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Assessing of Telepharmacy in Rural Healthcare Settings

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Abstract

The term "telepharmacy" indicates a form of pharmaceutical care in which pharmacists and patients are not in the same place and can interact using information and communication technology (ICT) facilities. Telepharmacy has been adopted to provide pharmaceutical services to underserved areas and to address the problem of pharmacist shortage. The benefits of Telepharmacy include increased value for pharmacies and pharmacists and adapting to patients´ needs, enhanced interprofessional care and increased efficiency of health systems and increased provision of patient- centred services, among others. People living in rural, remote and underserved geographical locations are considered vulnerable for many reasons, including their inability to access essential medications at times of need for their ailments. Telepharmacy refers to providing pharmaceutical care with the help of digital technology and telecommunication to persons who cannot access pharmacists physically. This becomes crucial in reducing healthcare disparities as we can ensure equitable access to pharmaceutical care for those in remote settings.

Keywords: Telepharmacy , Clinical pharmacy, Rural area, Healthcare, Remote area, Health post, Health centre , Telehealth care

Introduction

Telepharmacy-

Telepharmacy is defined as “the provision of pharmacist care by registered pharmacists and pharmacies through the use of telecommunications to patients located at a distance”. Telepharmacy services already developed include medication selection, order review and dispensing, patient counselling and monitoring, and provision of clinical service. A typical feature of a telepharmacy service is that the pharmacist is not physically present at the point of pharmacy operations or patient care. Advantages of telepharmacy services are represented by a wide coverage of the pharmaceutical service also in areas underserved due to economic or geographic problems. A decreased human interaction between health professionals and patients, problems in the evaluation of drug dispensing, and an increased risk for security and integrity of patient data represent some potential disadvantages of telepharmacy

Telepharmacy experiences are available in some countries such as the United States, Spain, Denmark, Egypt, France, Canada, Italy, Scotland, and Germany.

The present work has analysed the main studies reporting telepharmacy experiences with particular attention to those in some way different to the conventional pharmaceutical service. This to identify new

areas in which telepharmacy could increase availability of health services. Advantages and still unsolved limitations of telepharmacy practice were also discussed.

Patients who live in rural areas or in areas of difficult access for any reasons may have difficulties to use pharmacy services. For this people advances in technology may allow to reduce inequalities in healthcare delivery. Countries with the largest experience in reducing the shortage in health service for these citizens are the United States and Australia. The first, although rudimental, attempt to integrate a form of telepharmacy in the Australian health system is represented by the Australia's Royal Flying Doctor Service in 1942. A more articulated experience in a telepharmacy service began in the early 2000s in North Dakota (USA) as a response to the closure of a great number of rural pharmacies.

Who Does Telepharmacy Works

In general, a small rural hospital, pharmacy, or clinic in an isolated area is connected to a commonly utilized service model in larger urban centre that has greater access (often24 hours) to pharmacist staff. This connection is possible through videophone systems, novel software, and automated dispensing machine. 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 (e.g., fax) from patients who report to these sites to the central site, which is then processed by a qualified pharmacist. The central pharmacist reviews the prescription and releases the appropriate items at the rural (e.g., prepack-aged medication from the automated dispensing machines) and the label.

The North Dakota1 model's remote site processing and dispensing technique is shown in Figure

STEP-BY-STEP PROTOCOL FOR
PROCESSING NEW PRESCRIPTIONS
AT REMOTE TELEPHARMACY SITE

New Prescription is received by Pharmacy Technician from:

Patient Written prescription	Prescriber Phone/fax/computer
[Some pharmacists prefer the prescription be faxed to the central pharmacy for entry.]	[Some pharmacists prefer calls to come to the central pharmacy.]

[In North Dakota it is permitted for the pharmacy technician to perform these functions if allowed by the pharmacist.]

IF PATIENT IS KNOWN	IF PATIENT IS NOT KNOWN
Verify Insurance Any new allergies	Get demographic/Allergy info Insurance/Family history Disease status

Verify prescription has all required elements:

Noncontrolled substance NDAC 61-04-06-02	Controlled substance 61-04-06-03

Is prescription readable and understandable?
ANY Questions – contact pharmacist

Enter prescription into the computer patient profile
Pharmacist performs drug utilization review:

No Allergies or Drug–Drug/ Drug–Disease Interactions:	Allergies Drug–Drug/ Drug–Disease Interactions: Contact pharmacist for verification

Proceed to select correct product
Prepare prescription for dispensing and label proper use instructions
Bill through insurance–Clear any third-party problems (early refill etc.)
Final check performed by pharmacist
Seat patient in consultation room
Connect patient to pharmacist via audio/video link
Place filled prescription on a table in front of the patient
Pharmacist performs patient education counseling – Dispensing takes place here
Bag/Package prescription including written product information
Complete financial transaction

Thank you/come back soon

Figure:-1 North Dakota telepharmacy Project – step-by-step Protocol for processing new prescriptions at remote telephamacy site

The pharmacy technician or nurse at the rural site then scans the bar code so that the prescription matches with its label, attaches the label, and supplies it to the patient. The pharmacist at the central end can visually monitor the tech-niacin or nurse's work to ensure that the right medications have been filled and dispensed.

At the end of the process, the central pharmacist provides a two-way video consultation forth patient to ensure that they understand the intended Medi-cation use and administration.
This addresses any concerns from the patient's perspectives and enables efficient patient counselling from the central location. 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.15 These medica-tions are then directly delivered to the nurse by the pharmacy technician or are dispensed through automated dispensing devices (when available). In another example, to facilitate24-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.

Types Of Telepharmacy Models

1.Traditional full-service pharmacy-

Like traditional pharmacies, this telepharmacy site encompasses service such as filling prescriptions, medication reviews, and patient counselling. 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.

2.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 counselling and education.

3.Hospital telepharmacy-

Hospital pharmacist in urban medical centre 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.

4.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 then conducted.

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 counselling.
The annual cost of preventable adverse drug events in the USA alone is estimated at US$2billion. 11 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.
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.

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. In a 2005 Australian study, ~50% of pharmacists in rural and remote Australian communities indicated their willingness in using telepharmacy models to conduct home medication review (HMR). HMR through telepharmacy has the potential to deliver a significant service to rural and remote communities, which would normally require visiting pharmacist to conduct this review. Telepharmacy models in the US, especially in the North Dakota,1include and retain the role of a pharmacist as the primary healthcare provider in the delivery of pharmacy services.

Types Of Tele Pharmacy

1.Store and Forward-

This type of services are provided where in the live contact with the remote areas cannot be practiced or where the immediate Various Tele services and their description transmission of is not possible due to connection problems. In such cases the patients' problems are recorded and reviewed later and information is sent to the remote specialty centre for further evaluation and expert opinion and such cases are mainly practiced in non-emergency cases. E.g.: Tele pathology, Tele dermatology, Tele-radiology etc.,

2.Interactive Services-

In this type the patient with remote areas can have a direct contact with the specialist on the other side who can have direct face to face interactive sessions.

3.Remote Monitoring-

This type of communication is also called as Self-monitoring or Self-testing which enables the medical professionals to monitor a patient regularly using various technological devices. This is a process of using audio, video, and other tele communication technologies to monitor the health status of the patient regularly. This can be used to monitor the patient interviews, physical examination records, and investigational data along with other healthcare records from remote place by specialist.

Objectives Of Tele Pharmacy

1. To make a high quality of life available to under privileged population: In India many of the people are rural people and they are separated by large distances which needs regular health care will be enhanced by the tele pharmacy and this also enhances the availability of various medical services and clinical healthcare services despite of geographical barriers.
2. Saving the time both by the health care providers and the patient who are travelling from one geographical location to the other geographical location.
3. Case monitoring, home care, and remote critical care: n this the cost put over to the treatment includes the travelling and food that should be supplied to the relatives also finally contribute the overall cost of the treatment.

4. Survey and track disease: Tele medicine can help in better survey and tracking of epidemics and endemics and will add to the efficient management of diseases in the community and also helping to abet the disaster management programs.

Access To Pharmaceutical Care

One of the primary benefits of telepharmacy in rural settings is enhanced access to pharmaceutical care. In many rural areas, there are few, if any, local pharmacies, which forces residents to travel long distances to fill prescriptions and receive medical advice. Telepharmacy bridges this gap by enabling remote consultations with licensed pharmacists, ensuring that patients have timely access to their medications and can receive professional guidance on their use. This is especially critical for managing chronic conditions such as diabetes, hypertension, and mental health disorders, where ongoing medication and monitoring are essential.

Medication Adherence And Management

Telepharmacy also plays a crucial role in improving medication adherence and management among rural populations. Through regular virtual consultations, pharmacists can monitor patients' medication regimens, address any side effects or complications, and provide reminders and educational support to ensure that medications are taken correctly. This ongoing support can significantly reduce the risk of adverse drug events and hospitalizations, leading to better health outcomes and lower healthcare costs.

Patient Education And Support

In addition to medication management, telepharmacy offers valuable patient education and support services. Rural patients often have limited opportunities to receive comprehensive health education due to the scarcity of healthcare providers. Telepharmacy can provide educational sessions on various health topics, such as proper medication use, lifestyle modifications, and disease prevention. These sessions can be conducted individually or in group settings, leveraging digital platforms to reach a wider audience. Enhanced patient knowledge empowers individuals to take a more active role in their health, leading to improved self-care and health outcomes.

Rural Health Establishments In Developing Countries

Many developing countries organize primary healthcare around two types of care centers. At the most basic level are Health Posts (HP), in other countries called surgeries. HPs are the way most citizens gain access to the healthcare system. At the higher level are Health Centers (HC), also referred to as either basic polyclinics or ambulatory care centers, depending on the country. HPs and HCs are usually organized into networks, with the HC the reference point for several HPs that depend clinically and administratively on the HC. This network is a "health micronet," the basic unit of the primary health system. It is important to highlight the common characteristics of these centers throughout developing countries. HPs are mainly located in small towns of no more than a thousand inhabitants, have no telephone lines, and have a poor road networks. HPs rarely have more than one health worker (two in exceptional cases), normally an infirmary technician or recently graduated physician with limited training. HPs depend on HCs for severe case referral, pharmaceutical deliveries, epidemiological management, and coordination of the general activities within the micronet. As a result of the widespread absence of communication systems, when health personnel need to exchange information, they have to travel on foot or by land or river vehicles,

taking hours or even days to do so. HCs are above HPs in the health system hierarchy. The towns where HCs are located usually have access to the telephone network. HCs are always headed by physicians, have equipment for diagnostic tests, and sometimes have hospitalization facilities. As mentioned, the HC serves as the reference establishment for several HPs

Benefits

1. Can expand pharmacy services to medically underserved areas
2. Cost-effective expansion of hospital pharmacy services to 24 hours.
3. Can increase medication output at hospitals.
4. Cost-effective means of delivering pharmacy services.
5. Virtual consultations allow patients access to their entire medication cabinet while being comfortable at home, leading to increased adherence to drug regimens.
6. Allows pharmacy services in settings that are too small to justify the cost of a full-service pharmacy.
7. Can increase convenient access to pharmacy services for patients.

Impediments To Growth-

1. 1.No standard regulations across the states.
2. Debate continues over the amount of reimbursement for telepharmacy services.
3. Telepharmacy consultations security concerns, leading to exposure of patient health information.
4. A pharmacist must be licensed in the state that they are practicing, limiting the potential scope of the service.
5. No universally accepted definition of “telepharmacy” among the states. 6. Initial financial investment could be challenging.
6. Specializations of telepharmacists may not be relevant to the facility of practice.

Challenges

1. Pharmacy regulation laws-

Despite the widespread potential of telepharmacy, the laws and policies that govern pharmacy operations do not adequately address the growing industry. A number of policy issues, such as the physical location of pharmacists that provide telepharmacy services, minimum amount of time that pharmacist must be on site, the types of technology used, and the roles of pharmacists, pharmacy technicians, nurses, or other healthcare providers in medication distribution systems, need to be addressed. The regulations govern not only the system that ensures safe medication handling but also the operation of comprehensive medication use system, defining what role telepharmacy plays in this broader scope of pharmacy services in acute-care settings.

Telepharmacy is still a novel concept, and there is a delay in the implementation of new laws, although professional and technological innovations are being used. In places where telepharmacy laws exist, there is a lack of uniformity among various jurisdictions. Execution and implementation of comprehensive and uniform telepharmacy law is still a challenge.

2. Operational difficulties-

Telepharmacy undoubtedly is a great concept, but it is sometimes challenging to put into practice. The rural hospitals and clinics with telepharmacy services experience operational and resource challenges. Telepharmacy services experience operational and resource challenges. Telepharmacy services may only

be possible with more complex and sophisticated equipment with high-speed digital connection (eg, Integrated Service Digital Network), which are often limited in rural areas. Organizational cultures can also play significant roles as barriers for incorporating and embedding telepharmacy technologies into existing healthcare systems. Face-to-face versus remote workflow might often be overwhelming and less spontaneous for both patients and healthcare providers. A study on normalization of telehealthcare suggested that successful normalization of telehealthcare services was dependent upon a positive link with a policy level sponsor, involvement of organized, cohesive groups, development of supportive organizational structure, and the expansion of new procedures by professionals.

Telepharmacy involves substantial changes in the existing workflow for the rural and remote hospitals where some sites may experience significant challenges adopting the required changes. An issue with increased workload appears when a single pharmacist oversees several remote pharmacy sites. This may also involve time-consuming travel requirements to the remote sites, especially when a monthly on-site visit is recommended by the pharmacy law.

Future Directions

The future of telepharmacy in rural healthcare looks promising, with ongoing advancements in technology and increasing recognition of its value in healthcare delivery. Innovations such as mobile health apps, telemedicine platforms, and integrated electronic health records (EHRs) are enhancing the capabilities of telepharmacy. As telepharmacy services expand, it is essential to continue research and evaluation to optimize these services, ensuring they meet the specific needs of rural populations and are integrated seamlessly into broader healthcare systems. Conclusion Telepharmacy holds significant potential to transform healthcare delivery in rural settings by improving access to pharmaceutical care, enhancing medication adherence, providing patient education, and offering cost-effective solutions. As technology continues to evolve, and as healthcare policies adapt to support telehealth innovations, telepharmacy is poised to play an increasingly critical role in bridging the healthcare gap in rural areas, ensuring that all patients, regardless of location, have access to the high-quality care they need and deserve.

Conclusion

Telepharmacy holds significant potential to transform healthcare delivery in rural settings by improving access to pharmaceutical care, enhancing medication adherence, providing patient education, and offering cost-effective solutions. As technology continues to evolve, and as healthcare policies adapt to support telehealth innovations, telepharmacy is poised to play an increasingly critical role in bridging the healthcare gap in rural areas, ensuring that all patients, regardless of location, have access to the high-quality care they need and deserve.

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