

## A Review on Telepharmacy services

Arpana S. Karnvar, Dr. V. S. Kashikar, Dr. S. N. Dhole

Department of Pharmaceutics, P. E. Society's Modern College of Pharmacy (For Ladies), Moshi, Pune-412105, Maharashtra, India.

Date of Submission: 15-11-2020

Date of Acceptance: 30-11-2020

**ABSTRACT:** Telepharmacy is a new concept emerged rapidly in the recent years. Because of the geographical reasons and decreased availability of pharmacists, the patients of rural and remote area are not able to get healthcare services on time. Due to the technological advances and telecommunication network expansion, it is possible to furnish the healthcare services to the patients located in rural and remote area. The objective of this review is to discuss the information about telepharmacy and its working. This article includes all the information about telepharmacy such as its types, working, clinical benefits and challenges. Telepharmacy has become an area of research as it provides the access of healthcare services to the rural patients and contributes in the healthcare system.

**Keywords:** Telepharmacy, pharmacist, rural area, telecommunication, healthcare services.

### I. INTRODUCTION:

Telepharmacy will be outlined as "the providing pharmaceutical care to the patients by pharmacist via telecommunication wherever pharmacist may not have direct contact with patients." (1)

In telepharmacy services pharmacist may not physically present at the location of patient or at the pharmacy. Telepharmacy services supply the medications and clinical services to the patients at a remote area without physically present at that location. (2)

The telepharmacy is very crucial in reducing the possibility of adverse drug events, reducing medication cost and risk of treatment failure. (3)

Telepharmacy initially established at a hospital level by virtue of pharmaceutical care provision through telephone.

In 2001, telepharmacy was 1<sup>st</sup> officially evaluated in the United States, when North Dakota had become the 1<sup>st</sup> state to evaluate its use by

conducting a study having 81 pharmacies, carried out at North Dakota State University. (4)

Telepharmacy services are available in United States (U.S.), Canada, Italy, Germany, Scotland, France, Denmark, Spain and Egypt. The U.S. and Australia have the largest experience in reducing the shortage in health services. (2)

Pharmacies have utmost importance in the health care system and offer various health services. Pharmacists have important role in the patient counselling and also in the pharmacovigilance services. (5)

Nowadays, there is scarcity of health professionals. (6) Information and Communication Technologies (ICTs) applied to the health sector to face the problem of shortage of health professionals. Telepharmacy plays a vital role in addressing this issue. (2)

Many patients from the remote and rural area have difficulties in accessing pharmacy services. Small pharmacies in rural areas, nursing homes, hospitals, medical offices, prisons, military bases, ships, etc. are the areas where telepharmacy services are mainly applicable. (3) Endorsement of the practice of telepharmacy believe that it is the most favourable way to provide patient care to rural and other medically underserved areas across the country.

Telepharmacy is a new opportunity for pharmacists to sprout and ally with technology to benefit patients. It endorses pharmacists to expand their role and access more people than ever. (7)

### Types Of Telepharmacy :

#### 1. Inpatient / Remote Order-Entry Review :

In the inpatient telepharmacy, a pharmacist presents at a remote location and performs remote order-entry services for an inpatient pharmacy at a hospital.

Pharmacist at remote location reviews medication orders prior to the hospital staff giving medication to the patient. Inpatient telepharmacy is beneficial for the hospitals, clinics and health

systems as it enables real-time medication order examination and monitoring. In this inpatient telepharmacy pharmacist can provide 24/7 service.

## 2. Remote dispensing (retail/ outpatient/ discharge) :

It is also called as retail community telepharmacy. It is licensed physical retailer pharmacy having certified pharmacy technician. A pharmacist advises and monitors the technician, analyzes prescription and carries out his or her responsibilities from a remote location via Video-conferencing or telecommunication. Many rural patients have difficulties in accessing pharmacy services due to geographic location. This remote dispensing telepharmacy gives convenient accessibility to these patients.

These remote dispensing provides an opportunity to healthcare organizations to start retail telepharmacy sites in the areas where traditional pharmacy may not be possible. It also helps in improving the economical performance and patient adherence.

## 3. IV admixture :

IV admixture is outlined by The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) as, "the preparation of pharmaceutical product which needs the measured addition of a drug to a 50ml or larger bag or bottle of intravenous fluid."

By implementing the telepharmacy in iv admixture cleanroom, hospital pharmacies may consume less time and can also save money. If the iv admixture is reviewed by a pharmacist remotely, they can save the time required to kit up and to get inside the cleanroom for reviewing the solution. By saving the pharmacist's time make them able to concentrate on clinical activities and other earning tasks.

## 4. Remote Counselling :

Pharmacist furnishes counselling to the patients through secure, live and interactive video calls or via telecommunications.

Remote patient counselling gives potential for discharge counselling, speciality counselling, etc.(8)

## Telepharmacy system and services:

Telepharmacy systems are based on 1) the appointment of pharmacists in the centre from which the whole system is handled, and 2) the engagement of pharmacy technicians.

Pharmacists are the member of health care team with the most adequate knowledge of drug therapy.

Telepharmacy may not be operated without a pharmacy technician on duty. Technician play an important role to drive both inpatient and outpatient services. Technician must have proper qualification and sufficient practice to perform the activity.

It is necessary to be up-to-date with the prevalent communication devices by which the connection is recognized with the centre for system management where the pharmacist is situated. The main role of pharmacist in a central location is to provide consulting services for all medicines which are dispensed at remote location.

In order to facilitate telepharmacy services suitable telecommunication equipment are necessary.

This equipment includes:

1. Computer, i.e., PC with a specialized software
2. Video equipment
3. Some transmission systems (e.g. Digital Subscriber Line (DSL), Modem, Leased E<sub>1</sub> links, Internet connection, Mobile connections.)
4. Spare telepharmacy equipment.(3)

Telepharmacy services include drug review and monitoring, compounding verification, dispensing, medication therapy management, counselling, patient assessment, drug information and clinical consultation.

## Working Of Telepharmacy :

Usually, a smaller hospital, clinic or pharmacy is linked to a ordinary service model in larger urban centre which have better availability to pharmacist staff (usually 24 hours). This connection is achieved by automated dispensing machine.(9)

The rural site is generally furnished with nurses or pharmacy technicians, depending on the site. They may exchange the prescriptions (e.g. fax) from patients to the central site, which is handled by a qualified pharmacist.(10)

The pharmacist reviews all the medication orders under the telepharmacy model for the hospitals inpatient population. When a physician writes a medication orders, then the order is scanned and saved in.pdf format on the hospital's secure network via Internet, using an impregnable Virtual Private Network (VPN) connection, to analyze the order and collate it with the computerized patient profile. The pharmacist attempt all appropriate insinuation with respect to



the orders, including defining unclear or illegal orders, making suggestions for compliance with the hospital formulary, checking for the drug interactions, providing medication warnings for nurses, suggesting automatic therapeutic interchanges and ensuring that no restricted abbreviations are used. The pharmacist then introduces each order into the pharmacy's computer system and the medication labels are printed automatically in the hospital's pharmacy department. Then the central pharmacist delivers the appropriate items at the rural site and label.(11)

The pharmacy technician or nurse present at remote or rural area scans the barcode to check whether the prescription matches with its label or not, then assigns the label and delivers it to the patient.

The central pharmacist can observe the technician's work to make sure that the correct medications have been filled and dispensed correctly.

Then at the end, the central pharmacist comes up with a two-way video discussion for the patient to make sure that they properly understand the intended medication use and administration.(10)

#### **Advantages and Disadvantages Of Telepharmacy:**

Telepharmacy has many advantages to the pharmacy profession, clinic, and hospitals as well as for patients, but they also have some disadvantages and challenges. Some of them are discussed as follows:

#### **Advantages:**

##### **1. Access to healthcare system :**

Telepharmacy provides the availability of healthcare services to the patients located in rural and remote areas.(12) It is beneficial to provide the pharmaceutical care to rural or remote locations that have no or less availability of healthcare services.

##### **2. Patient Satisfaction :**

Telepharmacy have an advantage of patient satisfaction. Many aged patients did not want to escape their homes to go clinic and hence they miss out their appointments in clinic. Telepharmacy enables pharmacists to review patients medication from remote location. This increases the patients satisfaction with the telepharmacy services.(13)

##### **3. Minimal Shortage Of Pharmacists :**

Many clinics, medical centres and hospitals in rural area are facing the problem of deficiency of pharmacy services. In these places, medications are provided without pharmacists. Where there are no pharmacists are available in rural areas then pharmacy services are carried out by nurses, doctors or other healthcare providers. They may be not trained for such services. This forms non-ideal systems which do not fulfil the government policies related to the quality of pharmaceutical services. Telepharmacy has potential to cope up with these problems. Telepharmacy addresses the problem of pharmacists scarcity in rural areas and improves access to pharmaceutical services in rural areas.(10)

##### **4. Effective Patient Counselling :**

Telepharmacy provides the effective patient counselling. Telepharmacy assures gratification of patients with related to the counselling and time needed for receiving medication.(14)

##### **5. Economic Benefits :**

Telepharmacy has many economic benefits starting a new pharmacy store is more expensive than telepharmacy as telepharmacy only involves equipment and recruitment of pharmacy technician. Multiple sites can be handled by one skilled pharmacist. Hence, minimizes the cost associated with recruitment of additional pharmacists and salary.(14)

Telepharmacy also save travel cost and travel time which are hurdle for rural elder peoples and disabled persons.(15)

Travel time and other expenses related with the travels are eliminated as there is no need to go to other sites.(16)

#### **Disadvantages:**

##### **1. Practical Challenges :**

Unquestionably, telepharmacy is an excellent concept, but in certain cases, it is challenging to implement in practice. There are many operational and resource challenges in rural hospitals and clinics to implement telepharmacy. Telepharmacy services require more complex and sophisticated equipment with high-speed digital connection which is often restricted in rural areas.(17)

Institutional culture is also a significant barrier for implantation of telepharmacy into existing healthcare system.(12) Telepharmacy requires significant modifications in the current

workflow for the rural and remote hospitals. They may experience difficulties in adopting these changes.(18)

Telepharmacy might often be enormous and less impulsive for both patient and healthcare providers.(19)

## 2. Pharmacy Regulation Laws :

Though telepharmacy has ubiquitous potential, the laws and policies that run the pharmacy functioning do not satisfactorily address the growing industry. There are many policy issues such as minimum duration of time that pharmacist must be on central site, the location of central pharmacist, type of equipment and technology used, and the duty of pharmacist, nurses, pharmacy technicians and other healthcare providers in distribution of medications, need to be taken into consideration. The regulations are important for the operation of overall medication use system, describing role of telepharmacy plays in pharmacy services and in the intensive care settings.

Telehealth licensing remains a multi-layered effort with state-by-state inconsistencies that have restrained the wide application of telepharmacy.(20)

## 3. Security :

In telepharmacy, patient's personal and health related information is transmitted over the internet. Safety of information is of most importance as it is necessary to keep this tremendous data transmission under control.(10)

## 4. Plenty Of Time, Effort and Money :

Initiation of telepharmacy requires enormous time, money and efforts. It also involves connectivity, hardware, software, operational cost and special equipment.

Eventually, for rural hospitals having less number of patients, the issue of costing arises to be one of the biggest hurdles to telepharmacy services.(10)

## 5. Inability To Use Technology :

Aged peoples may not be able to adopt this technology. The pharmacist's may not be able to fully address patient's condition as there is no face-to-face interaction between patient and pharmacist.(10)

## Clinical Outcomes of Telepharmacy:

### Asthma:

Telepharmacy has been employed in efforts to enhance the clinical performance of patients suffering from asthma.

Mc Lean, Chandler D and colleagues has undertaken Cochrane Airways review of 21 clinical trials including telehealth and asthma.

In the effectiveness of telepharmacy, Bynum and colleagues worked together with 49 adolescent who had diagnosed with asthma and that are using Multi-Dose Inhaler (MDI) medications.

At the end of study, results shows that a larger proportion of patients in the telepharmacy guidance group performed the MDI technique more correctly than patients of the control group. There was no vital change amongst the telepharmacy counselling and control group in gratification with the instructive sessions.(21)

### Diabetes Mellitus:

Telepharmacy has additionally utilized to improve clinical performance in patients diagnosed with diabetes mellitus. A pharmacist performed Tele-MTM service in a Veterans Administration (VA) program, resulted in vital enhancements in alternate. Outcome indicators for genetic disorders including diabetes mellitus, HgbA1C, low density lipoprotein and systolic blood pressure, etc.(21)

## II. CONCLUSION:

Telepharmacy contributes an important part in delivering the medications to the patients who have lack of accessibility to the healthcare services.. Due to the technological advances and telecommunication network expansion, it is possible to furnish the healthcare services to the patients located in rural and remote area. Telepharmacy services involve the prescription reviewing and monitoring, medication therapy management, compounding verification, drug information, dispensing, patient assessment and counselling. This article includes all the information about telepharmacy such as its types, working, clinical benefits and challenges. Telepharmacy have many advantages such as economic benefits, easy access to healthcare system, effective patient counselling and patient satisfaction. Telepharmacy has becoming an area of research as it provides the access of healthcare services to the rural patients and contributes in the healthcare system.

## REFERENCES:

- [1]. Littauer SL, Dixon DL, Mishra VK, Sisson EM, Salgado TM. Pharmacists providing



- care in the outpatient setting through telemedicine models: A narrative review. Vol. 15, Pharmacy Practice. Grupo de Investigacion en Atencion Farmaceutica; 2017.
- [2]. Baldoni S, Amenta F, Ricci G. Telepharmacy services: Present status and future perspectives: A review. Vol. 55, Medicina (Lithuania). MDPI AG; 2019.
- [3]. Lebl A, Mitić D, Andrijana ), Georgiev M. Application of Telepharmacy: Importance of a Pharmacy Technicians' Role Dragica Lebl-Antonić 2). Vol. 67, Scientific Technical Review. 2017.
- [4]. Araújo dos Santos M, Bellicanta Lazzarotto P, Willhelm de Oliveira H, César de Lima JM, Russomano T. Telepharmacy: The Pharmacy of the 21 st Century [Internet]. 2017. Available from: [www.smgebooks.com](http://www.smgebooks.com)
- [5]. Kehrer JP, Eberhart G, Wing M, Horon K. Pharmacy's role in a modern health continuum. *Can Pharm J*. 2013;146(6):321–4.
- [6]. Bates I, John C, Seegobin P, Bruno A. An analysis of the global pharmacy workforce capacity trends from 2006 to 2012. *Hum Resour Health*. 2018 Jan 11;16(1).
- [7]. Steckler T. Telepharmacy: Controversy and Promise. Vol. 32, *Journal of Pharmacy Technology*. SAGE Publications Inc.; 2016. p. 227–9.
- [8]. Schladetzky Z. The 4 Different Types of Telepharmacy. 2018; Available from: <https://blog.telepharm.com/the-4-different-types-of-telepharmacy>
- [9]. Peterson C D, Anderson HC. The North Dakota Telepharmacy Project: Restoring and Retaining Pharmacy Services in Rural Communities [Internet]. 2004. Available from: <https://doi.org/10.1177/875512250402000107>
- [10]. Poudel A, Nissen L. Telepharmacy: a pharmacist's perspective on the clinical benefits and challenges. *Integr Pharm Res Pract*. 2016 Oct;Volume 5:75–82.
- [11]. Mcdonald K, Manager B. Practice Spotlight: A Telepharmacy Model of Care for Hospitals [Internet]. Vol. 62. Available from: [http://www.lillyhospitalsurvey.ca/hpc2/content/rep\\_2008\\_](http://www.lillyhospitalsurvey.ca/hpc2/content/rep_2008_)
- [12]. Goodridge D, Marciniuk D. Rural and remote care overcoming the challenges of distance. Vol. 13, *Chronic Respiratory Disease*. SAGE Publications Ltd; 2016. p. 192–203.
- [13]. Traynor K. Telepharmacy services bring new patientcare opportunities. Vol. 70, *American journal of health-system pharmacy: AJHP: official journal of the American Society of Health-System Pharmacists*. 2013. p. 565–6.
- [14]. Clifton G.D, Byer H, Heaton K, Gill H. Provision of pharmacy services to underserved populations via remote dispensing and two-way videoconferencing. *Am J Heal Pharm*. 2003;60:2577–82.
- [15]. Win AZ. Telepharmacy: Time to pick up the line [Internet]. *Research in Social and Administrative Pharmacy*. Elsevier Inc.; 2015. Available from: <http://dx.doi.org/10.1016/j.sapharm.2015.06.002>
- [16]. Gordon HL, Hoerber M, Schneider A. Telepharmacy in a rural alberta community cancer network. Vol. 18, *Journal of Oncology Pharmacy Practice*. 2012. p. 366–76.
- [17]. Nissen L, Tett S. Can telepharmacy provide pharmacy services in the bush? 2003.
- [18]. Cole SL, Grubbs JH, Din C, Nesbitt TS. Rural inpatient telepharmacy consultation demonstration for after-hours medication review. Vol. 18, *Telemedicine and e-Health*. 2012. p. 530–7.
- [19]. May C, Harrison R, Finch T, MacFarlane A, Mair F, Wallace P. Understanding the Normalization of Telemedicine Services through Qualitative Evaluation. *J Am Med Informatics Assoc*. 2003;10(6):596–604.
- [20]. Casey MM, Sorensen TD, Elias W, Knudson A, Gregg W. Current practices and state regulations regarding telepharmacy in rural hospitals. *Am J Heal Pharm*. 2010 Jul 1;67(13):1085–92.
- [21]. Stratton T. Review of Research on Telepharmacy [Internet]. 2016. Available from: [www.smgebooks.com](http://www.smgebooks.com)