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Digital Health and Telepharmacy in Healthcare Sector

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A B S T R A C T

Digital transformation in the pharmacy sector is redefining healthcare delivery through the integration of advanced technologies and digital health tools. Applications like fitness tracking platforms enable continuous health monitoring, empowering patients to take active roles in their care. These innovations are particularly impactful for rural and remote communities, where technology enhances access to pharmaceutical services and personalized care. Telepharmacy, as an emerging branch of digital health, allows pharmacists to deliver remote medication dispensing, patient counselling, and inventory management efficiently. It facilitates effective collaboration between healthcare professionals, streamlining hospital workflows and improving patient outcomes. Despite potential legal and regulatory challenges, the benefits of a well-structured telepharmacy system are substantial. By embracing these digital solutions, pharmacists can extend healthcare accessibility, ensure medication safety, and maintain continuity of care. As digital health continues to evolve, it holds transformative potential to revolutionize pharmacy practice, foster patient-centred approaches, and bridge healthcare gaps. Recognizing and integrating these technological advancements will enable the pharmacy sector to lead innovation in healthcare delivery and support a more connected, efficient, and equitable healthcare ecosystem.

Keywords: health care, personalized care, digital solutions, remote communities, ensure medication safety.

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Contents

1. Introduction

The healthcare landscape is a vast and interdependent network comprising both public and private sectors has undergone a transformative shift with the advent of digital health, which integrates advanced information and communication technologies into healthcare delivery. Digital health is a broad umbrella term that encompasses mobile health (mHealth), telemedicine, wearable devices, health information systems, big data analytics, artificial intelligence (AI), robotics, and cloud-based solutions. These tools enhance healthcare accessibility, improve clinical decision-making, optimize resource utilization, and foster personalized patient care. Within this broader

domain, tele pharmacy has emerged as a critical component of digital health, specifically focusing on pharmaceutical services delivered remotely. Tele pharmacy refers to the use of telecommunications technology to provide pharmaceutical care when direct contact with a pharmacist is not possible. Services may include remote prescription verification, medication dispensing, drug therapy monitoring, patient counselling, medication adherence support, and chronic disease management [(1).] Telepharmacy into digital health ecosystems ensures that patients receive safe, effective, and timely access to medicines, while reducing medication errors and improving therapeutic outcomes. Furthermore, it supports interprofessional collaboration, enhances healthcare system efficiency, and empowers patients through education, digital engagement. As healthcare continues to embrace technological innovation, digital health and tele pharmacy together signify a paradigm shift toward a more connected, equitable, and patient-centred model of care [(2).]

India launched the ABDM in 2021 with a focus on creating a secure, integrated digital health ecosystem that emphasizes personal health records, ensuring that each citizen's health data is accessible, interoperable, and under their control. This ambitious project introduced five key innovations designed to enhance the delivery and management of healthcare services across the nation. Central to the ABDM was a unique 14-digit health identifier for every citizen, the Ayushman Bharat Health Account (ABHA). Notably, the ABHA was primarily built upon Aadhaar (although other sources of identification are allowed) - India's robust biometric identification system, leveraging its technological underpinnings to securely authenticate and manage health records. "One Patient, One Health Record" model offered lessons on the value of ensuring patient access to their health data for enhanced care coordination and privacy [(3).]

The global strategy is to improve health for everyone, everywhere by accelerating the development and adoption of appropriate, accessible, affordable, scalable and sustainable person-centric digital health solutions to prevent, detect and respond to epidemics and pandemics, developing infrastructure and applications that enable countries to use health data to promote health and well-being, and to achieve the health-related Sustainable health promotion, disease prevention, diagnosis, management, rehabilitation and palliative care including before, during and after an epidemic or pandemic, in a system that respects the privacy and security of patient health information. To enhance research and development, innovation and collaboration across private and public sectors [(4).]

2. Digital Health

Digital healthcare offers a huge range of possibilities and may improve the quality of patient care. The traditional paradigm of clinical history, examination, differential diagnosis and treatment may be improved by tools such as machine learning, mobile applications and sensors, wearables, and telehealth.

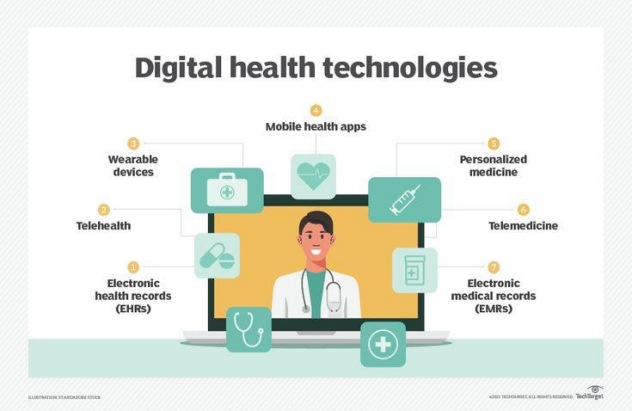

Fig.1 Digital health technologies and available services

Historical evolution of digital health:

- The evolution of digital health policy since the mid-2010s created a context that supported the rapid response to COVID-19. In 2015 the government launched the Digital India campaign aimed at increasing access to government services by improving digital infrastructure and focused on the creation of digital service delivery and promotion of digital literacy.
- The National Health Policy (NHP) of 2017 emphasized improving access and quality and reducing cost through the application of digital tools. It outlined the need for a national digital health ecosystem to regulate, develop and deploy digital health across a continuum of care.
- In 2018-19 the National Health Authority implemented its flagship public health insurance/assurance scheme called Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY), which, amongst other things, provides 100 million poor and vulnerable families with health care insurance coverage for up to Rs. 500,000 each.
- The National Digital Health Mission (NDHM), also called the Ayushman Bharat Digital Mission (ABDM), was launched in August 2020.16 Its aim is to develop the digital architecture necessary to support an integrated digital health infrastructure, including a unique health ID for every citizen, a registry of healthcare professionals, a registry of health care facilities and a system of personal health records. The NDHM is encouraging domestic health technology providers to link to this infrastructure through electronic medical records and artificial intelligence (AI) to extract insights from patient data to deliver better care [(5).]

Technological Innovations Driving in Digital Health Medical health (mhealth): Mobile health, also known as mHealth, involves delivering comprehensive medical and health aid to individualities seeking healthcare via mobile phones, laptops, tablets, and wearable bias. Using mobile health technology significantly affects individualities' health- related behaviors, including physical exertion, salutary choices, alcohol consumption, sexual conduct, and adherence to drug rules [(6)]. Mobile health(mHealth) apps are extensively accessible, low in cost, and can help promote

healthy behaviours is steadily adding. still, despite a growing body of substantiation, their effectiveness is still a subject of contestation. In general, apps have been set up to ply a small but notable effect on enhancing healthy cultures, specifically regarding nutrition, physical exertion, operation of habitual conditions and internal health [7].

Examples: My fitness pal, pill reminder.

My fitness pal:

MyFitnessPal Blog – Nutrition, calorie counting, healthy eating tips, and exercise guidance from the popular app. The MyFitnessPal Blog is a trusted extension of the popular fitness app, offering practical guidance on nutrition, calorie shadowing, healthy eating, and exercise. With expert tips, stoner success stories, and wisdom- backed advice, it helps compendiums make sustainable habits, understand food as energy, and integrate balanced fitness routines into everyday life for long- term health and heartiness. The MyFitnessPal app is famed for its vast food database, barcode scanning features, and capability to track diurnal input of calories and macronutrients. still, the MyFitnessPal Blog serves a different but reciprocal purpose it educates and motivates druggies. rather of simply logging refections and exercises, compendiums are encouraged to understand the" why" before healthy habits.

According to the approach, in order to effectively modify their health habits, people need a variety of intervention options suited to each stage. *Precontemplation*: Learn about the advantages and get motivated with educational information and positive words.

Contemplation: To overcome misgivings, make educated judgments by creating objects, assessing progress, and reviewing success stories.

Preparation: Prepare for action with training rules, exercise demonstrations, and food recommendations.

Action: Maintain engagement with personalized exercises, monuments, and performance feedback.

Conservation: Use habit monitoring, social support rudiments, challenges, and impulses to stay motivated.

Termination: Make exercise a habit with regular coaching to sustain the salutary metamorphosis [8].

Pill reminder: A pill reminder app notifies a person when to take specific medications. A person can download it on their smartphone or some other devices. Aim of pill reminder to Taking medication at the right time improves how well it works and how safe it is. To the today's healthcare services have several numbers of pill reminder app are available are my therapy, Medi safe, pill reminder, pillboxie, dose cast, drug.com, med manage, lady pill reminder, etc.

Medi safe app:

The Medi Safe App has the following features:

- an option to synchronize data from multiple users into a single account
- an unlimited number of medication reminders
- information about drug interactions and side effects
- notifications about medical appointments
- notifications for caregivers about when to refill prescriptions
- the offer of online pharmacy services
- recording and monitoring of:
    - weight
    - heart rate
    - blood pressure
    - temperature

The Medi Safe App allows people to add multiple users to one account. The people can share medication data as PDFs, which may be useful during medical appointments.

Med manage app: The Med Manage app allows iOS users to log and manage medications for multiple people.

It offers these features:

- tracking for current and past prescriptions
- customizable medication lists, schedules, and reminder alerts
- an optional birth control reminder
- an optional opioid monitor
- the option of monitoring chronic diseases [9].

Electronic Health Record (Ehr) System:

Electronic health record (EHR) systems, introduced in the early 1960s, are computer- grounded software for managing medical records, replacing traditional paper- grounded flyers with enhanced structural storehouse of patient health information. The uninterrupted growth of technology has led to increased relinquishment of EHR systems in colourful healthcare operations. The large- scale and different nature of the healthcare terrain causes a need for EHR systems to offer a wide range of functionality and integration. As technology continues to advance, EHR systems must continue to offer fresh capabilities and remain interoperable with recently arising systems. numerous innovative EHR systems are offering fresh functionalities and algorithm- grounded prognostications, including the capability to prognosticate lung cancer webbing results [10].

Example: ABDM (Ayushman Bharath Digital Mission)

ABDM (Ayushman Bharath Digital Mission)

The ABDM's task is to develop and manage an intertwined digital health structure in the country using digital results to ground gaps in the health ecosystem. The ABDM is thus aligning colourful health- related data records and registries by developing an allied armature with well- defined morals for data norms and operation of EHRs. The ABDM aims to ameliorate citizen and case services by engaging a wide range of stakeholders, including policy makers (in central and state governments), director (controllers and program directors), providers (hospitals, labs, and apothecaries), health care professionals (croakers and other interpreters), confederated private realities (similar as insurance providers and health tech companies), and nonprofit associations (similar as civil society and development mates). ABDM is anticipated to ameliorate health- sector decision- making at themacro-level, as well as to give cases with access to safe and secure medical records that can be participated across health care providers in the public and private sectors. National digital health dockets should be sensitive to specific individual countries' capacities while also backing the core principles of availability, confidentiality, interoperability, sequestration, replicability, scalability, security, and translucency. Relinquishment of digital health technologies by health care providers, health

assiduity professionals, cases, and consumers is governed by the public health sector and health strategies. Several low- and middle- income countries, including India, have espoused a multi-pronged approach to digital metamorphosis of health care services. India launched the Ayushman Bharat Digital Mission (ABDM) in 2021 to pursue the digital health docket with an original focus on strengthening the digital health Eco-system for data, information, and structure services. After providing background on ABDM, this paper presents an assessment of the progress of the mission thus far, focusing on selected parameters of development and impact [(11)].

Wearless digital health technology:

Wear lower is a term used for forms of technology that are worn on the body, similar as smartwatches or tenacious patches containing detectors, and that perform a useful function for the wear and tear or a caregiver. Common exemplifications include bias that track physical exertion and sleep or give physiological data about the wear and tear, similar as heart rate and meter or blood glucose situations. Decreasingly, wearables are being used by medical professionals to give clinical data on their cases and for their cases. This digital health technology (DHT) that's worn by cases and connected through mobile apps or particular digital sidekicks can be used for complaint monitoring, diagnostics, cautions, or other clinical care services. In this series, we relate to this specific class of technology as "wearable DHT" [(12).] Digital technology assessment criteria (DTAC) are produced across global authorities, and the number increases by hundreds each day. The sheer number, variety, complexity, and pace of change make regulating them a redoubtable challenge [(13).]

Example: Smartwatches, continuous glucose monitoring, etc

Smartwatches: Smartwatches frequently come with advanced features like a heart rate examiner. These high-tech bias use a fashion called photoplethysmography to directly measure the stoner's heart rate [(14).] By exercising light shafts and technical detectors on the smartwatch, changes in blood volume flowing through the wrist can be precisely quantified. This process generates a PPG waveform that provides precious data for determining an existent's heart rate. By the movement of body or vibration of the number of ways we walked is also responsible [(15,16)].

Continuous Glucose Monitoring

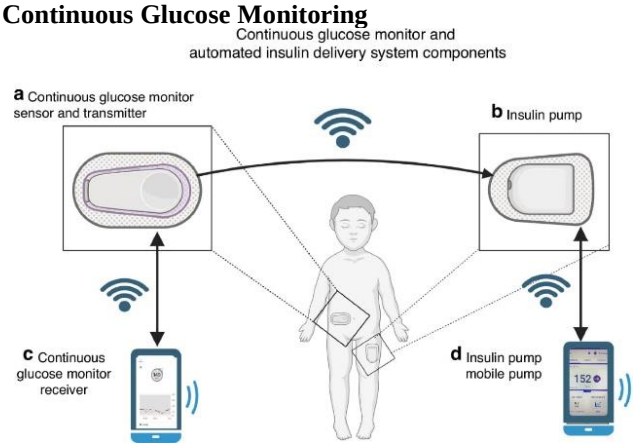

Fig.2 Expanding the horizon of continuous glucose monitoring

CGM bias induce time- series data that capture glucose oscillations with granularity. These data form the foundation for prophetic modelling, where advanced algorithms can assay glucose dynamics to give practicable perceptivity. Prophetic modelling has demonstrated implicit in enhancing both individual diabetes operation and broader clinical decision- timber [(17)].

3. Telepharmacy

The term "tele" began from the Greek word "Telos" meaning "at a distance" and the term "drug" deduced from a Latin word "Meden" meaning "to heal". This technology was cooked to give healthcare services to medically deprived population in geographically remote locales with the help from long- distance medical centres. Telemedicine has been defined by the World Health Organization [(18).] Telepharmacy is a type of pharmaceutical care that allows druggists and their cases to interact indeed when they are n't physically present in the same position. In the journal Medicina, this is defined as "the provision of druggist care by registered druggists and apothecaries through the use of telecommunications to cases located at a distance" [(19).]

Historical evolution of telepharmacy Technological Innovations Driving in Telepharmacy:

- 1950s–1970s Beforehand robotization and robotization in drugstore laid the root for remote services.
- 1990s – 2000s The rise of the internet enabled online apothecaries and introductory telepharmacy models, especially in pastoral areas.
- 2010s Integration with electronic health records (EHRs), mobile health apps, and AI began shaping further sophisticated remote allocating and patient comforting systems.
- Acceleration During COVID- 19- The epidemic catalyzed global relinquishment of telepharmacy, with patient use of telehealth services is jumping from 11 in 2019 to 46. Consumer trust in online drug services increased significantly, shifting gets toward digital platforms [(20).]

Remote medical dispensing: Remote allocating is a decreasingly common form of telepharmacy, designed to help cases admit specifics when druggists are n't actually onsite. This process relies on automated systems, which are able of packaging and labelling specified specifics. These are also released to cases at authorized locales [(19).]

Examples: India's digital drugstores(e-Sanjeevani-linked).

E-Sanjeevani:

E-Sanjeevani, a public telemedicine platform, was launched by the Government of India in November 2019. This model has proved salutary to deliver tele- health care, with minimum threat of cross-transmission during the COVID-19 epidemic in India [(20)]. This platform that has handed further than 16 million live, real- time videotape consultations delivered free- of- cost to cases during the COVID- 19 epidemic in India, the second-most vibrant country in the world. The word "e-Sanjeevani" derives its alleviation from the factory Sanjeevani that's substantiated in the Ramayana epic and is an apt fable describing the delivery of health care at the place of need [(21).]

The eventuality of e-Sanjeevani to address internal health requirements is an area warranting farther disquisition [22]. While the current application of internal health support is limited, the positive experience reported by the stoner suggests that telemedicine could play a precious part in this area [23]. The literature also provides substantial empirical substantiation supporting the use of telemedicine interventions for cases with internal diseases across a broad range of demographic and individual groups. also, exploration has shown positive trends in terms of cost savings associated with these telemedicine interventions [24,25]. Some general disadvantages of telemedicine include limitations in conducting comprehensive physical examinations, as certain individual procedures may not be doable without in- person visits. also, patient specialized difficulties, including challenges with internet connectivity, garçon stability and app integration, continue to hamper the effectiveness of the platform across colourful settings. likewise, telehealth may not be suitable for all medical conditions in which physical examinations and procedures are necessary, Telehealth can be used to condense in-person visits. A combination of virtual and in- person care may be necessary to give optimal healthcare services [26].

Fig.3: Promoting e- Sanjeevani app for free online croaker discussion

4. Electronic prescription

Electronic prescriptions can streamline the dispensing process at pharmacies, reducing the need for clarification calls, speeding up refill operations, maintaining organized data, and providing updated information on pharmaceutical formularies and pre-authorisations [27]. In essence, e-prescribing services aim to enhance patient access to medications and bolster the efficiency and efficacy of healthcare services, positioning it as a pivotal component of contemporary healthcare systems [28]. Collaboration among all system stakeholders is required to strengthen and support the electronic prescription system. E-prescription benefits patients in two ways. Firstly, it minimizes the chances of prescription misplacement or loss. Secondly, it reduces the dispensing time, leading to shorter wait times and higher satisfaction levels with pharmacies [29].

Examples: Apollo 24/7, NDHM (National Digital Health Mission), etc

Apollo 24/7:

Apollo Hospitals Enterprise (Apollo Hospitals), a leading private sector brick-and-mortar hospital chain in India known for using state-of-the-art technology, launched a unified virtual mobile platform Apollo 24/7 in February 2020, 45 days into the COVID-19 pandemic. The management believed that the digital platform had a unique ecosystem that could not be replicated [30]. Apollo 24|7 aims to deliver various healthcare experiences to people in India with telemedicine services, online doctor consultations, home delivery of medication, and improved clinician decision-making. Key pillars of this partnership include: The development of an AI-powered clinical decision support system: Apollo 24|7 teams worked with Google Cloud to build a Clinical Intelligence Engine (CIE) using Google Cloud's Vertex AI and generative AI (gen AI) models. This enables doctors to identify the next best action for patients during consultations [31]. This workflow enables users to connect with doctors 24/7 through audio, video, or chat.

Online doctor consultation:

Select service: The user opens the app and navigates to the 'Doctor Consultation' section.

Choose specialty: The user selects a medical specialty, such as a General Physician, Paediatrician, or Dermatologist. A "symptoms checker" tool, powered by AI, can also help guide users.

Find and book a doctor: The user can browse through a list of available doctors, view their profiles, and book an appointment slot at their convenience.

Consultation: The user connects with the doctor for a virtual consultation.

Receive and store prescription: After the consultation, the doctor's notes and prescription are sent digitally and automatically stored in the user's health records section of the app [32].

Medicine ordering and delivery:

This workflow allows users to order medicines and health products online for delivery to their doorstep.

Browse or search for products: The user can browse pharmacy categories or search for specific medicines.

Add to cart: The user adds the required medicines to their shopping cart.

Upload prescription: For prescription medicines, the user uploads a digital copy of the prescription from their doctor. The prescription can be the one received from an Apollo 24|7 online consultation or from a physical visit.

Checkout and payment: The user proceeds to checkout, confirms their order details, and makes a payment.

Delivery tracking: The app tracks the order status and delivers the medicines. In some locations, express 19-minute delivery is available.

Lab test booking:

This workflow enables users to book a wide range of diagnostic tests that can be performed from the comfort of their homes.

Select lab test: The user navigates to the 'Lab Tests' section and selects the required tests or health checkup packages.

Provide details: The user provides their location and other relevant information.

Schedule sample collection: The user books a convenient time for a technician from Apollo Diagnostics to collect samples (e.g., blood, urine) from their home.

Receive reports: After the tests are conducted, the results are delivered digitally to the user's app, and they can also be shared with their doctor [33].

5. National Digital Health Mission (NDHM)

India is among the first set of nations to develop a national digital health blueprint (NDHB) to strengthen the various building blocks of the health system to achieve the core objectives of the National Health Policy (2017). The NDHB establishes the need to create a framework for evolving the national digital health eco-system. It outlines guiding principles and building blocks and recommends setting up a National Digital Health Mission (NDHM) for successful implementation of the strategies. The NDHB also prescribes other physical, digital and artefact deliverables to measure the progress of the digital health initiative. Accordingly, the NDHM was piloted in 2020 and rolled out nationwide in 2021. The NDHM was subsequently renamed as the Ayushman Bharat Digital Mission (ABDM) and is implemented under the purview of National Health Authority (NHA)[34]. The focus is on three core components: inputs, processes, and outputs. The input indicators are associated with conventional programmatic requirements, such as funding and implementation staff. The NDHM envisaged capacity building and partnerships as critical inputs for the success of the mission and hence they are reviewed accordingly. Mapping of key registries and health care facilities are also important inputs to facilitate linkages [34].

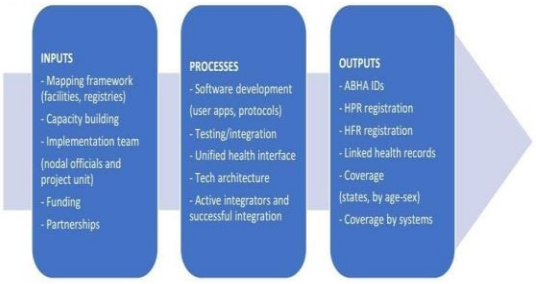

Fig.4: Framework for this concurrent assessment of ABDM

NDHM health records: It is an electronic record of an individual's health information conforming to national interoperability standards. It aggregates data from multiple sources, allowing individuals to manage, share, and control their health information. Functions include viewing records across multiple facilities like lab reports, treatment details, and discharge summaries [35].

Barcoding system in healthcare system:

Bar codes are standardized identification tools that allow for asset tracking. They have widespread use in point-of-sale purchases, delivery companies, automobile industry, and health care. With advances in technology over the past few decades, there have been tremendous improvements in bar code and scanner performance. Some of the main purposes of implementing a bar coding and tracking system are to reduce errors and increase efficiency. Instead of manual logging entries, bar coding has reduced human errors by automating identification and tracking. Regarding health care, bar coding is a hospital-wide operation. From patient wristbands to hospital beds, different bar codes or RFID tags are used to identify, locate, and audit labelled assets [36].

There are two types of barcoding system in healthcare system:

1D Barcodes

1D barcodes, also known as linear barcodes, are the traditional barcodes consisting of vertical lines of varying widths. In healthcare, 1D barcodes are commonly used on medication packaging for inventory management and dispensing purposes. By scanning the barcode on medication packaging, healthcare professionals can verify the drug name, dosage, and expiration date, reduce the risk of errors and improve overall medication safety.

2D Barcodes

2D barcodes, such as GS1 Data Matrix and QR codes, can hold more data than 1D barcodes. These barcodes are used for patient wristbands and medication labels. These barcodes store detailed information such as patient medical history, allergies, and medication dosages. By scanning the 2D barcode on a patient & rsquo; s wristband, healthcare providers can quickly access comprehensive patient data, ensuring accurate and personalized [37].

The recent use of 2D code technology for patient identification applications within the hospital environment provides a significant improvement of all health care related identification applications [38]. The implementation of this technology allows to quickly and effectively verify a patient's identity and data before administering medications, performing medical procedures, and even permits to monitor patients' location and movement to different hospital areas or other centres within the public health care system [39].

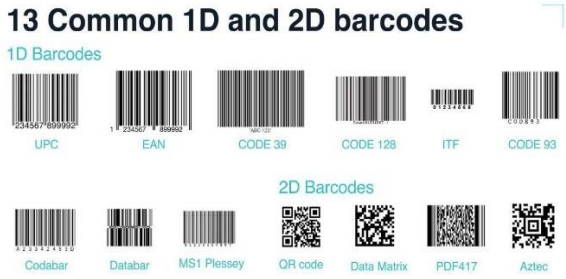

Fig.5: 1D and 2D barcodes using in healthcare sectors

Examples: Automated dispensing cabients (pyxis, Omnicell), etc.

Automated dispensing cabients:

use of automated dispensing cabinets (ADCs) is increasing in hospital settings. ADCs bring various potential benefits, among which are improvements to patient safety and reduction of medication errors. A core function of ADCs is to prevent medication stock outs by triggering an order when stock is reaching low levels. The great progress in

healthcare technology has been the wide adoption of automated dispensing cabinets for medications and supplies in hospitals and other healthcare facilities. This technology employs the use of storage units that operate somewhat like vending machines for the medical products, but also have sophisticated software on the back-end that handles patient orders, medication dosing documentation, inventory management, and billing transactions. This post will cover these medication dispensing systems as well as other pharmacy automation products**.**

Pyxis First to market, loyal customer base, deep operational knowledge, strongest in medication systems. Weaker in supply management products. Omnicell Advanced technical expertise, Guided Lights feature, broad integrated product line, original corporate structure remains Not top of market share AcuDose. Products recently re-engineered, "hold my place" feature, strong ROBOT-Rx product. Before being acquired by Omnicell, they were a distant third in market share [(40)].

6. Conclusion

The digital transformation in the pharmacy sector is significantly reshaping healthcare delivery, driven by the integration of cutting-edge technologies like my fitness pal app for continuous monitoring of health. Technology holds significant promise as a technology to improve access to pharmaceutical care for people living in rural and remote communities. The role of digital health in modern pharmacy cannot be overstated. It has the power to revolutionize pharmacy practice, empower patients, and transform healthcare delivery. By recognizing the importance of digital health, embracing emerging trends, adopting innovative solutions, pharmacists can continue to lead the way in promoting patient-centred care and advancing the future of pharmacy practice. Telepharmacy is an emerging branch within hospitals and healthcare systems that supports pharmacists in managing their daily responsibilities. Telepharmacy has significantly improved processes, including remote medication dispensing, patient counselling, medication inventory management, and collaboration with healthcare teams. These hospital workflow improvements significantly improve patient care. Telepharmacy is quickly becoming an integral part of modern pharmacy practice that has the potential to provide quality service, such as medication management, dispensing, patient counselling, and drug information. Adopting these practises includes potential legal risks and difficulties that must be resolved. A well- developed system, however, can change the practice of pharmacy that is beneficial to the rural communities as well as the hospital or retail pharmacies that deliver these services.

7. References

[1] World Health Organization (WHO). Global strategy on digital health 2020–2025. Geneva: World Health Organization. 2021..

[2] Baldoni S, Amenta F, Ricci G. Telepharmacy services: present status and future perspectives: a review. Healthcare. 2019;7(3):86.

[3] India's evolving digital health strategy. NPJ Digit Med. 2024

[4] World Health Organization. Global strategy on digital health 2020–2025. 2021.

[5] Empowering World by Global Strategy on Digital Health 2024. Safalta. 2024.

[6] The impact of mobile health interventions on service users' health outcomes and the role of health professions: a systematic review of systematic reviews. BMC Digit Health. 2024

[7] Martin BJM. Effectiveness of MyFitnessPal application among the senior high school students. J Phys Educ Res. 2024;11(4):1–8.

[8] 10 Best Medication Tracker and Pill Reminder Apps in 2025. Tech Commuters. 2025.

[9] Rose D. 9 best pill reminder apps: review article. J Med News Today. 2022 May 3.

[10] Razzano AV. A scoping review on the impacts of electronic health record systems on healthcare delivery. Int J Health Sci Res. 2024;14(7).

[11] Mishra US. The Ayushman Bharat Digital Mission of India. Taylor & Francis. 2024 Mar 5. doi:10.1080/23288604.2024.2392290.

[12] Friend SH, Ginsburg GS. Wearable digital health technology. Engl J Med. 2024.

[13] NHS England. Medical devices and digital tools. Version 1.3. 2025 Mar 3.

[14] Hosseini MM, Hosseini STM. Smartwatches in healthcare medicine: assistance and monitoring; a scoping review. PMC. 2024.

[15] Dunn J, Kidzinski L, Runge R, Witt D, Hicks JL, Schüssler-Fiorenza Rose SM, et al. Wearable sensors enable personalized predictions of clinical laboratory measurements. Nat Med. 2021; 27(6): 1105–1112.

[16] Isakadze N, Martin SS. How useful is the smartwatch ECG? Trends Cardiovasc Med. 2020; 30(7): 442–448.

[17] Bender C. The history, evolution and future of continuous glucose monitoring (CGM). 2024.

[18] Poudel A, Nissen LM. Telepharmacy: a pharmacist's perspective on the clinical benefits and challenges. PMC. 2024.

[19] Examining the use of telepharmacy and remote dispensing technologies. Carrington College. 2024

[20] Baldoni S, Amenta F, Ricci G. Telepharmacy services: present status and future perspectives: a review. PubMed. 2024.

[21] Suhas S, Kumar CN, Math E. Sanjeevani: a pathbreaking telemedicine initiative from India. J Psychiatry Spectrum. 2024.

[22] Rosh PSN, Lal SS, Lopez S, Mini GK. Current pattern of use and barriers to implementation of Sanjeevani telemedicine services in Kerala, India. Int J Community Med Public Health. 2025; 12(10): 4572–4580.

[23] Bashshur RL, Shannon GW, Bashshur N. The empirical evidence for telemedicine interventions in mental disorders. Telemed e-Health. 2015; 22(2): 87–113.

[24] Gajarawala SN, Pelkowski JN. Telehealth benefits and barriers. Nurse Pract. 2020;45(12):20–26.
[25] Department of Health Services, Government of Kerala. Mission and vision. 2025
[26] Hareem A. Benefits and barriers associated with e-prescribing in community pharmacy: a systematic review. PMC. 2024
[27] Lapane KL, Rosen RK, Dubé C. Perceptions of e-prescribing efficiencies and inefficiencies in ambulatory care. Int J Med Inform. 2011; 80:39–46.
[28] Porterfield A, Engelbert K, Coustasse A. Electronic prescribing: improving the efficiency and accuracy of prescribing in the ambulatory care setting. Perspect Health Inf Manag. 2014; 11.
[29] Apollo 24/7 – A chink in Apollo Hospitals' armour. Emerald Emerg Mark Case Stud. 2024.
[30] Apollo Hospitals partners with Google Cloud for its digital platform. Times of India. 2024.
[31] Aanchal D, Padmaraj S, Shrivishwanaathan N, Kansal N. Apollo247 is an online consultation app that helps connect with a doctor during emergencies. Naman Express. 2024.
[32] Apollo247: All of Apollo now on your phone. 2024.
[33] Mishra US, Joe W, Yadav S. The National Digital Health Mission (NDHM) of India: a concurrent assessment. Int Health Takemi Symp. 2024.
[34] Mishra A. National Digital Health Mission: what it does for health records. Bus Stand. 2024 Apr 9.
[35] Hanna MG. Barcode medication administration technology use in hospital practice: a mixed-methods observational study of policy deviations. PMC. 2024.
[36] Lachman P, van der Wilden E. Use of barcode technology can make a difference to patient safety in the post-COVID era. IJQHC Commun. 2021; 1(1): lyab014.
[37] SATO Healthcare ID Solutions. Positive patient identification wristband solutions. 2012.
[38] TEC-IT Datenverarbeitung GmbH. Data Matrix ECC200. 2012..
[39] Automated dispensing cabinets and their impact on the rate of omitted and delayed doses: a systematic review. PMC. 2024.
[40] Automated dispensing cabinets, pharmacy automation, Pyxis, Omnicell. 2024.

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