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REVOLUTIONARY PRACTICE OF PROVIDING THE DRUG IN RURAL AREA THROUGH TELEMEDICINE

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ABSTRACT
The utility of Telecommunication technologies and their information has developed at a rapid rate, which has a strong impact on healthcare delivery in many countries. Telepharmacy define as healthcare services that enable pharmaceutical services, such as patients counseling, medication review, and prescription verification under qualified pharmacists for the patients situated in a remotely located healthcare center and hospital. In India, there have been a large number of badly equipped hospitals with a limited number of specialists. The telemedicine plays a potential role in avoiding the frame of travel helps in timely getting specialist advice to remote areas, reducing the cost, and provide an opportunity to learn about healthcare. Thus, this article showed revolutionized the practice of Telepharmacy by providing medical services mostly in rural areas. This review summarizes some of the case study done on Telepharmacy i.e. Express ECG study support the cardiac patient by the execution of the telemedicine process with expert command in a quick and quality response. And the second case study focuses to analyze the best practices and challenges faced at Apollo Hospitals by introducing telemedicine in the Indian setting. Lastly, the third case study represents the mobile phone-based telemedical health care represents an economically viable option that shows the result of the Indian communication revolution and also is integrated into the urban healthcare and national rural mission programs. Hence, this review highlighted advanced technology that can change the practice of pharmacy essential for both the hospitals, rural communities, and retail pharmacies that deliver these services.

INTRODUCTION
Telemedicine and Telepharmacy were novel technology for healthcare service and more patient-centered which was a result-oriented and quality measure. In past 10 years, various advancement was carried out for broadening of pharmacy services to include direct patient care, Telepharmacy is being used to serve patients who are unable to physically access for this pharmacist trained to perform clinical evaluations. [1]It supports health systems to expand the services by employing full-time pharmacist, who interacts with patients through telecommunication across boundless distances, then several part-time pharmacists.[2]This service was being implemented through video conferencing, text messaging, email, and telephone in a variety of settings.[3]

The term 'tele-pharmacy' was officially defined by the National Association of Boards of Pharmacy (NABP), the USA in 1997, the concept appears to have come into practice much earlier than that. Pharmacists started this concept of tele-pharmacy by providing pharmaceutical services telephonically (Angaran, 1999).[4]As per NABP, 'The provision of pharmaceutical care by the use of telecommunications technologies and their information to patients at a distance' is called a Telepharmacy.[5]As per the US Health Resources and Services Administration, tele-pharmacy is the use of electronic information and communication technology to provide and support comprehensive pharmacy services when distance separates the participants.[6]Telepharmacy was initially designed for providing pharmaceutical services

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to underserved rural areas. Telepharmacy removes the geographical barriers by increasing pharmacy services through electronic and telecommunication, to reach the patients at the remote sites. This type of tele-pharmacy is also called a 'remote pharmacy site'. Another type of tele-pharmacy is a 'rural tele-pharmacy hospital'.[7,8] This is a small rural hospital that benefits from full-time or part-time pharmacy support from an urban hospital pharmacy or local retail pharmacy (Peterson and Anderson, 2005).

A tele-pharmacy system monitors the dispensing of prescription drugs at remote sites and also provides patient counseling (Drug Store News, 2004). [9, 10]

It is not necessary that the pharmacists to be present at the site of the tele-pharmacy system all the time, as it can be operated by use of audio or an audio-video loop by the help of digital service i.e. Automatic Dispensing Device (ADD) or machine which are installed at a patient's site for the purpose of dispensing the medicine. ADD and ADM allocate the patients with real-time pharmacist counseling by the use of telecommunication loop through both video and voice transmission e.g. using, speakers, microphones, and a webcam. [11, 12]

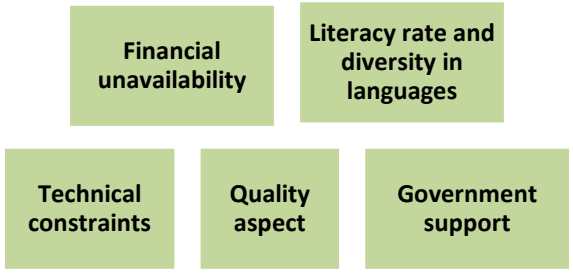
Clinical Benefits of Telepharmacy

Telepharmacy was a sign of promising technology to improve access to pharmaceutical care in rural and remote communities. It is a new approach for modern pharmacy practice which has the potential to provide quality pharmaceutical services, such as dispensing, patient counseling, medication management, and drug information. [13-15]

Fig 1. Showing Clinical benefits of Telepharmacy

Telemedicine in India

In India, 70% of the population present in rural areas has limited facilities for providing health care. Telemedicine is one of the promising techniques for bringing a revolutionary change in the healthcare sector for rural and remote areas. The objective of starting telemedicine systems in India is to provide the healthcare service at cheaper cost through telecommunications infrastructure. Currently, there are almost 550 telemedicine units located in suburban and rural India having telemedicine consultations from specialists from 70 tertiary care hospitals.[6] The first telemedicine unit started working through former President of United States Mr. Bill Clinton, in 2001 in Aragonda, Andhra Pradesh which initiates the development of telemedicine in India with more than 400 such centers existing at present.[17,1



8]

Fig 2. The implementation of Telemedicine in India

Challenges for Implementation of Telemedicine in India

1. **Financial unavailability:** The communication technology costs being too high which makes it financially unfeasible for various hospitals for the implementation of telemedicine projects?
2. **Literacy rate and diversity in languages:** Only 65.38 % of India's population is literate with very wide diversity in languages spoken by the different populations. Hence it causes hindrance in the implementation of advanced technological skills. [16]
3. **Technical constraints:** Telemedicine supported by various software and hardware, still needs to upgrade with efficient designing and advances in biological sensors and better connectivity solutions.
4. **Quality aspect:** Standardizing, authenticating, certifying, and registering telemedicine units which lead to minimizing the safety standards which were uniformly adopted. The Tele-health act was drafted for India which was necessary to ensure quality health care and support Pharmacovigilance program.
5. **Government support:** Telemedicine is at the primary stage and the government has resources and power to support it for better health care delivery. [17-19]

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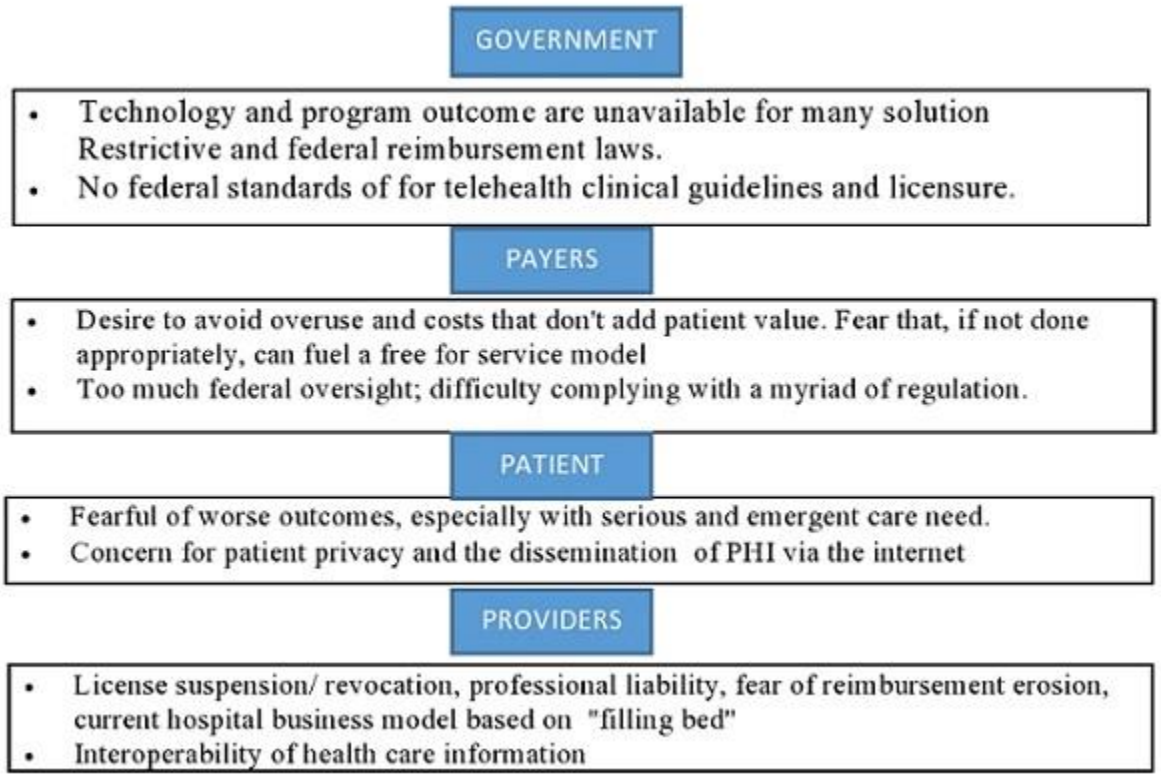

Fig 3**.** Showing barriers for implementation of Telepharmacy

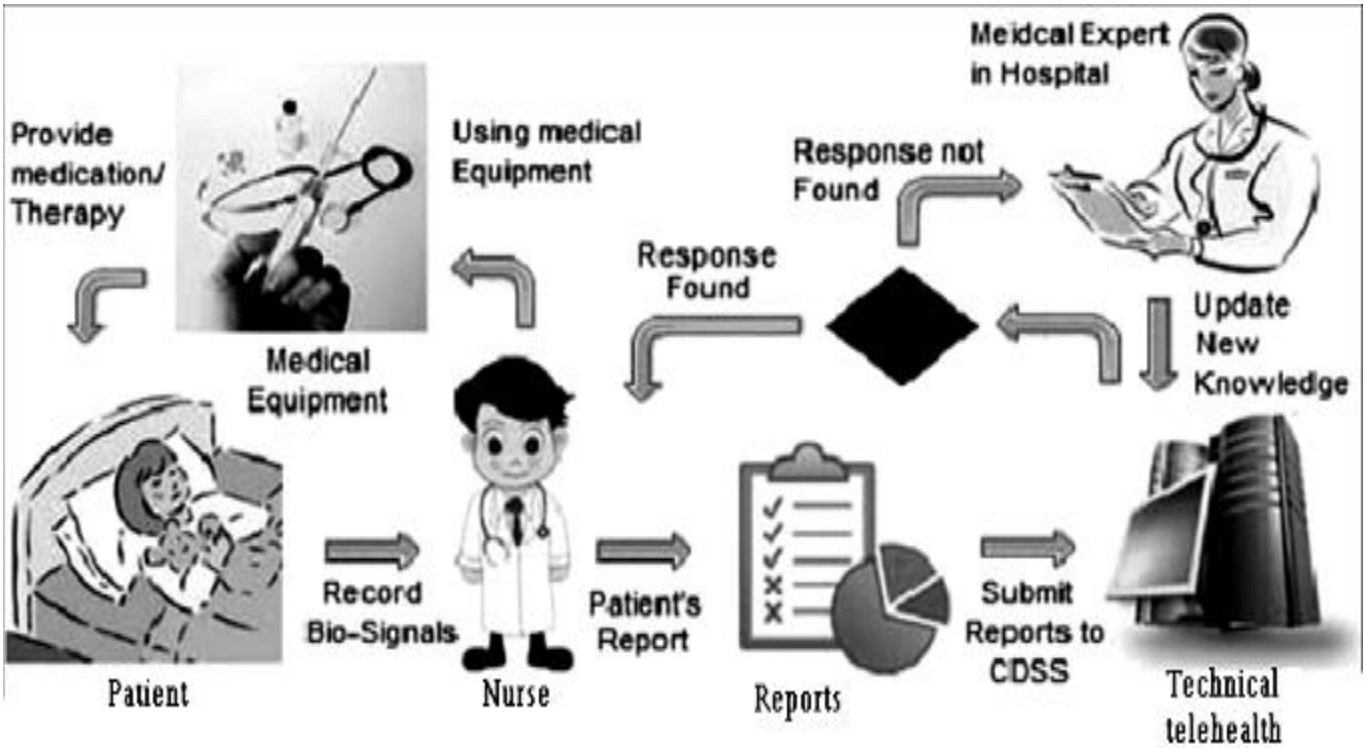

Fig 4. Schematic of Telepharmacy working

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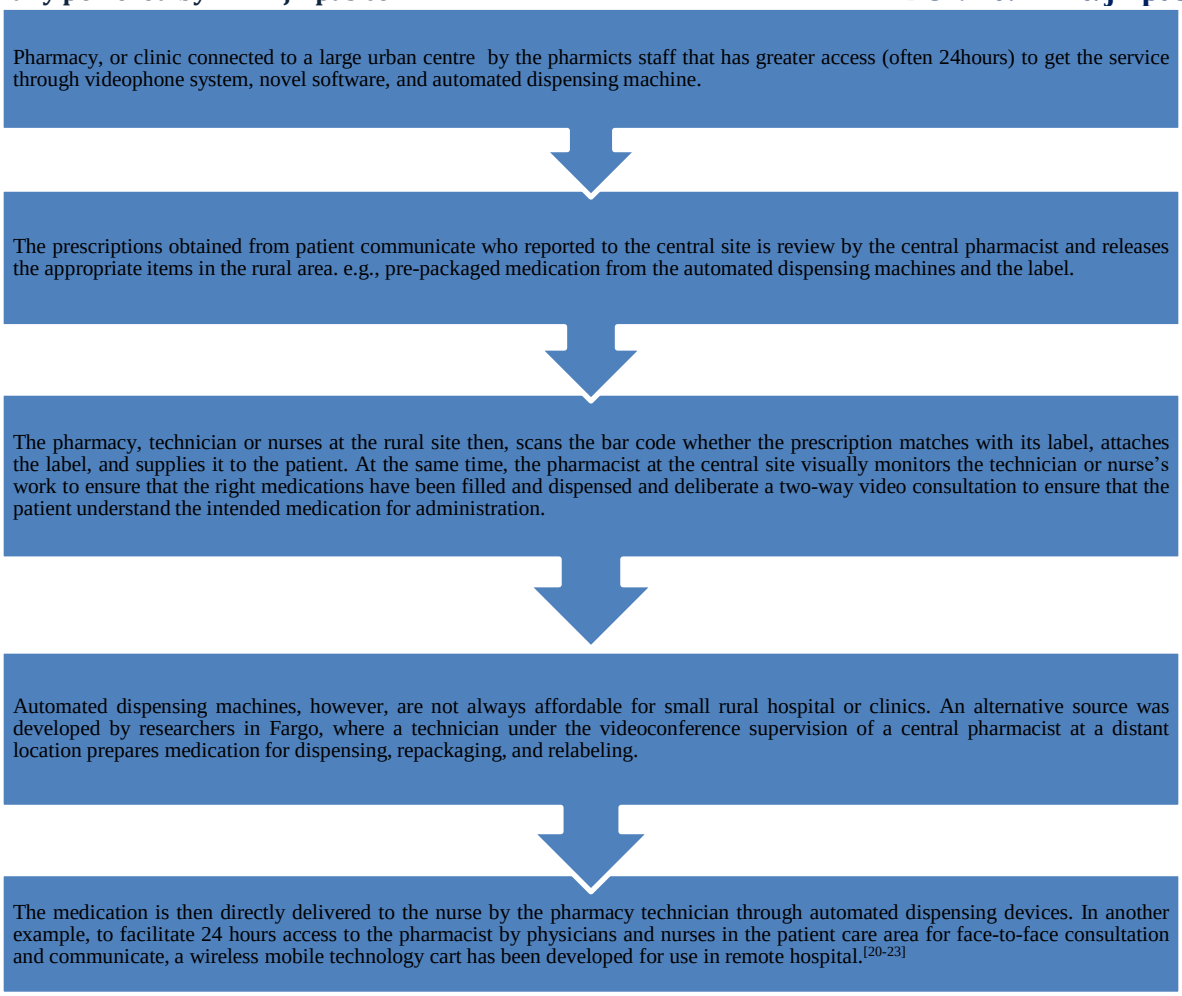

CASE STUDY

1. Tele-Electrocardiograph

This case study describes the Telecardiology branch of telemedicine. Express ECG was done for recognizing the process, drawbacks, and benefits of a tele-echocardiograph. Express ECG was utilized where ECG is unavailable but required for the rural and remote area patients. Express ECG project is an example of the successful execution of the telemedicine process which helps the cardiac patient by providing a rapid and quality response from the expert [24-25]. This technique improves the quality of rural health services in India. This likewise helps in providing expert opinion to the remote areas where advanced medical facilities are not present. But trained manpower, fund, and geographical area covered by the single central room is the limitation of the process. In this way, if it is possible to make visible examination by the expert doctor/specialists or by the arrangement of videoconferencing between the two doctors and by sharing the videos of the patient will improve the treatment of the patient. [26-27]

2. Telemedicine practices implemented concerning Apollo Hospitals

Apollo Telemedicine Networking Foundation (ATNF) was developed by the Apollo Group Hospital which was the largest multispecialty telemedicine network in South Asia. The success of ATNF helped different hospitals to connect with the platform and made telemedicine in India a reality. [28] Apollo hospitals have done a lot of good work in rural areas. They take up this telemedicine benefits as an approach to show their corporate social responsibilities. There is less communication between medical professionals and patients which increased the chances of error in medical services due to the absence of a registered professional and protected health information may be compromised through electronic storage and transmission in virtual medical treatment. [29-31]

3. Utilization Smartphone-based telemedical health-care in India for allied neurological specialty

It is reported that 26 patients were suffered from thrombolysis which is treated under the tele-stroke projects located at different district hospitals in the state of Himachal Pradesh through the hub and spoke model which simple but effective solution for ischemic stroke management. It is suggested that Smartphone-based tele-stroke services were cheaper as compared to video conferencing based tele-stroke services. This technique reduces the distance barrier and helps in educating health care providers. [32-34]

This technique has significant advancement in the field of management of neurological disorders with the ability to optimize health care across all grade of the society, subsequently helping to build a bridge within economic as well as rural and urban divide along with removing geographical barriers in the country, promote training to the medical professional across the country. The mobile phone-based telemedical health care represents an economically feasible approach. Therefore, the Indian communication revolution is integrated into the national rural and urban health mission programs. [35-36]

CONCLUSION

Rural residents and communities lack easy access to healthcare services often due to geographical and demographic factors. Telepharmacy holds a significant role as a technology to improve access to pharmaceutical care for people living in rural and remote communities. It is 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 as clinical benefits of tele-pharmacy. Likewise, the case study Express ECG helps the cardiac patient by providing the expert view with a quick and quality response. Apollo hospitals are performing many good works in reaching out to rural areas.

It provides many services in a way to show their corporate social responsibilities. But, in medical treatment, the human interaction is less between medical professionals and patients, which may lead to an increased risk of error in medical services due to the registered professional was not present, and health information protection. Due to improper legal regulation for telemedical practices, this may create many problems by claiming to compensate from government programs or insurers in some fields. Hence, the Telepharmacy system needs to be developed by the government for the improvement of health and access to more patients mostly in rural areas.

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