

# A review on telepharmacy and digital health integration

Dhanashree Ghorpade<sup>1</sup>, Nirmala Musmade<sup>2</sup>

<sup>1</sup>Student, Yashodeep Institute of Pharmacy

<sup>2</sup>Asst.Professor, Yashodeep Institute of Pharmacy

**Abstract**—Telepharmacy and digital health technologies have significantly changed the way healthcare Services are delivered by improving access, efficiency, and patient outcomes. This review Discusses the historical development, tools, components, applications, challenges, and future Trends related to the integration of telepharmacy and digital health. Telepharmacy refers to the Delivery of pharmaceutical care using telecommunication technologies and has proven to be Especially useful in addressing pharmacist shortages, improving medication safety, and supporting Chronic disease management. Digital health uses information and communication technologies to Manage clinical and genetic data and enhance both patient care and healthcare operations. When Telepharmacy is combined with digital health systems, several benefits emerge, including better Access to healthcare services, increased patient convenience, reduced costs, improved medication Management, and better health outcomes. The development of these technologies began with early Automation in the 1950s and has progressed to today's highly connected digital healthcare systems. Supportive global policies and patient-centered care initiatives have further encouraged the Adoption of digital health solutions. However, challenges such as limited technological skills, data Privacy concerns, algorithmic bias, and unequal access to digital devices still need to be addressed to ensure fair and inclusive healthcare delivery.

Emerging innovations in telepharmacy and digital Health have the potential to transform healthcare by enabling continuous access to care, Personalized treatment, stronger patient–provider relationships, and broader community health Benefits. Achieving these goals requires collaboration among all stakeholders to overcome existing Challenges and ensure equitable access for all. Telepharmacy and digital health integration are transforming the way healthcare services are delivered, especially in remote and underserved areas. Telepharmacy allows pharmacists to provide services such as medication review, patient counseling, and prescription verification through digital

communication technologies. When combined with digital health tools like electronic health records, mobile health apps, and teleconsultation platforms, it improves access to safe and effective medication use.

**Keywords:** Digital health, Integration, Patient-centered care, Telecommunication, Telepharmacy Patient centered care.

## I. INTRODUCTION

Telepharmacy: A Modern Healthcare Solution

Telepharmacy is an innovative approach used in hospitals and healthcare systems to provide Pharmaceutical care remotely. Telecommunication and digital technologies play a crucial role in Enabling telepharmacy, particularly in rural and underserved regions. This approach gained Significant attention during the COVID-19 pandemic, as it allowed pharmacists to provide Consultations and manage medications remotely, reducing the risk of viral transmission while Maintaining community-based care. (1) Telepharmacy helps address pharmacist shortages by Extending the reach of pharmacists beyond physical locations, ensuring that patients with limited Access can still receive essential pharmaceutical services. (2)

Telepharmacy involves providing pharmaceutical care through telecommunication technologies, allowing patients in remote or underserved areas to access pharmacist services without visiting Healthcare facilities in person. (3) Initially introduced to improve medication safety and address Workforce shortages, telepharmacy experienced rapid growth during the COVID-19 pandemic. It Played a key role in maintaining pharmaceutical services during lockdowns by removing physical Barriers to healthcare access. Evidence shows that telepharmacy improves health outcomes by Supporting medication adherence and effective disease management. For

example, telepharmacy Has been shown to improve glycaemia control in patients with diabetes and reduce hospital Admissions. Over the past two decades, telepharmacy has expanded globally and has become an Important component of modern healthcare delivery. (4)

Pharmacies play a vital and multifaceted role in patient care. Beyond dispensing medicines, Pharmacies have evolved into essential healthcare partners that promote health, ensure medication Safety, and improve patient well-being.(5) Pharmacists, as medication experts, ensure that patients Receive appropriate medicines in correct doses. They review prescriptions, identify potential drug Interactions, and educate patients on medication use and side effects. (6) Pharmacies also support public health initiatives by providing vaccinations, health screenings, and preventive care services. (7) Pharmacists often administer vaccines and contribute to disease prevention efforts. (8)

Telepharmacy enables the remote delivery of clinical pharmacy services. (9) It involves providing pharmaceutical care through telecommunication technologies and includes services such as Medication order review, dispensing and compounding supervision, drug information services, Patient counselling, and therapeutic drug monitoring. (10, 11.)

Telepharmacy is an innovative approach to delivering pharmaceutical care using Technology. It Has significantly improved access to pharmacy services in rural and remote Areas. (12) Telepharmacy has expanded the role of pharmacists by enabling better medication Management For chronic diseases, identifying and resolving drug-related problems, monitoring adverse drug reactions, and providing patient education with greater privacy. (13)

During the COVID-19 Pandemic, telepharmacy played a crucial role in maintaining pharmaceutical services while Minimizing infection risk. Advances in telecommunication Networks now allow even remote Regions to connect with pharmacists in larger healthcare Centers. (14) Technology also supports Secure storage of patient records, automated

medication Dispensing, supply chain management, And monitoring of medication safety and Effectiveness.

#### Types of Telepharmacy (15)

1. Inpatient Telepharmacy (Remote Order Entry Review):  
A remote pharmacist reviews medication orders before hospital staff administer drugs to patients.
2. Remote Dispensing (Retail/Outpatient): (16)  
A licensed pharmacy staffed by trained technicians operates under the supervision of a remote Pharmacist.
3. IV Admixture Services:  
This involves the preparation of intravenous medications by adding drugs to IV fluids in controlled Environments.
4. Remote Counselling:(17)  
Patient counselling is provided through live video sessions or other telecommunication methods.

#### Components of Telepharmacy

Illustrates the key components of telepharmacy identified across the reviewed studies. These Components include a wide range of digital and communication tools such as websites, cloud based platforms, telephones, facsimile services, tablets with internet-based login access, mobile Messaging applications, electronic health records, videoconferencing systems, radio and live Broadcast stations, interactive chat services, and social media platforms.

Telepharmacy enables effective communication and collaboration between healthcare Professionals by supporting patient consultations and medication reviews through Videoconferencing, fax, email, and telephone services. In addition, smartphones play an important Role in telepharmacy by allowing pharmacists to provide virtual counselling to patients and send notifications related to new or modified medication therapies.

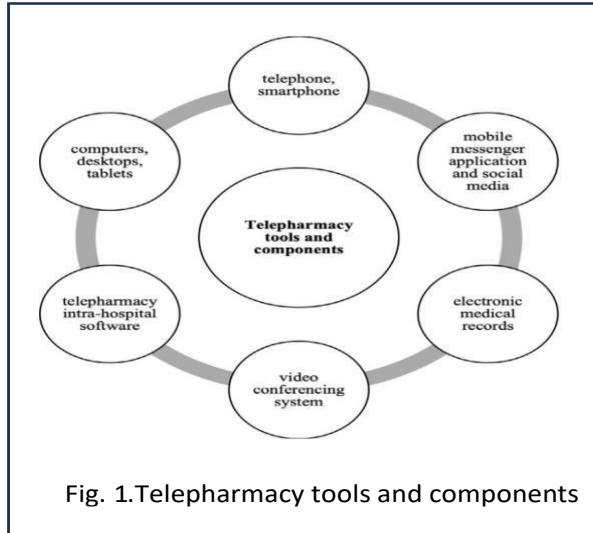


Fig. 1. Telepharmacy tools and components

### Digital Health

Digital health uses information and communication technologies to improve patient care by Managing clinical and genetic data.(18) It has transformed healthcare by streamlining clinical Operations, supporting research, and improving health outcomes. One example is Blue Star, a Digital health application developed for diabetes management and among the first FDA-approved Digital health tools. Prescribed by healthcare providers, it includes an insulin dose calculator that Helps patients safely adjust their insulin levels. (19)

Digital health interventions, delivered through mobile applications, websites, or text messaging Systems, offer scalable and cost-effective solutions for healthcare delivery. These tools support Healthy lifestyle behaviours such as smoking cessation, balanced diets, and physical activity. They Also assist in managing chronic diseases and improving mental health outcomes. (20, 21)

### Integration of Telepharmacy and Digital Health

The integration of telepharmacy with digital health has revolutionized healthcare delivery by Improving accessibility, convenience, cost-effectiveness, medication management, and health Outcomes.(22) Telepharmacy allows clinical pharmacists to remotely review inpatient medications In rural hospitals, significantly reducing medication errors and improving treatment outcomes. Automated technologies such as smart blister packs equipped with microprocessors help track Medication adherence and

manage inventory, reducing errors and improving chronic disease Management. (23)

Innovations such as pharmacist-led medication reconciliation and barcode-based medication Systems with visual aids have further enhanced drug safety and optimized antibiotic use. The Collaboration between telepharmacy and digital health demonstrates how technology can improve Overall healthcare quality, particularly in advanced fields such as genomics. (24)

### Historical Evolution of Telepharmacy and Digital Health

#### Telepharmacy

The origins of telepharmacy and digital health can be traced back to key technological Advancements. In 1876, the invention of the telephone by Alexander Graham Bell enabled remote Medical communication. By 1879, physicians were already using telephone technology to Diagnose patients.(25) In 1925, Hugo Gernsback introduced the concept of the “Teledactyl,” a Futuristic device designed to conduct remote patient examinations using robotic tools.(26)

#### Digital Health

##### First Wave:

The first phase of digital health began in the 1950s, focusing on automation and the use of Computerized systems for administrative tasks such as payroll and data management.

##### Second Wave:

During the 1970s, health informatics and electronic health record (HER) systems emerged, Allowing digital storage and management of patient data.

##### Third Wave:

The current phase is characterized by digital integration and interconnectivity. Technologies such As wearable devices, mobile health applications, and Internet of Things (IoT)-enabled systems are Now integrated into unified platforms. These systems support real-time data exchange, artificial intelligence-based diagnostics, and personalized patient monitoring, significantly improving patient care.(27)

#### How Does Telepharmacy Work?

In general, small rural hospitals, clinics, or pharmacies are connected to larger urban healthcare Centers that

have greater access to pharmacists, often available 24 hours a day. This connection is Established through video conferencing systems, specialized software, and automated dispensing Machines.(28) Rural sites are typically staffed by pharmacy technicians or nurses, depending on the Setting. Prescriptions received at rural locations are transmitted electronically to the central Pharmacy, where they are reviewed by licensed pharmacists.(29) Telepharmacy generally works by linking a small rural hospital, pharmacy, or clinic located in a Remote area with a larger healthcare facility in an urban center.

These urban centers usually have Better resources and round-the-clock access to qualified pharmacists. The connection between the Rural and central sites is established using videoconferencing systems, specialized pharmacy Software, and, in some cases, automated dispensing machines. At the rural site, day-to-day operations are typically managed by pharmacy technicians or nurses, Depending on whether the location is a pharmacy or a clinic. When patients visit these sites, their Prescriptions are sent to the central pharmacy, often through fax or electronic communication. A Licensed pharmacist at the central site reviews and processes these prescriptions to ensure accuracy And safety.

However, automated dispensing machines are often expensive and may not be affordable for many Small rural hospitals or clinics. To overcome this limitation, an alternative model was developed By researchers in Fargo, North Dakota, USA. In this approach, a pharmacy technician prepares, Repackages, and labels medications at the rural site under the real-time supervision of a pharmacist Through videoconferencing. This ensures that medications are prepared correctly while Maintaining professional oversight.

In some settings where automated dispensing machines are not affordable, alternative models have Been developed. For example, under video supervision, trained technicians prepare and label Medications, which are then dispensed to patients. In other models, mobile telepharmacy units Allow healthcare staff to consult pharmacists in real time. At the end of the process, patients receive A two-way video consultation with the pharmacist to ensure they understand the dosage and Method of administration.(30)

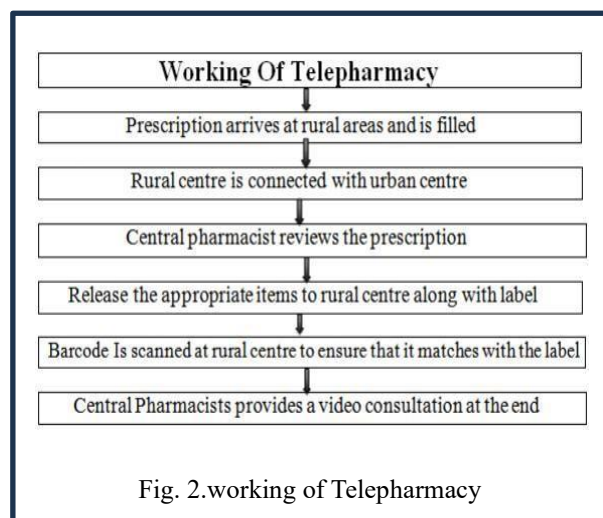


Fig. 2.working of Telepharmacy

## II. ROLE OF HOSPITAL PHARMACISTS IN TELEPHARMACY

Hospital pharmacists play a critical role in delivering effective therapy in both hospital and Community settings.(31) Through telepharmacy, pharmacists can remotely review medication Orders, provide drug information, and offer clinical consultations. This model is especially useful In small hospitals during night shifts when on-site pharmacists are unavailable. Telepharmacy Improves access to expert medication advice in remote areas and enhances communication Between healthcare professionals and patients.(32) It also reduces pressure on healthcare resources And improves medication management. In critical care settings, telepharmacy ensures timely Verification of medication orders and supports standardized care across multiple healthcare Facilities.(33)

Hospital pharmacists play a very important role in telepharmacy by using technology To take care of patients' medicines even when they are not physically present in the hospital. First, hospital pharmacists check prescriptions online. They carefully review doctors' orders to Make sure the right medicine, right dose, and right duration are prescribed. This helps prevent Medication errors and improves patient safety. Hospital pharmacists also work closely with doctors And nurses using digital platforms. They give suggestions about better medicine choices, dose Adjustments, and alternatives when required. This teamwork improves the overall quality of Treatment.

Second, they talk to patients through video calls, phone calls, or messages. Pharmacists explain How and when to take medicines, what side effects to watch for, and what to do if a dose is missed. This makes patients feel supported and confident about their treatment. Another important role is Monitoring treatment progress. Pharmacists check lab reports and patient records through Electronic systems and help adjust medicines based on the patient’s condition, especially for Serious or long-term illnesses.

They also help with medication reconciliation, meaning they make sure patients are taking the Correct medicines when they are admitted, transferred, or discharged from the hospital. This Reduces confusion and avoids duplication or missed medicines. In emergency situations or in hospitals with limited pharmacy staff, hospital pharmacists provide Remote support. They guide healthcare professionals in selecting and using medicines safely Through telecommunication tools. Hospital pharmacists also maintain proper records of all telepharmacy activities. This ensures legal Compliance, accountability, and continuity of care.

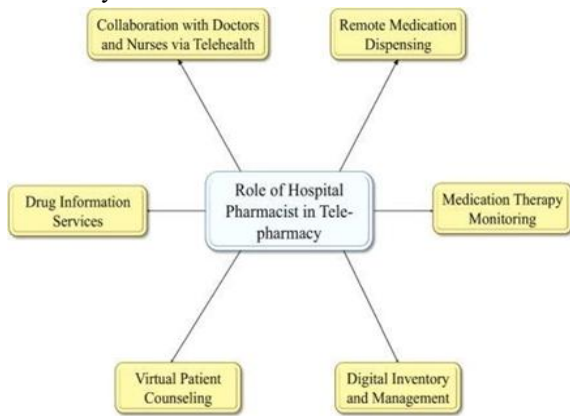


Fig. 3.role of hospital pharmacist in telepharmacy

Global Overview of Telepharmacy

Telemedicine refers to the use of electronic communication technologies to provide healthcare When distance separates participants. Telepharmacy is a specialized application of telemedicine That focuses on the remote delivery of pharmaceutical care.(34) Research shows that many clinical And operational pharmacy services—such as patient assessment, medication review, education, Prescription verification, disease prevention, and outcome monitoring—can be effectively Provided through

telepharmacy.(35) The importance of telepharmacy increased significantly during The COVID-19 pandemic due to social distancing requirements and increased strain on healthcare Systems. Many countries adapted regulations to support telepharmacy, allowing continued access To pharmaceutical care while minimizing infection risks.(36)

Telepharmacy has been implemented worldwide for decades, particularly in regions with limited Access to pharmacy services. Countries such as Australia, the United States, Canada, the United Kingdom, and Hong Kong were early adopters.(37) The COVID-19 pandemic significantly Accelerated telepharmacy adoption globally. Innovative models include cloudbased pharmacy Services in China, nationwide online counselling services in Denmark, robotic medicine supply Systems in Scotland, and collaborative telemedicine programs in Switzerland. Research has Consistently shown that telepharmacy improves medication safety, reduces adverse drug events, And enhances patient outcomes, especially in chronic disease management. (38, 39,40,41)

Problem Statement and Significance of Telepharmacy

Access to quality pharmaceutical care remains a major challenge, particularly in rural, remote, and Underserved areas. Many healthcare facilities face a shortage of qualified pharmacists, leading to Problems such as delayed medication dispensing, inadequate patient counselling, increased Medication errors, and poor treatment outcomes. Patients with chronic diseases, the elderly, and Those with mobility limitations often struggle to visit pharmacies regularly, which affects Medication adherence and continuity of care. Telepharmacy plays a significant role in improving access to pharmaceutical services by bridging The gap between pharmacists and patients, especially in areas where pharmacy services are limited Or unavailable.

Through telepharmacy, patients can receive medication counselling, prescription Review, and follow-up care without the need for physical travel, saving time and reducing Healthcare costs. It enhances patient safety by allowing pharmacists to remotely review prescriptions, monitor drug Therapy, and identify potential medication errors or drug interactions. Telepharmacy also supports Better medication

adherence through regular virtual follow-ups and reminders, which is particularly beneficial for patients with chronic illnesses. Telemedicine is particularly valuable when physical access to healthcare facilities is limited. Telepharmacy reduces medication errors, lowers costs, and improves healthcare accessibility across different socioeconomic groups. However, the lack of standardized regulations and clear guidelines poses challenges for the validation and approval of emerging digital health technologies.(42)

#### Challenges and Limitations

Despite its benefits, telepharmacy faces several challenges. Ensuring patient privacy and data security during remote consultations is critical. Secure communication platforms and strict privacy regulations are necessary to build trust. Another major concern is the availability of reliable and affordable internet connectivity, particularly in rural areas. Without stable internet access, patients may not be able to use telepharmacy services effectively. Regulatory frameworks for telepharmacy vary across regions, creating inconsistencies in practice. Policymakers must establish clear guidelines to ensure patient safety and standardize service delivery.

Collaboration among pharmacists, healthcare providers, and regulatory authorities is essential.

Although existing studies show high reporting quality, findings are limited by variability in study designs, cost components, and clinical outcomes. The rapid technological advancements and the impact of the COVID-19 pandemic have significantly altered telehealth delivery models, limiting long-term comparisons.(43)

#### 1. Technology Skills and Access

Many patients struggle to use telehealth platforms because of limited digital skills, disabilities, or lack of access to technology. Tools such as electronic health records (EHRs) and wearable devices are often difficult to operate, especially when they do not support accessibility features like screen readers. This makes digital health services challenging for vulnerable populations.

#### 2. Confidentiality and Informed Consent Issues

Telehealth consent processes often use complicated and technical language that patients may not fully understand. In addition, the use of proprietary

algorithms reduces transparency and limits patient control. These systems may also introduce bias into healthcare decision-making.

3. Poor Communication Between Healthcare Providers  
Even with HER systems in place, patients frequently experience poor communication between healthcare providers, sometimes even within the same healthcare network. This lack of coordination can negatively affect the quality of care, particularly for patients with complex medical conditions.

#### 4. Algorithmic Bias

Many automated systems and wearable devices are designed based on assumptions of "average" users. As a result, marginalized groups are often excluded. For example, fitness trackers may not recognize wheelchair movement as physical activity, and some algorithms do not have proper mechanisms to correct inaccurate outputs.

#### 5. Device Accessibility and Limitations

Medical devices such as CPAP machines and glucose monitors may unintentionally include biased assumptions or excessive surveillance features. Additionally, people with disabilities or limited financial resources often face difficulty accessing these technologies.

6. Inadequate Inclusive Data Collection  
Electronic health records rarely include information about disability status. This limits the ability to identify health disparities and improve accessibility in telehealth services.

#### 7. Scope for Technological Advancement

New technologies such as smartphone-based health monitoring and 3D printing show strong potential. However, their development must prioritize inclusivity and accessibility to ensure benefits for all populations.(44,45)

#### Emerging Developments and Innovations in Telepharmacy and Digital Health Integration

##### 1. Continuous Access to Healthcare

Telehealth is expected to become a permanent and essential part of healthcare systems, ensuring that

patients receive quality care regardless of their location.

## 2. Technological Innovation in Healthcare

Advances in digital technology will enable healthcare professionals to deliver more accurate, Preventive, and personalized care, leading to improved patient outcomes.

## 3. Stronger Patient–Healthcare Professional Relationships

Rather than replacing human interaction, technology will enhance communication, trust, and Collaboration between patients and healthcare professionals.

## 4. Broader Impact on Public Health

Telemedicine will extend beyond individual patient care to support public health initiatives, Emergency response systems, and global health programs.

## 5. Improved Efficiency and Quality of Care

Telemedicine will help reduce healthcare costs, improve treatment outcomes, and enhance overall Quality of life, contributing to more sustainable healthcare systems.

## 6. Collaborative Efforts for Equity

Achieving equitable telehealth access requires collaboration among healthcare professionals, Technology developers, policymakers, and patient advocates to overcome existing barriers.(46)

### Clinical Benefits of Telepharmacy

Telepharmacy offers several advantages that improve patient care. One of its key Benefits is Increased accessibility, especially for patients living in remote areas. It Eliminates the need For long-distance travel and is particularly helpful for elderly Individuals, patients with Limited mobility, and those with chronic illnesses. Telepharmacy also reduces waiting times by allowing patients to consult pharmacists Remotely.

It supports better medication adherence through personalized counselling, Medication reviews, and continuous follow-up. Pharmacists can identify potential Drug related problems and provide guidance on correct medication use, which Improves treatment outcomes. In addition, telepharmacy helps reduce medication Errors by allowing pharmacists to remotely

review prescriptions and ensure accurate Dosing instructions.

### Key Benefits Include:

- Improved Access to Pharmacy Services  
Telepharmacy removes geographical barriers and ensures that people in Underserved or rural areas receive pharmaceutical care and medication guidance.

- Enhanced Medication Adherence

Through remote monitoring, reminders, and regular follow-ups, pharmacists help Patients follow their medication regimens more effectively.

- Medication Review and Counselling

Patients can discuss side effects, drug interactions, and concerns with pharmacists Through virtual consultations, eliminating the need for in-person visits.

- Time and Cost Savings

Telepharmacy saves patients time and money by reducing travel and waiting Periods. Consultations can be done conveniently from home or work.

- Support for Healthcare Facilities

In areas with a shortage of pharmacists, telepharmacy provides access to expert Pharmaceutical services, helping healthcare facilities maintain quality care.

- Quality Dimensions of Telepharmacy

The benefits of telepharmacy can be categorized using the five dimensions of the Alberta

- Quality Matrix for Health:

1.Acceptability: Refers to how well telepharmacy is adopted by pharmacists and Patients, including satisfaction and willingness to continue using the service.

2.Accessibility: Indicates how easily pharmaceutical care can be delivered and Received through telepharmacy systems.

3.Effectiveness: Focuses on how well telepharmacy services achieve intended Healthcare outcomes.

4.Efficiency: Relates to workflow optimization and effective use of resources.

5.Safety: Addresses patient and healthcare worker safety, including medication Accuracy and secure service delivery.

#### Advantages

- 1.Improved access to healthcare in rural areas.(47)
- 2.Reduced operational costs
- 3.Enhanced clinical role of pharmacists
- 4.Improved patient adherence
- 5.Reduced pharmacist shortages
- 6.Effective patient counselling
- 7.Higher patient satisfaction
- 8.Rapid communication
- 9.Reduced travel and face-to-face interactions

#### Disadvantages

- 1.Regulatory and legal challenges. (48)
- 2.Limited technological literacy
- 3.Privacy and data security risks
- 4.High implementation costs
- 5.Operational difficulties
- 6.Reduced emotional interaction
- 7.Language and literacy barriers

#### Applications of Telepharmacy

- 1.Medication dispensing and verification
- 2.Patient counselling
- 3.Support for rural and remote areas
- 4.Hospital and clinic pharmacy services
- 5.Chronic disease management
- 6.Medication therapy management (MTM)
- 7.Emergency and after-hours services
- 8.Public health and health education
- 9.Home delivery and follow-up
- 10.Collaboration with doctors and nurses

Telepharmacy is used to provide pharmacy services from a distance using digital technology.

Its Main applications include:

- Medication dispensing and verification

A pharmacist checks prescriptions remotely and approves medicines before they are given To patients, especially in rural or small hospitals.

- Patient counselling

Pharmacists talk to patients through video calls or phone to explain how to take medicines, possible Side effects, and precautions.

- Support for rural and remote areas  
Telepharmacy helps people in villages or remote locations get access to qualified pharmacists Without traveling long distances.

- Hospital and clinic pharmacy services  
Hospitals use telepharmacy for prescription review, dose adjustment, and medication safety, Especially during night shifts or emergencies.

- Chronic disease management  
Patients with long-term diseases like diabetes, hypertension, or asthma receive regular medication Review and follow-up through telepharmacy.

- Medication therapy management (MTM)

Pharmacists review all medicines a patient is taking to avoid drug interactions and improve Treatment outcomes.

- Emergency and after-hours services

Telepharmacy provides pharmacy services when an onsite pharmacist is not available, such as During nights, weekends, or disasters.

- Public health and health education

Telepharmacy is used to spread awareness about safe medicine use, vaccination, and disease Prevention.

- Home delivery and follow-up

Medicines can be delivered to patients' homes, with follow-up counselling provided remotely.

- Collaboration with doctors and nurses

Pharmacists communicate with other healthcare professionals online to support safe and effective Patient care.

### III. CONCLUSION

The integration of telepharmacy with digital health technologies has transformed Pharmacy Practice by improving efficiency, expanding access to care, and supporting Personalized patient Services. Although challenges such as legal issues, data security Concerns, and infrastructure Limitations remain, collaborative efforts among stakeholders Can ensure equitable and sustainable Implementation. Telepharmacy has

immense potential to improve healthcare delivery by Enhancing Medication management, increasing access to services, and supporting patient-centered Care. As digital health technologies continue to evolve, telepharmacy will remain a vital Component of modern healthcare systems, contributing to better health outcomes and a more Connected healthcare ecosystems. People living in rural and remote areas often face difficulties in Accessing healthcare services because of geographical distance and low population density. Telepharmacy plays an important role in improving access to pharmaceutical care for these Underserved communities.

It has rapidly become an essential part of modern pharmacy practice, With the potential to deliver high quality services such as medication management, dispensing, Patient counselling, and drug information. However, the successful implementation of Telepharmacy also involves addressing various legal and regulatory challenges. Despite these Concerns, the use of advanced digital systems can transform pharmacy practice in ways that benefit Both rural communities and the hospital or retail pharmacies providing these services. This review presents examples of telepharmacy services that have been shown to be cost-effective From a healthcare system perspective. Generating strong economic evidence remains essential to Support the broader adoption and successful implementation of telepharmacy services.

#### REFERENCES

- [1] T.V. Dat, V.L. Tu, N.K. Quan, et al. (2023), Telepharmacy: a systematic review of field Application, benefits, limitations, and applicability during the COVID-19 pandemic *Telemed eHealth*, 29 (2), pp. 209-221
- [2] S. Baldoni, F. Amenta, G. Ricci (2019), Telepharmacy services: present status and future Perspectives: a review *Medicina*, 55 (7), p. 327
- [3] Imam S.N., Braun U.K., Garcia M.A., Jackson L.K., (2024), Evolution of Telehealth—Its Impact on Palliative Care and Medication Management. *Pharmacy*. Apr 2;12(2):61.
- [4] Ghozali M.T., (2024), Assessment of knowledge, Perception, and readiness for Telepharmacy-Assisted pharmaceutical services among young Pharmacists in rural Indonesia. *Explor Res Clin Soc Pharm*. Dec; 16:100513.
- [5] Leong S.L, Teoh S.L, Fun W.H, Lee S.W.H., (2021), Task Shifting in primary care to tackle Healthcare worker Shortages: An umbrella review. *Euro J General Pract*.;27(1):198-210
- [6] Gillani S.W, Gulam S.M, Thomas D, et al. (2021), Role and Services of a pharmacist in the Prevention of Medication errors: a systematic review. *Current Drug Safety*.;322-8.
- [7] Strand M.A, Davidson K.M, Schulze N. (2017), Linking pharmacists to the delivery of public health services. *J Am Pharm Assoc*.;57(6):742-6.
- [8] Agomo CO. (2012), The role of community pharmacists in public health: a scoping review of the literature. *J Pharm Health Services Res*.;3(1):25-33.
- [9] Casey, M.M., Sorensen, T.D., Elias, W., Knudson, A. and Gregg, W., (2010), Current Practices and state regulations regarding telepharmacy in rural hospitals. *American Journal of Health-System Pharmacy*, 67(13): 1085-1092.
- [10] Keeys, C., Kalejaiye, B., Skinner, M., Eimen, M., Neuffer, J., Sidbury, G., Buster, N. and Vincent, J., (2014), Pharmacist-managed inpatient discharge medication Reconciliation: a Combined onsite and telepharmacy Model. *American Journal of Health System Pharmacy*; 71(24): 2159-2166.
- [11] Cole, S.L., Grubbs, J.H., Din, C. and Nesbitt, T.S., (2012), Rural inpatient telepharmacy Consultation Demonstration for after-hours medication review. *Telemedicine and eHealth*, 18(7): 530-537.
- [12] Rabbani, et al. (2023), A systematic scoping review of implementation of telepharmacy During COVID19. *Journal of Applied Pharmaceutical Science* Vol. 13(04), pp 030-044.
- [13] Ruben Viegas, et al. (2022), Telepharmacy and pharmaceutical care: A narrative review by International Pharmaceutical Federation *Farmacia Hospitalaria* l Vol. 46 l Supl 1 l 86 – 91
- [14] LEBL A. et al. (2017), Application of Telepharmacy: Importance of a Pharmacy Technicians' Role. *Scientific Technical Review*, Vol.67, No.1, pp. 54-60
- [15] Mohapatra Dr. Snehamayee, et al. (2022), A progress review on current state of affairs on Telepharmacy and telemedicine service. *Peer review & International Journal*, volume 28, Issue 12.
- [16] S. Lertsinudom, et al. (2023), Telepharmacy services to support patients with epilepsy in

- Thailand: A descriptive study. *Heliyon* 9 ( ) e13361.
- [17] Rundquist Michelle, et al. (2017), Pharmacy Services in Telepharmacy: how is it working, where is it working, and what is required to practice in this new setting. *Advances in Pharmacy: Journal of Student Solutions to Pharmacy Challenges*, Volume 1, Issue 1 June
- [18] Bidasee K.R., A.M.A. Alshabeeb M.A., Abohelaika S, Alomar F.A., (2023), impact of Telemedicine on Glycaemic control in type 2 diabetes mellitus During the covid 19 Lockdown period. *Front Endocrinol Lausanne*. Feb;3(14).
- [19] Farooqi M.H., Abdelmannan D.K., Al Buflasa M.M., Abbas Hamed M.A., Xavier M, Santos Cadiz T.J., Et al.(2022), The Impact of Telemonitoring on Improving Glycaemic and Metabolic Control in Previously Lost-to-Follow-Up Patients with Type 2 Diabetes Mellitus: A Single-Center Interventional Study in The United Arab Emirates. Abdelwahab A, editor. *Int J Clin Pract*. Apr 20;1–9.
- [20] Vandelanotte C, Spathonis K.M., Eakin E.G., Owen N.,(2007), Website-Delivered Physical Activity Interventions. *Am J Prev Med*. Jul;33(1):54–64.
- [21] Sridhar S.B., Rabbani S.A., (2021), Pharmaceutical care Services provided by pharmacists During COVID19 pandemic: perspectives from around the World. *J Pharm Health Serv Res*. Sep 14;12(3):463–8.
- [22] Pathak S, Blanchard C.M., Moreton E, Urick B.Y.(2021), A Systematic Review of the Effect of Telepharmacy Services in the Community Pharmacy Setting on Care Quality and Patient Safety. *J Health Care Poor Underserved*.;32(2):737–50.
- [23] Damery S, Jones J, O’Connell Francischetto E, Jolly K, Lilford R, Ferguson J.(2021), Remote Consultations Versus Standard Face-to-Face Appointments for Liver Transplant Patients in Routine Hospital Care: Feasibility Randomized Controlled Trial of myVideoClinic. *J Med Internet Res*. Sep 17;23(9): e19232.
- [24] Shickh S, Rafferty S.A., Clausen M, Kodida R, Mighton C, Panchal S, et al.(2021), The Role of digital tools in the delivery of genomic medicine: enhancing patient-centered care. *Genet Med*. Jun;23(6):1086–94
- [25] Aronson S.H., (1977), The Lancet on the telephone 1876–1975. *Med Hist*. Jan;21(1):69–87.
- [26] Angaran D.M., (1999), Telemedicine and telepharmacy: Current status and future Implications. *Am J Health Syst Pharm*. Jul 15;56(14):1405–26.
- [27] Baldoni S, Amenta F, Ricci G. (2019), Telepharmacy Services: Present Status and Future Perspectives: A Review. *Medicina (Mex)*. Jul 1;55(7):327.
- [28] Kapoor A, Guha S, Kanti Das M, Goswami K.C., Yadav R. (2020), Digital healthcare: The Only solution for better healthcare during COVID-19 pandemic? *Indian Heart J*. Mar;72(2):61–4
- [29] Peterson C.D., Anderson H.C., (2004), The North Dakota telepharmacy project: restoring and retaining pharmacy services in rural communities. *J Pharm Technol*.;20(1):28–39.
- [30] Peterson C.D., Rathke A, Skwieria J, Anderson H.C., (2007), Hospital telepharmacy Network: delivering pharmacy services to rural hospitals. *J Pharm Technol*.;23(3):158–165.
- [31] A. Ahmed Abousheishaa, A. Hatim Sulaiman, H. Zaman Huri, et al.(2020), Global scope of hospital pharmacy practice: a scoping review *Healthcare*, 8 (2), p. 143
- [32] D.E. Kosmisky, S.S. Everhart, C.L. Griffiths, (2019), Implementation, evolution and impact Of ICU telepharmacy services across a health care system *Hosp Pharm*, 54 (4), pp.232-240.
- [33] Angaran D.M., (1999), Telemedicine and telepharmacy: current status and future Implications. *Am J Health Syst Pharm*.;56(14):1405-26.
- [34] Friesner D, Scott D.M., (2009), Exploring the formation of patient satisfaction in rural Community telepharmacies. *J Am Pharm Assoc* (2003).;49(4):509-18.
- [35] Win A.Z., (2017), Telepharmacy: Time to pick up the line. *Res Social Adm Pharm*.;13(4):882-3.
- [36] Grigsby J, Kaehny M.M., Sandberg E.J., Schlenker R.E., (1995), Shaughnessy PW. Effects And effectiveness of telemedicine. *Health care Fin Rev*.;17(1):115–31.
- [37] Hedima E.W., Okoro R.N., (2021), Telepharmacy: An opportunity for community Pharmacists During the COVID-19 pandemic in Sub Saharan Africa. *Health Policy Technol*.;10(1):23-4.

- [38] Li H, Zheng S, Li D, Jiang D, Liu F, Guo W, et al. (2021), The Establishment and Practice of Pharmacy Care Service Based on Internet social media: Telemedicine in Response to the COVID-19 Pandemic. *Front Pharmacol.*;12:707442.
- [39] Ho I, Nielsen L, Jacobsgaard H, Salmasi H, Pottegård A. (2015), Chat-based telepharmacy In Denmark: design and early results. *Int J Pharm Pract.*;23(1):61-6
- [40] Erni P, Von Overbeck J, Reich O, Ruggli M., (2016), netCare, a new collaborative primary Health care service based in Swiss community pharmacies. *Res Social Adm Pharm.*;12(4):622-6.
- [41] Niznik J.D., He H, Kane-Gill S.L., (2018), Impact of clinical pharmacist services delivered Via telemedicine in the outpatient or ambulatory care setting: A systematic review. *Res Social Adm Pharm.*;14(8):707-17.
- [42] Le T, Toscani M, Colaizzi J., (2018), Telepharmacy: A new paradigm for our profession. *J Pharm Pract.*:176–82.
- [43] A.C. Smith, E. Thomas, C.L. Snoswell, et al. (2020), Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19) *J Telemed Telecare*, 26 (5), pp. 309-313,
- [44] Cantor J.H., McBain R.K. Ho P.C., Bravata D.M., Whaley C. (2023), Telehealth and In Person Mental Health Service Utilization and Spending, 2019 to 2022. *JAMA Health Forum*. Aug 25;4(8): e232645.
- [45] Phuong J, Ordóñez P, Cao J, Moukheiber M, Moukheiber L, Caspi A, et Al. (2023), Telehealth and digital health innovations: A mixed landscape of access. Kalua K, Editor. *PLOS Digit Health*. Dec 15;2(12): e0000401.
- [46] Odilibe, I. P. E O.A, Akomolafe, O, Anyanwu, E.C, A comprehensive review of Telemedicine technologies: past, present, and future prospects. *Int Med Sci Res J*. 4(2):183–93.
- [47] Goodridge D, Marciniuk D. (2016), Rural and remote care overcoming the challenges of Distance. *Chron Respir Dis.*;13(2):192–203.
- [48] Casey M.M., Sorensen T.D., Elias W, Knudson A, Gregg W. (2010), Current practices and State regulations regarding telepharmacy in rural hospitals. *Am J Health Syst Pharm.*;67(13):1085.