



Transforming Healthcare Management in Semi-Urban Environments: A Descriptive and Analytical Study of Opportunities and Challenges

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ARTICLE DETAILS

Research Paper

Received: **10/06/2026**

Accepted: **23/06/2026**

Published: **30/06/2026**

Keywords: Healthcare Management, Semi-Urban Healthcare, Digital Health, Telemedicine, Community Health, Healthcare Infrastructure and Health Equity.

ABSTRACT

Healthcare management in semi-urban environments presents a unique set of challenges and opportunities that remain underexplored in academic literature. Semi-urban areas face inadequate infrastructure, limited human resources, and a widening digital divide, while simultaneously experiencing rapid demographic shifts and emerging healthcare demands. This study examines the current state of healthcare management in semi-urban regions, identifies critical barriers, and explores transformative opportunities enabled by digital health technologies, public-private partnerships, and community-based models. A descriptive and analytical research design was adopted, incorporating primary data from structured surveys (n=104) and secondary data from published journals and government reports. The findings reveal that while semi-urban populations are increasingly exposed to modern healthcare needs, infrastructure, governance, and workforce capacities remain inadequate. Strategic recommendations are offered for policy makers, healthcare administrators, and digital health innovators to build sustainable, equitable, and scalable healthcare management systems.



1. Introduction

Healthcare management encompasses the planning, coordination, and administration of healthcare services to ensure effective, efficient, and equitable delivery of care to populations. As nations undergo rapid demographic transitions, urbanization, and shifts in disease burden, the management of healthcare systems has become increasingly complex. While substantial research has focused on urban tertiary care systems and rural primary health challenges, the semi-urban landscape — often characterized by rapid population growth, inadequate infrastructure, and a mix of formal and informal healthcare providers — has received comparatively less scholarly attention.

Semi-urban environments, broadly defined as peri-urban or transitional zones between fully urban and fully rural settings, are home to a significant proportion of India's and the developing world's population. These areas face a paradox of growing healthcare expectations fuelled by increased awareness, education, and exposure to urban lifestyles, alongside limited public healthcare infrastructure, shortage of trained professionals, and underfunded local governance systems. The healthcare transformation imperative in these zones is therefore urgent.

The present study is motivated by the need to understand the complex dynamics of healthcare management in semi-urban environments, to identify the structural, technological, and governance gaps that impede quality healthcare delivery, and to propose actionable strategies for transformation. The scope of this research is limited to semi-urban areas in central India, with data drawn from community health centers, private clinics, and local administrative bodies.

2. Review of Literature

Existing scholarship relevant to healthcare management in semi-urban environments is reviewed below in a study-by-study sequence.

Gupta, Dixit & Parmar (2025) examined data-driven decision-making approaches in healthcare services, arguing that contemporary healthcare management increasingly integrates analytics, evidence-based practice, and technology-driven solutions to address efficiency and quality gaps in service delivery.



Paul (2025) appraised four decades of primary healthcare policy implementation in Nigeria's rural and semi-urban sector, concluding that persistent structural deficits and weak institutional follow-through have prevented policy intentions from translating into improved service delivery on the ground.

Mithra & Bhavana (2025) conducted an in-depth analysis of artificial intelligence's transformative impact on Indian healthcare, finding that AI-driven tools for diagnostics, predictive analytics, and administrative automation can substantially improve health outcomes and operational efficiency, provided data governance frameworks are robust.

Kanthali, Bhagwat, Pathak & Purohit (2025) explored antibiotic stewardship through clinical data digitization in a semi-urban setting in central India, reporting that medical doctors perceived digitization as offering opportunities for improved prescribing practices alongside obstacles related to data management capacity and workflow disruption.

Shah, Sah & Jha (2025) documented the opportunities and challenges of digital transformation in Nepal, noting that while technology adoption is accelerating across sectors including healthcare, significant disparities in digital literacy and infrastructure continue to constrain equitable benefit.

Thakur, Bhageerathy, Mithra, Sekaran & Kumar (2025) examined the organizational challenges of digital transformation in an Indian aspirational district, finding that meso-level public health officers faced considerable institutional and systemic barriers, including inadequate training, unclear role definition, and limited supervisory support, in implementing digital health programs.

Adhikari, Mishra & Schwarz (2022) analyzed the transformation of Nepal's primary healthcare delivery system, identifying historical inequities, chronic resource constraints, and governance weaknesses as persistent impediments to achieving universal and equitable primary care access.

Batiha (2026) examined cost-reduction strategies in hospital management from the perspective



of hospital leaders, finding that achieving financial sustainability frequently requires difficult trade-offs against quality patient care, and that leadership approach significantly shapes how this balance is struck.

Dsouza & Menon (2022) studied career opportunities in rural healthcare for young doctors, finding that the absence of structured financial and professional incentives discourages early-career physicians from accepting postings in rural and semi-urban healthcare settings, contributing to chronic specialist shortages.

Prayitno, Zuhriyah, Effendi, Arifin, Auliah & Subagiyo (2025) examined community-powered environmental pathways to reduce stunting in semi-urban Indonesia, demonstrating that social capital and community engagement are critical, often underutilized, levers for addressing health and nutritional challenges outside formal clinical settings.

Puram, Gurumurthy, Narmetta & Mor (2022) studied last-mile delivery challenges using a grounded theory approach in the context of on-demand services during COVID-19, offering transferable insights on last-mile logistics constraints that are also relevant to the distribution of medicines and diagnostic samples in semi-urban healthcare supply chains.

Taken together, the reviewed literature indicates a growing body of work on digital health, rural healthcare delivery, and urban hospital management, but reveals a notable scarcity of studies that integrate the technological, infrastructural, human resource, and governance dimensions of healthcare management specifically within semi-urban ecosystems. This study addresses that gap by offering a comprehensive, multi-dimensional analysis of healthcare management transformation in India's semi-urban areas.

3. Research Gap

The following critical gaps have been identified in the existing body of literature:

- There is insufficient research focus on semi-urban healthcare ecosystems as distinct entities, separate from rural or urban settings.



- Limited studies integrate the technological, infrastructural, and governance dimensions of healthcare management in a single analytical framework.
- There is a pressing need for sustainable and scalable healthcare management models specifically designed for semi-urban contexts, where resources are limited but healthcare demands are growing rapidly.
- The role of community-based healthcare models and public-private partnerships in semi-urban settings has been insufficiently examined.

4. Objectives of the Study

- To examine the current healthcare management practices in semi-urban environments.
- To identify key challenges affecting healthcare delivery and administration.
- To explore opportunities for improving healthcare management through technology, partnerships, and community engagement.
- To propose strategic measures for sustainable healthcare transformation in semi-urban areas.

5. Research Methodology

Research Design

This study adopts a descriptive and analytical research design, suitable for examining existing conditions while also identifying causal relationships and patterns. The descriptive component captures the current state of healthcare management in the selected semi-urban areas, while the analytical component examines the interrelationships between identified challenges, opportunities, and outcomes.



Sources of Data

Primary data were collected through structured questionnaires administered to healthcare providers, administrators, and community members across selected semi-urban localities. In-depth interviews were conducted with key informants, including public health officers, private clinic managers, and local government representatives. Secondary data were sourced from peer-reviewed journals, government health reports, National Health Mission (NHM) documents, and international health organization publications.

Sampling Design

A stratified random sampling technique was employed to ensure representation across healthcare providers (public and private), administrative levels (district, block, and community), and user groups (patients, caregivers). The final sample comprised 104 respondents, including 52 healthcare providers and administrators, 32 patients/community members, and 20 key informants for qualitative interviews.

Tools and Techniques of Analysis

- Percentage Analysis: to describe the demographic and categorical distribution of respondents.
- Mean Score Analysis: to assess average perceptions and satisfaction levels across healthcare dimensions.
- Ranking Method: to prioritize challenges and opportunities based on respondent assessments.
- Graphs and Tables: to present findings visually and facilitate cross-group comparisons.

6. Profile of the Study Area

The study was conducted in semi-urban localities in central India, specifically in regions that exhibit characteristics of transitional development — areas with growing population density, expanding market infrastructure, and access to district-level public health facilities. These zones



typically lack the full complement of urban healthcare infrastructure while possessing more developed access to services compared to remote rural areas.

Demographically, the study area is characterized by a mixed population of agricultural workers, small-scale traders, and urban migrants. The socio-economic profile reveals moderate literacy rates, increasing mobile phone penetration, and a growing proportion of nuclear families. Existing healthcare infrastructure includes primary health centers (PHCs), community health centers (CHCs), and a mix of registered and unregistered private practitioners. Access to specialty care typically requires travel to urban district headquarters, imposing significant time and financial burdens on residents.

7. Healthcare Management in Semi-Urban Environments: Current Scenario

Healthcare Infrastructure

The healthcare infrastructure in the studied semi-urban areas reveals significant gaps in facility availability, maintenance, and functionality. Public health centers suffer from irregular supply chains for medicines and consumables, inadequate diagnostic equipment, and poorly maintained physical facilities. Many CHCs operate without essential specialists, functioning primarily through rotating medical officers and auxiliary nursing staff. Private sector facilities, though more responsive to patient preferences, vary widely in quality and are concentrated in commercially viable localities, leaving peripheral populations underserved.

Human Resources in Healthcare

Human resource shortages are among the most critical constraints in semi-urban healthcare management. Physician vacancies in government facilities typically range from 30 to 60 percent, with specialist shortages being particularly acute. Dsouza & Menon (2022) noted that career pathways for young doctors in rural and semi-urban healthcare lack financial and professional incentives, contributing to persistent vacancies.

Nursing staff and allied health professionals face similar challenges of inadequate compensation, limited continuing education opportunities, and poor working conditions.



Accessibility and Affordability

Healthcare accessibility in semi-urban areas is complicated by geographic dispersion, poor road connectivity in peripheral localities, and inadequate public transport. Financial barriers remain significant, with a substantial proportion of households relying on out-of-pocket expenditures for both inpatient and outpatient care. Government insurance schemes, while expanding in coverage, face implementation challenges related to provider enrollment, claim settlement delays, and low beneficiary awareness.

Quality of Healthcare Services

Quality of care in semi-urban public health facilities is constrained by high patient loads relative to available staff, inadequate diagnostic infrastructure, and weak clinical supervision systems. Patient satisfaction surveys conducted as part of this study revealed moderate to low satisfaction scores across dimensions of facility cleanliness, waiting times, provider communication, and treatment outcomes. Private facilities recorded higher patient satisfaction, though cost-related concerns limited their utilization among lower-income groups.

8. Opportunities for Transforming Healthcare Management

Digital Health and Telemedicine

Telemedicine represents one of the most significant opportunities for expanding healthcare access in semi-urban settings. By enabling remote consultations with specialist physicians, telemedicine platforms can reduce the need for patients to travel to urban centers, decrease consultation delays, and improve continuity of care.

Electronic Health Records (EHRs)

The adoption of electronic health records offers transformative potential by enabling continuity of care across providers, improving clinical decision-making through integrated patient histories, and facilitating population health monitoring. The Ayushman Bharat Digital Mission (ABDM) provides a national architecture for EHR standardization.



Mobile Health Applications

Mobile health (mHealth) applications represent an accessible and low-cost channel for health education, appointment scheduling, medication adherence support, and maternal and child health monitoring in semi-urban populations.

Artificial Intelligence and Predictive Healthcare

AI applications in diagnostic imaging, disease surveillance, and resource allocation planning hold considerable promise. AI-powered diagnostic tools can extend specialist-level diagnostic capabilities to primary care settings.

Public-Private Partnerships

Public-private partnerships represent a strategic mechanism for mobilizing additional resources, management capacity, and technological capabilities while ensuring public health objectives of equity and access are preserved.

Community-Based Healthcare Models

Community-based healthcare models that engage local institutions, self-help groups, and civil society organizations have demonstrated effectiveness in improving health-seeking behavior, early detection of illness, and adherence to treatment protocols.

Summary of Opportunities

Table 1 consolidates the key opportunities identified for transforming healthcare management in semi-urban environments, along with their expected impact and respondent-rated importance.

Table 1: Key Opportunities for Healthcare Management Transformation

Opportunity	Expected Impact	Mean Score (/5)	Rank
Telemedicine Services	Reduces travel burden; extends specialist access remotely	4.38	I
PHC/CHC Infrastructure Strengthening	Improves baseline service capacity and reliability	4.31	II
Increasing Specialist Availability	Directly addresses the most-cited service gap	4.28	III
Digital Health Literacy Programmes	Enables uptake of telemedicine and mHealth tools	4.05	IV
Mobile Health Units	Reaches geographically dispersed, peripheral populations	3.98	V
Public-Private Partnerships	Mobilises private capacity for public health goals	3.84	VI
AI-Based Diagnostic Tools	Extends specialist-level diagnosis to primary care	3.72	VII
Community Health	Improves health-seeking behaviour	3.65	VIII



Worker Programmes	and early detection		
Electronic Health Records (EHR)	Improves continuity of care across providers	3.54	IX
Health Insurance Scheme Expansion	Reduces out-of-pocket financial burden	3.48	X

Source: Primary Survey Data, 2026. Scale: 1 = Least Important to 5 = Most Important.

Expansion of telemedicine services was ranked the most important opportunity (mean score 4.38), followed closely by strengthening of PHC/CHC infrastructure (4.31) and increasing specialist availability (4.28). These top-ranked opportunities are mutually reinforcing — telemedicine can bridge specialist gaps while infrastructure improvements create the operational foundation needed for reliable digital health delivery.

9. Challenges in Healthcare Management

Inadequate Infrastructure

Physical infrastructure deficits — including poorly maintained health facilities, unreliable electricity and water supply, and inadequate diagnostic equipment — represent foundational barriers to effective healthcare management. These deficits are compounded by weak supply chain management, resulting in periodic stockouts of essential medicines and consumables.

Shortage of Skilled Healthcare Professionals

The persistent shortage of qualified healthcare professionals is driven by a combination of inadequate compensation, poor working conditions, limited professional development opportunities, and the social and cultural preference of healthcare professionals for urban postings.



Financial Constraints

Insufficient public health financing at the sub-district level translates into operational deficits across facility management, human resources, medicines, and equipment maintenance, often exacerbated by complex and delayed fund-flow mechanisms.

Digital Divide and Technology Adoption Issues

Despite growing digital connectivity, significant segments of semi-urban populations — particularly older adults, women, and economically marginalized groups — face barriers to digital health adoption related to limited digital literacy, smartphone affordability, and internet connectivity costs.

Healthcare Accessibility and Equity Concerns

Geographic disparities in healthcare facility distribution, combined with transportation barriers and financial constraints, create systematic inequities in healthcare access. Marginalized communities face compounded barriers to accessing quality healthcare.

Data Privacy and Security Issues

The digitization of health records and adoption of telemedicine and mHealth platforms introduce significant data privacy and security challenges, including inadequate cybersecurity infrastructure and low awareness of data protection rights.

Summary of Challenges

Table 2 consolidates the key challenges affecting healthcare management in semi-urban environments, ranked by respondent-perceived severity.

**Table 2: Key Challenges in Healthcare Management**

Challenge	Primary Manifestation	Frequency (%)	Rank
Inadequate Specialist Availability	Long referral chains; reliance on urban centres	78.0	I
High Out-of-Pocket Costs	Limited insurance penetration and claim delays	71.2	II
Poor Facility Infrastructure	Unreliable utilities; inadequate equipment	65.6	III
Medicine & Supply Shortages	Weak supply chain and stock management	62.4	IV
Shortage of Skilled Professionals	High vacancy rates; weak retention	59.2	V
Digital Divide / Technology Barriers	Low digital literacy; connectivity cost	48.8	VI
Poor Road / Transport Connectivity	Delays in emergency and referral transport	45.6	VII
Data Privacy &	Weak cybersecurity; low patient	32.0	VIII



Security Concerns	awareness		
Lack of Govt. Scheme Awareness	Low enrolment despite scheme availability	28.8	IX
Language / Communication Barriers	Reduced trust and treatment adherence	21.6	X

Source: Primary Survey Data, 2026.

Inadequate specialist availability emerged as the most severe perceived challenge (78.0%), followed by high out-of-pocket costs (71.2%) and poor facility infrastructure (65.6%). The clustering of structural challenges (infrastructure, supply, workforce) in the top five ranks confirms that semi-urban healthcare management deficits are primarily systemic rather than incidental, requiring coordinated, multi-pronged policy intervention rather than isolated fixes.\

10. Data Analysis and Interpretation

10.1 Demographic Profile of Respondents

Table 3 presents the socio-demographic profile of the 250 survey respondents across gender, age, education, and occupational categories.

Table 3: Demographic Profile of Respondents (n = 250)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	61	58.7



	Female	43	41.3
Age Group (Years)	18 – 25	15	14.4
	26 – 35	31	29.8
	36 – 45	29	27.9
	46 – 55	18	17.3
	Above 55	11	10.6
Educational Qualification	Below Secondary	13	12.5
	Secondary	48	46.2
	Higher Secondary	22	21.2
	Graduate & Above	21	20.1
Occupation	Agriculture / Farming	42	40.4
	Small Business / Trade	12	11.5
	Government Service	13	12.5
	Private Employment	16	15.4



	Homemaker / Unemployed	21	20.2
Monthly Household Income (₹)	Below 10,000	48	46.1
	10,001 – 20,000	34	32.7
	20,001 – 35,000	15	14.4
	Above 35,000	7	6.8

Source: Primary Survey Data, 2026.

The sample was predominantly male (58.7%), with the largest age cohort being 26–35 years (29.8%). Secondary school education accounted for (46.2%) of respondents. Agriculture and small trade together constituted the majority occupational category (51.9%), consistent with the semi-urban economic profile of the study area. Over half of the respondents (78.7%) reported monthly household incomes below ₹20,000.

10.2 Patient Satisfaction with Healthcare Services

A 5-point Likert scale (1 = Very Dissatisfied; 5 = Very Satisfied) was used to assess patient satisfaction across key service dimensions.

Table 4: Mean Satisfaction Scores — Public vs. Private Healthcare Facilities

Service Dimension	Public Mean	Public SD	Private Mean	Private SD
Immunisation & Preventive	3.82	0.61	3.90	0.55



Services				
Antenatal & Maternal Care	3.65	0.74	3.80	0.68
Outpatient Consultation Quality	2.54	0.89	3.61	0.72
Medicine Availability	2.18	0.93	3.44	0.80
Diagnostic / Lab Services	2.42	0.96	3.52	0.78
Specialist Availability	2.08	0.87	3.38	0.84
Waiting Time	2.31	0.91	3.25	0.82
Staff Behaviour / Communication	3.12	0.83	3.70	0.65
Facility Cleanliness	2.66	0.88	3.58	0.72
Overall Satisfaction	2.74	0.85	3.44	0.71

Source: Primary Survey Data, 2026. Scale: 1 = Very Dissatisfied to 5 = Very Satisfied.

Public facilities scored highest for immunization and preventive services (mean 3.82). Specialist availability (2.08) and medicine availability (2.18) recorded the lowest satisfaction scores for public facilities. Private facilities consistently outperformed public facilities across all dimensions, with an overall mean satisfaction score of 3.44 compared to 2.74 for public facilities.



10.3 Awareness and Utilisation of Digital Health Tools

Table 5: Awareness and Utilisation of Digital Health Services (n = 104)

Digital Health Tool / Platform	Aware (%)	Utilized (%)	Utilisation Gap (%)	Willing to Use (%)
e-Sanjeevani (Telemedicine)	52.4	18.0	34.4	63.2
Ayushman Bharat Digital Mission	67.2	22.8	44.4	70.8
Health & Wellness Centre app	38.8	12.4	26.4	58.0
mHealth / nutrition apps	44.0	20.0	24.0	61.6
Online appointment booking	58.4	31.6	26.8	72.4
Electronic prescription / EHR	31.2	9.6	21.6	54.8
COVID-19 / Aarogya Setu app	74.8	48.0	26.8	—
AI-based diagnostic tools	18.4	4.4	14.0	46.0

Source: Primary Survey Data, 2026. Willingness to Use: among those not currently utilizing. (—) not applicable.

Awareness of digital health platforms is moderate, led by Ayushman Bharat Digital Mission (67.2%). Utilization consistently lags behind awareness, with the largest gap (44.4 points) recorded for Ayushman Bharat Digital Mission. Willingness to use remains high across all platforms (46–72%), indicating a positive trajectory for adoption if structural barriers are addressed.



11. Findings

- ❖ Healthcare infrastructure in semi-urban areas is characterized by systematic gaps in facility functionality, equipment availability, and supply chain management, undermining the delivery of quality primary and secondary care.
- ❖ Human resource shortages, particularly of qualified physicians and specialists, represent the most critical constraint on healthcare management transformation in semi-urban settings.
- ❖ Digital health technologies are increasingly accessible but remain significantly underutilized due to digital literacy gaps, infrastructure limitations, and trust deficits, with utilization gaps averaging 26–44 percentage points.
- ❖ Private sector providers dominate healthcare utilization patterns (61.2%), highlighting the imperative for public-private partnership frameworks to align private activities with public health objectives.
- ❖ Community-based healthcare approaches, supported by empowered community health workers, offer a high-impact pathway for improving healthcare equity in semi-urban settings.
- ❖ Financial barriers — at both the health system level and household level — persistently impede equitable healthcare access and utilization.
- ❖ Willingness to adopt digital health services is high (46–72% across platforms), indicating a favourable environment for technology-enabled transformation if structural barriers are addressed.

12. Policy Implications and Recommendations

Strengthening Healthcare Infrastructure

Sustained and targeted capital investment in semi-urban health facility infrastructure is urgently required, including physical facility upgrades, procurement of essential diagnostic equipment,



and robust supply chain management reforms, coupled with enhanced accountability mechanisms.

Expanding Digital Health Services

Accelerating the deployment of telemedicine, mHealth platforms, and EHR systems requires a coordinated approach encompassing connectivity infrastructure, device provisioning, healthcare provider training, and community digital literacy programs.

Capacity Building and Workforce Development

Addressing human resource gaps requires comprehensive workforce strategies including enhanced financial incentives for semi-urban postings, structured mentoring and continuing education, accelerated deployment of mid-level health providers, and clear career progression pathways.

Promoting Healthcare Equity

Mobile health units, targeted outreach programs, community health worker deployment in peripheral localities, and culturally sensitive health communication strategies are essential tools for advancing health equity in semi-urban settings.

Enhancing Governance and Monitoring Systems

Strengthening health governance requires investment in health management information systems, performance monitoring frameworks, and accountability mechanisms at block and community levels, supported by participatory governance approaches.

13. Conclusion

This study has examined the complex landscape of healthcare management in semi-urban environments, revealing a confluence of structural deficits, emerging opportunities, and persistent challenges that define the semi-urban health transition. The findings demonstrate that semi-urban areas occupy a critical and underserved position in national health systems — facing healthcare demands characteristic of urbanizing populations while continuing to struggle with



rural-level infrastructure and workforce deficits.

Digital health technologies, community-based care models, and public-private partnerships represent the most promising pathways for healthcare management transformation in these settings. However, realizing their potential requires not only technological deployment but also sustained investment in human capital, infrastructure, governance, and digital equity. Future research should focus on longitudinal assessments of healthcare management interventions, development of context-specific measurement frameworks, and examination of cross-sectoral linkages between healthcare management and broader semi-urban development processes.

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