

SHORT COMMUNICATION

SETTING UP TELE HEALTH FACILITIES AT PERIPHERAL SMALL-SCALE HEALTHCARE SET UPS

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ABSTRACT

Conventional medicine with direct patient-medic suffers stagnation and may become redundant without any innovative oxygen of ideas. Current healthcare practices will ultimately need newer gateways for evolution, more cost-effective medical businesses and evidence-based healthcare at doorsteps. Though promising, the practice may face additional kick starts for changing patient-physician approach, infrastructural development, ethical and regulatory guidelines to help pave the way forward. In the opinion of author the successful deployment of "Tele-Health" will economize finances, patient referrals, physician/paramedical move to casualty site, improve clinical decisions, quality healthcare provision at country's periphery, and can dawn upon new learning avenues by distant learning programs.

Keywords: Distant learning programs, Information technology, Tele medicine.

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Tele Medicine Today

Tele-medicine is no more a new concept and is being rapidly evolved in terms of feasible biotechnology being available at the doorstep along with acceptance across the globe in terms of prompt provision of life-saving advice but also general guidance. The technology is already available in multiple Armies and Homo sapien's generated disaster zones¹. Same facility can also be utilized to deliver online lectures and training at varied locations in line with global rise in "webinars" and "online conferences" which will allow doctors and paramedical staff to pursue "continuous professional development (CPD)" programs². Pubmed search on the subject provides multiple avenues within and outside Armed Forces where telemedicine in different shapes and context has provided miracles in terms of healthcare provision timeliness, availability of top-most health expert advice within no time, cost-effectiveness, monitoring of critical patients in war zones and disaster services³. Not only that the best experts on the globe can be reached by simple software tools like 'skype' or "whatsapp" but cost of mobilizing medics to site of casualty, real-time casualty evacuation thru air or road can be minimized⁴. Developed and several developing economies are fast utilizing this magic tool in their war zones and disaster like services⁵⁻⁷. So as far as technology, concept of health-care provision at far flung locations including war zones and disasters areas the idea is simply recommended, rather steps need be taken to incorporate this in Armed Forces healthcare

services at faster pace.

Challenges and Obstacles

Though desirable by all in real-time to improve timely super specialty care, avoid unnecessary medical staff mobilization, reducing burden to health economy and adopting programs like continuous professional development, still the authors feel multiple obstacles need to be taken care of before we become able a successful launch. Salient challenges to overcome include:

Conventional "inside the box life" - The landscape of world in terms of boundaries, conventional care provision and current day standard operating non-upgraded procedures have become rusty and are needed to be realized first to make our systems compatible with rest of the world. This can provide space for "Tele Health" entry into the system. The concerned authorities need to define a way forward with technical knowledge and motivation to incorporate such a system in existing function.

Comparative health economy benefits assessments - Sending medic teams to the site of casualty from base hospitals, though needed in some disaster like situations but much help can be provided if simple e-health tools of tele medicine are available. Tele medicine usage in real terms will need certain training requirements, addition of IT experts and infrastructure development. The added expense associated with tele medicine can be weighed with existing system for mobilizing health workers to casualty site and vice versa. The cost of diagnostics especially the role of radiology and consultancy super specialist expertise can also be avoided for both saving lives and transportation. Technicians at casualty site may carry on the

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medic’s job to reduce medical cost wherever and whenever possible. Farabi *et al* have done systematic review of over twenty studies in developed set ups and have found tele medicine to be very cost-effective in patients suffering from cardiovascular diseases⁸.

Regulatory framework to adopt “Tele Health” in system - Being new and innovative in our set up, the model does not need any specifics for implementation. Successful set ups around the globe now exist and provide state of the art health care tele medicine services. The needful regulatory compliance of some models can be studied for successful deployment for defining rules of patient-physician interaction, health-care SOPs, audio and visual record keeping, sharing radiological and laboratory data, prescription monitoring and raising concern alarms when the need demand so⁹.

Infrastructure build up - The system to initiate will require certain additional infrastructural additions in the shape of training and orientation of medical, paramedical and administrative staff. IT services functionality both in terms of human resource and equipment support will remain central to tele medicine success. The newer medical equipment must be interfaced with electronic health records, diagnostic data and may allow some degree of algorithmic approach for consolidated Artificial Intelligence (AI) for medical decision making. The communication signal strength must be compatible enough for smooth and timely data sharing. Potter *et al* have given a preliminary framework for deploying tele health services in rural areas within USA with benefits equated both for patients and physicians¹⁰.

Centre of “Tele Health Management”- In order to collaborate various existing and emerging concepts in AI supported tele medicine in specific and tele health in a broader perspective, there will a need for centralization and development of a center of excellence. This center should not only be acting as the brain for redefining healthcare through tele medical practice throughout the region, but also be responsible for exactness of infrastructure usage and implementation of regulatory framework as per evidence based medical guidelines. Regular tele health sessions for both preventive health and awareness programs be planned. Alongside the center should create both human-IT interfaced expertise for disaster planning and management and be able to evolve with rapidly emerging innovative concepts in AI, biotechnology and health-care. “Collegium Telemedicus” is providing a nucleus for smaller tele medicine hub in various developed

countries with a humanitarian perspective and have shown expansion towards specialty care along with improved quality care over recent years¹¹. A similar pattern with growth planned in coming years can also be adopted for our set up (figure).

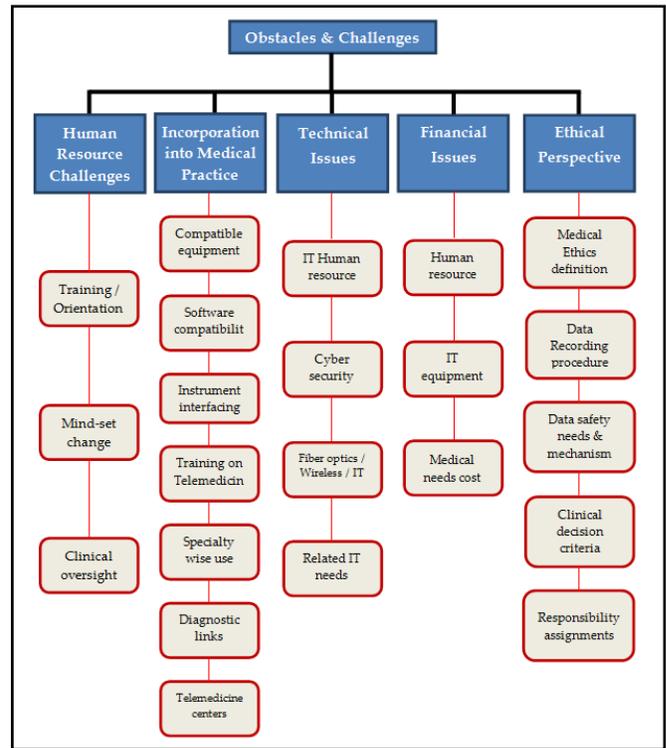


Figure: Various obstacles and challenges to be over-come for successful implementation of “Tele Health Services” at a small-scale set up.

Tele Medicine Models in Other Countries

Review of literature suggest a rapid surge in tele medicine across the globe with target now shifted from simplistic first generation primary healthcare provision to next generational tertiary healthcare facility. Quantifying data surfacing on PubMed in recent years clarifies a real-time shift of focus on development of specific tele medical tools for provision of plethora of specialty specific services. While the objective behind this trend seems to be primarily cost-effectiveness, managing demand with limited human resource, resource provision in less-resources countries and war zones and reducing turnaround time (TAT) for specialist advice. Though it’s difficult to cover all the variant modes of tele medicine, some prototype tele health projects are being shared. Using fundus camera diabetic retinopathy (DR) was screened in a large population group with author documenting a better capture rate

for DR without loss of many patients to routine follow up¹². Another study by Patterson demonstrated desirable epilepsy management outcomes in resource scarce countries by using tele medicine use under guidance by non-physician workers, which is normally considered a serious condition with emergent and timely medical interventional needs¹³. Another study from Haj medical mission from India suggested the need for tele medicine incorporation in medical care improvement in augmenting resource and development of decision support systems¹⁴. A team from North American pediatricians and surgeon established a tele Pediatric Intensive Care Unit (Tele-PICU) in a war zone at Syria with on ground care provision was done by non-physicians with oversight provided through tele medical tools¹⁵. Pamplin *et al* have described a military model for tele medicine in disaster like situations and war where timeliness, precision and accuracy were considered as mandatory in saving lives¹⁶. These references exemplify the successful use of this new via healthcare provision with benefits reaching to patients in timely manner along with considerations for health economy.

Way forward for Pakistan deployment of tele health project need not be difficult and simple understanding is only deemed essential to kick start the project. Pakistan, lagging behind in many ways initially needs to go through a “catch up” phase where the preliminary steps may be defined under the common umbrella for medical, AI and IT resources. Literature review highlights the use of tele medicine but on small-scale and needs to be incorporated at a professional scale in public sector¹⁷. Simplistic questions needed to be addressed may be addressed under following themes:

Medical Questions

- a. Medical functions in general from patient attendance at a peripheral set up to prescription
- b. Specialty specific and general training requirements
- c. Data exchange mechanism
- d. Consultation cost
- e. Tele pathology and radiology
- f. Ethical / Regulatory compliance with regards to confidential patient information
- g. Tele medical equipment support and maintenance
- h. Human resource addition needed if any
- i. Financial impact calculation

IT Related Queries

- a. HMIS system interfacing with tele medicine tools
- b. Internet link feasibility / Fiber optic linkage
- c. Feasibility of video-conferencing and computer systems along with back up service provision
- d. Cyber security issues.
- e. Service contract with provider
- f. IT services related human resource addition to manage the IT issues at peripheral locations like software, local area network (LAN), data base management and hardware expertise along with data entry operators (DEOs) and machine operators.
- g. Interfacing of electro-medical equipment with “Hospital Information & Management System” software.
- h. Data banking for patient data in terms of duration and back up

Futuristic AI Needs

- a. AI based rapid incorporation of algorithmic medical decision trees needs to be studied for deployment in our set ups
- b. Needful readily available medical & statistical data pathways
- c. AI related professional development programs for medical practitioners
- d. The science of genomics, bioinformatics and links of international and possibly national data repositories can be established.
- e. Family tree linkage analysis can be done.
- f. Enhancement of bio banking by donor directories and transplant medical support services

CONCLUSION

Pursuant to above discussion and reviewing the rapid emergence of tele health platforms paving way to AI support in clinical care pathways, we can anticipate a revolution in conventional medicine. Timeliness, knowledgeable decisions along with dedicated efforts are the need of time to remain compatible with peers, being cost-effective and taking multi-disciplinary clinical care to bed site for better patient outcomes. Requisite data repository links and IT support under the umbrella of country owned regulatory guidelines will not only economize efforts but will pave way for better and healthier Pakistan.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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