

TELEPHARMACY: WAY TO DIGITAL PHARMACY

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Article Received on 12/01/2022

Article Revised on 02/02/2022

Article Accepted on 23/02/2022

ABSTRACT

The use of information and telecommunication technologies has expanded at a rapid rate, which has a strong influence on healthcare delivery in many countries. Rural residents and communities, however, often lack easy access to healthcare services due to geographical and demographical factors. Telepharmacy, a more recent concept that refers to pharmaceutical service provision, enables healthcare services, such as medication review, patients counseling, and prescription verification, by a qualified pharmacist for the patients located at a distance from a remotely located hospital, pharmacy, or healthcare center. Trends in telemedicine show that telepharmaceutical care is likely to continue to expand as it allows for a better allocation of resources and access to more patients. Telepharmacy has many recognizable benefits such as the easy access to healthcare services in remote and rural locations, economic benefits, patient satisfaction as a result of medication access and information in rural areas, effective patient counseling, and minimal scarcity of local pharmacist and pharmacy services.

KEYWORDS: Telepharmacy, Telecommunication, Telepharmaceutical, Medication access, Telehealth.

1. INTRODUCTION

“Telepharmacy” analogous to telemedicine, is a more recent concept that refers to pharmaceutical service provision. Strategies to address the barriers to accessing pharmacy services have resulted in the creation of several models of telepharmacy. The National Association of Boards of Pharmacy defines “telepharmacy” as “the provision of pharmaceutical care through the use of telecommunications and information technologies to patients at a distance”. Telepharmacy delivers clinical pharmacy services^[1] Telepharmacy is considered to be a way of delivering pharmaceutical products and care by the means of telecommunication to different patients. These way patients can receive their medicines and other pharmaceutical care items in the comfort of where they can get the services easy. Some of the services given are patient counseling, drug therapy monitoring, and refill authorization for the prescribed drugs, monitoring or formulary compliance by the means of videoconferencing or teleconferencing and prior authorization of prescribed drugs. Other services are taking medicines to remote places and also labeling the systems. These services can be given at your retail pharmacy places or even through the nursing homes, hospitals, and other medical facilities. The word can also mean using videoconferencing in the pharmacy world to give other services like training, education, and also management services to the pharmacists.^[2] Telehealth is the use of electronic information and telecommunication

technologies to provide long-distance health care and education to patients. And these strategies are used to provide patient care services and optimize subsequent outcomes from a distance. During the 20th century, the use of information and telecommunication technologies has expanded at a rapid rate. This expansion has strongly influenced healthcare delivery in many countries.^[3] The availability of the Internet has created more informed consumers who demand more of healthcare professionals. However, a shortage of healthcare services and trained healthcare professionals, especially in the rural and regional areas, often hinders appropriate treatment and care for patients.^[4,5] Pharmacies that currently operate in remote areas face the problem of service sustainability because of recruitment and retention of pharmacists, leading to difficulties in creating succession plans. As such, residents have to either drive to the nearest pharmacy or use mail order or online service to fill their prescription, which is a particular concern for frail individuals with limited mobility and limited support or without the connection/competence of information technology.

Technology has emerged as a potential mean to overcome some of these obstacles to patient care. Telemedicine, particularly telepharmacy, appears to be an enabling technology that represents a unique and innovative way to deliver quality pharmacy services to rural and regional areas particularly.^[6]

2. Telepharmacy

Telepharmacy, analogous to telemedicine, is a more recent concept that refers to pharmaceutical service provision. Strategies to address the barriers to accessing pharmacy services have resulted in the creation of several models of telepharmacy. The National Association of Boards of Pharmacy defines “telepharmacy” as “the provision of pharmaceutical care through the use of telecommunications and information technologies to patients at a distance”.^[7]

Telepharmacy delivers clinical pharmacy services and the dispensing of a prescription at a remote location without the physical presence of a pharmacist. Typical telepharmacy involves services such as medication order review, dispensing and compounding, drug information services, patient counseling, and therapeutic drug monitoring.^[8]

Hence, telepharmacy uses state-of-the-art technology

that allows a qualified pharmacist situated at a central location to supervise a pharmacy assistant or a pharmacy technician situated at a remote site in the dispensing of pharmaceuticals through audio and video computer links. Telepharmacy acts as a potential alternative to around-the-clock on-site pharmacist medication review for remote hospitals.^[9]

This has been adopted by many healthcare institutions as an alternative strategy of extending pharmacy coverage in areas where 24-hours pharmacy services are not available. The emerging electronic health information systems and related technologies, such as fax, and electronic health records make information more readily available to pharmacist for review before a dose is available for administration to a patient. These technologies are advancing telepharmacy services and enabling pharmacist to contribute efficiently in improving medication use.^[10]

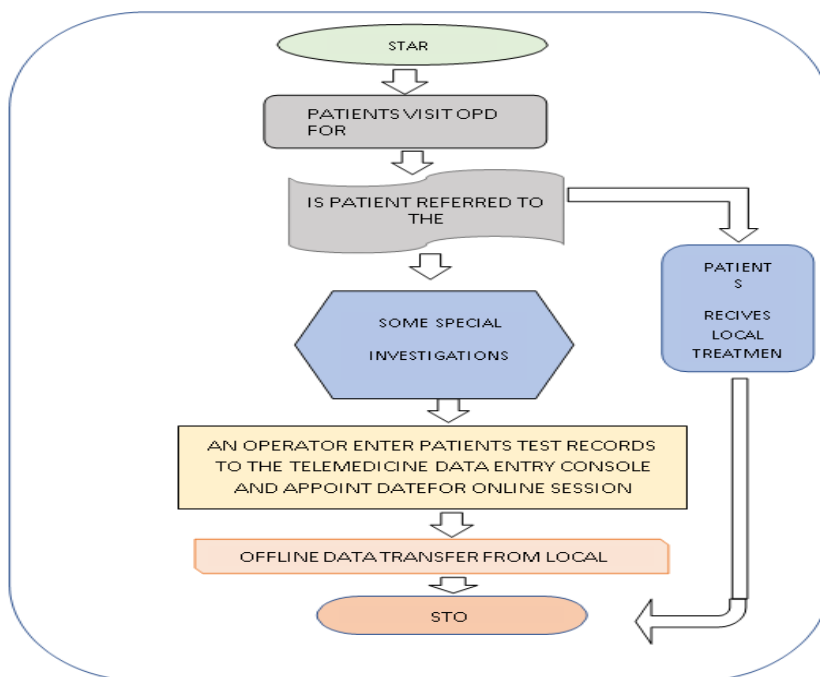


Figure 2: Mechanism of telepharmacy.

2.1 Working of telepharmacy

In general, a small rural hospital, pharmacy, or clinic in an isolated area is connected to a commonly utilized service model in larger urban center that has greater access (often 24 hours) to pharmacist staff. This connection is possible through videophone systems, novel software, and automated dispensing machine.^[11]

The rural site is usually staffed by either pharmacy technicians or nurses, depending on whether the site is a pharmacy or a clinic. They may communicate the prescriptions (eg, fax) from patients who report to these sites to the central site, which is then processed by a qualified Automated dispensing machines, however, are not always affordable for small rural hospitals or clinics.

An alternative was developed by researchers in Fargo, ND, USA, where a technician under the videoconference supervision of a central pharmacist at a distant location prepares medication for dispensing, repackaging, and relabeling.^[12] These medications are then directly delivered to the nurse by the pharmacy technician or are dispensed through automated dispensing devices (when available). In another example, to facilitate 24-hour access to the pharmacist by physicians and nurses in the patient care area for face-to-face consultation and communication, a wireless mobile technology cart has been developed for use in remote hospitals.^[13]

2.2 Working of telepharmacy in pandemic situation

Changes attitudes towards telehealth systems after

COVID-19 The covid-19 pandemic is the spread of the SARS-COV-2. SARS-COV-2 is a highly contagious virus that was discovered at the end of 2019. Infection by the virus can lead to mild to severe respiratory illness and potentially death. Due to the virus, WHO recommends physical distancing to minimize the spread of the virus. As a result of the covid-19 pandemic, changed attitudes towards the use of telehealth have been obtained. A study by Kirihara and

colleagues has shown changed attitudes towards the use of different telehealth systems of individuals with Parkinson Disease utilizing telemedicine. The individuals expressed more positive attitudes towards telehealth during covid-19 than before the pandemic, as more individuals have been interested in establishing online contact with their therapist than before the covid-19.

3. Types of telepharmacy models

Table 1: Types of telepharmacy.^[12]

Traditional full-service pharmacy	Like traditional pharmacies, this telepharmacy site encompasses services such as filling prescriptions, medication reviews, 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 and 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

4. How does telepharmacy differs from internet pharmacy?

A. Internet pharmacy

An online pharmacy, internet pharmacy, or mail-order pharmacy is a pharmacy that operates over the Internet and sends orders to customers through mail, shipping companies, or online pharmacy web portal.^[14]

- Internet pharmacies are online drug stores that ship medications to patients.
- As stated, internet pharmacy does provide a level of convenience for patients when executed properly.

B. Telepharmacy

Telepharmacy works just like any traditional pharmacy; the pharmacist's scope of practice remains exactly the same. Everything a pharmacist does in a traditional pharmacy they do in a telepharmacy

- When a patient visits a telepharmacy, they have a nearly identical experience as they do with a traditional pharmacy
- The process works just like it does with traditional pharmacy.^[15]

a) Wrapping Up

Internet pharmacy and telepharmacy could not be more different in how they work, how safe they are in practice, or in how they affect pharmacists. Driving business to online vendors might lead to another pharmacy closing, and an already underserved population losing yet another healthcare professional. Internet pharmacy removes the

local pharmacist from the equation, takes business away from the local economy, and funnels it into the pockets of big businesses located elsewhere.

Telepharmacy is a tool pharmacists can use to ward off the threats posed by internet pharmacy, decreased reimbursement rates, physician dispensing, and other threats to pharmacy practice.

5. Telepharmacy: Past, Present, Future

5.1 Past: While this may sound surprising, telepharmacy is quickly approaching its 20th birthday. In 2000, the North Dakota State Board of Pharmacy reported that 26 of the state's rural communities had lost their community pharmacies and a dozen more communities were at risk of losing their community pharmacies. In response, the board established pilot rules for telepharmacy in 2001 in the hopes that the virtual service could help the state's medically underserved remote rural communities restore and retain pharmacy services.

5.2 Present: If there was no pandemic, a section on telepharmacy's role in healthcare today would have sounded a lot like how the previous section ended: optimism about its future but also some uncertainty about how quickly adoption and growth would occur and to what extent. But COVID-19 came along, and the value of telepharmacy — like other forms of telehealth — has become even more apparent,

appreciated, and embraced.

The federal government quickly championed telepharmacy as a way for pharmacists to minimize their risk of exposure to the novel coronavirus and reduce the risk for patients during the COVID-19 pandemic.

5.3 Future: As Healthcare IT News notes, a recent Kyrus survey found that about three-quarters of patients who have received virtual care during the pandemic said they want to see it become a standard part of care. As is likely apparent, we're quite bullish on telepharmacy. While we anticipate that at least some of the federal, state, and private payer decisions that eliminated barriers and/or improved access to telehealth, and subsequently telepharmacy, during the pandemic will be rolled or scaled back once the worst of the pandemic is behind us.^[16]

6. Telepharmacy market scenario

Research analyses the market to account to USD 123.57 million by 2028 growing at a CAGR of 6.19% in the above-mentioned forecast period. The growing awareness among the patients regarding the benefits of telepharmacy which will create lucrative opportunities for the growth of the market.

The growing access to quality health care service in medically backward and rural areas, rising number of internet penetration coupled with rising internet users, surging volume of patients suffering from infectious diseases such as Covid19, and others, increasing preferences towards online health services to limit exposure and risk of infection are some of the major as well as important factors which will likely to accelerate the growth of the telepharmacy market in the projected timeframe of 2021-2028. On the other hand, unavailability of pharmacists in hospitals, rural area hospitals that cannot afford pharmacists, prevalence of insufficiently skilled pharmacist along with prevalence of favourable government initiatives to support telemedicine and increasing healthcare expenditure which will further contribute by generating immense opportunities that will led to the growth of the telepharmacy market in the above mentioned projected timeframe.^[17]

7. Involvement of pharmacists

In any telepharmacy model, pharmacist can play an active role in the delivery of pharmacy services. The pharmacist involving in telepharmacy models ensures high quality care for the community particularly areas such as medication reviews and patient counseling.^[18]

A 2013 study of the impact of telepharmacy services has shown that the involvement of pharmacists in the remote review of medication orders when the hospital pharmacy was closed resulted in a decreased number of adverse drug events reported.^[19] Adverse drug events and other

medication error contribute to several thousand deaths each year. The annual cost of preventable adverse drug events in the USA alone is estimated at US\$2 billion.^[20] Similarly, a 2012 US study has shown that adverse patient outcomes including prolonged hospitalization and potential death may have been prevented using telepharmacy services as potential alternatives to around-the-clock on-site pharmacist medication review for rural hospitals.^[21]

With the growing population of patients with chronic medical conditions, all around the world involvement of pharmacists in telepharmacy models to improve monitoring and encourage medication compliance can decrease the risk of medication errors, adverse drug events, decreased medication cost, and the chances for treatment failure. This means that we need to be cautious of some of the telepharmacy models that often exclude active pharmacist involvement including Internet pharmacies, vending machine models, mail-order pharmacies, and models that shift pharmacist's roles to other healthcare professionals such as doctors and nurses.^[22]

Despite the differences in healthcare system between countries, telepharmacy models involving the active role of pharmacists are successful in several states of the USA and in Australia.^[2,19,23]

8. Possibilities with telepharmacy

- Patient Satisfaction
- Acceptance of technology among patients
- Clinical outcome
- Patient Safety when using telepharmacy
- Economic beneficial for pharmacy and patient
- Attitudes among pharmacist

8.1 Patient satisfaction

Patient satisfaction is an essential aspect of telehealth systems since satisfaction can affect healthcare outcomes for the patient.^[24] Previous studies that examined patient satisfaction with the application of telepharmacy reported telepharmacy as a promising technique.

Clifton and colleagues (2003) showed that above 75% of all individuals who used remote dispensing were satisfied with their experience when examining remote dispensing was applied in a society with poor access to pharmacies.^[25]

80% of all participants claimed that they were satisfied with their pharmacist counseling after the dispensing of their drug in a traditional physical pharmacy.

8.2 Acceptance of technology among patients

Medication access and information in rural areas via telehealth has an advantage of patient satisfaction.

One of the prominent barriers in the clinic used to be with the elderly patients missing their appointments

because they did not want to go out of their homes.

This remote technology has allowed pharmacists to review patient's medications without them having to travel. This has increased patient trust and satisfaction with the service.^[26]

9. Clinical outcome

According to previous research, telepharmacy does not seem to decrease the quality of drug utilization [27]. In a study by Pathak and colleagues (2020), the quality of telepharmacy was measured as differences in adherence to certain high-risk drugs compared to when the patient dispensed their medication through traditional full-service pharmacies. No difference was seen between the drug use of the individuals who had their medication dispensed in a physical pharmacy and the individuals who used telepharmacy, indicating that the quality of drug utilization does not differ between telepharmacy and traditional pharmacies.^[28]

10. Patient safety when using telepharmacy

Implementation of telepharmacy has shown promising results regarding its medication dispensing error after implementing telepharmacy, most studies indicate that telepharmacy does not seem to increase medicine dispensing errors.^[29] Following the North Dakota Project implementation, Friesner and colleagues investigated the incidence of MDE at 14 remote pharmacies and eight traditional pharmacies. The results demonstrated a significant difference where remote pharmacies had about 1.3% MDE compared to 0.8% in the control group. Both types of pharmacies showed lower numbers of cases of MDE versus the national ones (1.7%).^[30,31]

11. Economic beneficial for Pharmacy and Patient

In addition to that, telepharmacy has shown to be economically beneficial for patients living in rural areas. Low-income patients in rural areas experience telepharmacy saves them travel time and money as they do not have to travel to a traditional pharmacy. A study by Clifton and colleagues reported that 66% of low income would experience difficulties affording their medications without the use of telepharmacy services.^[32]

12. Attitudes among pharmacist

Currently, there are few studies examining pharmacists' views on telepharmacy. Muflih and colleagues (2021) examined the experience, competence, and perception of telepharmacy systems. 70.6% of all pharmacists included in the study had positive attitudes towards the utilization of telepharmacy. However, 8.8% of the participants in the study reported concerns regarding telepharmacy being a time-consuming method.^[33]

13. Obstacles with telepharmacy systems:

- a. Compliance of this technique by users
- b. Financial unavailability
- c. Literacy rate and language barriers
- d. Technical pressure:

- e. Quality aspect
- f. Regulatory bodies
- g. Reported outcomes

13.1 Compliance of this technique by users

A lack of emotional relationship among the patients towards physicians. And on another hand, it is a matter of difficulty for untrained healthcare workers to convince in managing the cases through Tele-pharmacy due to their poor knowledge of gadgets.

13.2 Financial unavailability

High cost of technology and its supportive gadgets makes financially unfeasible for various organizations and hospitals for the implementation of Tele-pharmacy projects.

13.3 Literacy Rate and Language barriers

Poor literacy rate and very wide diversity in languages spoken by different populations interfere with the implementation of advanced technology skills

14. Technical pressure

Tele-pharmacy supported by various old version software and hardware, still needs to upgrade with the latest designing and advances in biological sensors and better connectivity solutions.

14.1 Quality aspect

Registration of telemedicine by this way after the perusing of standard procedure so that minimum safety standards are uniformly adopted. Drafting and passing a Telehealth act for India is required which ensures quality health care and supports the post-marketing surveillance program.

14.2 Regulatory bodies

Telemedicine is at the primary stage and the government has resources and power to support it for better health care delivery.

14.3 Reported outcomes

It is reported that by following this noble technique patient compliance has been increased in rural due to the unavailability of healthcare workers/ pharmacists, the health of the patient was affected. This technique lowers the incidence of health affected cases. This technique may be the best way to provide cognitive behavioral therapy in depressive patients as it is.^[34]

CONCLUSION

Rural residents and communities lack easy access to health-care services often due to geographical and demographical factors. Telepharmacy holds significant promise as a technology to improve access to pharmaceutical care for people living in rural and remote communities. Telepharmacy is quickly becoming an integral part of modern pharmacy practice that has the potential to provide quality pharmaceutical services, such as medication management, dispensing, patient

counseling, and drug information. Inherent to the adoption of these practices are legal challenges and pitfalls that need to be addressed. A well-developed system, however, can change the practice of pharmacy that is beneficial to both the rural communities and the hospital or retail pharmacies that deliver these services.

ACKNOWLEDGEMENT

We are very thankful to that people, who contributed generously their time to prepare this review paper.

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