Mini Review Paper

Health IT in Indian Healthcare System: A New Initiative

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Abstract

The purpose of this paper is to assess the current status of information system specifically in the areas of health sector, role of health information technology (HIT) and its importance in improving the delivery of health care services; to assess the challenges/issues faced and future recommendation to improve the status of health IT in India. Secondary data is used. Various articles and research papers published in national and international journals are used. India is hub of IT and its use is increasing in health sector. Currently HIT is used through electronic health records (HER); telemedicine; digital health knowledge resource; hospital information management system; e-learning technologies, health informatics etc. Health Inter Network India project was designed to access the impact the IT in health. Various challenges and issues are involved with the use of information technology such as non availability of internet facility in all the geographical areas, absence of policy, guidelines and standards, lack of proper infrastructure and competent human resource. On the basis of the current status and challenges associated with Health IT, some recommendations are suggested such as formulation of policy, standards and guidelines to maintain the quality, improve the government funding to improve the current infrastructure, purchasing and installing technology and recruiting the competent staff or train existing health staff.

Introduction

Technology is the making, usage and knowledge of tools, machines, techniques, crafts, systems or methods or organization in order to solve a problem or perform a specific function[1]. Information technology (IT) concerned with the use of technology to treat information whereas health information technology describe the comprehensive management of health information across computerized systems and its secure exchange between consumers, providers, government and quality entities, and insurers[2,3]. Health information technology (HIT) is viewed as the most promising tool for improving the overall quality, safety and efficiency of the health delivery system[4]. Broad and consistent utilization of HIT will improve health care quality; prevent medical errors; reduce health care costs; increase administrative efficiencies; decrease paperwork and expand access to affordable care[3].

According to World Health Organization (WHO), health technologies are developed to solve health problem and improve the quality of lives[5]. It can help in collection, storage, retrieval, and transfer of information electronically. Several studies show that health sector uses less IT on the whole comparison to other industries. But in last decade its use has been increased in health care system. Health information technology can prevent medical errors, reduce health care costs and also lead to expansion of accessible health care[3].
IT in health sector can be utilized in three broad categories: i. Improving the execution of health system by improving the

management of information and access to that information; ii. Improving the health care delivery through better diagnosis, better mapping of public health threats, better training and sharing of knowledge among health workers; and iii. Improving communication about health, including improved information flows among health workers and the general public, better opportunities for health promotion; and improved feedback on the impact of health services and interventions[3].

Current Status of Health it in India

India is hub of IT and IT enabled service industry. Use of HIT is very less in India. It is often used by big pharmaceutical companies, corporate hospitals and other private health sector. But public health sector is far behind in its utilization. In past decade, health insurance has grown very rapidly which uses IT in collecting, analysis and transferring information when needed.

Currently electronic health records (EHR); telemedicine; digital health knowledge resource e.g. digital medical library; hospital information management system; e-learning technologies; health sciences and public health informatics etc uses information technology.

Role of Health Information Technology in India

Health and Hospital Information System: Hospital and healthcare information systems are viewed as the most controversial area. Most of the hospitals in the country

especially public hospitals and health facilities uses manual process and avoid the use of IT. Patient's record and its timely availability can affect the quality of health delivery. Currently, the major software application areas for information systems in the modern healthcare organizations are: patient admission and registration (data collection, form production, census management); patient/payer accounting (patient service pricing, patient billing and insurance or other claims, electronic data interchange, payer logs); medical records management (assignment of a medical record number, chart location and completion monitoring, procedure and diagnosis coding and transcription processing); general financial management; patient care management; department clinical management (laboratory systems, pharmacy systems, radiology systems, operating room systems); outpatient management; decision support (budgeting system, cost accounting system; financial modeling system, case-mix analysis systems, market analysis systems, productivity management systems); management reporting; office automation and specialty systems (critical care system, imaging devices). Automation can help hospitals to meet the challenges of modern health care delivery. Although a large number of products are available in the market, the major players in this field are CDAC, Wipro, TCS and Siemens Information Systems Ltd (SISL)[6,7,8,9].

Electronic Health Record: Electronic health record (EHR) systematically collect electronic health information about individual patients or population. It record information in digital format which can be shared across different health care settings. EHRs may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal information like age and weight, and billing information[10].

Digital Health Knowledge Resource: Digital health knowledge resource is a concept where contents are stored in digital format e.g. digital medical library in which information are collected and stored in digital formats and accessible by computers. A health or medical digital library is designed to assist physicians, health professionals, students, patients, consumers and medical researchers in finding health and scientific information to improve, update, assess or evaluate health care. Medical libraries are typically found in hospitals, medical schools, and private industries and in medical or health associations. It has several advantages. It can be accessed at any point of time and from any location where internet facility is available. It needs little space for storage. The cost of maintenance is much lower than that of a traditional library. Digital libraries are user-friendly interfaces, giving clickable access to its resources. To handle the growing volume of electronic publications, new tools and technologies have to be designed to allow effective automated semantic classification and searching[10,11,12].

E-learning Technologies and Applications in Health Sciences: E-learning is transfer of skills and knowledge electronically. E-learning applications and processes include web-based learning, computer-based learning and digital collaboration. Content can be any form of text, image, animation, streaming video and audio which can be delivered through the internet, intranet/extranet, audio or video tape, satellite TV and CD-ROM. CBT (Computer-Based Training), IBT (Internet-Based Training) or WBT (Web-Based Training) have been used as synonyms to e-learning. Various public health courses are running on e-learning from various public and private institutions (such as National Institute of Health and Family Welfare, Institute of Health Management Research, Indira Gandhi National Open University etc) which are beneficial for the students who want to make their career in the area of health sector as very few institutions are available in India providing education on health related subjects[10,13].

Telemedicine: Telemedicine is essentially an application of information and communication technologies which uses a combination of hardware and software and transmit signals for the exchange of valid information between the care provider and the receiver for diagnosis, treatment and prevention of diseases and injuries, using the internet network. The technology is also useful in medical education and training of doctors and paramedical staff located in remote locations in the country. Desktop computer with a webcam and a microphone at both ends is sufficient for basic telemedicine services. For transmitting live data to the other end, several peripheral equipments like electronic stethoscope, microscope and computed tomography (CT) scan can be connected. A basic telemedicine facility may not cost more than 6 lakh and an advanced facility can be created within 20 lakh. To run this application high-speed internet connectivity is essential. Satellite-based internet connection can be used in the places where wire connection will take long time to reach. Private hospitals like Apollo Hospitals, Aravind Eye Hospitals, Narayana Hrudayalaya etc are using this technology on a bigger pace to help people to access their services at distant locations[8-10,14].

Public Health Informatics: Public Health Informatics has been defined as the systematic application of information and computer science and technology to public health practice, research, and learning. The scope of public health informatics includes the conceptualization, design, development, deployment, refinement, maintenance, and evaluation of communication, surveillance, and information systems relevant to public health. It requires the application of knowledge from numerous disciplines, particularly information science, computer science, management, organizational theory, psychology, communications, political science, and law. Its practice must also incorporate knowledge from the other fields that contribute to public health (e.g., epidemiology, microbiology, toxicology, statistics, etc.). SAPPHIRE (Health care) or Situational Awareness and Preparedness for Public

Health Incidences and Reasoning Engines is a semantics-based health information system capable of tracking and evaluating situations and occurrences that may affect public health[10,15,16].

Successful Health Information Technology Projects in India: CDAC, an autonomous government IT organization has developed the first HIS software in collaboration with Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow in 1997 which has been implemented at SGPGI and GTB hospital, New Delhi. GRAMSAT (rural satellite) programme of Indian Space Research Organization (ISRO) has been applying its space technology into healthcare. Apollo's Telemedicine Initiatives: Apollo has been set up Rural Telemedicine Centre in the village of Aragonda of Andhra Pradesh. The Mercury software for telemedicine was developed in collaboration with CDAC as part of Research and Development. Tele-cardiology has been performing by Asia Heart Foundation and Escort Heart Institute & Research Center. Shankar Nethralaya at Chennai and Meenakshi Eye mission at Madurai have launched Mobile Tele-ophthalmology service, with the support of ISRO. Africa Medical and Research Foundation (AMREF) telemedicine project is improving its clinical outreach program with the help of telemedicine. Sustainable Access in Rural India (SARI) program of Tamil Nadu state has provided wireless Internet connections to some 8000 people in more than 50 villages. This involved public, private, and academic collaboration and helped local service providers in operating local tele-center. Aravind Eye Hospital provides online eye consultations. Operators are trained to take pictures of eyes and e-mail them to hospital doctors. Based on these images, doctors can make a preliminary diagnosis and recommend various courses of action. South African researchers are using mobile phone technology that improves adherence to HIV and TB treatments. Mobile phones are being used in South Africa by 80 counselors to support people living with HIV to follow the treatment plan for their anti-retroviral drugs and text messages are helping TB patients remember to take their drugs. Similar technology has been developed by a small company in Cape Town.

The Health Inter-Network India Project

Health Inter-Network (HIN) project was launched in 2000. This pilot project was designed to document and assess the impact of Information, Communication and Technology (ICTs) on the flow of reliable, timely, and relevant information for health services provision, policy making, research, and to evaluate and better understand the challenges for improving the flow of and access to relevant health information in developing countries.

Challenges in Implementing health Information Technology

India is a hub of IT but still its utilization is very less in health sector. Several studies have documented the challenges faced in implementing information technology especially in health

sector. Major constrain is lack of accessibility as internet connectivity is not available in all geographical areas especially in rural areas. Non availability of comprehensive policy on HIT which results in absence of standards, guidelines and quality control mechanism. Cost is one important aspect which is mainly incurred in purchasing and installation of technology, improving the infrastructure to support IT. Most of the staff working at health institutions lacks basic knowledge of computers. Government arranged several courses timely to make human resource competent [17].

Conclusion and Recommendations

IT has a role in all the sectors. Health sector is also applying IT applications but its usage is very less. To expand the utilization of HIT several actions need to be taken. Firstly, policy, standards or guidelines need to be formulated to maintain and control the quality. Government funding need to be improved in such areas which can result in availability and improvement in current infrastructure, purchasing and installing technology, recruiting the competent staff or train existing health staff. To make the health staff competent government should arrange training programmes or courses to enhance their computer skills as well as partnership can be done with the private sector for conducting such training.

References

1. Wikipedia of technology, Last assessed 02/02/2012 **(2012)**

2. Wikipedia of information technology, Last assessed 02/02/2012 **(2012)**

3. Wikipedia of health information technology, Last assessed 02/02/2012 **(2012)**

4. Basit Chaudhry; Jerome Wang; Shinyi Wu; Margaret Maglione; Walter Mojica; Elizabeth Roth; Sally C. Morton; Paul G. Shekelle., Systematic Review: Impact of Health Information Technology on Quality, Efficiency and Costs of Medical Care, Improving patient care, *Annals of Internal Medicine,* **144(10),** 742-752 **(2006)**

5. http://www.who.int/eht/eht_intro/en/index.html: last assessed on 02-02-2012 **(2012)**

6. DeLuca Joseph M. and Doyle Owen, Health Care Information Systems: An Executive's Guide for Successful Management, American Hospital Publishing, Inc., **(1991)**

7. Lun K.C., The Role of Information Technology in Health Care Cost Containment., *Singapore Med J.,* **36,** 32-34 **(1995)**

8. Mishra S.K. Current Status of E-Health in India. http://openmed.nic.in/1265/01/skm12.pdf; last assessed on 02-02-2012 **(2012)**

9. SK Mishra, Lily Kapoor, Rajesh Basnet, Kartar Singh., Current Telemedicine Infrastructure, Network, Application in India http://www.stbmi.ac.in/matter/international%20pub/20_Current%20Telemedicine%20Infrastructure,%20Network,%20Applications%20in%20Indiafinal.pdf; Last assessed on 02/02/2012 **(2012)**

10. Health Information Technology- A New Initiative: FICCI; Last assessed on 02/02/2012 **(2012)**

11. http://en.wikipedia.org/wiki/Electronic_health_record; Last assessed on 02/02/2012 **(2012)**

12. http://en.wikipedia.org/wiki/Medical_library; Last assessed on 02/02/2012 **(2012)**

13. http://en.wikipedia.org/wiki/E-learning; Last assessed on 02/02/2012 **(2012)**

14. Sharma Arun Kumar; Telemedicine: A New Technology in Waiting, *IJPH,* **55(4),** 286-288 **(2011)**

15. http://en.wikipedia.org/wiki/Public_health_informatics; Last assessed on 02/02/2012 **(2012)**

16. Yasnoff William A, O'Carroll Patrick W., Koo Denise, Linkins Robert W., Kilbourne Edwin M., Public Health Informatics: Improving and Transforming Public Health in the Information Age., *Journal of Public Health Management and Practice,* 67-75 **(2000)**

17. Kuruvilla Shyama, Dzenowagis Joan, Pleasant Andrew, Dwivedi Ranjan, Murthy Nirmala, Samuel Reuben and Scholtz Michael., Digital bridges need concrete foundations: lessons from the health internetwork India, *BMJ,* **328,** 1193-1196 **(2004)**