

## Telemedical Services in India

**C. G. Nayak\***

Associate Professor

Deptt. of Instrumentation & Control Engineering  
MIT, Manipal University, Manipal, India

**Nishant Rath**

B. E. Student

Deptt. of Instrumentation & Control Engineering  
MIT, Manipal University, Manipal, India

**Sagar G. Nayak**

M.S. Student

Department of Information Technology  
University of Stuttgart, Germany - 70569

### Abstract

*The purpose of this paper is to give a proper description and provide a full study on telemedical services in India. It's uses in different areas of the world and show few examples where showing the proper and efficient use of telemedicine. This paper also gives the use of these services in Indian hospitals like Narayana Hrudayalaya, Karnataka.*

**Keywords:** Videotelephony, Telemedicines, Telenursing, Trauma Tirage, Patient Monitoring, Narayana Hrudayalaya, Ophthalmology Assessment.

**\*Author for correspondence** [cgurudasnayak@yahoo.co.in](mailto:cgurudasnayak@yahoo.co.in)

### 1. Introduction

Telemedicine is mainly described the use of telecommunication and use of information technology in order to provide proper health care to an individual. Its main aim is to provide proper medical services to distant rural areas where proper medical facilities are not available. In turn, it also helps to eliminate the distance barrier and save lives in critical care and emergency situations. Earlier, telephones and radios were used for telemedicine but now it has been upgraded by the use of video-telephony, advanced diagnostic methods and additional telemedical devices.

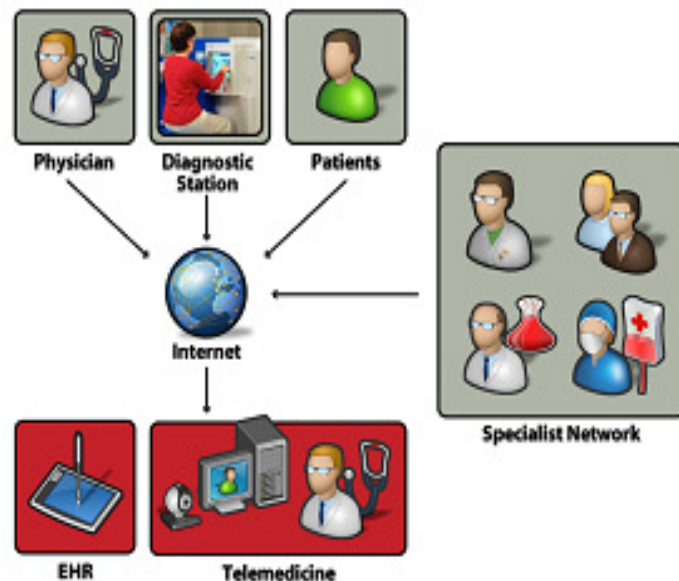


Fig. 1: Working of a Telemedical Center

## 2. Pros & Cons

Telemedicine is useful for patients living in isolated areas where they don't need to come to visit the doctor. Remote patient monitoring through mobile technology can reduce the number of outpatient visits and enable remote prescription verification and drug administration oversight.

The cons mainly include the cost of telecommunication and data management equipment and of technical training for medical personnel who shall employ it. It also entails potentially decreased human interaction between the medical professionals and the patients. It may also decrease the time efficiency due to the difficulties of assessing and treating patients through virtual interactions.

## 3. Types of Telemedicine

It is mainly divided into 3 parts:

- a) **Store and forward:** Mainly involve acquiring medical data and then transmitting this data to a doctor or a medical specialist at a proper and convenient time for assessment. It doesn't require the presence of both parties at the same time. A properly structured medical preferably in electronic form should be a component of this transfer.
- b) **Remote monitoring:** This enables a doctor to examine a patient remotely using technological devices. It is cost effective, provides better interaction between patients and doctors as it provides comparable health outcomes.
- c) **Real time interactive services:** Real time interactive sessions is provided for the doctors and the patient who happens through phone conversations, online communications and home visits. All the examinations which involve psychiatric evaluations, ophthalmology assessment scan are conducted in the same way as in the traditional face to face talk.



Fig. 2: Telemedicine Ecosystem

## 4. Advancements in Telemedicine

### a. Telenursing

It mainly deals with the provision of telecommunications and information in order to provide nursing facilities to a patient especially when the nurse does not have proper access to the patient. It has achieved proper growth in many countries mainly due to the aging population, reducing costs of health care. It also manages the use of nurses, reduces travel and saves time.

### b. Telepharmacy

This helps in providing a patient, proper

### Practice Settings: 2000

### Telenursing Role Study

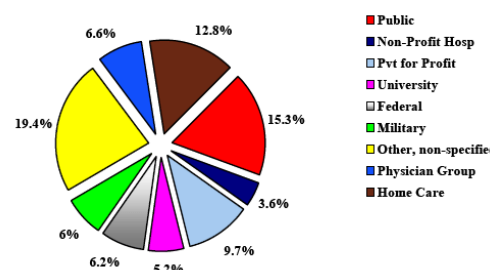


Fig. 3: Telenursing role study in different areas

pharmaceutical care when there is no contact with a pharmacist. It includes drug monitoring therapy, patient counseling, prior authorization and refill authorization for prescription drugs.

### c. Telerehabilitation

It mainly deals with provision of rehabilitation services. They mainly fall into two categories: Clinical Assessment and Clinical Therapy. Most tele-rehabilitation mainly is visual. In 2006, the most commonly used modalities are through webcams, video conferencing etc. Two important areas of tele-rehabilitation research are:

- i. Demonstrating equivalence of assessment and therapy to in-person assessment and therapy.
- ii. Building new data collection systems to digitize information that a therapist can use in practice.

### d. Teletrauma Care

Telemedicine can be used to increase the efficiency of delivery care and trauma environment. Examples are:

- Telemedicine for trauma triage
- Telemedicine for Intensive Care Unit rounds
- Telemedicine for trauma education
- Telemedicine in the trauma operating room

Similarly there is use of telemedicines in different areas are: Telecardiology, Telepsychiatry, Teleradiology, Telepathology, Teledermatology, Teledentistry, Teleaudiology, Telesurgery, Teleophthalmology, and Videotelephony etc.

## 5. Narayana Hrudayalaya

Narayana Hrudayalaya is situated in the city of Bengaluru and is a multi-specialized hospital in India. It is one of the largest heart hospitals in the world performing nearly 15,000 surgeries on patients' from 25 different countries. It is also a renowned center for telemedicine and the most intriguing factor is that, it is provided free of cost. Dr. Devi Prasad Shetty started the Narayana Health in the year 2000 with the help of Asian Heart Foundation (AHF). They are now situated in the cities of Bengaluru and Kolkata. Both are multi-specialty hospitals which offer cure to wide range of illnesses and diseases.



Fig. 4: Telepharmaceuticals System

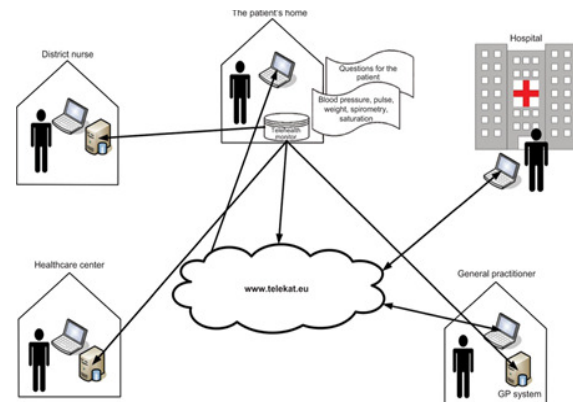


Fig 5: Working network of telerehabilitation



Fig 6: Narayana Hrudayalaya Center, Bengaluru

## 6. Telemedicine in Narayana Hrudayalaya

The telemedicine service was started in the year 2002 mainly to cater to the needs of the rural mob. The network is connected to countries like Malaysia, Mauritius and Pakistan and most of the cases are the cardiac ones. All the analysis reports are exchanged via telephone lines. The service is free and till date more than 21,000 cases have been referred to use this service. Narayana Health is also a part of 'The Karnataka Telemedicine Project' inaugurated in April 8, 2002 and it links two rural hospitals in Saragur (Karnataka) having the Chamarajnagar District Hospital and Vivekananda Memorial Hospital with the Narayana Hrudayalaya.



Fig. 7: Doctor talking to the patient through video

## 7. Conclusion

Telemedicine and tele-health principals, policies and performance are studied.

## References

- [1] Darkins, A. W., & Cary, M. Ann. *Telemedicine and Telehealth: Principles, Policies, Performances and Pitfalls*.
- [2] *Telemedicine: A Guide to Assessing Telecommunications for Health Care*. Committee on Evaluating Clinical Applications of Telemedicine, Institute of Medicine.
- [3] Norris, A. C. *Essentials of Telemedicine and Telecare* [Kindle Edition].
- [4] Ferrer-Roca, O., & Sosa-Iudicissa, M. C. *Handbook of Telemedicine*.
- [5] Bashshur, Rashid L., & Shannon, Gary W. *History of Telemedicine*.

## Author Details

**Dr. C. Gurudas Nayak**, B.E. in Instrumentation Technology and M.S. in Communication Engineering. Ph. D. from Manipal University, Manipal. He has 22 years of Industrial/Teaching experience and published 70 papers in International/National Conferences and Journals. He is currently working as Associate Professor (ICE) in M.I.T., Manipal University, Manipal. His area of research interests are Communication Networks and Mobile Telephone Systems.



**Nishant Rath**, pursuing B.E. in Instrumentation and Control Technology from M. I. T., Manipal University, Manipal.

**Sagar G. Nayak**, pursuing M.S. in Information Technology, from Department of Information Technology, University of Stuttgart, Germany – 70569.