, such as opening hours and appointment arrangements. Affordability relates to direct and indirect costs, including transport expenses and loss of daily wages. Acceptability concerns whether services are considered appropriate and trustworthy by the communities they are intended to serve.

These dimensions are interconnected. For example, a village may be located near a PHC, but if the facility is not adequately staffed or does not provide the required services, residents may have to travel to a higher-level institution. The additional journey may increase transport costs and delay treatment. Similarly, the physical distance to a facility may be manageable for a household with a private vehicle but difficult for a household dependent on irregular public transport.

It is therefore useful to distinguish potential access from realized access. Potential access describes the opportunity to reach a service, whereas realized access refers to actual use. Actual utilization may be influenced by awareness, household decision-making, gender relations, perceived quality, cultural preferences and previous experiences with health institutions. A geographical review can explain the spatial context of access, but it cannot establish actual utilization without appropriate survey or administrative data.

For these reasons, healthcare accessibility should be understood as a relationship among population distribution, the location and capacity of facilities, transport conditions and the social circumstances of users. This broader understanding is particularly relevant to rural and tribal districts.

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III. Geographical Factors Influencing Access to Public Healthcare

1. Distance and settlement distribution

Distance is one of the most commonly discussed dimensions of healthcare access. When settlements are dispersed, a single health institution may serve a large and geographically extensive area. Residents of settlements located far from facilities may face longer journeys, particularly when transport is unavailable. Straight-line distance, however, does not always represent the route people actually travel. Rivers, hills, forest areas and the availability of roads can make the effective journey longer than the map distance suggests.

Settlement distribution also affects the planning of health services. A facility located near a major road or population centre may be convenient for some villages but less accessible to peripheral settlements. District averages can conceal these local differences. Consequently, planning should consider the distribution of individual settlements and the population served by each facility rather than relying only on the total number of institutions in a district.

2. Roads, transport and travel time

The availability and quality of transport influence whether people can reach healthcare in time. In rural areas, public transport may be infrequent, and households may depend on private vehicles, hired transport or informal arrangements. The cost of travel can become a barrier for low-income families. Poor road conditions and seasonal disruptions may further affect access, particularly for pregnant women, older persons, children and people requiring emergency treatment.

Travel time is often more meaningful than distance because it reflects the practical effort involved in reaching a facility. However, travel time is affected by road condition, vehicle type, weather and transport availability. Published studies and official records

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can indicate broad patterns, but local field evidence is needed to describe current travel conditions accurately.

3. Physical environment and terrain

Physical geography can influence the location of settlements, road development and the delivery of public services. Hilly or forested landscapes may increase the difficulty and cost of transport infrastructure. Seasonal rainfall can affect road usability and travel time. These conditions may create differences between settlements that are geographically close but poorly connected and settlements that are farther away but linked by better roads.

In a district such as Kanker, the relationship between physical environment and healthcare access deserves attention. It should not be assumed, however, that every tribal or forest settlement is inaccessible. The degree of difficulty varies from place to place and must be supported by reliable local evidence.

4. Facility capacity and service availability

Access does not end when a patient reaches a health institution. The availability of doctors, nurses, medicines, diagnostic services, beds and referral arrangements determines whether the institution can respond to health needs. If essential services are unavailable, patients may be referred to higher-level facilities, increasing both travel time and household expenditure.

The number of health institutions is therefore an incomplete measure of healthcare provision. A meaningful assessment should also consider facility type, operational status, staffing and service readiness. These details are particularly important in rural regions where one facility may serve a large catchment population.

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5. Socio-economic and cultural factors

Geographical barriers interact with socio-economic conditions. Poverty, limited education, lack of information, language differences and household responsibilities can influence decisions about seeking care. Women may face additional constraints related to mobility, safety and dependence on other household members for transport. Cultural beliefs and previous experiences with health services may also affect whether people choose to use public facilities.

These factors show why a purely physical interpretation of accessibility is insufficient. Health geography needs to consider the interaction between space and society, while recognizing that the nature and scale of these barriers should be established through credible evidence rather than assumed.

IV. Public Healthcare and Rural-Tribal Settings in India

India's public healthcare system is organized through different levels of service provision, including Sub Health Centres, Primary Health Centres, Community Health Centres and district-level hospitals. These institutions are intended to provide services ranging from preventive and primary care to referral and specialist services. The effective functioning of this network depends on adequate staffing, infrastructure, medicines, transport and coordination between levels of care.

Rural and tribal populations may face particular challenges when settlements are widely dispersed or when transport connections are limited. The distance to a higher-level facility can be especially important for emergencies, childbirth complications and conditions requiring diagnostic or specialist services. Referral systems are therefore a key part of geographical access. A patient may be able to reach a primary facility but still face difficulty in being transferred to a higher-level institution.

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Government publications such as Rural Health Statistics and related health-system reports provide information on infrastructure and human resources at national and state levels. These sources can help describe the broader context, but district-level interpretation requires careful attention to the year, definitions and completeness of the data. A facility count from one year should not be compared uncritically with a population figure from another year.

The World Health Organization's work on health-system monitoring emphasizes the importance of measuring service availability, readiness and access through appropriate indicators. For geographical research, these indicators should be interpreted alongside settlement distribution and transport conditions. This makes it possible to distinguish between the nominal presence of a health facility and the practical ability of people to obtain care.

V. Existing Research Relating to Healthcare Access in Kanker

The most directly relevant published study identified for Kanker is the work of Majhi and Baghel (2021), titled "Accessibility and Service Area Analysis of Primary Health Centres in North Bastar Kanker District, Chhattisgarh." The authors examined the accessibility and service areas of 31 PHCs in the district. Their study used facility-location information and geographical materials, including road-network and terrain-related data, to understand the spatial coverage of primary health centres.

The study is important because it demonstrates that geographical access to PHCs is a relevant issue in Kanker and provides a district-specific evidence base. The authors reported that more than two-fifths of villages were located over 10 kilometres from the nearest PHC. This finding should be understood in the context of the study's data and method; it should not be presented as a current measurement without updated verification.

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The Kanker study also indicates the value of considering transport and physical geography while examining the service areas of health facilities. However, PHC accessibility is only one part of the wider public healthcare system. People may use Sub Health Centres, PHCs, CHCs, district hospitals or other public facilities depending on the nature and seriousness of their health needs. A review of healthcare access should therefore consider the broader hierarchy of services and the referral connections between them.

The present paper differs from the district-specific PHC accessibility study in its purpose and scope. It does not repeat its spatial measurements. Instead, it uses the study as a local reference point within a wider discussion of geographical accessibility, facility capacity, transport barriers and the social dimensions of access. Further research may examine how current facility functionality, staffing, transport availability and community experience influence access across the district. Such questions require updated administrative data and, where possible, field investigation.

VI. Research Gaps and Issues Requiring Further Attention

The available literature and conceptual discussion suggest several areas that deserve further attention in Kanker district.

First, there is a need for updated information on the operational status and service capacity of public health facilities. The presence of a facility in an official list does not necessarily establish that all expected services are consistently available. Staffing, opening hours, medicines and diagnostic services can influence whether a facility meets local needs.

Second, geographical access should be considered across different levels of the healthcare system. A study limited to PHCs may not fully explain access to emergency,

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specialist or referral services. The relationship between primary-level institutions and higher-level facilities is important for understanding the complete patient journey.

Third, transport barriers require more detailed documentation. Distance alone cannot explain whether a person can reach a facility during an emergency or during periods of poor road conditions. Information on transport modes, journey costs, seasonal barriers and referral transport would provide a more realistic account of access.

Fourth, the experiences of different population groups need attention. Rural and tribal communities are not homogeneous, and their access conditions may vary according to settlement location, income, gender, age and other circumstances. Comparisons should be based on reliable data and should avoid treating tribal identity as an automatic indicator of remoteness or disadvantage.

Finally, there is a need to connect geographical evidence with planning decisions. Identifying a remote settlement is only the first step. Planning also requires consideration of whether access can be improved through transport, outreach services, staffing, facility upgrades or changes in referral arrangements. These questions provide a useful direction for future research and policy assessment.

VII. Implications for Healthcare Planning in Kanker District

The review has several implications for district-level planning. First, planning should move beyond the total number of health institutions and consider the population and settlements served by each facility. This can help identify areas where a facility may face high demand relative to its available resources.

Second, the functioning of existing facilities should receive attention alongside the question of new construction. Strengthening staffing, medicine availability, diagnostic

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services and regular service hours may improve the usefulness of facilities that already exist. Any decision about additional facilities should be based on verified local needs and a careful assessment of existing service coverage.

Third, transport and referral arrangements should be treated as integral parts of healthcare access. Reliable emergency transport, coordination between primary and higher-level institutions, and clear referral procedures can reduce delays. In areas where regular transport is limited, outreach services and mobile health activities may help address some access barriers, although their suitability depends on local health needs and implementation capacity.

Fourth, planning should be sensitive to local physical and social conditions. The needs of peripheral settlements may differ from those of larger villages or towns. Consultation with local communities, health workers and panchayat representatives can help identify barriers that are not visible in administrative statistics.

Finally, district health planning should use current and comparable data. Facility information, population estimates and road conditions should be dated and documented. This is essential for monitoring change and evaluating whether interventions are improving access. The present review does not rank Kanker's blocks or villages because such a ranking would require current, verified data. Instead, it identifies the dimensions that should guide a future evidence-based assessment.

VIII. Conclusion

Geographical accessibility to public healthcare is a multidimensional issue shaped by the distribution of settlements, distance, transport, terrain, facility capacity and socio-economic conditions. In rural and tribal regions, the presence of health

institutions does not by itself guarantee equitable access. People must be able to reach facilities and obtain appropriate services when required.

Kanker district provides an important setting for examining these issues. The study by Majhi and Baghel (2021) offers a valuable district-specific account of PHC accessibility and service areas. Building on this evidence, the present review emphasizes the need to consider the wider healthcare network, facility functionality, referral arrangements and the experiences of rural and tribal communities.

As a focused narrative review, this paper does not claim new field findings or updated spatial measurements. Its contribution is to organize the geographical dimensions of healthcare access, identify questions that require further investigation and outline planning priorities. Improving healthcare access in Kanker will require reliable facility data, stronger primary-level services, effective transport and referral systems, and planning that responds to the varied needs of settlements across the district.

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