Role of E – Commerce in Improving Drug Availability in Primary Health Centers in Tirunelveli City

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1. Abstract

The integration of e-commerce into healthcare systems has significantly transformed the accessibility and availability of essential medicines, particularly in Primary Health Centers (PHCs). This study examines the role of e-commerce platforms in improving drug availability in PHCs, especially in rural and semi-urban areas. E-commerce enables efficient procurement, real-time inventory management, and streamlined supply chain operations, thereby reducing stock outs and delays in medicine delivery. By leveraging digital platforms, PHCs can connect directly with authorized suppliers and pharmaceutical companies, ensuring timely access to quality drugs at competitive prices. The study highlights how e-commerce solutions contribute to transparency, cost reduction, and better demand forecasting through data-driven insights. It also explores the challenges associated with the adoption of e-commerce in PHCs, including limited digital infrastructure, lack of technical expertise, and regulatory concerns. Despite these challenges, the findings suggest that the adoption of e-commerce can enhance healthcare service delivery by ensuring continuous availability of essential drugs, improving patient satisfaction, and strengthening public health systems. The research concludes that effective implementation of e-commerce in PHCs can play a crucial role in bridging the gap between demand and supply of medicines, ultimately contributing to improved healthcare outcomes.

2. Introduction

Primary Health Centers (PHCs) play a vital role in delivering basic healthcare services to the population, especially in semi-urban and rural regions like Tirunelveli city. However, inadequate drug availability remains a persistent issue in many PHCs across India.

Studies show that the availability of essential medicines in public health facilities often ranges between 17% to 51%, with frequent stock-outs lasting several weeks.

E-commerce in healthcare refers to the buying, selling, and distribution of medicines and healthcare products through online platforms. In India, the growth of e-pharmacies has been driven by digitalization, logistics expansion, and increasing internet penetration.

E-pharmacies enable:

- Online ordering of medicines
- Digital prescription validation
- Doorstep delivery services
- Real-time tracking of drug inventory

3. Review of Literature

Shamsuzzaman Ansari et al. (2025) The authors analyzed online pharmacy adoption and found that e-commerce plays a crucial role in ensuring medicine availability, especially when drugs are unavailable in traditional markets. The study emphasized that digital platforms reduce dependency on physical pharmacies and improve timely access to medicines in underserved areas.

ThirupathaiahBoya et al. (2025) This review highlighted that e-pharmacies enhance drug availability by offering 24/7 access, a wide range of medicines, and doorstep delivery. It also pointed out that online platforms improve accessibility in rural and semi-urban regions where primary health centers often face stock shortages.

Sunil Shrestha et al. (2022) The study emphasized the role of pharmacists and pharmaceutical services in improving healthcare outcomes. It suggested that integrating digital systems and e-commerce into pharmacy services can enhance drug distribution efficiency and ensure better availability of medicines in primary healthcare settings.

Khang Wen Goh et al. (2022) This research pointed out that online pharmacy systems help maintain continuous supply chains and improve accessibility of prescription drugs. It also stressed the importance of monitoring and regulation to ensure safe and reliable drug distribution through e-commerce channels.

AyçaKolukısaTarhan et al. (2019) The study reviewed digital transformation in healthcare and concluded that adopting technology-driven systems improves efficiency, service quality, and availability of healthcare resources, including medicines. It supports the role of e-commerce in strengthening healthcare delivery systems.

4. Objectives of the Study

- To examine the role of e-commerce in improving the availability of drugs in Primary Health Centers in Tirunelveli city.
- To analyze the existing system of drug procurement and distribution in Primary Health Centers.
- To study how e-commerce platforms help in timely procurement of medicines.
- To evaluate the effectiveness of e-commerce in reducing drug shortages in PHCs.
- To identify the challenges faced by PHCs in adopting e-commerce systems for drug supply.

5.5. Research methodology

This study adopts descriptive research design.

5.1 Sampling Technique

Convenience sampling was used to select 75 respondents from primary health centers in Tirunelveli city.

5.2 Data Sources

Primary Data: Structured questionnaire featuring Likert-scale items.

Secondary Data: Academic journals, books and online databases.

5.3 Tools for Analysis

Percentage analysis

Chi-Square Test

Table 1

Awareness of E-Commerce in PHCs

Response	No. of Respondents	Percentage
Aware	60	80%
Not Aware	15	20%

Source: Primary Data

The above table presents the statistical level for e-commerce, indicating good familiarity with digital health services. Among the 75 respondents, 80 % of the respondents are awareness of E-commerce in PHCs and 20 %of the respondents are not aware digital health service. Most respondents (80%) are aware of e-commerce, indicating good familiarity with digital health services.

Table 2

Availability of Drugs After E-Commerce

Response	No. of Respondents	Percentage
Improved	66	88%
Not Improved	9	12%

Source: Primary Data

The above table presents the statistical level for drug availability has improved due to e-commerce. Among the 75 respondents,88 % of the respondents are imp-rove availability of Drugs and 12 %of the respondents are no improved drug availability. A large majority (88%) believe drug availability has improved due to e-commerce.

Table 3

Reduction in Stock-Outs

Response	No. of Respondents	Percentage
Yes	63	84%
No	12	16%

Source: Primary Data

The above table presents the statistical level for e-commerce has reduced stock shortages in PHCs. Among the 75 respondents,84 % of the respondents are yes and 16 %of the respondents are no reduced stock shortage. Most respondents (84%) feel that e-commerce has reduced stock shortages in PHCs.

Table 4

Delivery Time Efficiency

Response	No. of Respondents	Percentage
Faster	69	92%
Same/Slow	6	8%

Source: Primary Data

The above table presents the statistical level for e-commerce ensures faster delivery of medicines. Among the 75 respondents, 92 % of the respondents are faster, 8 %of the respondents are same or slow delivery medicine. Almost all respondents (92%) agree that e-commerce ensures faster delivery of medicines.

Table 5

Satisfaction Level

Response	No. of Respondents	Percentage
Satisfied	64	85%
Not Satisfied	11	15%

Source: Primary Data

The above table presents the statistical level for E- commerce service of the respondents. Among the 75 respondents, 85 % of the respondents are satisfied , 15 %of the respondents are not satisfied service . Majority (85%) are satisfied with e-commerce services in PHCs.

Table6

Preference for E-Commerce

Response	No. of Respondents	Percentage
Prefer	68	91%
Do Not Prefer	7	9%

Source: Primary Data

The above table presents the preference for E- commerce of the respondents. Among the 75 respondents,91% of the respondents are prefer ecommerce, while 9%of the respondents are not prefer E – Commerce. Most respondents (91%) prefer e-commerce over traditional methods for drug supply.

Table 7

E-commerce usage and drug availability in Primary Health Centers

Category	O	E	$(O-E)^2$	$(O-E)^2/E$
High–Adequate	30	24	36	1.50
High–Inadequate	10	16	36	2.25
Low–Adequate	15	21	36	1.71
Low–Inadequate	20	14	36	2.57
Total χ^2				**8.03**

Table value = **3.84**

Since **8.03 > 3.84**, reject the null hypothesis.

Interpretation

There is a **significant relationship between E-commerce usage and drug availability** in Primary Health Centers.

- PHCs with **high E-commerce usage** show better drug availability.
- PHCs with **low usage** face more shortages.

7. Findings

- The majority (80%) are aware of e-commerce, indicating good familiarity with digital health services.
- The majority (88%) believe drug availability has improved due to e-commerce.
- The majority (84%) feel that e-commerce has reduced stock shortages in PHCs.
- The majority (92%) agree that e-commerce ensures faster delivery of medicines.
- The majority (85%) are satisfied with e-commerce services in PHCs.
- The majority (91%) prefer e-commerce over traditional methods for drug supply.

8. Suggestion

- Based on the study findings, the following suggestions are recommended to improve the effectiveness of E-commerce in Primary Health Centers (PHCs):
- Government should strengthen internet connectivity and digital systems in PHCs to ensure smooth functioning of E-commerce platforms.
- Regular training programs should be conducted for PHC staff to improve their ability to use E-commerce systems efficiently.
- Integration of E-commerce platforms with centralized drug warehouses can help ensure continuous availability of medicines and reduce delays.
- Awareness campaigns should be conducted among healthcare workers and administrators about the benefits of E-commerce in healthcare delivery.

9. Conclusion

The study clearly indicates that E-commerce plays a significant role in improving drug availability in Primary Health Centers in Tirunelveli City. A large majority of respondents are aware of E-commerce and recognize its benefits in enhancing healthcare delivery. Moreover, the preference for E-commerce over traditional methods highlights its efficiency and reliability in managing pharmaceutical supplies. Overall, the adoption of E-commerce in PHCs has positively transformed the drug distribution system, making it more efficient, transparent, and accessible. With proper support, infrastructure, and continuous improvements, E-commerce can further strengthen the public healthcare system and ensure better medical services for all.