

Telemedicine for Reach, Education, Access, and Treatment: Structural Analysis of the Pilot Data

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Abstract

Background: Tele-health Centre at AIIMS Bhopal was established in January 2012 with the help of Information Technology Group and Department of Community and Family Medicine. High bandwidth connectivity was ensured through National Knowledge Network and Bharat Sanchar Nigam Limited that is the current provider of '104' telephone service free to the patient. **Materials and Methods:** Pilot data of 1000 calls of first phase simple telephonic voice-based service are reported using 3 internet protocol phones. A second phase model has been conceived, its cost analyzed and presented here. This led to designing of a scalable 3-tier system. **Results:** Ninety eight percent calls belonged to 12 clinical domains which include seasonal illnesses (29%), chronic and noncommunicable diseases (15.8%), depression and psychological problems (15%), sexual advises (11%), worried mother (7.5%), women health and sexual symptoms (7%), family planning related advise (5.0%), oro-dental (4.0%), acute illnesses (1.5%), child growth and vaccination (1.2%), critical illnesses (0.8%), and others (2.2%). The total cost of the tele-health center was calculated to be around ₹ 1.2 crores. Cost analysis showed that the cost for consultation provided to AIIMS Bhopal was ₹ 34 for 5 min and free to the caller. **Conclusion:** We identified 12 clinical domains for tele-consultation. The proposed 3 tier tele-health center shall curtail crowd of out-patients resulting in cost savings. Fiber to home enabling video conferencing, image transmission, assisted consultation, e-prescription, SMS, apps-based services and onsite camera-based emergency and disaster management will greatly enlarge its scope. Crank call elimination and cost reduction can be achieved by converting it to pay by caller service.

Key words: Community health call-center, mobile-based community health, mobile voice based tele-health, tele-medicine, voice-based community health out-reach

INTRODUCTION

Telemedicine has evolved over the years. The earliest form of telemedicine was health related material on newspapers, radio, and television. With the advent of communication technology, especially the satellite communications combined with Information Technology (IT), Indian Space Research Organization (ISRO) started its pilot project of telemedicine in 2001.^[1] Telemedicine is a confluence of communication technology, IT, biomedical engineering, and medical science.^[1] With the ambitious project of fiber to the home (FTTH) and fiber to the-x by the honorable Prime Minister of India the concept of tele-medicine has been re boosted.^[2] Although India has made considerable progress in health care delivery, one of the critical challenges now is to overcome the rural-urban inequalities.^[3] It is known that 75% of the qualified doctors practice in urban centers, whereas the vast majority

of India's population lives in the rural areas. This problem can easily be addressed by popularizing telemedicine in a vast way.^[1] Today, doctors are equipped with modern diagnostic gadgetry and molecular laboratories who can also become avid users of high-end IT. Telemedicine can be used extensively for tele-education, tele-training, tele-teaching (webinars), tele-consultation, tele-diagnosis, tele-treatment, E-prescriptions, tele-monitoring, and tele-support in disaster management.^[1] Telemedicine can also be used for outreach health survey, health risk monitoring, data collection, and follow-up.

AIIMS Bhopal has embarked upon an ambitious telemedicine program. In order to enhance and extend the health care delivery to the remotest corners of central India for marginalized urban dwellers, rural families, and the tribal population who may possess a mobile telephone, AIIMS Bhopal has started its voice-based tele-health center to determine its usage. Telemedicine at AIIMS Bhopal has started verbal tools of clinical decision making. Swipe card for directly observed treatments and vaccination, SMS- and mobile-based applications for delivery of health messages and prescription

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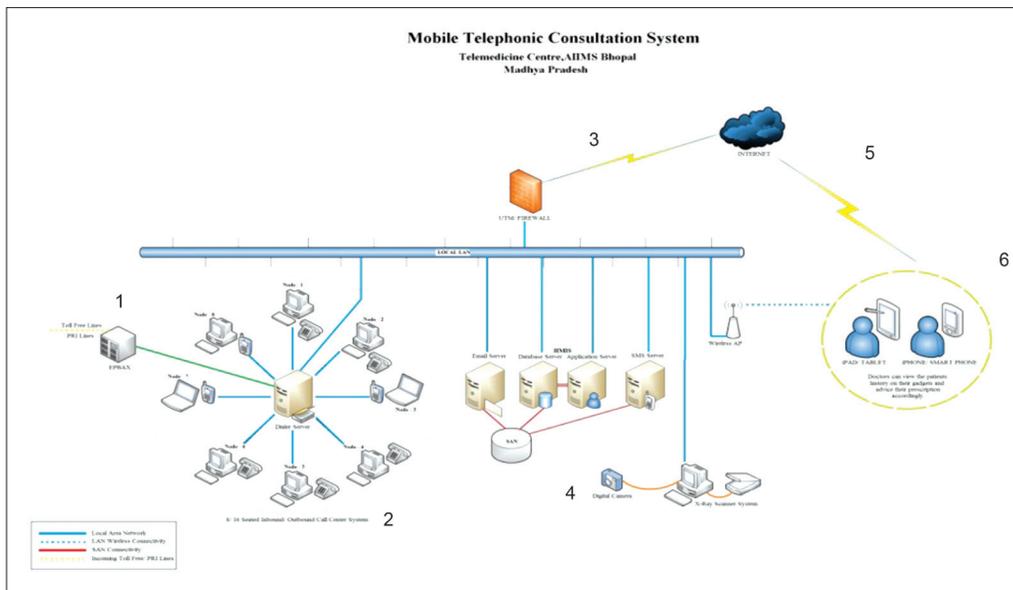


Figure 1: Schematic representation of a mobile telephone consultation system. (1) IPPBX, (2) Callers, (3) Firewall, (4) Storage, (5) Cloud, (6) Specialist on mobile. IPPBX: Internet protocol private branch exchange.

transfer are the other areas of interest that are under research at AIIMS Bhopal.

We present here our preliminary knowledge of establishing a voice based tele-health center. We report the pilot data of 1000 calls in the first phase and its cost analysis. The objective of this manuscript was to sensitize the doctors and public health professionals about the modern IT tools-related to telemedicine which will enrich and complement the existing health care practices. It will also allow a peer review of our telemedicine program at AIIMS Bhopal.

MATERIALS AND METHODS

The tele-health center in AIIMS Bhopal has been established with required hardware and supporting software, networking and application platform with the collaboration of ISRO, National Knowledge Network (NKN) and Bharat Sanchar Nigam Limited (BSNL), State Wide Area Network (SWAN) of Madhya Pradesh. It has been established with the working hypotheses that telemedicine will be effective in; (1) tele-triage and curtail at least 30% footfall of ambulatory patients, (2) tele-consultation of seasonal illnesses, noncommunicable diseases viz.: diabetes, hypertension, rheumatism, depression, sexual problems, growth/vaccination advises in children, women health and family planning and (3) tele-triage of acute and critical conditions.

In the 1st phase, we used 3 wireless local loop BSNL lines initially and later replaced it by Primary Rate Interface (PRI). The PRI Connection has enabled connectivity from all most all service providers in the state. We achieved ISRO satellite connectivity with 16 centers in various districts of Madhya Pradesh and NKN linkages with various medical colleges. The most popular at present, however, is the session initiation protocol '104' BSNL toll free number for simple voice-based

service. This is a cross-sectional pilot study of 1000 typical tele-consultations of 104 facility which was spread over 6 months from May to October 2014. We provided the service on routine office hours 9 am - 5 pm on 5 days a week. We entered all the required data in Microsoft office excel sheet and later analyzed. These calls were not recorded although the disclaimer was announced. The quality of service and patient satisfaction has not been analyzed in this study.

In the 2nd phase, we propose a 3 tier system with 20 node internet protocol (IP) phones. The 1st tier will consist 15 tele-health executives (THEs) consisting nurses and paramedics who will be the first respondents. The remaining 5 nodes will be answered by MBBS doctors tele-health supervisors (THSs) consisting the 2nd tier. Family physicians and other specialists will comprise the 3rd tier who will be on call basis. A community and family medicine faculty as nodal officer of the tele-health center will coordinate the entire process.

In the 3rd phase, the system will be integrated and supported with a scalable platform that will perform several intelligent functions including, recording, filter, diversion, parking, clinical decision support system (CDSS), and conferencing the audio visual calls. All the calls of last 3 years will be recorded. A backup recording system in cloud will be an additional safety measure. Call recording will be utilized not only for conflict resolution but also for training, quality assurance, and research purposes. The caller will receive SMS/E-mail ID after the call for his/her feedback. The details of various attributes of the conceived system are given below.

Hardware [Figure 1]

Internet protocol private branch exchange

It provides audio, video, and instant messaging communication through the transmission control protocol/IP stack for its

internal network and interconnects its internal network with the Public Switched Telephone Network (PSTN) for telephonic communication. It uses voice over IP (VoIP) gateway to manage intranet and help to reduce long distance expenses. It also provides the benefit of advanced computer telephony integration (CTI) features at low cost.

Application server

It provides a generalized approach in creating an interface with the tele-application implementation. The server's function is dedicated to the efficient execution of procedures (programs, routines, scripts) for supporting its applied applications.

Database server

It provides database services to other computer programs or computers, as defined by the client-server model. It is physically kept on a common server.

Network attached storage

It is a file-level computer data storage system connected to a computer network providing data access to a group of clients. Network attached storage systems are networked appliances which contain one or more hard drives, often arranged into logical, redundant storage containers or redundant array of independent disk.

Internet protocol phones

Internet protocol phone uses VoIP technologies for placing and transmitting telephone calls over an IP network, such as the internet or also in intranet, instead of the traditional PSTN.

Unified threat management

It is a solution in the network security industry gained as a primary network gateway defense solution for the organization. It is the evolution of traditional firewall into all-inclusive security product to provide multiple security functions within one single appliance, that is, network firewalling, network intrusion prevention and gateway antivirus, gateway anti-spam, Virtual Private Network, content filtering, load balancing, data leak prevention, and on-appliance reporting.

Network switches

It is also known as a switching hub which is a computer networking device that is used to connect devices together on a computer network using a form of packet switching to forward data to the destination device.

Computer machines

A computer is a general-purpose device that can be programmed to carry out a set of arithmetic or logical operations automatically.

Keyboard, video, mouse

Switches - Keyboard, video, mouse switch allows the user to control multiple computers from one or more keyboard, video monitor, and mouse.

Tape drive

A tape drive is a data storage device that reads and writes data on a magnetic tape. Magnetic tape data storage is typically used for offline, archival data storage.

Software and the platform

Simple telephony is well-known to all. In order to develop a system that will have the artificial intelligence to filter crank calls, distribute and position calls to a desired destination in the right direction are the primary functions of this software called the platform. This part of the platform may be commercially available. However, there are a large number of secondary functions for which customization of the platform has to be done. To enumerate some of the secondary functions are firewall, IP Private Branch Exchange (IPPBX), CTI, management information system, CDSS Software, application server, database server, SMS gateway, bi-lingual multi language support, and E-prescription support. The platform is a dynamic structure and is the backbone of tele-health center. The platform requires a continuous presence and active support of the software vendor for hands on training of the in-house personals for its optimum usage. As the user matures, the platform will require up gradation.

The platform of the software is based on reverse client server architecture, where a single server sits in the center at the hub and the clients sit around the edge, joined to the server via spokes. The server end has open source system software integrated with IPPBX and the client end built on the net platform or other programming languages. It will also support various application programming interfaces that allows multi-dimensional application to get integrated with the system, like conference bridge manager, traffic control communication, dynamic interactive voice response support etc. It should be easily manageable over the web graphical interface with following features, that is, user id creation, authentication, desktop call control, customizable reports, automatic call dialing, call distribution, call conference, call transfer, call blocking, call park, SMS support and report generation etc.

Network

In the region of Madhya Pradesh, AIIMS Bhopal has started its own toll free service number '104'. Its availability has been ensured across almost all the service providers in urban and rural Madhya Pradesh, that is, Idea, Bharti Airtel, BSNL, Vodafone, Aircel, Videocon, Reliance telecom etc. This simple 3 digit '104' toll free service is an opportunity for the underserved areas, where no other resource is available in the health sector. Undoubtedly, this easy access of '104' will overload the system and inundate the provider in future.

Decision making analysis and development of verbal tools; frequently asked questions and disclaimers

The folk terminology for various diseases and symptoms is region and dialect-specific. Standardization and use of this for patient support and care at a Tele-health Center need appropriate training and sensitization of the operational staff. This shall involve engagement of a local linguist of folk and tribal terminologies apart from medical professionals. Verbal tools (leading, open-ended or closed) are powerful clinical structured questions which were the only methods of good old clinical medicine. Telemedicine will revive this fading art of

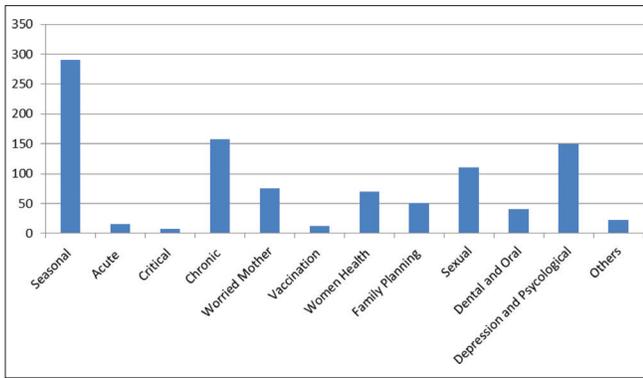


Figure 2: Bar diagram of the frequency distribution of first 1000 tele callers at AIIMS Bhopal in 12 predefined domains of clinical service.

verbal predictive rules and evolve a new chapter in creating an algorithm of making a workable diagnosis for the purpose of tele-triage. It will also remove the ill reputation of the modern physicians over dependence on laboratory-based diagnosis. The CDSS will help the health professionals in making a decision for appropriate treatment of a given condition.

Conflict resolution

An automated self-explanatory disclaimer is given below: *“Dear friends! You are welcome to AIIMS Bhopal Tele-health Centre. Telemedicine is to help you with your initial problem only. It cannot replace your doctor. It cannot examine a patient. It mostly depends upon symptoms elaborated by you. It has a limited scope. If your symptoms are serious, and you are worried or you are suffering for a long time then kindly visit your family physician or a specialist. Our will try to help you as best as possible. There is no liability of a legal action as this is only a preliminary advice to guide you, and it is free to you. This call may be recorded for quality and training purpose. You will receive an E-mail id at the end of this call on which you can send your opinion.”*

Vigorous efforts are required to create new cyber laws to suit telemedicine services for conflict resolutions, SMS applications and E-prescription.

OBSERVATIONS AND RESULTS

The ratio of crank calls versus useful calls was approximately 7:3. The 10 nonhealth related frequently asked questions that were encountered during this period are: (1) What is 104? (2) What are the limitations of “104” community outreach service? (3) Is this facility free of cost? (4) Is there in any online appointment facility available for the OPD registration? (5) Is there is any pick and drop facility available from AIIMS? (6) Can you send the rate chart of all the pathological investigations available in AIIMS Bhopal? (7) Can you provide me the SMS based on the telephonic consultant prescription? (8) Is it 24 × 7 services? (9) Can we get the schedule chart of the doctors in OPD? (10) Is there any accommodation facility available in AIIMS premises, if no then can we have nearest

Table 1: Clinical Domains of ABVS Model

Tele-call generic disease and symptoms based classification	Remarks
Seasonal illnesses (29%) (communicable diseases) GI Respiratory ENT	These include symptoms of cough, cold, abdominal cramps, loose-motion, dysentery, vomiting, earache, sore throat, sneezing, etc.
Acute illnesses (15%) Acute abdomen Acute GI and respiratory infection Breathlessness Others	These include acute abdominal colic, renal colic, acute breathlessness, severe diarrhea and dysentery. In these conditions, patients are fully conscious, oriented to time and place and his pulse and blood pressure, that is, vitals are normal
Critical Illness (life in danger) (08%)	Critically ill where danger is suspected is advised to urgent transfer to nearest medical facility
Chronic and prediagnosed illnesses (noncommunicable diseases) (15.8%) Diabetes Hypertension Rheumatology – aches and pains Neurological Skin problems	The proportion of such callers is likely to increase once senior doctors are available in the 3rd tier of the service. Also, a large number of follow-up patients will use this service
Worried mother (7.5%)	Growth, learning and behavioral problems in children
Vaccination related questions (1.2)	
Women health (7%)	Women were more comfortable with women service providers
Family planning related advice (5%) Women Men	This service is likely to improve once we advertise this more widely
Sexual advises (11%) Women Men	Sexual advises were sought more commonly by men, but women appeared more comfortable seeking these advises telephonically
Dental and oral related problems (4%)	Most of the advice was for dental ache and oral ulcer
Depression and psychological problems (15%)	Clinical psychologists can very well handle this part of tele-health provision
Others (2.2%)	

ABVS: AIIMS Bhopal Voice Service, GI: Gastrointestinal

hotel details along with address details? Leaving aside these nonhealth related issues, we analyzed 1000 tele-consultations and identified 12 major clinical domains where consultation was sought [Table 1 and Figure 2].

Cost analysis – Cost efficacy [Table 2]

A call center of 20 nodes IP phones with the above-mentioned hardware, networking and application platform is likely to cost ₹ 1.2 Crores in. Taking into account of 15 tele health executives (THE) working 8 h or 480 min a day at 10 min per client, one should be able to handle 48 or 50 callers per day or 1500 calls per month or 18,000 calls per year. All the 15 executives can handle 270,000 or approximately 3 lakhs calls per year. An inter-call attrition time of 100% has been taken by reducing

Table 2: Cost Calculation of AIIMS Bhopal Tele-Health Centre

Expenditure head	Monthly expenditure ₹	Yearly expenditure ₹
Nonrecurring		
Establishment/capital cost ₹ 1 crore 20 lakhs discounted in 10 years	100,000	1,200,000
Recurring		
Nurses and paramedics At ₹ 20,000 X 15	300,000	3,600,000
Doctors-2nd tier MBBS qualified at ₹ 50,000 X 5	250,000	3,000,000
Engineers-software In-house support at 30% salary at ₹ 20,000 X 2	40,000	480,000
Office expenses Attendants, stationery and sundry expenses at ₹ 50,000	50,000	600,000
Toll-free calls at ₹ 0.60/min Crank calls × 7 lakhs/year × 1 min	35,000	420,000
Real calls × 3 lakhs/year × 5 min	75,000	900,000
Total monthly and yearly cost	850,000	10,200,000
Cost of 5 min call is ₹ 34 approx.		

the call from 10 to 5 min in the final calculation. Table 1 shows the cost analysis for a public health sector hospital to provide voice-based service using that of AIIMS Bhopal Voice Service (ABVS) model. The same model is easily scalable to a video conferencing unit when the fiber optic connection is available at the caller site. The future call center cost will definitely come down once the platform is developed and standardized.

Budget for the 20 node call center included the salary of 15 tele health executives (THE) and 5 tele health supervisors (THS) working full time. The in-house IT support group will provide part-time service and therefore only 30% of the salary cost of two IT personnel has been included. The office expenses recurring head includes the cost of hiring telephone internet lines, SMS alerts etc. The capital cost of establishment ₹ 1.2 crores or 120 lakhs has been used as ₹ 100,000/month on interest free discounting of 10 years. The budget also includes the cost of creation of the service platform and its continuous maintenance, support, and upgradation for 5 years. Cost calculation has not taken into account the cost of premises, electricity or building related services but a running cost of ₹ 50,000/month has been included on these accounts that may also include the depreciation, maintenance, and instrument up gradation.

DISCUSSION

Indian doctors are popular worldwide. One of the reasons for the popularity of Indian doctors is their traditional compassionate nature. Doctors learn to master their knowledge and clinical decision-making rules over the years. A doctor possessing modern IT gadgets with effective verbal communication

in a convincing tone has a much greater outreach, more cost effective, able to handle larger number of patients with satisfaction and thus able to devote quality time for more complicated cases that require direct consultation and procedures. There are a large number of IT professionals are available in India who can be engaged easily. Another strength of India is its satellite connectivity and fiber network.^[1] The Prime Minister's announcement of FTTH program will give further fillip to telemedicine services in India.^[2] Role model doctors and health care providers need to be convinced to take out that little extra time and effort to acquaint themselves with these new gadgetries. The bigger challenge, however, is to develop systems within the existing health care delivery facility.

There is a foot fall of thousands of patients in public sector hospitals in the outpatient departments. It is a common knowledge that an average consultant and his team of resident doctors usually see 100–150 patients or more in a busy OPD daily. Half of these patients are follow-up cases or asking for dose titration or simply getting their prescription renewed. Despite this heavy burden, information regarding OPD morbidities are not routinely collected and used in healthcare planning. Dharmaratne *et al.* (Srilanka 2012) reported that the total outpatient visits in public sector hospitals are estimated to be more than 80 million, 4 times the total population of 20 million in Srilanka.^[4] Though there is no systematic published literature of this kind in India, it will not be much different from that of our neighbor country. Looking at the tele-call profile of ABVS it is evident that a large number of patients can be effectively treated with voice service alone [Table 2]. Rezende *et al.* (Brazil 2013) also mention in their study that out of two hundred and sixty three tele-consultations, treatment was not necessary for 9.8% of patients and tele-consultation prevented the physical referral of patients in 64.2% of cases.^[5] This will allow more time and improve the quality of care for more complicated cases in the OPD. In another study from Australia the 10 most common causes of general practitioner's consultation were hypertension (5.7%), immunization (4.2%), upper respiratory tract infection (3.3%), depression (2.9%), diabetes (2.3%), lipid disorder (2.1%), general check-up (1.9%), osteoarthritis (1.7%), back complaint (1.7%), and prescription request (1.6%).^[6] Telemedicine bridges the distance gap as it can be accessed by people in remote corners by dialing a phone. It is the ready reckoner of knowledge and access to a competent specialist. Tender delivery of medical advice by a compassionate good communicator and experienced physician can reduce the void of touch and feel of physical examination to some extent. Telemedicine is exhibiting a U-turn towards the good-old-clinical-medicine using verbal tools and developing new clinical prediction rules. If combined with picture and image transmission (video conferencing) it can be virtual consultation. Video consultation can be further enhanced by on-site presence of a paramedic or doctor. Telemedicine can be used extensively for tele-education, tele-training, tele-teaching (webinars), tele-consultation, tele-diagnosis and tele-treatment. Tele-consultation, health parameter-monitoring, tele-triage of

disaster management, emergency treatment using a camera mounted ambulance service and E-prescription are the areas of interest of several institutions world-wide.

American College of Emergency Physicians in Telemedicine reports a large number of usages in a variety of circumstances and it also describes how information gaps are readily fulfilled by telemedicine.^[7] Disease specific telemedicine at the behest of specialists has paid high dividends. Self-management of rural diabetes patients and empowered self-care was reported In USA.^[8] In another study, remote monitoring as opposed to hospital-based monitoring was used in patients with implantable cardio defibrillator. Remote monitoring allowed new standard of care and it found that 62% of notifications on telemedicine were of no clinical significance avoiding visit to the cardiologist.^[9] In rural Bangladesh, remote monitoring of malaria detection and follow-up was reported to be highly effective using mobile telephone alone.^[10] In ambulatory postoperative low risk follow-up of surgical patients a mobile application was used for home monitoring and it reduced the cost in each patient by few hundred dollars. This was cost effective both from societal and health care system perspective. It is well-known that mental problems are extremely common in armed forces posted in borders and remote areas. USA used “mHealth” for the military troops by military surgeons very successfully. The Telemedicine Advanced Technology Research Centre, the Military Operational Medicine Research Program, United States Army Medical Research and Material Command and The National Centre for Tele-health and Technology are heavily investing in the “mHealth” program.^[11] Yet another use of IT is to monitor rural vaccination program. Using automated text messages to monitor adverse events following immunization is a general practice in Australia which had shown that 70% patients responded by SMS permitting cost saving in vaccination monitoring.^[12] In heterogeneous population study of multilingual tool for facilitating the primary-specialty care interface in low resource settings, the MSF (*Médecins Sans Frontières*) Tele-Expertise System was developed in English, French, and Spanish to support the field workers in 41 countries in Europe.^[13] Telemedicine can be used in advanced formats of image transmission for long distance specialist consultation. A trans-Pacific tele-ultrasound image transmission of fetal ultrasound of central nervous system structures including video clips has been done between Brazil and Australia.^[14] Mobile based service reported from Haryana has shown high acceptability with 2.7 minutes of average call duration and two third calls seeking medical advice. A high degree of satisfaction was reported.^[15]

All India Institute of Medical Sciences Bhopal is an up-coming institution with an ambitious program of telemedicine and tele-health center. This facility will also be an effective tool for undergraduate and nursing teaching programs. The soft-phone audition has already been transmitted in the classroom and used as an effective method of teaching. Structured verbal assessment of the clinical situation and its further confirmation has become a new found textbook material. Several verbal

tools in the common domains of tele-consultation can also be developed. Specifically employed tele health executives in the 1st tier and tele health supervisor doctors in the 2nd tier will be given adequate training. Continued presence of senior faculty members in the tele-health center will not be required once the platform will be available in their respective office.

A cost of ₹ 34 for 5 min (₹ 6.80 for 1 min) consultation has been calculated at 100% attrition allowing 5 min inter-call wastage time. Once the platform is developed, further expansion of tele-health center can be done at the marginal cost of hardware of computer nodes with soft telephones and networking. If we calculate the cumulative time saved by both the caller and the doctor this price seems to be worth spending. Similar to the line of Indian Railways “139” service the crank calls can be nearly eliminated by shifting from a toll free service to a normal tariff service paid by the caller. In that case, the cost to the provider will be negligible. If tele-call does indeed save physician’s precious time and achieve reducing OPD attendance this cost can be further reduced by offsetting the cost of direct consultation. Cost of travel to hospital can be saved by the patient.

Telemedicine has gathered a reputation of a nonstarter and a nonviable business proposal on cost-benefit basis. Its role as a mediator between 2 beneficiaries has not yet been explored in a big way. A dotcom telemedicine company as go-between the client seeking medical advice and doctors wooing business may be a successful business model. The strength of ABVS model is its capacity to train and captivate a medical human resource and sustain the activity as a parallel to its busy out-patient department. It is envisaged that the tele-health center will be the fore-runner of the health services provided by the All India Institute of Medical Sciences Bhopal in the near future. The applications and scalability of telemedicine are numerous and can be elaborated in a magical manner. The day may not be far away that several aspects of telemedicine will be within the grab of a 5-inch mobile handset at both ends. Telemedicine may soon emerge as useful as automated teller machine of banks cutting the hour long agonizing wait in OPD. However, the current perceived threat by none other than physician’s response to take telemedicine seriously can be overcome by continued advocacy, efficient connectivity, and online payment services. Availability of the technology in the physician’s own chamber will go a long way to establish efficient telemedicine services.

CONCLUSIONS

Tele-health Center at AIIMS Bhopal in its proposed full phased 3 tier system is likely to curtail out-patient crowd by 30%. In the 1st phase of its voice-based service the most common health related domains for which consultation was sought were; seasonal illnesses (29%), chronic and noncommunicable diseases (15.8%), depression and psychological problems (15%), sexual advises (11%), growth and vaccination advises in children 87 (8.7%). At this point of time cost analysis revealed

₹ 34/for 5 min consultation to the provider (AIIMS Bhopal) and nil to the caller. This price will definitely come down with more and more calls with its popularity and accessibility. Crank call elimination and hence the cost reduction can easily be achieved by converting it to pay by caller service. The larger goal is to develop facility of video conferencing assisted consultation, e-prescription, SMS- and apps-based service, image transmission, and onsite camera based emergency and disaster management. The time is not far away when anybody in the central India can consult AIIMS Bhopal Tele-health Centre at his will true to the spirit of “Health for all by 2025” can be really achieved soon.

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