E-Pharmacy in Rural Pakistan: Evaluating Platforms' Reach, Opportunities, and Challenges

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E-pharmacy, rural healthcare, digital health, telemedicine, Pakistan, healthcare access, digital literacy

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ABSTRACT

Background: E-pharmacy platforms in Pakistan have largely focused on urban centers, leaving rural areas underserved due to limited digital literacy, infrastructure, and awareness. Despite potential benefits, little research has examined their reach and challenges in rural Pakistan.

Objective: To evaluate the reach, opportunities, and barriers to e-pharmacy platforms in rural Pakistan, and to identify strategies for improving their adoption.

Methods: A mixed-method approach was used, involving secondary data analysis to identify existing e-pharmacy platforms, and primary data collection through Key Informant Interviews (KIIs) with 35 pharmacists, healthcare professionals, and researchers. Thematic analysis was conducted using NVivo software to identify key themes and barriers.

Results: Seven major e-pharmacy platforms were identified. These platforms primarily serve urban areas with limited reach in rural regions. Key opportunities include convenience, cost-effectiveness, and telemedicine integration. Major barriers include poor internet connectivity, low digital literacy, mistrust, and logistical challenges.

Conclusion: E-pharmacies can bridge healthcare gaps in rural Pakistan but require improved internet infrastructure, regulatory oversight, digital literacy programs, and targeted outreach to build trust and expand reach.

INTRODUCTION

The digitization of healthcare systems has given rise to the concept of e-pharmacies, which are digital platforms that facilitate the online purchase of medications and healthcare products. In developed countries, these platforms have become integral to the healthcare ecosystem, offering significant advantages in terms of convenience, accessibility, and cost-effectiveness. E-pharmacies not only enable customers to order prescription and over-the-counter medications but also provide access to online doctor consultations and a range of healthcare products (1). This trend has begun to extend into developing countries, including Pakistan, where the emergence of e-pharmacies is attributed to advancements in technology and increased internet penetration (2). Despite these developments, e-pharmacies are predominantly concentrated in urban centers, with limited reach in rural areas. This creates an opportunity for e-pharmacy platforms to address the healthcare challenges in rural Pakistan by overcoming geographical barriers and enhancing access to essential medicines and healthcare products (3).

In Pakistan, e-pharmacy platforms have the potential to mitigate the issues associated with the inadequate healthcare infrastructure in rural regions, where there is often a scarcity of traditional pharmacies (4). These platforms can ensure the availability of essential medicines, which are otherwise difficult to obtain due to limited physical pharmacies in remote areas (5). Previous research has indicated that e-pharmacies have been successfully integrated into the healthcare systems of other developing nations, such as India and Bangladesh, where they have significantly improved medication accessibility and healthcare delivery in underserved rural areas (6). By leveraging digital technology, e-pharmacies can offer rural populations in Pakistan a viable solution to the healthcare access gap, providing convenience, time-saving, and increased accessibility to a broader range of products and services (7).

The integration of e-pharmacies into rural settings, however, presents a number of challenges that hinder their adoption and effectiveness. Internet connectivity is a fundamental requirement for the use of digital platforms, yet many rural areas in Pakistan still lack reliable internet services, making it difficult for residents to access e-pharmacy services (8). Moreover, low levels of digital literacy in these regions prevent rural populations from effectively utilizing e-pharmacy platforms, even when internet access is available (9). This lack of digital literacy, coupled with a general mistrust of online platforms, has impeded the widespread adoption of e-pharmacies in rural areas (10). People in these regions are often unaware of the existence of such services or are hesitant to use them due to concerns over the authenticity and safety of medications purchased online (11). Regulatory and logistical challenges further complicate the implementation of e-pharmacies in rural Pakistan. The absence of stringent regulatory oversight and quality assurance measures increases the risk of counterfeit medications and poor service delivery, which undermines consumer confidence (12).

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Despite these challenges, e-pharmacy platforms can offer significant advantages for rural populations by improving the convenience and affordability of healthcare services. The ability to order medications from home is particularly beneficial for elderly and disabled individuals, as well as for those who face mobility constraints (13). E-pharmacies operate round-the-clock, unlike traditional pharmacies that follow standard business hours, allowing customers to place orders at any time, which is a critical advantage for those living in remote areas (14). The platforms often offer competitive pricing and discounts due to lower overhead costs, making medications more affordable for rural populations with limited financial resources (15). Additionally, the availability of subscription services and reminders ensures that patients can manage their prescriptions effectively, reducing the likelihood of missed doses or disruptions in treatment (16).

E-pharmacies also have the potential to support telemedicine services, providing a comprehensive healthcare solution for rural populations. Through these platforms, individuals can consult with healthcare professionals online and receive prescribed medications without the need for a physical visit (17). This integration of telemedicine with e-pharmacies can significantly enhance healthcare access for rural communities, where healthcare facilities are scarce, and travel to urban centers is often difficult and costly (18). The platforms further provide access to a wider range of products, including specialty medications that are not typically available in local pharmacies (19). This broad selection enables rural customers to obtain necessary medications and healthcare products that would otherwise require travel to urban areas (20).

Moreover, e-pharmacies offer privacy and confidentiality for patients, which is particularly important for those with sensitive health conditions such as mental health issues or sexual health concerns (21). The anonymity provided by online platforms reduces the stigma associated with purchasing such medications and encourages individuals to seek necessary treatment without fear of judgment (22). This discreet purchase option can play a pivotal role in promoting better health outcomes in rural communities, where social stigmas often deter individuals from seeking timely healthcare (23). During the COVID-19 pandemic, the importance of contactless delivery services offered by e-pharmacies became even more pronounced, as they provided a safer alternative to traditional pharmacies, minimizing the risk of infection for both customers and healthcare workers (24).

The implementation of e-pharmacy platforms in rural Pakistan must be accompanied by coordinated efforts from government, public, and civil society organizations to address the barriers to adoption and maximize their potential benefits. Improved internet infrastructure, digital literacy training, and awareness campaigns are essential to enable rural populations to access and utilize these services effectively (25). Regulatory frameworks must be strengthened to ensure the quality and safety of medications, and logistical networks need to be expanded to facilitate timely and cost-effective delivery of products to remote areas (26). By addressing these challenges, e-pharmacy platforms can become a valuable component of the healthcare system in rural Pakistan, contributing to better health outcomes and reducing the disparities in healthcare access between rural and urban populations (27).

In conclusion, e-pharmacies represent a promising solution to the healthcare challenges faced by rural Pakistan. While these platforms offer numerous opportunities for improved healthcare access and affordability, their adoption is currently limited by technological, regulatory, and logistical barriers. Addressing these challenges through targeted interventions and policy support can pave the way for the successful integration of e-pharmacies into the healthcare landscape of rural Pakistan, ensuring that underserved populations receive the healthcare they need (28).

MATERIAL AND METHODS

The current research study employed mixed method of research where both primary and secondary data were used for analysis and results. The research design was selected due to the nature of the study and there is ample justification of its use in the literature in similar kind of studies (Naz B et al., 2023c; Naz B et al., 2022a; Afridi et al., 2022).

For the first objective, identification of e-pharmacy platforms in the country secondary data including published reports and research articles were used, while for the rest of objectives primary data were used through Key Informant Interviews (KIIs) from a total of 35 respondents including pharmacists, research scientists, and healthcare professionals across the country.

The inclusion of pharmacists, scientists, and healthcare professionals can provide a comprehensive overview about the set objectives of this research study. Content analysis, and thematic analysis were used as data analytical techniques. Former analytical approach was employed for the secondary data to achieve the first objective as to identify e-pharmacy platforms in the country, while the later technique was used for the rest of the objectives. Content analysis and thematic analysis have been largely used in similar kind of studies in the literature (Naz B et al., 2023c; Naz et al., 2022a; Naz B et al., 2022b). For the primary data collected through KIIs were entered in NVivo software, coded and thematic analysis were carried out. Through thematic analysis, the researchers aimed to identify recurring themes and patterns related to the factors influencing the choice of delivery among rural women of the study area.

The type of analysis has been widely used in the field of social sciences for the analysis of qualitative data and the identification of patterns, categories, and themes within the data (Naz B et al., 2024; Naz B, 2023a; Naz B et al., 2023b; Naz B et al., 2022b). Similarly, SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis was also performed.

RESULTS

E-Pharmacy Platforms and Their Reach

In Pakistan, seven major e-pharmacy platforms were identified in this study. These platforms operate under the purview of the Drug Regulatory Authority of Pakistan (DRAP), which oversees the registration, licensing, and quality assurance of pharmaceutical products. The platforms include Dawaai, Sehat, MEDZnMORE, Emeds, DVAGO, MedsOnline, and PharmaDeal. Brief descriptions of these platforms are provided below:

Dawaai: This platform is one of the largest and most well-known e-pharmacy platforms in the country. It not only provides medicines but also offers online doctor consultations, a wide range of pharmaceutical products, medical devices, and lab tests. While it has nationwide coverage, its focus remains on urban areas. This platform delivers medicines to rural areas as well.

Sehat: Sehat offers a broad selection of medicines and various healthcare products. Additionally, it provides diagnostic services and telemedicine. The platform operates in both urban and rural areas, but its coverage is more concentrated in urban regions of the country.

MEDZnMORE (Tabiyat.pk): MEDZnMORE, operating under the brand Tabiyat.pk, aims to provide prescription medicines and healthcare products. The platform offers telehealth services and primarily targets urban centers, but there is potential for expansion to rural areas through its logistical network.

Emeds: Emeds provides an extensive range of pharmaceutical products and medical services through its online presence. It offers prescription drugs, supplements, and vitamins, along with telemedicine consultations. The platform's coverage is concentrated in major cities, with some reach in rural areas as well.

DVAGO: This platform has both an online presence and traditional physical stores across the country. It provides prescription medicines, healthcare products, and health consultations. The coverage is mainly focused on major urban centers, but it is extending its services to smaller towns as well.

MedsOnline: This platform offers medicines and healthcare products. Its coverage is concentrated in urban centers; however, the delivery services also extend to rural areas of the country.

PharmaDeal: PharmaDeal provides medicines, healthcare products, and supplements primarily in urban areas. However, its delivery services also operate in semi-urban and rural areas.

Table 1 Schema of E-Pharmacy Findings

Aspect	Details
Factors Influencing Adoption	Convenience and cost-effectiveness drive adoption among younger and tech-savvy individuals. Elderly and disabled individuals benefit from home delivery and telemedicine options.
Gender Disparities	Women face barriers to adoption due to cultural norms restricting mobility and lower digital literacy levels. E-pharmacies could provide discreet purchasing options.
Recommendations	Develop digital literacy programs, invest in logistical infrastructure, strengthen regulatory oversight, launch awareness campaigns, and improve gender inclusivity.

Opportunities Offered by E-Pharmacy Platforms

Thematic analysis identified several themes and sub-themes for opportunities offered by e-pharmacy platforms:

Convenience: E-pharmacies allow customers to order from the comfort of their homes and receive their orders at their doorstep, making them ideal for elderly, working individuals, and people with disabilities.

Full-Time Access: E-pharmacy platforms can be accessed anytime, day or night, without the constraints of business hours. Traditional pharmacies usually operate only during business hours, while e-pharmacies are available 24/7, making them accessible for all people.

Timesaving: E-pharmacies save time by eliminating the need to visit physical pharmacies, wait in queues, and search multiple stores to find a specific medicine. Routine refills can also be done more quickly.

Discounts and Better Prices: E-pharmacy platforms generally offer medicines and health products at lower prices compared to traditional pharmacies due to reduced overhead costs. Additionally, they offer discount deals, bulk purchase options, and promotional deals, providing competitive and better prices.

Access to a Wide Range of Products: E-pharmacies offer a wide range of medicines and products that are often difficult to find in traditional pharmacies. Detailed product descriptions, uses, side effects, and customer reviews are also available, enabling informed decision-making.

Discreet Purchases: E-pharmacies maintain confidentiality and privacy, making them ideal for people with sensitive health conditions. They abide by principles of confidentiality and do not reveal personal health information.

Easy Refill and Reminders: These platforms offer subscription and reminder services, ensuring patients remain on top of their medication schedules and receive timely refills without the need for repeated orders.

Enhanced Safety: Contactless delivery options provide enhanced safety measures. During the COVID-19 pandemic, e-pharmacies proved to be the safest option for medication access.

Increased Accessibility: E-pharmacies have enhanced accessibility to medications, especially in rural areas where traditional pharmacies are limited. For people with disabilities, women, and other vulnerable groups facing mobility issues, e-pharmacies have improved access to healthcare.

Prescription Management: E-pharmacies keep track of customers' records, enabling easy access to their history of medications and allowing for tracking and reordering.

Additionally, e-pharmacies offer consultations with healthcare professionals.

Comparative Shopping: E-pharmacies enable customers to compare prices, discounts, deals, and brands across various platforms, facilitating better price and brand selection.

Telemedicine Integration: Physical visits to healthcare professionals can be replaced with online consultations. Rural populations with internet connectivity and digital literacy can avail of this option, which is more cost-effective.

Challenges of E-Pharmacy Coverage in Rural Areas

The reach and coverage of e-pharmacies are limited in rural areas due to several challenges:

Limited Internet Access: The most significant barrier to e-pharmacy adoption in rural Pakistan is limited internet connectivity. Many rural areas have inadequate and unreliable internet access, which restricts the use of online services (11).

Digital Literacy: Low levels of digital literacy prevent rural people from using these platforms. Due to a lack of understanding, many individuals cannot place orders or manage online payment options (14).

Awareness and Trust: Rural populations are often unaware of e-pharmacy platforms and do not trust online platforms due to their preference for traditional physical pharmacies. Awareness programs are lacking, especially in rural areas (15).

Logistics and Delivery: The delivery infrastructure in rural Pakistan is underdeveloped compared to urban areas. Poor road conditions, lack of courier services, and long distances delay deliveries, making them more expensive and reducing the use of these platforms (16).

Regulatory and Quality Assurance: Authenticity and quality of medicines from e-pharmacy platforms remain a challenge across the country. Errors in deliveries and returns of incorrect products are not always corrected due to the lack of regulatory oversight. Counterfeit drugs are another concern that requires strict regulatory oversight to protect consumers (18).

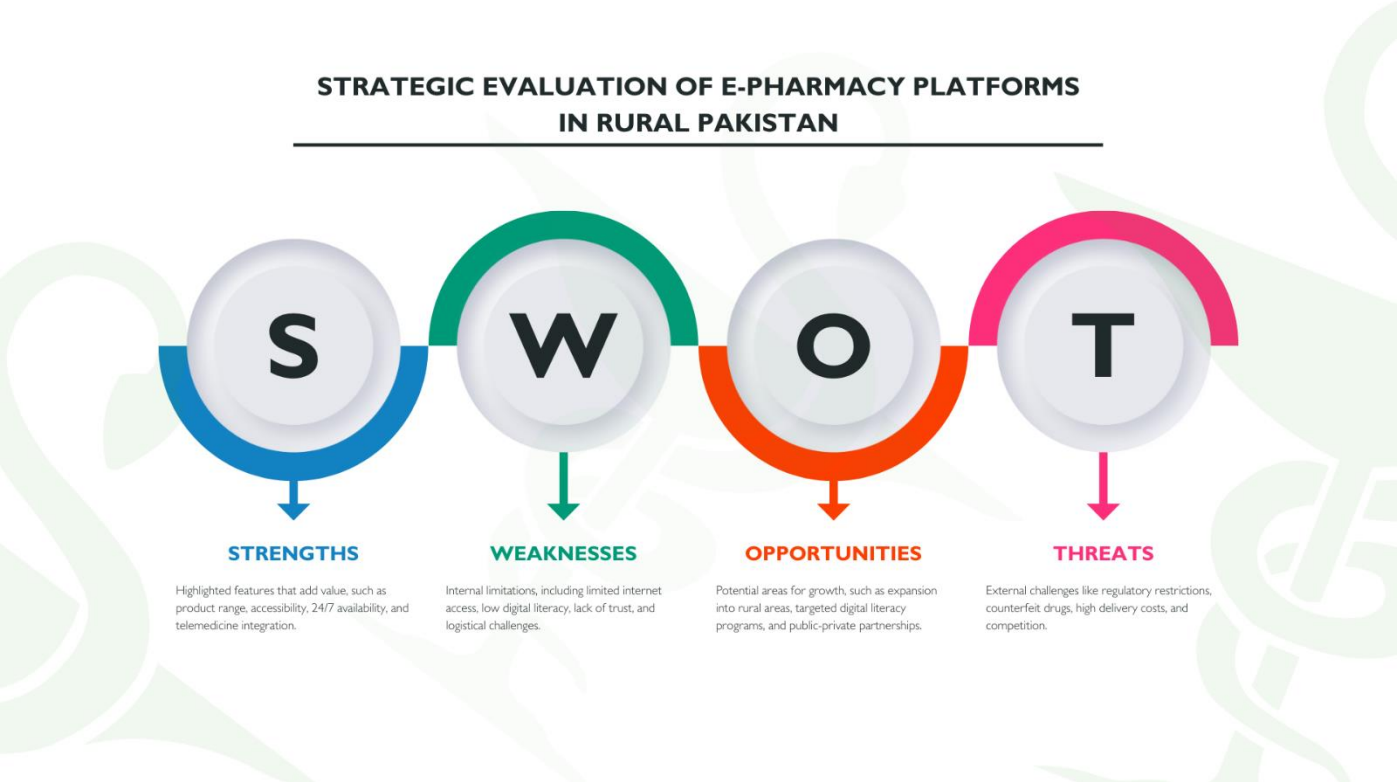

Table 1 Schema of E-Pharmacy Findings

DISCUSSION

The findings of this study suggest that while e-pharmacy platforms have the potential to address significant gaps in healthcare delivery in rural Pakistan, their current reach and impact are limited by a combination of technological, regulatory, and logistical challenges. E-pharmacies, such as Dawaai, Sehat, and MEDZnMORE, have made notable advancements in expanding their services, yet their coverage remains predominantly urban-centric (1, 2). This indicates that although there is a high demand for accessible healthcare in rural areas, the structural limitations of these regions prevent e-pharmacies from effectively meeting this demand. The most prominent advantage of e-pharmacies is their ability to deliver medications and healthcare products directly to patients' homes, reducing the need for travel and providing a convenient option for individuals living in remote locations (3). However, the low levels of internet penetration and digital literacy in rural areas are major impediments to adoption, making it difficult for residents to utilize these services even when they are available (4, 5).

The study highlights that internet connectivity is the cornerstone for the successful implementation of e-pharmacy platforms, yet many rural areas in Pakistan still lack reliable and fast internet services (6, 7). Without a robust digital infrastructure, the potential benefits of e-

pharmacy platforms remain largely unrealized. This limitation is compounded by the lack of awareness and digital skills among rural populations, which further prevents the effective use of these platforms. Research has shown that in similar settings, targeted digital literacy programs can significantly improve the adoption of digital health services by equipping individuals with the necessary skills to navigate online platforms and engage confidently in digital transactions (8). Therefore, addressing the issue of digital literacy, particularly among older adults and women who may have limited access to technology, is crucial for expanding the reach of e-pharmacies in rural Pakistan (9).

Another critical challenge identified in the study is the regulatory environment governing e-pharmacies in Pakistan. While the Drug Regulatory Authority of Pakistan (DRAP) is responsible for ensuring the quality and safety of medications, the regulatory framework for online pharmacies is still in its nascent stages (10). The lack of comprehensive regulations increases the risk of counterfeit drugs and poor-quality products being sold through these platforms, which undermines consumer trust and poses a significant barrier to widespread adoption (11, 12). Implementing stricter regulatory oversight and developing a robust legal framework that specifically addresses the unique challenges of e-pharmacies are essential to safeguard consumers and promote the growth of the sector (13). Additionally, the study participants highlighted the need for greater accountability and transparency in the delivery process, as errors in medication delivery and product returns are not uncommon, leading to customer dissatisfaction (14).

Logistical challenges, including poor road infrastructure and the absence of reliable courier services, were also noted as significant barriers to the expansion of e-pharmacies in rural areas (15, 16). These challenges not only increase delivery costs but also result in delayed deliveries, which can negate the convenience advantage of e-pharmacy platforms (17). Developing a cost-effective and efficient logistics network is essential for ensuring the timely delivery of medications and maintaining the quality of healthcare services provided through e-pharmacies (18). Some platforms, such as MEDZnMORE, have started to invest in building their own delivery networks to mitigate these issues, but such efforts require substantial financial resources and strategic planning (19). The role of public-private partnerships in improving the logistics infrastructure in rural areas should be explored, as it could provide a sustainable solution to the logistical challenges faced by e-pharmacies (20).

E-pharmacies also offer significant potential for integrating telemedicine services, which can further enhance their value proposition in rural settings where access to healthcare professionals is limited (21). The integration of telemedicine into e-pharmacy platforms allows patients to consult with healthcare providers online and receive prescriptions that can be conveniently filled through the same platform (22). This comprehensive approach not only saves time and travel costs for patients but also ensures continuity of care, as patients can receive follow-up consultations and medication management services through a single platform (23). However, for this model to be successful, it is imperative to address the existing barriers to telemedicine adoption, such as the need for reliable internet connectivity and the lack of trained telehealth professionals in rural areas (24, 25).

The study also sheds light on the gender disparities in the adoption of e-pharmacy services. Women in rural Pakistan face unique challenges in accessing healthcare, including social and cultural barriers that restrict their mobility and decision-making autonomy (26, 27). E-pharmacies can play a transformative role in improving healthcare access for women by providing a discreet and convenient option for purchasing medications and consulting with healthcare professionals. However, to fully realize this potential, e-pharmacy platforms must invest in gender-sensitive digital literacy programs and outreach initiatives that specifically target women and address their unique needs and concerns (28, 29). Additionally, partnerships with local women's organizations and community leaders can help to build trust and promote the adoption of e-pharmacy services among rural women (30).

CONCLUSION

In conclusion, while e-pharmacy platforms present a promising solution to the healthcare challenges faced by rural Pakistan, their successful implementation requires a multifaceted approach that addresses the technological, regulatory, and logistical barriers identified in this study (31). Enhancing internet connectivity, improving digital literacy, strengthening regulatory frameworks, and developing a robust logistics network are all essential steps toward expanding the reach and impact of e-pharmacies in rural areas. Coordinated efforts from the government, private sector, and civil society are necessary to create an enabling environment for the growth of e-pharmacies and to ensure that rural populations have equitable access to high-quality healthcare services. By overcoming these challenges, e-pharmacies can play a pivotal role in reducing healthcare disparities and improving health outcomes in rural Pakistan.

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