

The Telemedicine Experience of Care Hospitals

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Abstract

Telemedicine is one of the latest evolutions of ICT. Telemedicine can be used as the effective means of delivering the quality healthcare to the rural people. The resource availability is comparatively less for making the healthcare to reach rural masses. Telemedicine helps the rural people access the expert advice and reducing their health risks. Andhra Pradesh Vaidhya Vidhana Parishad (APVVP), the supervisory body of all the government hospitals in Andhra Pradesh is spearheading the telemedicine implementation at 24 district hospitals with the help of Care and Apollo hospitals. These services are heavily relied on the Information Communication Technologies (ICTs) for making the quality health care to reach the rural. This paper analyzes the application of telemedicine technology towards benefiting the rural people.

Keywords

Information and Communication Technologies (ICTs); Sanjeeva – The Telemedicine Project; Medical Imaging; Video Conferencing

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Introduction

About the Care Foundation

Care Foundation [1] is a registered non-profit society with the mandate of making quality health care affordable and accessible to all through appropriate use of technology. The Foundation has been established by a group of medical scientists and technologists with the stated mission of making advanced comprehensive healthcare affordable and accessible to all. The Foundation is a non-profit organization and is registered as a society. The patrons of the Foundation are renowned cardiologist Padmashri Dr. B. Soma Raju and the Chairman of the Foundation is Prof. P. Krishnam Raju. The Foundation implements its mission of making advanced technology based care affordable and accessible to common man under a three dimensional program of conducting research, imparting specialized education, developing cost effective medical products and providing healthcare to the economically poor people living in the rural areas. The mission is executed through Care Hospitals and the Cardiovascular Technology Institute (CVTI) respectively. The CVTI headed by Prof. Arun Tiwari is the nodal agency for executing research and development activity acts as an enabling center for clinical validation of indigenously developed medical products and devices.

Recent Technological Developments in Healthcare Sector

The health care industry in India started seeing the technological advancements in this decade. The recent years witnessed the advancements in Healthcare industry because of three major reasons:

1. Failure to disseminate the medical knowledge available fast enough to the rural people or to use it in other medical matters.
2. Medical practitioners with scarce specialized knowledge cannot bring it to bear beyond their geographical confines.
3. The increased demand in the rural India for the quality health care at reduced costs.

But these progresses in healthcare, particularly telemedicine are being implemented that can spread critical medical expertise across a region and around the globe. The

telemedicine was first implemented at Intensive Care Units (ICU). After thorough research on the operations of specialists they realized that they need not be present physically to deliver the treatment. This probed them to pilot test the projects, which combine the Information Communication Technologies with the traditional medical setup. The bulk of specialist job is to analyze the physiological data like electrocardiograms, CT scan reports and blood pressure reports and coordinating the care with the surgeons and primary physicians. This data can be made available electronically to them and the coordination can be done remotely with the Information Communication Technologies (ICT). According to Dr. Ann, P Resident Doctor of the Society of Critical Care Medicine, explains “It has a long way to go to demonstrate exactly what can be done with the telemedicine and its potential is, but it may be a way of spreading a thin resource over a much larger population”.

“We do not know yet how widely applicable the approach can be, nor do we know how many centers or patients an expert can handle at one time using telemedicine” Dr. Mathew Nikon states. Telemedicine in India is still progressing towards the successful implementations. Hospital chains such as Medicity, Apollo and Care are trying to expand their reach to the rural India with the telemedicine. Apollo has already started the telemedicine implementations at various districts in Andhra Pradesh. Care hospitals combined with Andhra Pradesh Vaidhya Vidhana Parishad (APVVP) is spearheading the implementations in rural villages of Andhra Pradesh.

In Andhra Pradesh, APVVP is the governing body for all the government hospitals that are existing starting from villages to metropolitans. The village masses of Andhra Pradesh are relatively poor; the private nursing homes are unaffordable for them. The Government hospitals spread in almost all villages and mandals are helping out the poor by providing the subsidized medical services. The APVVP network in a typical district will be shown in **Fig 1**.

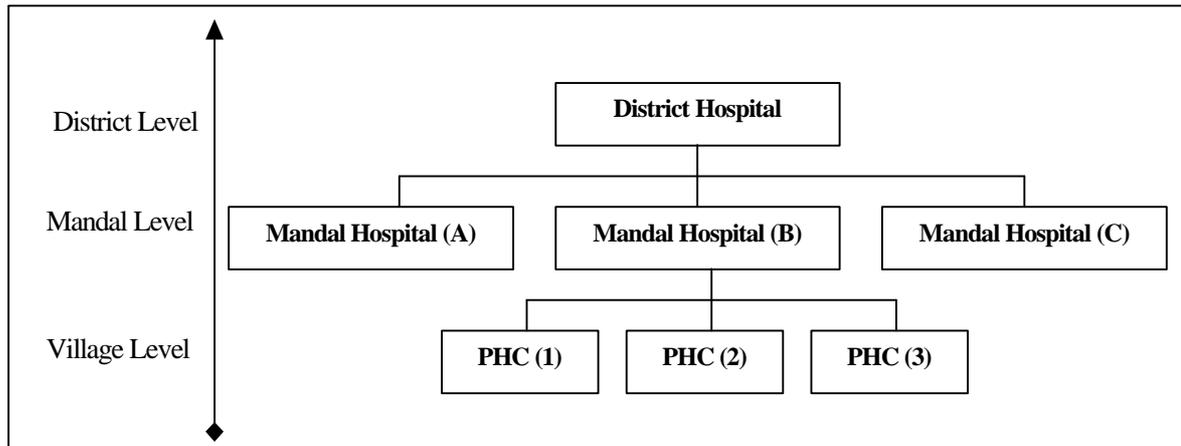


Fig 1: The APVVP hospital Distribution across the state of Andhra Pradesh

Care hospitals located in Hyderabad, capital of Andhra Pradesh tied up with the APVVP to provide the quality health care to the rural people. Karishma Software Ltd. is providing the system services required for the project. The project is started at Mahaboobnagar District hospital in Andhra Pradesh. The telemedicine project in Mahaboobnagar district hospital is attracting the rural for the service levels it is offering at cheaper prices. The implementation of telemedicine project includes bigwigs in respective industries are listed below.

Organization Name	Function
Care Foundation	Medical Expertise Services, equipment interface and systems integration
Andhra Pradesh Vaidhya Vidhana Parishad	Infrastructure Arrangements
Karishma Software Ltd.	Software and Training Services.
Siemens and Phillips	Medical Equipment

Fig 2: The listing of organizations participating in Telemedicine project at Mahaboobnagar.

The project is supposed to connect the 23 District hospitals with the Care Hospitals, Osmania Hospitals and Nizams Institute of Medical Sciences at Hyderabad. As of now Mahaboobnagar district hospital is operational and connected with Care

hospitals in Hyderabad. This project consists two important nodes – the Primary Health Center (PHC) and the Expert Center. PHC is where the patient is examined and interacted. Here medical tests will be conducted on the patient and the results will be transferred to the Expert Centers. The Expert Center will be consisting two or three experts who will examine the reports that are digitally transferred to them and shares the comments with the PHC doctors. More than 2,500 patients visited the Mahaboobnagar district hospital for availing the telemedicine services. The telemedicine project proved to be the cost effective solution in delivering the quality health care to the rural masses.

Overview of the project

The telemedicine project involves designing and developing an ICT platform for providing connectivity between primary health care centers and expert centers [3]. Right now the communication channel has been established between Mahaboobnagar district hospital and Care Hospital, Hyderabad. This project is named as Sanjeeva [2]. The arrangements is a hub and spoke or a mentoring institutions driven link.

The project broadly comprise of following features:

- Video Conferencing
Gives the expert to look at the patient and talk to patient as well as the doctor at PHC.
- Electronic Patient Records
Enables the PHC to keep track of patient's disease and progress by maintaining the database.
- Medical Imaging
Enables the PHC doctor to transfer the reports in digital format to Remote Expert Center.
- Medical Equipment Connectivity
Enables the devices such as CT Scan to connect the System that is operating at PHC.
- Expert Consultation
Enables the patients and doctors at PHC can request for the Expert Consultation within no time.

As of today the medical equipment that is being used is state of the art, thus providing the rural people with super specialty hospital health care experiences.

Depending on the medical equipment the following information in form of records or in streaming mode can be linked up:

- Radiology (X-Ray, Ultrasound, CT-Scan, MRI, Mammography and etc.
- Pathology
- ECG/EKG, Echo
- Stress Test, Coronary Angiography.

The Process

A patient who is visiting the hospital for the first time is given a registration number. This will be called as Medical Record Number. Once the patient registers with all the demographic, historical and current medical related details his current vitals are captured for transmission and review. Details such as complaints and diagnostic reports are entered for doctor's inspection. Some of the data, which is entered, will require an authorized medical personnel's approval at PHC level. Once that is done a visit ID will be generated by the system and dispatched to the medical personnel residing at PHC.

The details and the reports with a visit number combined will be called as a Case. Case will be transferred to the server and the medical administrator will be classifying the case and will be deciding the workflow rout of the case. He will be responsible to make the case available for the specialist. A specialist based on the requirement can contact the medical personnel at PHC or straight away he can speak to the patient. The expert gives the following suggestions:

- Gives the opinion, which will be helping the medical personnel in treating the patient.
- Asks for more information
- Orders for further investigation through some diagnosis or tests.

Idea Initiation

Great things are achieved against great obstacles and after a great thought process. The project, which is unique in delivering the health care to the poor people of Andhra Pradesh, was no exception to this. The origins of this project are laid down on May 5, 2000 by Dr A P J Abdul Kalam, who was at that time Principal Scientific Advisor, Government Of India, mooted the idea to the Dr. Soma Raju and Dr. Arun Tiwari of the Care Foundation. There started the idea of implementing telemedicine at the rural villages of states, providing them the state of the art medical infrastructure. The government of Andhra Pradesh provided its support to the telemedicine project by encouraging Care management through associating APVVP with it. The APVVP gave the infrastructure support to Care Hospital. Karishma Software limited supported the project by studying the requirements and developing the software required for the telemedicine operations including medical imaging. The Siemens and Phillips, the leading medical equipment manufacturers joined with the project later to provide the medical equipments required at the PHCs. Dr. Arun Tiwari, Head-CVTI, Care developed clinical database management tools to interweave clinical information into software and quantify physiological features such as stenoses in coronary artery disease and infectious diseases. The management of the project managed to get the best vendors for the network services required for connecting the PHC to the expert centers according to the local availability. The Network setup of telemedicine project is shown in **Fig 3**:

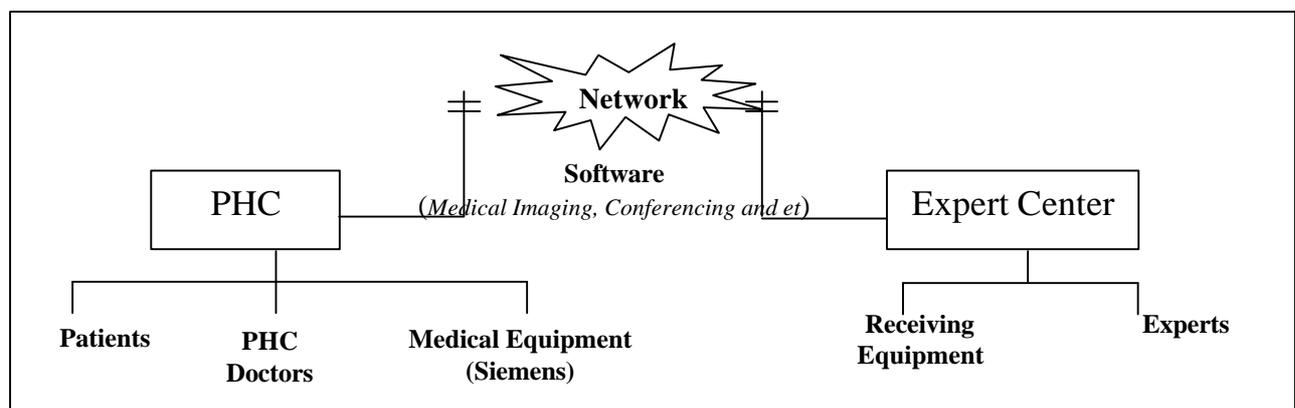


Fig 3 : The PHC to Expert Center – Network setup

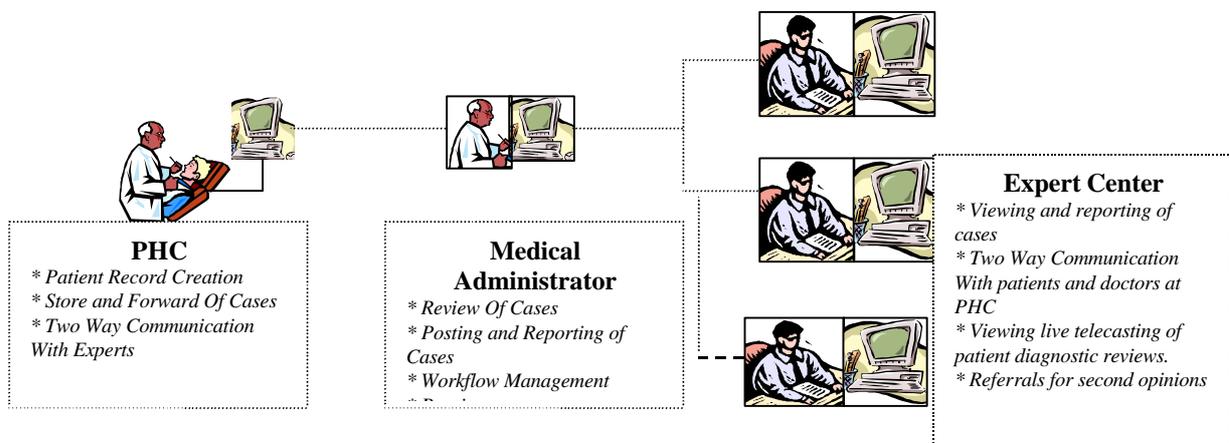
Project Conceptualization Process

The telemedicine project, Sanjeeva gave a sigh of relief to the poor who were thronging into the government hospitals as it entered providing hi-tech Medicare to the rural masses.

The pilot project with an investment of Rs.35 million promises the rural masses quality health care. As the project's first phase is already taken off which includes connecting the Mahaboobnagar district hospital with Care Hospitals is operational and the links will also be developed with the hospitals at Eluru and Hindupur.

In the next phase district hospitals all over the AP are connected with the Osmania Hospital, Care and APVVP and area hospitals with the nearest mentor hospital.

The communication process happens between the expert center and the PHC is shown in **Fig 4**:



As shown in the **Fig 4**, there are five user perspectives for this project

- Patient – Who will be using the service
- Primary Healthcare Center – which has trained medical person
- Expert Center – Which gives consultation
- Medical Administrators – Who administers the network and
- Expert – Who gives opinions and interfaces with the patient.

Project Coordination

The telemedicine project, which is spearheaded by the APVVP, envisages networking of all the 23 district hospitals with more than 200 beds each and 100 area hospitals with 100 beds each. These in turn will be linked by 256 Kbps leased line of BSNL - with the Care Foundation Hospitals, Osmania Hospital and Nizam's Institute of Medical Sciences, Hyderabad.

However, the Mahaboobnagar hospital has been geared up, with its staff and infrastructure upgraded with the state of art tools in information Technology. The medical equipment and the hardware and software in place are developed according to the requirements and they are from well-known companies in respective fields. For instance Siemens is providing the medical equipment to the district hospital. The total processing is driven by the clinical database management tools developed by Mr. Arun Tiwari, Head, CVTI at Hyderabad to interweave clinical information into software and quantify physiological features such as stenoses in coronary artery disease and infectious diseases. While the indigenous scanner from CVTI, the image processing software is provided by Karishma Software to convert the X-Rays, ultrasound and ECG at the district hospitals into digital format. The digitally formatted data will be transferred to the super specialty hospitals in Hyderabad through a devoted leased line.

In addition, video-conferencing facilities are in place in this integrated setup where the patient can even see the expert and talk to him. It gives the expert a chance to see the patient and listen to him.

Even though the APVVP is playing a major role in the whole project, the remaining companies are also playing a vital role in its implementation. Karishma Software is training the doctors in order to make the best use of the software and the technology available. Siemens and Phillips provided the state of the art medical equipment to the district hospital. Servicing of the machines is being done by both Siemens and Phillips. Care Hospital offering its consultation services free of cost and the APVVP is providing the necessary infrastructure in terms of the locality.

Ensuring Participation of Beneficiaries

Sanjeeva – The Telemedicine project, is being implemented at Government Hospital, Mahaboobnagar and the beneficiaries will be the rural masses of the

Mahaboobnagar district. Mahaboobnagar is the most backward district in Andhra Pradesh. Most of the people are illiterates. People of this district are mainly laborers. The population of this district neither has the knowledge to understand what is required for a patient nor the money to spend on the people. Sanjeeva is charging nominal prices for advanced technologies such as CT scan for white cardholders. The price is not even half the amount charged by a specialty hospital for the same. Besides this, Mahaboobnagar district is having lot of rural mass consisting of tribal people. These people are innocent, superstitions and have wrong beliefs.

This project is implemented at Mahaboobnagar government hospital where the participation of beneficiaries in the project. The poor people visit the government hospitals because of their inability to pay for the private health services.

So as far as the objective of this project is concerned it is reaching the rural masses of Andhra Pradesh state. The following companies are also tied up with the execution of the project.

Care Foundation

Providing Consultancy Services, Medical equipment interface, systems integration and Second Opinion.

Karishma Software Ltd.

Providing the software for transferring the data that is in the digital format.

Siemens and Phillips

Providing the Medical Equipment to the district hospitals.

Andhra Pradesh Vaidhya Vidhana Parishad

Providing the infrastructure such as place to execute and referrals of the patients.

Project Objectives

The telemedicine project at Mahaboobnagar – Sanjeeva is the one amongst a few projects that are interested towards the rural people. As it is explained by Dr. Arun

Tiwari, Care Hospitals, "The project was started by Dr. Abdul Kalam to benefit the rural people". On an average there are there are 30 to 40 patients visiting the telemedicine center located in district hospitals of Mahaboob Nagar.

Delivering the quality healthcare to the rural villages of Andhra Pradesh.

- Creating Employment opportunities in the rural.
- Deploying the Medical infrastructure at primary health centers.
- Increasing the service levels of government hospitals.
- Establishing a network between the hospitals located at villages to the hospitals located at metropolitan cities.
- Developing the skill set of doctors working at rural villages and to create interest towards serving the rural poor.
- Technology transfer to the rural hospitals, which are lacking basic infrastructure.
- Sharing the expertise gained by the specialists across the state especially to the rural villages.
- Making the rural population to enjoy the benefits of new medical technologies at subsidized prices.
- Increasing the trustworthiness of government hospitals in rural and semi urban areas.

Project Implementation

Initially as a pilot test the Mahaboobnagar hospital has been geared up, with its staff and infrastructure upgraded with the state of the art tools in information communication technology. A part of Human resources required for the execution of the project were provided by APVVP and Karishma Software Ltd provided the technical expertise. The project, which was currently operating at district hospital at Mahaboobnagar already, dealt more than 2,600 cases. As the process is concerned typically it is following Tele-consultation process. The majority of the cases are store-forward cases.

Assessment of Services Provided

The cardiology services are life saving telemedicine applications that have flourished in recent years. Improvements in integrating the tools of the

cardiologists (Echocardiograms, Ultrasonography machines and electronic stethoscopes) with telemedicine workstations have greatly added to the diagnostic quality and availability of cardiology via telemedicine at remote places. The services offered at Mahaboobnagar district hospital are as follows:

- Ultrasonic
- CT Scan
- Echocardiograms/ Electrocardiograms

For all services offered, the district hospital is charging nominal price to the eligible ones, which is not comparable to the super specialty hospital prices. Services available at district hospital are helping the poor as well as doctors. The patient is benefited due to the better quality of service since the systems are in place. The doctors can diagnose a patient in an efficient way with the help of telemedicine in addition the latest information regarding the medicines is accessible now.

Emergency Services

The greatest impact of telemedicine is on the patient, their family and their community. By using telemedicine technologies, it reduces travel time and related stresses to the patient. In many instances, patient travel would have required additional family members, travel, day care costs, and time away from the job. This disruption can be avoided through the telemedicine. If there is any emergency service required to patients, it poses a big problem for the relatives of the patient to get access to the technology that is far away from them.

In emergency situations like surgery, telemedicine helps the local doctor in the following way:

There are several advantageous of video conferencing for surgery. First, it can be used as means to screen patients without making them travel to the surgical center. In addition, nurses can utilize the same technology to prepare the patient for the procedure by linking them a day prior to surgery. The second application is during the surgery, telemedicine can be used to connect a doctor with a colleague and mentor during an operation or to demonstrate the procedure to medical and

surgical students without having them crowd around the operating table. The third area of utilization is during the post-operative follow-up. The use of telemedicine has been used successfully by surgeons to monitor the process of healing and recovery after the surgery. This technology allows surgeons the flexibility to provide quality treatment no matter where the patient is.

Project Evaluation Systems

A project evaluation system is the critical part of any project. Without performing the evaluation the project never finishes. The evaluation of a project results in success or failure of a project by comparing the initial goals to the actual ones. Evaluation triggers the gap analysis and management control processes to takeover there after to ensure the effective implementation.

Though there are no project evaluation systems in place in Sanjeeva at PHC, the project keeps track of the patients that are visiting the telemedicine center. The feedback by the patients given to the government hospital authorities is being used for evaluation of services. The references from doctors also helping the telemedicine implementers in evaluating the systems. As of now the project is using the best methodologies and devices available in the market.

As Mr. Patra stated, "The basic bottom-line in providing the quality service to the rural is to benchmark ourselves with the best ones available in the market".

Technical Performance

The technicalities involved in Sanjeeva project are being taken care by the Karishma Software Ltd. A trained operator can operate the software, which was provided to the PHC, very easily. There are training programs arranged for the doctors of District Hospital at Mahaboobnagar. The process of uploading and downloading of the cases are automated to the large extent. There are very little issues that should be clear in the operator's mind.

The basic technical requirements that are attached with the Sanjeeva include:

1. Software

- Medical Imaging
- Data Transfer to the Expert Center

- User Registration and Maintenance
- Video Conferencing
- Billing

2. Hardware

- Video Camera
- Network Connectivity Devices such as Modem and Lan Cards
- Computer Systems
- Medical Equipment
- Voice and Video Output Devices

3. Human Resources

- Technical Users
- Medical Equipment Operators

The abilities of all the machinery in place will not be sufficient to deliver the best telemedicine service because of bandwidth problems that are very much existing in rural India. Sanjeeva heavily relies on bandwidth of the network because of the lots of data that to be sent to the remote expert center. Connectivity remains still a problem of concern for Sanjeeva. The vulnerabilities that are connected with the telecommunications in India are also areas of concern for the Sanjeeva project.

Organizational Achievements

Sanjeeva is basically a subsidized project where the project has a limited ability to earn profits. It is purely meant for the poor. And the prices of the services vary phenomenally from super speciality health center to PHC. So the poor are attracted towards this project where their costs are minimized to the greater extent. In the coming years this project will attract the rural masses. Sanjeeva is doing well in Mahaboobnagar as it already dealt more than 2500 cases within a year. The statistics itself says the appeal of Sanjeeva to the rural people at Mahaboobnagar. Sanjeeva showed the hospital industry majors the rural market capabilities. The rural people are not very cautious about the telemedicine facilities available at their door front. Once the telemedicine reaches to every nook and corner of the rural then it surely delivers the profits to both the organizations as well as the patients.

Skill Set Development and Application - Empowerment Levels:

The empowerment levels can be discussed here in two perspectives: Doctors and Technicians perspective and secondly Patients perspective.

Technicians and Doctors

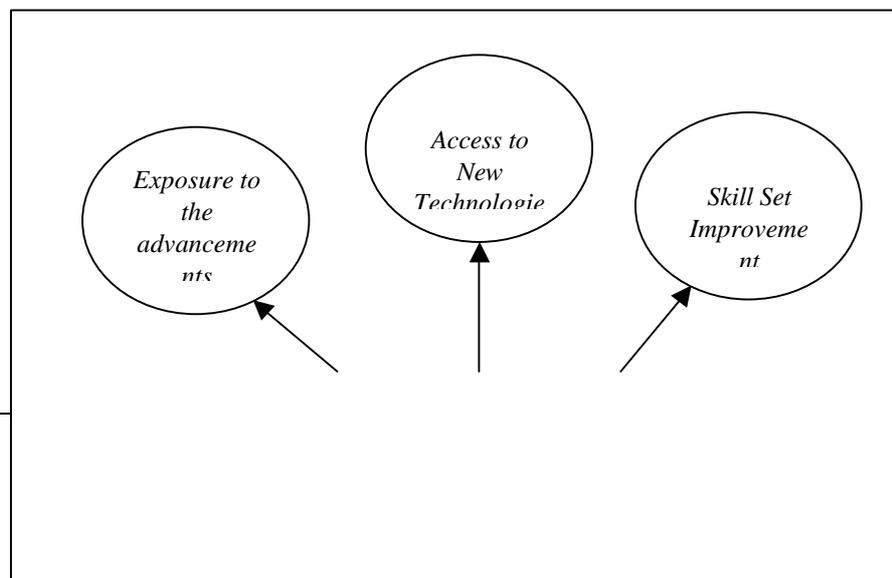
Technicians play a vital role in the project. The responsibility of the technicians is to perform Ultrasonic scan, CT Scan and take an ECG. The first step of the technician is registering the names of patients and their medical record numbers. Regarding the CT Scan, technicians scan and add their comments to the report and send it to Care Hospitals. Here reports are referred to the doctors of Care Hospitals who in turn send it back to the technicians of Mahaboobnagar. They generate the finalized reports and give to the patients for the treatment.

Telemedicine is helping them in developing their skills and giving quality services in terms of learning, offering better service and providing greater satisfaction to them. When the doctors are not available, technicians have to take decisions on their own. Doctors have to come forward to support the telemedicine project.

As one private medical practitioner in Mahaboobnagar comments "As of my experience is concerned telemedicine project gives me access to the medical resources that I would have never even can think of".

As another doctor comments, "The procedure of Sanjeeva requires lot of interest from the side of PHC doctor and as well as Expert. It demands the interaction between the two in turn that enables us to correct ourselves and gives us much broader solutions possible for a single case".

Sanjeeva is helping the doctors in treating the patients by giving the second opinions and latest technology.



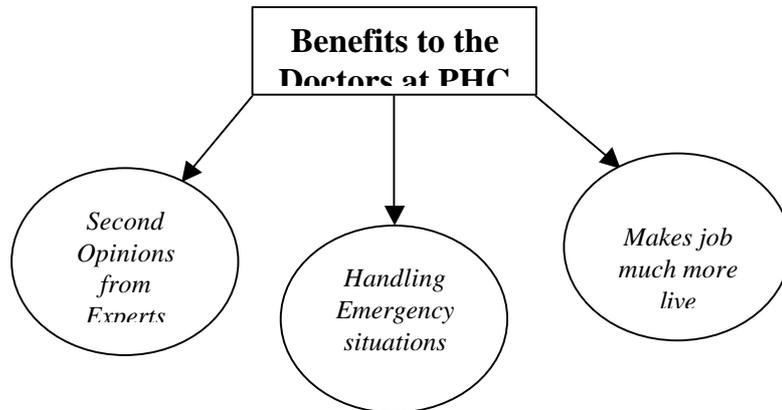


Fig 5: Benefits to the Doctors

Patients

Mahaboobnagar district is one of the backward districts in Andhra Pradesh. Problem of illiteracy is the root cause of all the problems associated with the project. The wrong beliefs and narrow mindedness of people are the additional problems associated with the rural folk of Mahaboobnagar district. Dealing with these people requires a lot of patience.

Patients visiting the district hospital are unaware of the precautionary aspects to be taken care of, while attending tests such as CT Scan. We got a few blank responses from some patients. The literates are also unaware of telemedicine.

The targeted users of the project are the rural masses. The need to explain to them of the happening in the hospital is essential. As far as a patient visiting the government hospital is considered, the doctor is considered supreme. Whatever he suggests will be given utmost prominence. So doctors are the only media to educate them properly.

Once people understand the process and talk of the project to their neighbours at their leisure it explains the extent to which users understood the project. Till then we can assume that this project is not reaching the people.

The distribution of White Card, Non-White Card and Free Card Holders is given in **Table 1:**

	CT	Echograms	ECG
White Cards	2253	445	na
Non-White Cards	563	88	na
Free	91	96	na
	2907	629	596

Table 1:

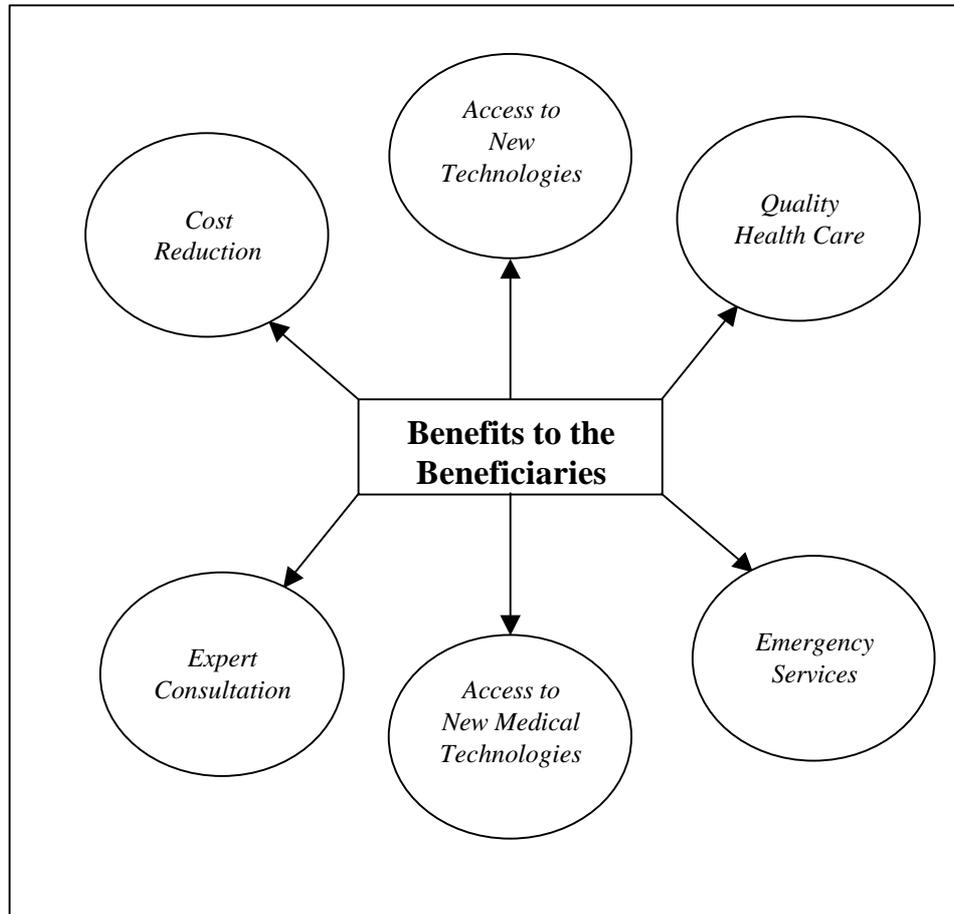


Fig 6: Benefits to the Patients

Replicating the Experience

Success never stops and it is infectious too. The telemedicine project is no different to this fact. The telemedicine experience of Care is the best example of the ICT helping the poor in improving the standards of their lives and making them live better lives. The project is pilot tested at Mahaboobnagar district, which is the most backward district of Andhra Pradesh. The successive steps in this project include implementations at Rajamundhary, Eluru and Hindupur are still in progress. The connectivity is established with Rajamundhary while with the other two is in progress. Recently the district hospital of Puri is connected to the network of hospitals. APVVP and Care are planning in a big way to take on the telemedicine project to the remaining rural districts of Andhra Pradesh.

Local Leadership Development

Nothing is possible without a strong leader leading the way. Sanjeeva is no exception to this. Prof Arun K Tiwari, Director CVTI, Care Hospitals is the one who made the dream of Dr. APJ Abdul Kalam a reality. When APVVP announced the project Care Hospitals responded positively and provided the support. Care combined with APVVP managed to implement the telemedicine at Mahaboobnagar district as the pilot. Prof Arun K Tiwari and his team planned every step in the implementation of the project carefully. He managed to rope in the giants such as Siemens and Phillips in their respective industries to support the project. Every member in the Sanjeeva team was properly trained to service the rural poor. To manage the technical service center in highly illiterate rural places requires lot of patience and effective leadership. Care telemedicine team was well educated by their leaders in this regard. Prof Arun K Tiwari and his collaborators injected the importance of serving the poor to their respective teams. This can be easily observed at their telemedicine service center located at district hospital, Mahaboobnagar. Patients who'll be visiting the service center are very happy with the atmosphere. Recently the team has recognized the importance of educating the poor about what is happening around them. The root cause of all these to happen is nothing else an efficient and effective leader sharing his ideas with his teammates.

Critical success factors: Management practices and learning

There are some prejudices, which we identified during our study.

- Technology in place will be the area of concern. The problems like bandwidth of the network, and technology being used are still to be addressed.
- The most critical aspect that determines the future prospects of the project is the literacy of the people. It is found that almost all the people visiting the government district hospital are illiterates. Doctors have to come forward and educate the patients.
- Doctors should be trained to accept the technology and use it. They are totally responsible to educate patients visiting hospital.

- Mahaboobnagar district is surrounded by three cities. People of the district never pay visit to the district headquarters unless they have some work. This project is not yet popular in villages of the same district forcing the people to visit the district headquarters for medical care.
- The bureaucracy is seen everywhere, in any government setup.
- The reporting procedure of Sanjeeva is not spontaneous. Whatever is the test suggested to patient, is done at the district hospital and the concerned report is sent to Care Hospital. After an expert sees that report, then he gives his comments on it. The total process takes a minimum of 12 hrs to 24 hrs. That is a huge time for a patient who is in a critical condition.
- There is every need for financial assistance to the poor. Income levels of people are low and they can't afford the treatment expenses. There are number of patients who complained regarding the cost of the treatment.
- Here, we would like to cite an incident that took place at Mahaboobnagar hospital. The patient had a head injury and he was advised to go for a CT scan. Once the CT scan was done the technician recognized that there is a serious need for the operation within 3 to 4 hrs and advised the patient to go to Hyderabad. The patient's relatives had no money for operation. The patient died after 6 hrs. This is a typical situation of the rural people of this district. So there is a need for some charitable organizations to come forward to help the poor.
- Need for publicity is essential to make this project a success. If the project is not publicized properly there is every chance that the rural people who are unaware of this might move to the nearest urban hospital. The people of Mahaboobnagar do not know about the telemedicine, available at the government hospital.
- There is a need for 24 hrs attendants for patients and availability of an expert all the time for a primary health center. But now the consultations are

going on at specified timings. As the doctors complained about the expert, this should be taken care.

- There is every need to educate the poor people visiting the hospital about Sanjeeva.
- The total job starting from registering a patient and sending him for the test, maintaining financial detail, administering the network, uploading documents, marketing and everything related to telemedicine ranging from technical to managerial works is done by only 3 people. Here we can see a deficiency in terms of human resources.

There is no doubt that if people are explained about the project it will turn out to be a big success and it will be renowned for its noble cause of existence [4].

Conclusion

The success of the telemedicine project Sanjeeva indicates the potential for the use of ICT in the rural areas. Such projects are having enough potential to deliver the end results to the rural masses of India. The challenges involved in this project are making people understand the process of consultation. The dedication and the commitment levels of the project staff are the critical success factors. The major reasons behind the success of this project include the effective leadership and effective training and development programs for the PHC doctors. APVVP embarked on the project in a big way by pulling in the Apollo and Care hospitals. Telemedicine has been a successful experience. The transaction volume continued to be low and any attempt at diffusion has to deal with volume, at low volume average cost will be high [5].

Telemedicine in India is at inception stages. There are several possibilities that are still to be tested. In a sense operations such as performing surgeries remotely will be the extreme of what telemedicine can do for the remote rural population. At present, India uses tele-consultation and tele expertise shared services. Moving forward one can see the tele surgeries happening with Robots in place operating the patient by listening to the expert. One of the major issues to be dealt are the cultural ones. In consultation the confidence of the patient is a critical success factor. In sensitive cases teleconsultation may not be easily accepted. Telemedicine

provides a platform for remote consultation and remote medical services. If it has to diffuse rapidly the volume has to come down and investments have to come down. A public-private partnership may provide a viable option for this to happen.

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