Telemedicine :

- **Telemedicine** refers to the practice of caring for patients remotely when the provider and patient are not physically present with each other.
- The World Health Organization (WHO) refers to telemedicine as "healing from a distance". It is the use of telecommunications technology and information technologies to provide remote clinical services to patients. Physicians use telemedicine for the transmission of digital imaging, video consultations, and remote medical diagnosis.
- Telemedicine is the remote delivery of healthcare services, such as health assessments or consultations, over the telecommunication infrastructure. It allows health care providers to evaluate, diagnose and treat patients without the need for an in-person visit
- The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of diseases and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals.

Four elements are relevent in telemedicine:

- Its purpose of clinical support.
- It is intended to overcome geographical barriers, connecting users who are not in the same physical location.
- It involves the use of various types of ICT (Information and communication Technology).
- Its goal is to improve health outcomes.
- Types of Telemedicine:
- Telemedicine is practiced on the basis of three concepts.

1. Real Time (Synchronous)
2. Store and Forward (Asynchronous)
3. Hybrid systems.

1. Real Time (Synchronous):

- Real Time Telemedicine could be as simple as a telephone call or as complex as robotic surgery.
- Video conferencing equipment is one of the most common forms of technologies used in synchronous telemedicine.
- There are also peripheral devices which can be attached to computers or the video conferencing equipment which can aid in the interactive examination.
- A tele-otoscope allows a remote physician to see inside a patients ear and a tele-stethescope allows the consulting remote physician to hear the patients heart beat.

- Medical specialities conductive to this kind of consultation include psychiatry, family practice, internal medicine, rehabilitation, cardiology, pediatrics, obstetrics, neurology and pharmacy.

2. Store and Forward (Asynchronous):

- Store and Forward telemedicine involves acquiring medical data and then transmitting this data to a doctor or medical specialist at a convenient time for assessment offline.
- It does not require the presence of both parties at the same time.
- Dermatology, radiology and pathology are common specialists that are conductive to asynchronous telemedicine.
- A properly structured medical record preferably in electronic form should be a component of this transfer.

3. Hybrid systems:

- Hybrid systems combines capabilities of Real Time and store and forward telemedicine.
- Combining stored still or motion video with Real Time video conferencing is an example of a hybrid telemedicine system.
- For example, video clips of patient examination stored and forwarded to a specialist for assessment can be useful for teleconsultation of ocular motility disorders associated with neuro-ophthalmology conditions.
- The specialist doctor can play, pause or sequentially step through digitized video movies.

Concepts of Telemedicine System:

- The Telemedicine technology includes hardware, software, medical equipment and communication link.
- The technology infrastructure is a telecommunication network with input and output devices at each connected location.

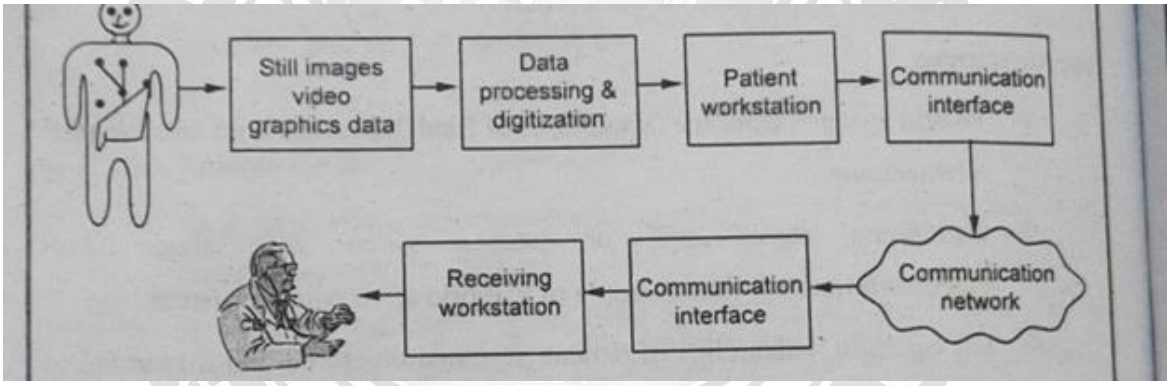

Fig.5.1.1: Basic concept of Telemedicine

Source: web

- The following type of information is required to be obtained and transmitted in a telemedicine system.

  Data: Non-medical patient data such as personal data, admission information and release, payments, insurance status, disease history, status of physiological parameters such as blood pressure, pulse, respiration rate, temperature.

- Audio: For medical diagnosis, some patient data is primarily acoustic. For example, ausculation of heart sounds, sounds from respiratory movements.
- Still Images: X-ray, CT, MRI Images, Skin Images, Images of tissue and cellular specimens.

❖ Video: Video of images of the patient, echocardiography, video conferencing.

❖ Primary patient data: Name, age, occupation, sex, address, telephone number, registration number etc.

❖ Patient history: Personal and diagnostics reports.

❖ Investigations: Complete analysis reports of haemotology and biochemistry tests, stool and urine examination.

Applications:

A telemedicine system may have all or some of the following medical devices at a telemetry transmitting station.

- Telecardiology: PC based Digital ECG Machine Electronic Stethescope.
- Telepathology: Video microscopy system microscope, CCD camera, single chip camera, three chip camera.
- Teledermatology: Dermascope with digital camera.
- Miscellaneous: Document camera- CCD based camera that forms the image of the document placed over its flat bed.