Telemedicine in the State of Maharashtra: A Case Study

Abstract: The Government of Maharashtra telemedicine project was operationalised in the year 2007 and since then it has taken a path to expand its outreach and number of beneficiaries. This instance provides an example of how the modern ICT can be gainfully used for benefitting the masses, who till now were deprived from getting advanced medical care. The attempt of this case study is to document the path taken by the Health Ministry of Maharashtra in implementing the telemedicine successfully.

Key Words: NRHM, HER, Specialist End, Patient End, Teleradiology

Introduction

Telemedicine is an umbrella term which involves all the medical activity having an element of distance (Wotton, 1998). Although, telemedicine has been practiced since hundred of years by means of letters (See, Wotton, n.d), but with advancement of Information and Communication Technology, there has been a manifold increase in using telemedicine as a tool for delivering medical treatment. Telemedicine not only includes the real time consultation between patient and expert, but it also has the element of getting medical advises on prerecorded medical data such as in the case of ‘teleradiology’ or ‘telepathology’. A more sophisticated model has been using it extensively for providing health care benefits to the unprivileged people. These interventions usually are taken in the form of welfare projects involving substantial investment, coordination and planning.

The Government of Maharashtra launched its pilot project on Telemedicine in the year 2007, with one Specialist node at KEM Hospital, Parel, Mumbai and 5 sub district hospitals. The prime target areas for this intervention were tribal areas such as those of Sindhudurg, Nandurbar, Beed and Satara. The second phase of expansion involved participation of 5 specialist node, 23 district hospitals and 4 sub-district hospitals.

The Maharashtra State Telemedicine project is a part of larger initiative undertaken by Government of India and World Health Organisation. Under the banner of National Rural Health Mission (NRHM), Telemedicine is one of the key initiatives to improve the health services for the rural people of India.

The General Framework of Telemedicine Project in Maharashtra

The overall network of Telemedicine in Maharashtra can be classified under two broad subheadings, viz. 1. Specialist End
2. Patient End

Specialist End: The Specialist end consists of Five Medical colleges. The medical colleges that have been developed as specialist end are KEM Hospital Mumbai, B. J. Medical College Pune, GMC Aurangabad, GMC Nagpur, Sir J. J. Hospital Mumbai. Nanavati Hospital at Mumbai has been made honorary specialist centre.

The J. J. Hospital at Mumbai has a dual role to play. It acts as main server centre for coordinating between the specialist centers and patient centers. Additionally, it also provides consultation service for the referred patient through teleconference.

Patient End: The patient end constitutes of 27 districts hospitals of Maharashtra (See, Annexure 1). Furthermore 4 Sub district hospitals in each district acts as centers where patient from nearby areas come for consulting the doctors. All the district and sub district hospitals are equipped with modern state of art telecommunication network system for carrying out teleconferences. The Sub-District hospitals are further sub-divided into Regional Hospital (RH) and Primary Health Centre (PHC).

The diagrammatic representation of the present set up has been depicted in Fig. 1.

Technical Support: The first phase of telemedicine was technically supported by Indian Space Research Organisation (ISRO) who provided their expertise in network connectivity. Initially there were serious troubles with internet connectivity.

Annexure 1: Name of the districts where Telemedicine have been implemented.

Thane Bombay
Alibagh Nashik
Pune Satara
Ratnagiri Osmanabad
Latul Bid
Ahmednagar Parbhani
Jaina Aurangabad
Jalgaoon Buldana
Amravati Wardha
Nagpur Chandrapur
Garhchiorli Bhandara
Gondia Nandurbar
Hingoli Washim
Sindhudurg

* Radiology is specialized medical branch which involves using of imaging technologies (X-Ray, MRI, CT Scan etc.) to identify and treat the anomalies in human body. Pathology involves with identification of diseases based on laboratory analysis.
as many times the connection would be snapped. Later, this trouble was solved by using dedicated lease lines of fiber optic cables having a high bandwidth capacity. Thereafter a medical equipment supplier company “Progonosis” provided facilities for video conferencing along with other basic medical equipments such as those of scanner, BP apparatus etc.

Management Structure

The whole project has a Mission Managing Director (MD) under whom there are several Joint Directors followed by Assistant Directors. All three positions together form the top management who make the critical decisions in the implementation of overall project. Additionally, independent consultants are hired for giving their expertise from time to time.

The ground level day to day operations are taken care by the coordinators and facility managers of technical support services. Each district has nodal officer who is responsible for overall day to day operation of telemedicine project at their district. Other than these managerial and support staff, a whole set of dedicated doctors both at Specialist and Patient End are involved in the consultation and treatment of patients. The doctors are not paid any extra by the government for consulting patient through telemedicine. However, an honorary sum of Rs. 100/- and Rs. 300/- are paid to the doctors of District Hospital and Specialist Hospital per patient.

The Motto of Telemedicine

The primary motive of implementing a pan state telemedicine network was to provide a better access of super-specialty medical care to the residence of remote areas where they either do not have sufficient time or lack enough resource to travel to big cities for advance treatment. Highlighting the present medical system Nodal Officer of Mumbai area, Ms. Sandhya Tayde apprised that “The areas targeted for telemedicine intervention had a poor access to trained doctors or medical staff. Furthermore, due to the distance factor and cost involved in seeking a first hand specialist opinion was both time consuming and costly affair. We using telemedicine have tried to reduce the time of intervention and cost and improve the quality of treatment by getting specialist opinion at their place of residence only.” In a way this was a positive development for rural folks who did not have an idea of how and where to go for a particular type of disease of illness. Furthermore, by early detection of serious life threatening illness such as in cancer patients, lives can be saved by early detection and timely intervention.

Another key beneficial feature of Telemedicine intervention is its ability to build and maintain a central database having all the details pertaining to patient medical history and treatment administered to him/her. This means that there is one centralized monitoring hub from where all the data can be accessed from any remote location at a given point of time. This also means that patient digitized data related to X-Ray, CT scan, Pathology report etc. are easily accessible and opinion from different specialist can be sought before deciding a particular course of treatment. It also ensures completeness and correctness of information and past data records are often utilized by specialist for better management of health care services.

The Telemedicine system in Maharashtra has been equipped to seamlessly capture and upload patient information, waveforms and images from remote location to a centralized server and get experts opinion or review instantly within the network (intranet) or at a later point of time. An Electronic Health Record (EHR) is generated for each patient and is archived in a digital format. During cardiac arrest or other emergencies, the ECG and other relevant data can be instantly transmitted and the doctors at remote location can suggest a course of action based on the live data.

Other than consulting and archiving medical data, Telemedicine has been innovatively used in Maharashtra to train and develop medical staff personnel at patient end. The CME division (Continuing Medical Education) is very proactive in dissipating the latest knowledge or medical cases to the staff. At regular intervals of time CME is organised and along with technical knowledge various attitude and behavioral skills related session are delivered, which in turn helps in creating improved clinical performance and professional development. Additionally, via tele-conferencing between medical colleges and district hospitals computer specific skill set are imparted to equip the medical professionals to trouble shoot minor technical problems.

Impact and outreach of Telemedicine in Maharashtra

The telemedicine drastically reduced the time taken for seeking an expert advice. According to Ms. Tayde earlier the wait period for a patient to seek an appointment with specialist was on an average of three months. However, now the wait time has reduced drastically as they can divert the patient digital information to any expert who is willing to handle the case. The junior doctors involved in district hospital also learn in this whole process of referring

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Specialty</th>
<th>Patients Referred from District (April 2010 to March 2011)</th>
<th>Opinion Received from Specialty Centers (April 2010 to March 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Medicine</td>
<td>1059</td>
<td>1032</td>
</tr>
<tr>
<td>2</td>
<td>Surgery</td>
<td>344</td>
<td>316</td>
</tr>
<tr>
<td>3</td>
<td>OBGY</td>
<td>146</td>
<td>207</td>
</tr>
<tr>
<td>4</td>
<td>Pediatrics</td>
<td>393</td>
<td>387</td>
</tr>
<tr>
<td>5</td>
<td>Cardiology</td>
<td>65</td>
<td>51</td>
</tr>
<tr>
<td>6</td>
<td>Neurology</td>
<td>45</td>
<td>44</td>
</tr>
<tr>
<td>7</td>
<td>Anesthesia</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>8</td>
<td>Chest</td>
<td>25</td>
<td>23</td>
</tr>
<tr>
<td>9</td>
<td>Ophthalmology</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>10</td>
<td>Skin VD</td>
<td>85</td>
<td>83</td>
</tr>
<tr>
<td>11</td>
<td>ENT</td>
<td>76</td>
<td>43</td>
</tr>
<tr>
<td>12</td>
<td>Orthopedics</td>
<td>278</td>
<td>287</td>
</tr>
<tr>
<td>13</td>
<td>Psychiatry</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>14</td>
<td>Radiology</td>
<td>1301</td>
<td>1400</td>
</tr>
<tr>
<td>15</td>
<td>Ayurvedic</td>
<td>68</td>
<td>30</td>
</tr>
<tr>
<td>16</td>
<td>Unani</td>
<td>155</td>
<td>160</td>
</tr>
<tr>
<td>17</td>
<td>Forensic</td>
<td>38</td>
<td>36</td>
</tr>
</tbody>
</table>

Table 1: Specialty wise patient referred and opinion received for the same in the year 2010-11.

Source: Arogya Bhavan, CST Mumbai.
the cases and having a discussion with the specialist over tele-conference. At times special rural camps on community health and ophthalmology are organised through telemedicine equipments mounted on mobile vans.

The kind of specialist services extended through telemedicine is in 30 area of medicine which is quite broad. The key and most used specialist services are related to cardiology, dermatology, pathology, ophthalmology, ENT, surgery (consultation), neurology and medicine. The data related to the number of patient referred in the year 2010-11 has been summarized in table 1. Table 2 summarizes the total number of patient referred and opinion received for them, from the year 2008-11.

Thus one can observe from the table above that the telemedicine has been quite popular among its end user and has been catering for the service needs of the poor and unprivileged rural people residing in remote areas of Maharashtra.

### Conclusion and the way ahead

The development in telecommunication technology has given birth to modern telemedicine, which has found its way into improving the health services for the unprivileged masses. Maharashtra has successfully implemented the telemedicine across its districts in two phases. In the first and second phase of the project, all the district and sub divisional hospitals have been linked with the state medical colleges. Now Maharashtra government is planning to implement the phase 3 of the project which proposes to link all the Primary Health Care Centers (PHC, Primary level) to medical colleges (tertiary level). This means creation of a complete network of primary (PHC), Secondary (District Hospitals) and Tertiary (Medical Colleges) for ensuring proper and better care of the patients. This network is expected to reduce mortality and morbidity thus saving more lives by ensuring continuity of care throughout the network.

The present setup of Telemedicine network in Maharashtra is one of the largest in India. Telemedicine intervention has been successful in reducing travel by patient and therefore saving their costs involved in travel, food, accommodation along with pay loss due to taking leave from regular work. It also meant less flocking of patient in the specialty hospital and the doctors can give their opinion by looking the digitized data of patients, according to their convenience. Telemedicine has also reduced cost involved in training and development of medical staff for Primary Health Care center. Therefore, telemedicine is a perfect instance where amalgamation of technology and social cause has resulted in welfare of deprived masses.

### References


### Table 2: The number of patient referred through telemedicine and expert opinion received for the referred cases.

<table>
<thead>
<tr>
<th>Year</th>
<th>Patient Referred</th>
<th>Opinion Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09</td>
<td>538</td>
<td>448</td>
</tr>
<tr>
<td>2009-10</td>
<td>3640</td>
<td>3739</td>
</tr>
<tr>
<td>2010-11</td>
<td>4230</td>
<td>4195</td>
</tr>
<tr>
<td>Total</td>
<td>8408</td>
<td>8382</td>
</tr>
</tbody>
</table>

*Source: Arogya Bhavan, CST, Mumbai.*

### About the Authors

**Randhir Kumar** is a PhD candidate of AISSR (Amsterdam Institute of Social Science Research) at University of Amsterdam (The Netherlands). He secured his Masters degree in ‘Globalisation and Labour Studies’ from Tata Institute of Social Sciences (Mumbai); after which he worked as a Research Associate in Personnel Management and Industrial Relations Area of IIM (Ahmedabad).

**Dr. P K Choudhary** (Double MA, PhD and NET JRF) is a HOD of University Department of Sociology, Ranchi University, Ranchi. Having more than 17 years of Experience in Research and Teaching at University level, he is Program Committee chair for various national and International Conferences. He has written several articles and books on various societal issues. Considering his knowledge and expertise, State and Central Governments have given him additional authority to lead various Development Projects of Jharkhand.

**S M Fahimuddin Pasha** is an Assistant Manager at Computer Society of India. He has done M A in Globalization and Labour from Tata Institute of Social Sciences (Mumbai) and MA in Sociology from Ranchi University. He is on the verge of completing his PhD in Industrial Sociology. He is also a Researcher with International Institute of Social History (Amsterdam, The Neetherlands) and an invitee to the University of Leipzig, (Germany) to adress on the issues of ‘Detorization of Working Class’.