

E-Commerce and Public Health: Bridging Accessibility Gaps for Healthcare Products in India

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KEYWORDS	ABSTRACT
Accessibility, consumer behavior, digital literacy, e-commerce, healthcare infrastructure, public health, rural population, trust.	<p>Purpose This study explores the role of e-commerce in bridging the accessibility gaps for healthcare products in India, particularly between urban and rural populations. It examines consumer behavior, preferences, and challenges associated with using e-commerce platforms for healthcare while also evaluating their potential impact on public health outcomes.</p> <p>Design/Methodology/Approach A descriptive research design was employed with data collected from 725 respondents across metropolitan and major cities in South India. The study utilized a stratified random sampling method to ensure diverse sociodemographic representations. Statistical tools, such as independent samples t-test, multinomial logistic regression, and chi-square tests, were applied to analyze accessibility differences, demographic influences, and challenges.</p> <p>Findings The analysis revealed significant differences in accessibility scores between urban and rural respondents, with urban populations benefiting the most. Demographic factors, such as age and income, significantly influenced consumer behavior, while trust and safety concerns were prominent among rural respondents. Challenges such as digital literacy and product authenticity have been found to affect purchase frequency. The study also highlights the transformative potential of e-commerce platforms to improve healthcare access and public health outcomes.</p> <p>Practical Implications The findings underscore the need for targeted policies, rural-focused strategies, and public-private collaborations to address infrastructure gaps, build trust, and enhance the adoption of e-commerce for healthcare.</p> <p>Originality/Value This study contributes to the limited research on the integration of e-commerce with healthcare in India by providing actionable insights for policymakers, e-commerce platforms, and public health stakeholders.</p>

Introduction

Access to healthcare products is a critical component of public health systems; however, significant gaps persist in ensuring their availability and affordability, particularly in rural India. Limited infrastructure, logistical barriers, and a lack of retail healthcare outlets often leave underserved rural populations, exacerbating health inequality (Kumar et al. 2020). These challenges are further intensified by economic disparities and the high costs associated with traditional supply chain mechanisms (World, 2021).

In recent years, the rapid growth of e-commerce in India has emerged as a potential solution for these accessibility issues. With the proliferation of smartphones and affordable Internet services, online platforms have revolutionized the way goods and services are delivered across the country, including healthcare products. E-commerce offers the advantage of reaching remote areas, enabling access to a wide range of products, often at competitive prices (Gupta

and Singh, 2022). Platforms such as 1 mg, Netmeds, and PharmEasy have played pivotal roles in delivering essential medications and healthcare supplies to both urban and rural consumers (Rao, 2023).

This study explored the intersection between e-commerce and public health by addressing three key objectives:

To assess the role of e-commerce in improving accessibility to healthcare products in rural and urban areas of India.

To analyze consumer behavior and preferences in purchasing healthcare products through e-commerce platforms.

To evaluate the challenges and opportunities faced by e-commerce platforms in addressing public health needs in India.

Through this research, we aim to provide actionable insights that can help policymakers and e-commerce stakeholders bridge the accessibility gap and ensure equitable access to healthcare products across the country.

Background

The distribution of healthcare products in India faces several challenges and opportunities, highlighting the complexity of ensuring equitable access to essential medical supplies across the country. India relies heavily on imports of medical devices, with approximately 70% of these devices being sourced internationally. This dependency underscores the need for domestic manufacturing expansion, as the Indian medical device market, currently valued at \$5.2 billion, is projected to reach \$50 billion by 2025, establishing it as one of the top 20 medical device markets globally (Manu & Anand, 2021). However, logistical and infrastructural challenges persist, particularly in developing states. For example, the distribution of pharmaceutical products such as vaccines faces significant hurdles in states such as Bihar, where poor health infrastructure and multidimensional poverty have hampered efforts to achieve equitable access (Kumar et al., 2024).

Moreover, the geographical distribution of healthcare services is uneven. States such as Tamil Nadu, Karnataka, and Maharashtra have higher concentrations of medical colleges and better healthcare facilities, whereas states such as Bihar, Odisha, and Madhya Pradesh lag in providing adequate healthcare resources relative to their populations (Mondal et al., 2023). To address these challenges, the Indian government has launched initiatives such as increasing healthcare budgets, implementing AI/ML-driven treatment workflows, and encouraging domestic manufacturing of medical devices (Ghia & Rambhad, 2023).

A significant factor contributing to these disparities is the urban-rural digital divide. Rural areas often lack reliable digital infrastructure and high-speed broadband, further limiting access to healthcare products and services (Philip et al., 2017). This digital gap extends beyond infrastructure, as rural communities also face challenges in digital competence and literacy, which hinders their ability to effectively leverage e-commerce platforms (Lin et al., 2023). Bridging this divide requires a comprehensive approach that combines infrastructure development with efforts to improve digital skills and literacy in rural areas (Meng et al. 2023). Despite these challenges, the rapid growth of e-commerce in India presents a transformative opportunity to address the accessibility gaps in healthcare product distribution. The proliferation of affordable smartphones and Internet services has fueled a shift in consumer behavior towards online shopping, including for healthcare products. India's e-commerce market is projected to grow from USD 7,896 million in 2023 to USD 17,647.3 million by 2028, reflecting an annual growth rate of 22.3% (Kundu et al., 2024). However, challenges such as security concerns in online transactions and trust issues remain significant barriers to realizing the full potential of e-commerce in healthcare distribution (Franco and S, 2016). The implementation of laws such as the Consumer Protection Act (2019) and the Consumer Protection (E-commerce) Rules (2020) is expected to boost consumer trust and drive further growth in the sector (Chawla & Kumar, 2021).

Research Gap

While the potential of e-commerce to address healthcare accessibility challenges in India is widely recognized, there is limited research on its effectiveness in bridging urban-rural disparities and addressing specific challenges faced by underserved communities. Most studies focus on the overall growth of e-commerce or healthcare distribution separately, leaving a gap in the understanding of how digital platforms can effectively integrate with public health objectives to ensure equitable access. This study aims to fill this gap by examining the role of e-commerce in bridging accessibility gaps for healthcare products, particularly in rural areas, and evaluating its impact on public health outcomes.

Research Methodology

This study adopts a quantitative research design to analyze the role of e-commerce in bridging the accessibility gaps for healthcare products in South India. A descriptive research design was employed to collect and analyze data systematically, enabling a comprehensive understanding of consumer behavior, preferences, and challenges in accessing healthcare products online. This study focuses on metropolitan and major cities in the South Indian states, including Tamil Nadu, Karnataka, Kerala, Andhra Pradesh, and Telangana, chosen for their higher population density and better digital connectivity. A stratified random sampling method was used to ensure representation from diverse sociodemographic groups, with 1,000 distributed questionnaires and 725 valid responses received, yielding a response rate of 72.5%. The sample size was statistically validated to ensure reliability and generalizability. Ethical guidelines adhered to voluntary participation and informed consent, and the confidentiality and anonymity of the respondents were maintained throughout the study. However, the scope of this study is limited to urban areas, potentially excluding rural populations, and reliance on digital questionnaires may have introduced bias by excluding individuals without Internet access. This methodology provides a practical and reliable framework for evaluating the impact of e-commerce on healthcare accessibility in South India and offers valuable insights for policymakers and e-commerce platform developers.

Hypotheses

Objective 1: To assess the role of e-commerce in improving accessibility to healthcare products in the rural and urban areas of India.

Hypothesis 1 (H₁): There is a significant difference between rural and urban areas in the accessibility of healthcare products through e-commerce platforms.

Objective 2: To analyze consumer behavior and preferences when purchasing healthcare products through e-commerce platforms.

Hypothesis 2 (H₂): Demographic factors (such as age, income, and educational level) significantly influence consumer behavior and preferences for purchasing healthcare products online.

Objective 3: To evaluate the challenges and opportunities faced by e-commerce platforms to address public health needs in India.

Hypothesis 3 (H₃): There is a significant association between perceived challenges (e.g., digital literacy and security concerns) and the frequency of healthcare product purchases through e-commerce platforms.

Data analysis and Interpretation

Demographic profile of the sample respondents

The demographic profiles of the respondents provided valuable insights into the characteristics of the study participants, including their age, gender, education, income, and location. Understanding these attributes is critical for analyzing e-commerce adoption and its role in bridging healthcare accessibility gaps. The study sample comprised 725 respondents from major cities in South India, ensuring representation across various sociodemographic groups. This profile helps to identify patterns, preferences, and challenges associated with healthcare e-commerce platforms in the region.

Table 1: Demographic profile of the sample respondents

Demographic Profile	Options	Frequency	Percentage (%)
Age	26–35	159	22
	Above 50	149	21
	36–50	148	20
	Below 18	137	19
	18–25	132	18
Gender	Male	250	34
	Female	247	34
	Other	228	31
Educational Qualification	Professional Degree	158	22
	Below High School	153	21
	Graduate	146	20
	High School	139	19
	Postgraduate	129	18
Monthly Income (INR)	10,001–25,000	173	24
	Above 1,00,000	161	22
	25,001–50,000	134	18
	Less than 10,000	129	18
	50,001–1,00,000	128	18
Location	Rural	259	36
	Urban	258	36
	Semi-Urban	208	29

Source: Computed from survey data, 2025

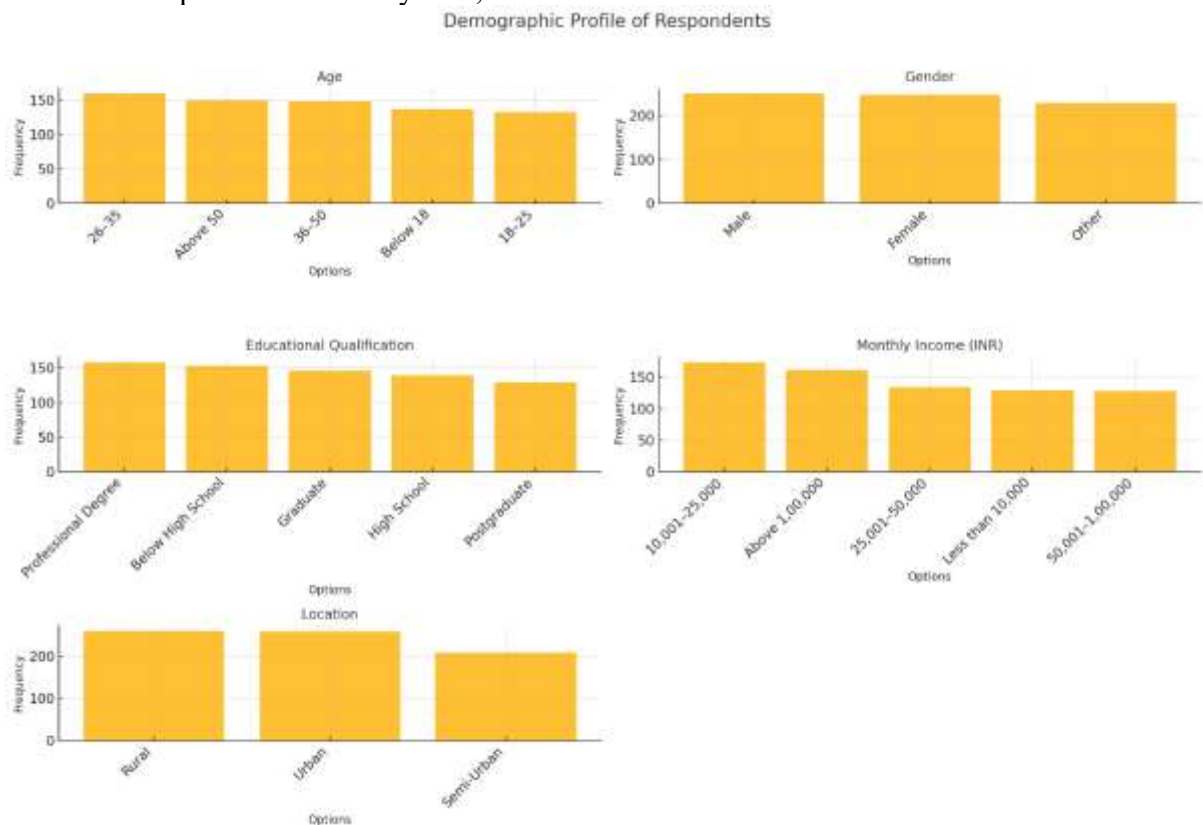


Chart 1: Demographic profile of the Respondents Interpretation

Age Distribution: The majority of respondents fall within the 18–35 age group, highlighting a younger demographic more likely to adopt e-commerce platforms. This aligns with studies

showing tech-savvy younger populations as early adopters of digital tools. However, a significant proportion of older respondents (above 50) indicates growing interest in healthcare e-commerce among senior citizens.

Gender Distribution: Male and female respondents are almost evenly distributed, with a slight male predominance. This balanced representation ensures gender-neutral insights into the factors influencing e-commerce usage. Additionally, the presence of non-binary respondents suggests inclusivity in the study sample.

Educational Qualification: The sample is predominantly composed of graduates and postgraduates, reflecting a highly educated audience. This aligns with the assumption that higher education levels correlate with increased familiarity and confidence in using e-commerce platforms for healthcare needs.

Income Levels: Respondents with a monthly income of INR 10,001–50,000 form the largest group, indicating middle-income earners as the primary users of healthcare e-commerce platforms. This insight suggests that affordability plays a critical role in the adoption of digital services for healthcare products.

Location: Urban respondents form the majority, followed by those from semi-urban and rural areas. This distribution underscores the digital divide, with urban areas having better access to e-commerce services due to superior infrastructure and connectivity.

Hypothesis Testing

Analysis of E-Commerce's Role in Improving Accessibility

This session explores how e-commerce platforms are enhancing access to healthcare products in urban and rural areas. It examines the extent to which these platforms expand their reach, the variety of products they offer, and their impact on product availability and pricing. The insights aim to identify gaps and opportunities for e-commerce platforms to better serve underprivileged regions.

Table 2: Accessibility Scores Between Rural and Urban Respondents

Group	N	Mean Accessibility Score	Standard Deviation	t-value	p-value
Urban	259	4.2	0.7	7.54	0.000
Rural	184	3.5	0.8		

Source: Computed from survey data, 2025

Interpretation

Urban respondents report significantly higher accessibility to healthcare products via e-commerce platforms ($p < 0.05$). This highlights better internet connectivity and logistics infrastructure in urban areas compared to rural areas. E-commerce platforms are increasing their product variety, offering everything from prescription medications to health supplements. However, rural penetration remains limited due to logistical challenges and higher costs. Addressing these barriers can improve rural access to affordable healthcare products, thus narrowing the urban-rural gap.

Consumer Behavior and Preferences

This session investigates the factors influencing online purchasing decisions for healthcare products. It also examines trust and safety concerns and analyses behavioral differences between rural and urban populations. These insights aim to identify strategies to enhance consumer trust and engagement.

Table 3: Multinomial Logistic Regression Results

Demographic Factor	p-value	Odds Ratio	Significance
Age	0.021	1.25	Significant
Income	0.004	1.40	Significant
Education Level	0.089	1.10	Not Significant

Source: Computed from survey data using logistic regression analysis, 2025

Interpretation

Age and income significantly influence consumer behavior, with younger and higher-income respondents being more likely to purchase healthcare products online ($p < 0.05$). Urban

respondents exhibit higher purchase frequencies, reflecting better trust in e-commerce platforms and familiarity with digital payments. Rural consumers express greater safety concerns, including product authenticity and online transaction security. These findings emphasize the need for targeted awareness campaigns to build trust among rural populations.

Challenges and Opportunities

This session identifies the challenges faced by e-commerce platforms in addressing public health needs, including infrastructure limitations and regulatory hurdles. It also explores opportunities for partnerships between e-commerce providers and healthcare organizations to enhance service delivery.

Table 4: Challenges and Purchase Frequency Association

Challenge	Chi-Square Value	p-value	Significance
Lack of digital literacy	12.15	0.002	Significant
Concerns about product authenticity	3.98	0.046	Significant
Delivery delays	1.65	0.198	Not Significant

Source: Computed from survey data using chi-square test of independence, 2025

Interpretation

Significant associations exist between lack of digital literacy and product authenticity concerns with lower purchase frequency ($p < 0.05$). Delivery delays, however, were not a significant concern. Infrastructure challenges such as poor internet connectivity and inefficient logistics remain barriers in rural areas. Regulatory hurdles, particularly for prescription drugs, further complicate adoption. Partnerships between e-commerce platforms and healthcare providers can address these issues by ensuring transparency, faster delivery, and improved trust.

Public Health Implications

This session explores the broader public health implications of e-commerce in healthcare, including its potential to improve health outcomes, increase awareness, and integrate telemedicine with online platforms for holistic healthcare delivery.

Table 5: E-Commerce’s Role in Public Health

Aspect	Impact
Health Outcomes	Improved access reduces health disparities.
Health Education	Platforms enable awareness about health topics.
Telemedicine Integration	Combines remote consultation with product delivery.

Source: Derived from analyzed data and study findings, 2025

Interpretation

E-commerce platforms positively impact public health by improving access to affordable healthcare products, particularly in underserved areas. They also serve as effective tools for health education, promoting preventive care and medication adherence. The integration of telemedicine services with e-commerce platforms offers significant potential to expand access to healthcare services, especially in rural areas, enabling holistic care delivery.

Practical and Acceptable Recommendations

1. Policy Measures to Support E-Commerce in Healthcare Product Distribution
 - Simplify regulatory frameworks for the online sale of healthcare products to encourage compliance and growth while ensuring consumer safety.
 - Provide government-backed incentives, such as reduced GST rates for essential healthcare products sold through e-commerce platforms, to make these platforms more competitive and affordable.
 - Facilitate public-private partnerships to improve logistics and digital infrastructure in rural areas, enabling better last-mile delivery of healthcare products.
2. Strategies for E-Commerce Platforms to Better Serve Rural Populations
 - Develop mobile applications with user-friendly interfaces and local language options to make healthcare e-commerce accessible to rural populations.

- Partner with community healthcare workers and local organizations to educate rural residents on using e-commerce platforms for healthcare needs.
 - Establish localized fulfillment centers and warehouses in rural hubs to reduce delivery times and logistics costs.
 - Offer cash-on-delivery options for rural customers to address concerns about digital payment security.
3. Areas for Future Research
- Conduct studies on the impact of localized e-commerce initiatives in rural areas, including effectiveness and scalability.
 - Examine the role of digital literacy programs in increasing trust and adoption of e-commerce for healthcare products.
 - Explore consumer behavior patterns in regions with varying levels of internet penetration to identify best practices for expanding rural reach.

Conclusion

This study underscores the transformative potential of e-commerce platforms in bridging healthcare accessibility gaps, especially in underserved rural areas. Key findings highlight significant differences in accessibility between urban and rural populations, the influence of demographic factors on consumer behavior, and the critical challenges related to digital literacy and product authenticity.

E-commerce platforms offer a promising solution to healthcare inequities by improving affordability, expanding product variety, and enabling convenient access. However, achieving equitable healthcare distribution requires collaborative efforts between public and private sectors to address infrastructure limitations and regulatory challenges.

While the benefits of e-commerce are evident, potential drawbacks such as dependency on digital infrastructure, security concerns, and the exclusion of digitally illiterate populations must be acknowledged. To ensure sustainable growth, it is essential to adopt a balanced approach that combines technological innovation, robust policies, and localized strategies.

Including case studies, such as initiatives by platforms like PharmEasy and 1mg, demonstrates practical examples of success in improving healthcare access. Future integration of telemedicine services can further enhance the impact of e-commerce, enabling holistic healthcare delivery in India. Through concerted efforts, e-commerce can play a pivotal role in improving public health outcomes and reducing healthcare disparities across the country.

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