The Impact of AI on Healthcare Accessibility in India: A Case Study of Medical Professionals in Chhatrapati Sambhajinagar

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Abstract:

Artificial Intelligence (AI) has the potential to significantly increase healthcare accessibility in India, especially in areas where medical resources were limited. This study investigates the impact of AI on healthcare accessibility from the perspective of medical professionals in Chhatrapati Sambhajinagar, an urbanizing city in Maharashtra. A survey was conducted with 30 medical professionals to study their perceptions on how AI can improve healthcare accessibility in both urban and rural contexts. The study analyze factors such as the benefits of AI in diagnosing & treatment, the challenges of AI integration, and the impact of AI on reducing disparities in healthcare access. Data analysis reveals that the potential for AI to enhance accessibility is recognized, but several barriers such as cost, training, and infrastructure remain

Keywords: Artificial Intelligence (AI), healthcare, perceptions, diagnosing, treatment

1. Introduction

India, a nation with a population exceeding 1.4 billion people, faces considerable obstacles in providing equitable, high quality healthcare services. The prominent issue is disparity in healthcare access between urban and rural regions, where rural communities frequently lacking timely and adequate medical services. According to World Health Organization (WHO) approximately 70% of India's population resides in rural areas, while 80% of healthcare professionals are located in urban areas (WHO, 2020). This geographical disparity resulted in limited access to high quality healthcare services for rural community.

In recent years, Artificial Intelligence (AI) has becomes a pivotal tool for bridging the existing healthcare gap. Various AI technologies, including machine learning algorithms and natural language processing, have been incorporated into healthcare systems to enhance diagnosis, treatment planning, and medical research. Research indicates that AI can support healthcare professionals in making more precise diagnoses, forecasting patient outcomes, and optimizing administrative tasks (Rajpurkar, 2018). Additionally, AI powered telemedicine platforms have immense potential to bring quality healthcare services to underserved areas, thereby addressing the healthcare accessibility gap in rural India (Kumar, 2021).

The shortage of medical professionals is a significant issue, as India only having approximately 9 doctors per 10,000 people, which is below the global average of 14 per 10,000 (Economic Survey, 2021). Furthermore, the nation experiencing a shortage of specialized healthcare services, particularly in

rural and remote areas. This limited of access to healthcare has resulted in an increased burden of disease, with rural populations from preventable conditions like cardiovascular diseases, cancer, and diabetes.

Chhatrapati Sambhajinagar, a district in the state of Maharashtra, is characterized by mix of urban and rural populations, and the city's healthcare system faces numerous issues seen across India. With a population of approximately 16.7 lakh people (Census, 2011), Chhatrapati Sambhajinagar is essential medical hub for surrounding rural areas. The city hosts several public and private hospitals, including the Government Medical College and Hospital (GMCH), which provides tertiary care to the population. However, despite having multiple medical facilities, there is still a shortage of medical professionals, and the healthcare infrastructure is under pressure due to the growing population and demand for services.

The healthcare facilities in Chhatrapati Sambhajinagar are predominantly located in urban areas, resulting in restricted access to specialized medical care services for rural population. The healthcare system in the city faces numerous challenges such as hospitals overcrowding, shortage of healthcare workers, and long waiting periods. According to the Economic Survey (2021) indicates that Maharashtra has about approximately 1.6 doctors for every 1,000 people, which is below the recommended standards and is highlighting the healthcare workforce shortage in Chhatrapati Sambhajinagar.

This paper examines the influence of AI on healthcare accessibility in India, specifically through a case study of medical professionals in Chhatrapati Sambhajinagar, a city located in Maharashtra. By conducting interviews with healthcare practitioners, data analysis, and a reviewing of existing literature, this study explores the way AI affecting medical practices, patient outcomes, and accessibility within the region.

2. Literature Review

1. A study by Binns et al. (2020) on AI's ethical and privacy concerns in healthcare finds that while AI can improve data security, privacy risks remain, and ethical issues surrounding decision-making need to be addressed.

2. Rajpurkar et al. (2018) compare AI diagnostic tools and human diagnoses, showing that AI has higher accuracy in diagnosing diseases like cancer and pneumonia, emphasizing its potential to improve diagnostic accuracy.

3. Kumar et al. (2021) highlight how AI-powered telemedicine in rural India reduces travel costs and wait times, improving healthcare access in underserved areas.

4. A review by Patel et al. (2020) of AI applications in healthcare reveals that AI can significantly reduce healthcare costs through early disease detection, automating tasks, and improving operational efficiency in hospitals

1. 5 According to a global survey by the World Health Organization (2020), AI can bridge healthcare access gaps, particularly in rural regions, by providing diagnostic support and reducing human error, ultimately improving accessibility.

5. Singh & Sharma (2020) show that AI-powered diagnostic tools and telemedicine improve healthcare access in remote regions by offering faster consultations and reducing the travel burden on patients.

6. Joshi & Patil (2020) find that AI integration improves healthcare efficiency by automating administrative tasks and reducing waiting times, though rural areas face infrastructure challenges that hinder its adoption

7. Agarwal et al. (2021) demonstrate that AI can reduce healthcare costs by enabling early diagnosis, minimizing unnecessary procedures, and optimizing hospital resources, which could lower financial burdens for both patients and providers.

3. Research Objectives

1. To investigate the perceptions of medical professionals in Chhatrapati Sambhajinagar regarding AI's potential to improve healthcare accessibility.
2. To identify the benefits and challenges associated with the adoption of AI in healthcare.
3. To analyze the factors that influence healthcare professionals' willingness to adopt AI-based tools.
4. To explore the impact of AI on reducing healthcare disparities in urban and rural regions of Chhatrapati Sambhajinagar.

4. Research Methodology

A quantitative survey was conducted with 30 medical professionals in Chhatrapati Sambhajinagar, including general practitioners, specialists, and surgeons. The survey consisted of 15 questions focused on:

- Awareness and knowledge of AI in healthcare.
- Perceived benefits and challenges of AI integration.
- Trust in AI-based diagnostic and treatment tools.
- Hurdles to the adoption of AI in healthcare practices.

The sample size of 30 respondents was selected using purposive sampling, targeting medical professionals.

Data Collection Tools:

- Online survey questionnaire distributed via email and social media.

Data Analysis:

Descriptive statistics were used to analyze the responses. Data were presented as percentages to showcase the distribution of opinions, with special emphasis on the barriers and benefits identified by medical professionals. Additionally, a Chi-square test was used to assess the relationship between respondents' perceptions of AI and their age, specialty, and years of practice.

5. Discussion of Results

5.1. Demographics of Respondents

Table 1.1

Category	Frequency (n=30)	Percentage (%)
Gender		
Male	16	53.30%
Female	14	46.70%
Professional Category		
General Practitioners (GPs)	12	40%
Specialists (Cardiologists, Dermatologists, etc.)	10	33.30%

Surgeons	8	26.70%
Years of Practice		
Average	10.5 years	-
Range	2 to 25 years	-

Source: primary survey

The data presents the demographic and professional profile of 30 medical professionals. In terms of gender, 53.30% of the respondents are male, while 46.70% are female. Regarding their professional categories, 40% are General Practitioners (GPs), 33.30% are specialists, such as cardiologists and dermatologists, and 26.70% are surgeons. The average year of practice among the respondents is 10.5 years, with a range of 2 to 25 years. This data provides a snapshot of the respondents' gender distribution, professional roles, and experience in the medical field.

5.2. Awareness and Knowledge of AI in Healthcare

Table 1.2

Question	Response Options	Frequency (n=30)	Percentage (%)
Are you aware of AI in healthcare?	Yes	24	80%
	No	6	20%
Do you feel knowledgeable about AI in your specialty?	Yes	16	55%
	No	14	45%

Source: primary survey

The above table 1.2 shows that out of 30 medical professionals surveyed, 80% are aware of AI in healthcare, showing a strong familiarity with the concept. However, when asked if they feel knowledgeable about AI in their specific field, only 55% felt confident, while 45% admitted they didn't know much about how AI relates to their specialty. This shows that while many are aware of AI, there is still a need for more learning and training to help them understand how it can be used in their own practice

5.3 Perceived Benefits of AI in Healthcare

Table 1.3

Benefit	Agree	Neutral	Disagree
Improved Diagnostic Accuracy	24 (80%)	4 (13.3%)	2 (6.7%)
Reducing Human Error	21 (70%)	5 (16.7%)	4 (13.3%)
Enhancing Accessibility in Rural Areas	19 (65%)	7 (23.3%)	4 (13.3%)
Optimizing Healthcare Delivery	18 (60%)	8 (26.7%)	4 (13.3%)

Source: primary survey

The table 1.3 data highlights that a significant majority of medical professionals see AI as a powerful tool for improving healthcare. Most respondents believe AI can enhance diagnostic accuracy (80%) and reduce human error (70%), which can lead to better patient outcomes. Additionally, many professionals agree that AI has the potential to improve healthcare accessibility in rural areas (65%) and streamline

healthcare delivery (60%), making the system more efficient. However, while the benefits are widely recognized, a few respondents remain neutral or sceptical, indicating that more awareness and understanding are needed to fully embrace AI's role in healthcare.

5.4 Perceived Challenges of AI in Healthcare

Table 1.4

Challenge	Agree	Neutral	Disagree
High Cost of AI Technologies	21 (70%)	5 (16.7%)	4 (13.3%)
Lack of Training for Medical Professionals	18 (60%)	8 (26.7%)	4 (13.3%)
Infrastructure Limitations in Rural Areas	16 (53.3%)	9 (30%)	5 (16.7%)
Ethical and Privacy Concerns	14 (45%)	10 (33.3%)	6 (20%)

Source: primary survey

The survey data in table 1.4 identifies several challenges in adopting AI in healthcare. The high cost of AI technologies is the biggest concern, with 70% agreeing it's a major barrier. Lack of training for medical professionals is also a challenge (60%), along with infrastructure limitations in rural areas (53.3%). Ethical and privacy concerns are a worry for 45% of respondents. While these challenges are significant, some respondents remain neutral or disagree, indicating that these issues can potentially be addressed through better solutions and resources.

5.5 Trust in AI-Based Systems

Table 1.5

System Type	Trust	Neutral	Distrust
AI Diagnostic Tools (e.g., radiology, imaging)	17 (58%)	8 (26.7%)	5 (16.7%)
Robotic-Assisted Surgery	13 (45%)	9 (30%)	8 (26.7%)

Source: primary survey

The survey shows that 58% of respondents trust AI diagnostic tools like radiology and imaging, while 26.7% are neutral, and 16.7% distrust them. For robotic-assisted surgery, 45% trust the technology, 30% is neutral, and 26.7% distrust it. This indicates higher trust in AI diagnostics compared to robotic surgery, where more scepticism exists.

5.6 Impact of AI on Healthcare Accessibility

Table 1.6

Impact	Agree	Neutral	Disagree
Improvement in Healthcare Accessibility in Rural Areas	22 (75%)	6 (20%)	2 (6.7%)
Improvement in Healthcare Delivery in Urban Hospitals	19 (65%)	7 (23.3%)	4 (13.3%)

Source: primary survey

The survey shows that 75% of respondents believe AI improves healthcare accessibility in rural areas, with only a small percentage disagreeing (6.7%). In urban hospitals, 65% think AI enhances healthcare delivery, though there is slightly more scepticism, with 13.3% disagreeing. Overall, AI is seen as having a greater impact on rural healthcare compared to urban settings

5.7 Chi-Square Test Results

The following table summarizes the results of the Chi-square tests to determine if there is a significant relationship between certain variables such as age, specialty, and years of practice, and the trust in AI technologies.

Table 1.7

Variable	Factor	P-value
Age	Younger doctors (under 40) were more likely to trust AI than older doctors (over 50)	0.03
Specialty	Surgeons were more skeptical of AI in surgery than GPs and specialists	0.05
Years of Practice	Doctors with more than 15 years of experience showed less trust in AI	0.02

Source: primary survey

The Chi-square test results highlight that trust in AI varies based on age**,** specialty**,** and years of practice**.** Younger doctors (under 40) are more likely to trust AI (p-value = 0.03), possibly due to greater comfort with technology. Surgeons are more sceptical about AI in surgery (p-value = 0.05), likely due to concerns about AI's reliability in high-risk procedures. Additionally, doctors with more than 15 years of experience show less trust in AI (p-value = 0.02), potentially because of their reliance on traditional methods.

6. Conclusion

The integration of AI in healthcare improves the not only accessibility but also quality of medical services in Chhatrapati Sambhajinagar & across India. As data analysis highlighted AI driven tools shows increasing diagnostic accuracy, reduce workload, and penetrating healthcare in the underserved populations. However challenges such as limited infrastructure, data privacy concerns, need for continuous of healthcare workers must be addressed to fully leveraged AI's capabilities. By fostering collaborations between the government agencies, healthcare professionals, and technology developers, AI can be a transformative catalyst in making healthcare more accessible, efficient, and equitable for all and to meet sustainable development goal 3 " Good Health & Well being".

7. References

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