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## A BRIEF INTRODUCTION ON TELEPHARMACY

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### ABSTRACT

The fast expansion of information and telecommunication technology has a significant impact on the delivery of healthcare in many nations. Geographical and demographic reasons, however, frequently result in rural inhabitants and communities having limited access to healthcare services. A more recent term for pharmaceutical service delivery is telepharmacy, which allows patients who live far from a hospital, pharmacy, or other healthcare facility to receive healthcare services from a qualified pharmacist, including medication review, patient counseling and prescription verification. Telepharmaceutical care is expected to keep growing as a result of improved resource allocation and more patient access, according to telemedicine trends. Numerous well-known advantages of telepharmacy include: Case of access to medical services in isolated and rural areas; financial gains; patient satisfaction due to medication availability and information in rural areas; efficient patient counseling; and minimal scarcity of local pharmacists and pharmacy services.

### KEYWORDS

Telemedicine, Telepharmacy, Patients pharmacological care and Clinical pharmaceutical services.

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### INTRODUCTION

Telepharmacy, a relatively new concept for the provision of pharmacological services, is similar to telemedicine. Strategies to reduce barriers that keep consumers from using pharmacy services have led to the development of several telepharmacy models. The National Association of Boards of Pharmacy defines telepharmacy as the practice of providing pharmaceutical treatment to patients who are geographically distant by use of information and communication technology. Telepharmacy is used to deliver clinical pharmaceutical services<sup>1</sup>. The process of giving prescription drugs and medical care to different people over the phone is known as

telepharmacy. Patients can obtain their prescription drugs and other pharmaceutical care supplies in the comfort of their own homes in this way. Among the services offered are drug therapy monitoring, prior authorization of prescribed drugs, videoconferencing or teleconferencing for formulary compliance monitoring, patient counseling and authorization for prescription medication refills. Medication delivery to remote areas and system labeling are two more services. These services can be obtained from your local retail pharmacy, as well as from nursing homes, hospitals, and other medical facilities. In the pharmacy sector, the term can also apply to the practice of offering pharmacists additional services such as administration, training, and teaching through videoconferencing<sup>2</sup>. The practice of providing patients with long-distance medical treatment and education through electronic data and communications technologies is known as telehealth. These strategies are also used to maximize outcomes by providing remote patient care services. Throughout the 20<sup>th</sup> century, information and communication technology use has increased significantly. The delivery of healthcare has been significantly impacted by this increase in many countries<sup>3</sup>. People have greater expectations for healthcare professionals and are better informed as a result of the Internet. However, particularly in rural and regional areas, a shortage of healthcare staff and resources frequently impedes the provision of effective treatment and care for patients<sup>4,5</sup>. Pharmacies that are now situated in rural locations find it difficult to provide sustainable services due to the difficulties in attracting and keeping pharmacists, which makes it challenging to create succession plans. Therefore, in order to finish their prescription, residents have to either drive to the nearest pharmacy or use mail order or online services. Elderly persons with limited mobility and help or who are not computer literate are particularly at danger from this. A potential solution to some of these obstacles to patient care is technology. Telemedicine, in particular telepharmacy, appears to be a novel and unique

technology that makes it possible to provide high-quality pharmacy services to rural and regional areas in particular<sup>1</sup>. Because pharmacies are so extensively available, at least in industrialized countries, they are important parts of health systems and can offer health services in a capillary fashion. Pharmacists are qualified healthcare professionals that can give pharmacovigilance services and advice to patients regarding drug dose regimens in addition to delivering drugs<sup>6</sup>. Despite pharmacists' crucial role as primary healthcare practitioners, the distribution of these facilities in developed countries is noticeably unbalanced, both at the regional and metropolitan levels<sup>7</sup>. These problems might become more urgent soon given the predicted decrease in the number of pharmacists<sup>8</sup>.

## MATERIAL AND PROCEDURES

In January and February of 2019, a literature analysis was completed in order to carry out this investigation.

For the research, the term "telepharmacy" was entered into the Pub Med library. Only English-language publications published between 2012 and 2018 were eligible for consideration; review articles were not considered in the selection process. 64 papers were discovered throughout the search. A second investigation was conducted independently by two researchers using a conventional methodology that involves reading through the titles and abstracts of the publications they had located. Furthermore, papers were evaluated according to the conventional criteria of the Newcastle–Ottawa Scale (NOS)<sup>9</sup>. The studies were ranked as having poor overall quality (score 0–4), moderate overall quality (score 5–6), or good overall (score 7–9). Forty-six publications were excluded from the study because they were judged unrelated to the topic at hand or had a low grade according to the aforementioned criteria.

## Outcomes

The selected items were categorized into three groups based on their contents: (1) support for clinical services; (2) remote training and administration of "special pharmacies"; and (3)

prescription and reconciliation of pharmacological therapy. The main findings from each of the papers are outlined in the summary that follows. A tabular summary of the articles' salient characteristics is included with each group of analysis. This summary covers the primary author and the country being studied, the kind of study, specific objectives and sample size, as well as the publications' strengths and flaws.

### **Support to Clinical Services**

Medication Adherence<sup>10</sup>

Clinical Pharmacist Shortage<sup>11,12</sup>

Pharmaceutical Counselling Activity<sup>13,14</sup>

### **Remote Education and Handling of “Special Pharmacies”**

Medical Staff Training and Patient Education<sup>15-18</sup>

Remote Surveillance of Anti-Neoplastic Medication Preparation<sup>19,20</sup>

Control of Medicine Chests in Seagoing Vessels<sup>21</sup>

## **PRESCRIPTION AND RECONCILIATION OF DRUG THERAPIES<sup>22-27</sup>**

### **DISCUSSIONS**

If a patient lives in a rural location or another location that is difficult to get to for whatever reason, using pharmacy services may be tough for them<sup>28</sup>. Thus, improvements in technology could potentially reduce inequalities in the delivery of healthcare<sup>29</sup>. The two countries with the most experience in reducing these individuals' lack of access to health care is Australia and the United States<sup>26</sup>. The first attempt at telepharmacy integration into the Australian healthcare system was the Royal Flying Doctor Service, which launched in 1942<sup>30</sup>. Early in the new millennium, North Dakota (USA) witnessed the rise of a more advanced telepharmacy service in response to the closing of many rural businesses<sup>31</sup>. In the wake of these interactions, telepharmacy is beginning to take shape as a way to deliver pharmacy services, and a number of companies are developing and marketing telepharmacy-integrated support packages. Two examples of this practice are PipelineRx and the Comprehensive Pharmacy Service<sup>32</sup>. Though there are still many unanswered

questions, interest in this innovative method of pharmacological therapy is rising. The development of telepharmacy is hampered by differences in regulations between countries or, in the case of the US, states<sup>33</sup>.

The first attempt to regulate telepharmacy in the US was made in 2001 when the Board of Pharmacy of North Dakota created a code of regulations to serve as a regulatory framework for the North Dakota Telepharmacy Project pilot project<sup>34</sup>. After this first experience, other laws were passed in an effort to regulate the growing opportunities that technical innovation had created<sup>31</sup>. There are now 23 states in the US that have laws specifically pertaining to telepharmacy, six states that are conducting pilot programs in preparation for the adoption of telepharmacy, and five states that are either getting ready to modify or have already modified the rules controlling access to telepharmacy services<sup>35</sup>. The remaining 16 states have not yet reviewed the legislative legislation for this region<sup>35</sup>. When it comes to the legal framework, it's crucial to remember that different states' legislation can occasionally be inconsistent and there are differences in the procedures required to obtain local competent bodies' approval for the provision of telepharmacy services<sup>34</sup>. Among the variations are interstate accessibility, authorized providers, staff requirements, instructional initiatives, geographic and facility constraints, and interstate accessibility<sup>31,35</sup>. To help telepharmacy services spread across the nation, the National Association of Boards of Pharmacy (NABP) has created standard guidelines<sup>32</sup> and the American Society of Health-System Pharmacists (ASHP) has started a national standardization process<sup>36</sup> to help clear up any confusion. Although European authorities have taken considerable action to govern the various aspects of telemedicine, member states have retained these responsibilities at the national level, resulting in a lack of consistency in rules<sup>37,38</sup>. For instance, pharmacies in Italy were allowed to perform clinical tests and share patient health information with doctors via approved networks in 2010<sup>39</sup>. Furthermore, in 2012 the Italian Ministry of

Health published guidelines for telemedicine use in Italy<sup>40</sup>. Other member countries do not presently have access to any similar initiatives.

A increasing amount of studies indicates that telepharmacy and its application may improve access to healthcare in rural areas<sup>41</sup>. While creating telepharmacy services costs the health systems money<sup>41,42</sup>, it is less expensive than adding more pharmacies. By enabling a single pharmacist to service many locations and a greater area, telepharmacy has the potential to reduce the costs associated with pharmacy services and do away with the necessity for multiple pharmacies<sup>41,42</sup>. Telepharmacy reduces costs and travel time for patients, which helps them access healthcare services more easily. This is especially beneficial for senior people<sup>42,43</sup>. The success of telepharmacy services is more dependent on the amount of technological infrastructure, such as quick internet connections<sup>42</sup>. It may be challenging to deliver services effectively if there are insufficient technological standards<sup>41</sup>. To prevent data leaks, encryption and data protection are essential components of any technology handling health data<sup>31,41</sup>.

Small rural healthcare institutions might not be able to afford the associated costs of procuring hardware and software, even if telepharmacy has the potential to reduce costs to the health system<sup>44</sup>. The integration of telepharmacy into health systems' payment schemes is one of the financial considerations that needs to be made<sup>42</sup>. Since insurance does not currently cover telepharmacy services, patients are actually responsible for paying for them<sup>41</sup>. Another constraining factor is the differing levels of skepticism among patients and medical professionals<sup>41,42</sup>. Conflicting relationships between hospital staff and the use of telepharmacy in specific situations have been reported. For example, a satisfaction survey conducted by Community Cancer Network of Alberta (Canada) found that the medical staff preferred to have the pharmacist on-site as if the service had been delivered via telepharmacy; compared to traditional standard services, more time is required for patient

registration and information as well as anti-neoplastic preparation. It would be ideal if the telepharmacy service could reduce treatment delays<sup>21</sup>. Another problem that prevents telepharmacy from being widely used is the poor quality of research that has been published on the topic. Critics drew attention to the fact that a greater number of papers described the procedures used in telepharmacy than controlled and/or randomized studies assessing the impact on patient health<sup>45</sup>. This notion was also confirmed by more study<sup>41</sup>.

### WORKING OF TELEPHARMACY

Remote clinics, pharmacies, or small rural hospitals are usually connected to a popular service model in a larger urban center that provides better access to pharmacist staff-often around-the-clock. This connection is made feasible by automated dispensing equipment, videophone systems and innovative software<sup>46</sup>. Pharmacy technicians or nurses typically work at remote locations, depending on whether they are clinics or drugstores. Patients who visit these locations might be able to fax their prescriptions to the central location, where a qualified person will handle them. Nevertheless, automated dispensing equipment might not always be within the budget of small rural hospitals and clinics. An alternative has been developed by researchers in Fargo, ND, USA, where a technician prepares medication for dispensing, repackaging and relabeling under the videoconference supervision of a central pharmacist situated at a remote site<sup>47</sup>. The pharmacy technician then administers these medications to the nurse directly or, in the event that an automated dispenser is available, dispenses them using it. An additional instance is the creation of a wireless mobile technology cart intended for usage in remote hospitals, which gives medical professionals in the patient care area round-the-clock access to the pharmacist for face-to-face consultation and dialogue<sup>48</sup>.

## **HISTORY OF TELEPHARMACY**

### **Past**

The fact that telepharmacy has been around for almost twenty years may surprise you. According to a 2000 assessment by the North Dakota State Board of Pharmacy, 26 rural communities in the state had lost its community pharmacy, and another dozen were in danger of doing the same. In 2001, the board developed telepharmacy pilot regulations in response, hoping to help the medically underserved remote rural areas of the state recover access to and continue receiving pharmacy services.

### **Present**

If there hadn't been a pandemic, the section on telepharmacy's role in healthcare today would have ended similarly to how it did before: with some uncertainty about how quickly and to what degree the technology would be adopted and grown, but also with hope about the technology's future. The advantages of telepharmacy and other telehealth technologies have, however, been acknowledged, cherished, and accepted much more following the release of COVID-19. The federal government quickly adopted telepharmacy as a way for pharmacists to reduce patient risk and their personal exposure to the new coronavirus during the COVID-19 epidemic.

### **Future**

As reported by Healthcare IT News, a recent Kyruus study found that almost 75 percent of patients who received virtual care during the pandemic said they would like to see it become a regular part of their care. As it's evident, we have a lot of optimism regarding telepharmacy. While we anticipate that some of the federal, state, and private payer decisions that decreased barriers to telehealth and by extension, telepharmacy, will be reversed or scaled back once the worst of the pandemic has passed<sup>49</sup>.

## **ADVANTAGES OF TELEPHARMACY**

Patient Satisfaction

Acceptance of technology among patients

Clinical outcome

Patient Safety when using telepharmacy

Economic beneficial for pharmacy and patient

Attitudes among pharmacist

### **Patient satisfaction**

Patient satisfaction is an essential part of telehealth systems since it can affect the outcomes of medical care<sup>51</sup>. Prior studies on the satisfaction of patients using telepharmacy applications have characterized telepharmacy as a potentially beneficial approach. In a study conducted in 2003, Clifton and colleagues looked at the usage of remote dispensing in a community where access to pharmacies is limited. They discovered that over 75% of users were happy with their experience<sup>52</sup>. Of all participants, eighty percent expressed satisfaction with the guidance they got from their pharmacist after had their prescription filled at a traditional brick-and-mortar pharmacy.

### **Acceptance of technology among patients**

When telemedicine is utilized to give information and access to medications in remote locations, patient satisfaction increases. One of the biggest challenges in the clinic used to be the elderly patients' unwillingness to leave their homes for their appointments. Thanks to technology, pharmacists may now remotely check patients' prescriptions without having to travel. Patients now have more faith in the service and are happier with it<sup>53</sup>.

### **Clinical outcome**

Previous research suggests that telepharmacy does not seem to degrade the quality of drug consumption<sup>54</sup>. When compared to traditional full-service pharmacies, Pathak and colleagues' (2020) assessment of the quality of telepharmacy was based on differences in patient adherence to particular high-risk drugs. The drug use of those who received their medication from a physical pharmacy and those who used telepharmacy did not differ from one another, indicating that there was no difference in the quality of drug consumption between telepharmacy and traditional pharmacies<sup>54</sup>.

### **Patient safety when using telepharmacy**

Given the outcomes of its deployment regarding medicine distribution errors, it is heartening that the bulk of research indicates that telepharmacy does not appear to increase drug dispensing errors<sup>55</sup>.

Following the implementation of the North Dakota Project, Friesner and colleagues investigated the prevalence of MDE at eight conventional pharmacies and fourteen remote pharmacies. Significantly different results were obtained, with 1.3% MDE in remote pharmacies and 0.8% in the control group. Both types of pharmacy reported less MDE cases than national pharmacies (1.7%)<sup>56</sup>.

#### **Economic beneficial for Pharmacy and Patients**

In addition, telepharmacy has proven to offer cost benefits to patients who live in distant areas. Low-income people save money and time by not having to visit a traditional pharmacy thanks to telepharmacy. In the absence of telepharmacy services, 66% of low-income individuals would find it difficult to pay for their prescription medications, per a study by Clifton and colleagues.

#### **Attitudes among pharmacist**

There is currently little research on pharmacists' perspectives on telepharmacy. Muflih *et al.* (2021) looked on the perception, expertise, and experience of telepharmacy systems. Of the pharmacists involved in the study, 70.6% had a positive opinion of telepharmacy. However, 8.8% of respondents voiced concern about how time-consuming telepharmacy is<sup>57</sup>.

### **DISADVANTAGES OF TELEPHARMACY**

Compliance of this technique by users

Financial unavailability

Literacy rate and language barriers

Technical pressure

Quality aspect

Regulatory bodies

Reported outcomes

#### **Compliance of this technique by users**

A detachment of sentiment from physicians to their patients. Conversely, due to their lack of technological competence, less experienced medical staff members could find it difficult to handle cases through Tele-pharmacy.

#### **Financial unavailability**

The high expense of technology and its auxiliary devices makes telepharmacy projects financially unfeasible for many hospitals and organizations.

#### **Literacy Rate and Language barriers**

The high number of languages spoken by different communities and the low literacy rate make it challenging to utilize advanced technology skills.

#### **Technical pressure**

The most recent designs, developments in biological sensors, and enhanced communication choices are still needed for telepharmacy, which is now supported by a variety of antiquated gear and software.

#### **Quality aspect**

After reviewing standard process, telemedicine registration should be completed in this way to guarantee that the minimal safety criteria are continuously followed. It is necessary to create and approve a telehealth act for India that ensures access to high-quality medical care and supports the post-marketing surveillance program.

#### **Regulatory bodies**

Although telemedicine is still in its infancy, the government has the power and means to advance it and enhance the quality of healthcare.

#### **Reported outcomes**

Reportedly, this great tactic has increased patient adherence in isolated locations with a shortage of pharmacists and other medical specialists, possibly endangering the patient's health. By using this approach, fewer cases result in negative health effects. This approach to cognitive behavioral treatment may be the most successful one for patients with depression right now<sup>58</sup>.

### **INVOLVEMENT OF PHARMACIST**

In any telepharmacy paradigm, a pharmacist can actively take part in the provision of pharmacy services. When a pharmacist engages in telepharmacy models, the community is assured of receiving top-notch care, particularly in areas such as prescription reviews and patient counseling<sup>59</sup>. When pharmacists assessed medicine orders remotely during hospital pharmacy closures, fewer adverse drug events were reported, according a 2013 study on the effects of telepharmacy services<sup>60</sup>. Adverse drug reactions and medication errors result in several thousand deaths each year.

In the USA alone, preventable adverse drug events cost an estimated US\$2 billion annually<sup>61</sup>. In a similar vein, a 2012 US study suggests that telepharmacy services, rather than round-the-clock on-site pharmacist prescription evaluations for rural hospitals, may have prevented poor patient outcomes, such as prolonged hospital admissions and even death<sup>62</sup>. In particular, as the number of patients with chronic medical conditions rises, pharmacists' global participation in telepharmacy models to improve medication adherence and promote better monitoring can lower the likelihood of medication errors, adverse drug events, medication costs and treatment failure. This means that certain telepharmacy models should be avoided because they often exclude active pharmacist involvement, such as Internet pharmacies, vending machine models, mail-order pharmacies, and models that transfer the responsibilities of pharmacists to other medical professionals like doctors and nurses<sup>63</sup>. Despite differences in healthcare systems, certain US states and Australia have shown success with telepharmacy models involving pharmacists playing an active role<sup>61,64,65</sup>.

## IMPLEMENTATION OF TELEPHARMACY DURING COVID-19

The COVID-19 pandemic has changed how information technology is used in healthcare services<sup>66</sup>. The ongoing pandemic brought telepharmacy greater attention, and it is currently widely utilized worldwide<sup>67</sup>. It has proven to be a workable substitute for in-person pharmaceutical care services during the epidemic, especially when people are advised to reduce their in-person hospital visits and practice social distancing<sup>68</sup>. Telepharmacy services have become more crucial throughout the epidemic in order to give patients the best telehealth care available. As a result, clinical and community pharmacists are now playing a more important role in the healthcare system. This thorough scoping review aimed to provide an overview of this evolution<sup>69</sup>. However, their literature search turned up only two databases, and each of them had different inclusion standards for their research. This systematic review employed a comprehensive search of four large databases, including a wide range of studies that reported the installation of telepharmacy services since the beginning of the COVID-19 pandemic.

### Types of telepharmacy models<sup>47</sup>

**Table No.1: Types of telepharmacy**

Traditional full-service pharmacy	Like traditional pharmacies, this telepharmacy site encompasses service such as filling prescriptions, medication views and patient counseling. These telepharmacy sites have complete drug inventories that include prescription and over the counter medications along with other health and beauty aids and other general merchandise
Remote consultation sites	Prescriptions are prepared at the central pharmacy and are delivered to the rural sites. Audio and video computer links are used to deliver patient counseling and education
Hospital telepharmacy	Hospital pharmacist in urban medical center reviews processes and verifies the prescriptions that are issued and electronically sent from rural hospitals. Automated dispensing machine (ADM) is used to electronically release the
	Prepackaged medication. A nurse or pharmacy assistant at rural end double checks the label and medication prior dispensing them to patients. The pharmacist from central (urban) location monitors the verification process involves in consultation between the patients, nurses or physicians when required via video conference link
ADMs	Pharmacist at a central location upon receiving drug order (electronically or by fax) confirms the patient profile, conducts proper drug utilization review and finally instructs the ADM to release the medication. With the help of audio and video computer links, patient counseling is then conducted

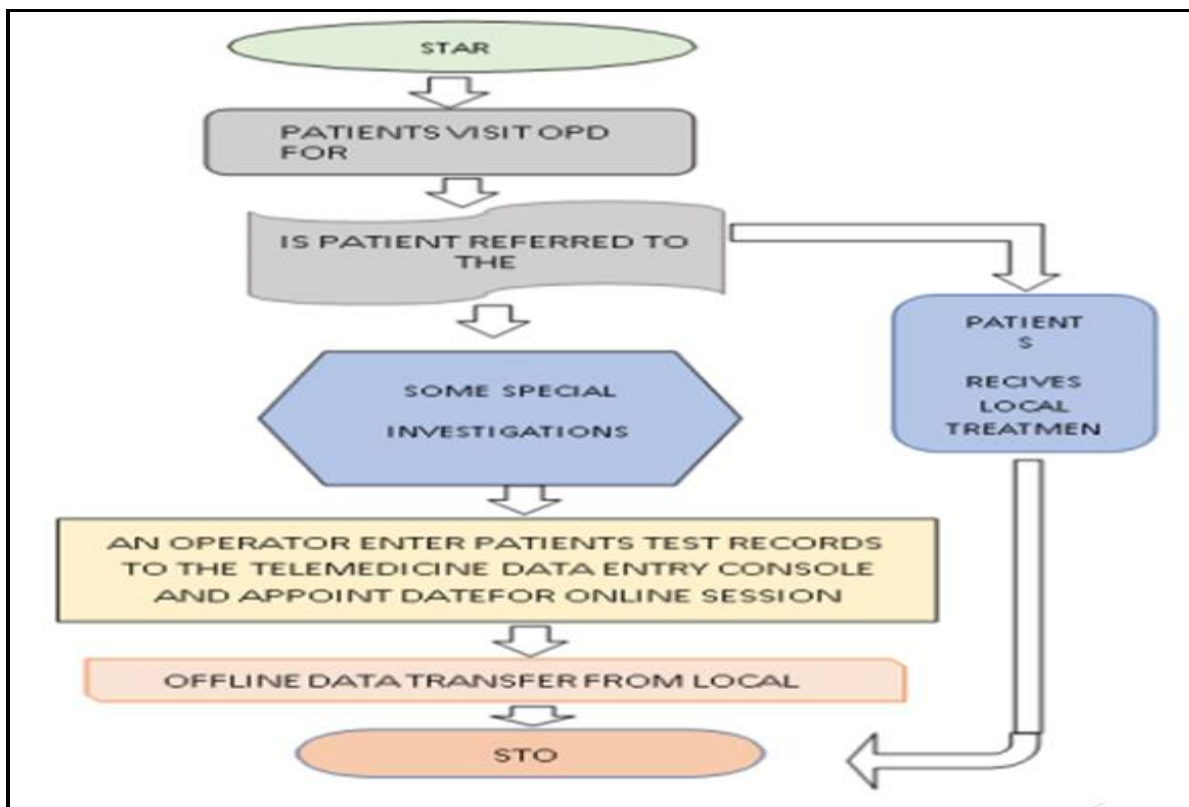


Figure No.1: Mechanism of Telepharmacy

Types of pharmaceutical care service<sup>50</sup>

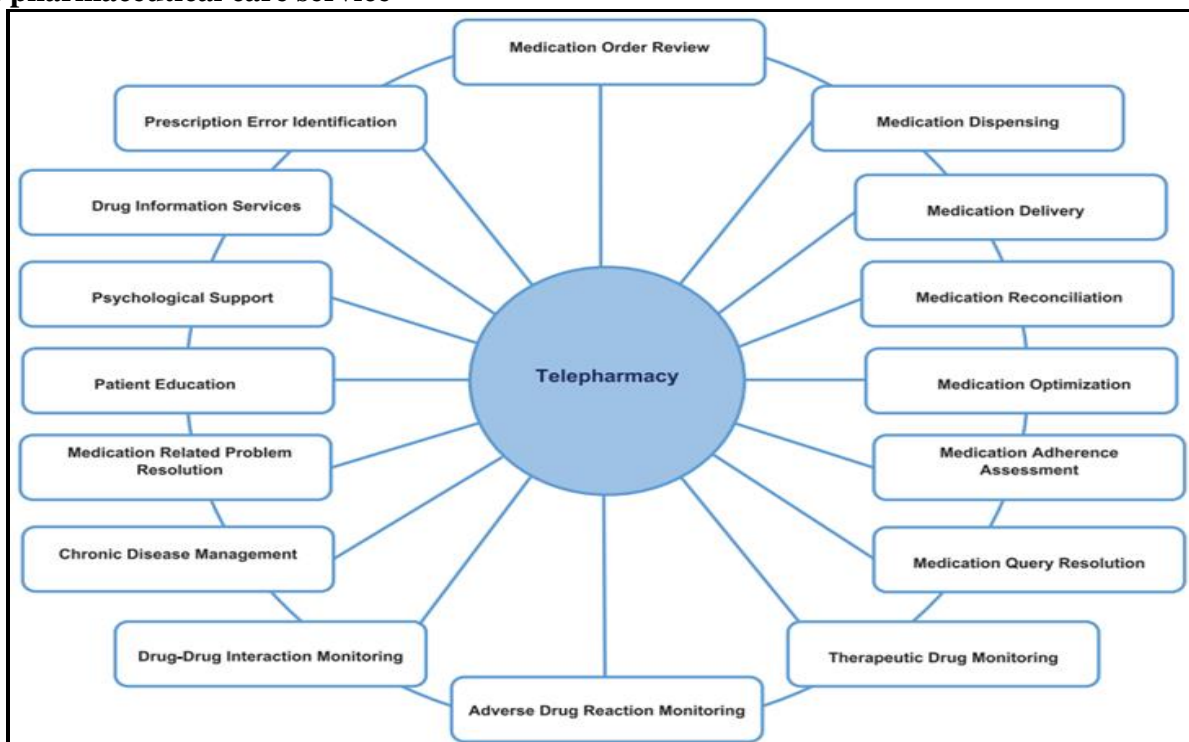


Figure No.2: Types of pharmaceutical care service



## Tools and means employed for Telepharmacy<sup>50</sup>

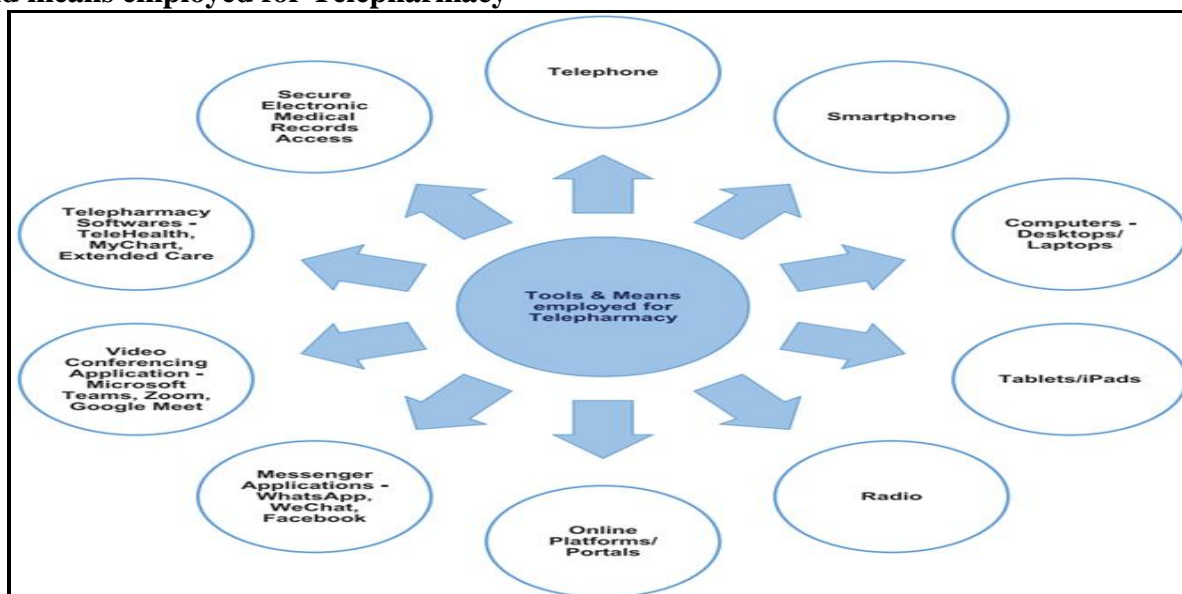


Figure No.3: Tools and means employed for telepharmacy

### CONCLUSION

Telepharmacy is a revolutionary development in pharmaceutical care delivery that provides improved patient engagement, cost-effectiveness, and accessibility. Though it has a lot of promise, in order to fully fulfill its potential, thorough consideration of the difficulties associated with data security, regulatory compliance, and technology access is necessary. Telepharmacy will surely be crucial in determining the direction of patient care in the future, bridging gaps and guaranteeing that everyone, wherever they may be, has access to high-quality pharmaceutical services as healthcare systems continue to change and adapt to the digital era. Leading the way in a new chapter in healthcare history, telepharmacy provides creative answers to persistent problems with patient involvement, cost and accessibility. Overcoming technical, governmental, and educational obstacles is essential to its sustained expansion and assimilation into traditional healthcare. Telepharmacy has the ability to greatly improve the way pharmaceutical treatment is delivered, making it more patient-centered, efficient, and accessible with coordinated efforts from all stakeholders. Telepharmacy will surely be essential in ensuring that everyone has

access to high-quality, individualized care regardless of location or socioeconomic position as the healthcare system changes.

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### CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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