INFORMATION TECHNOLOGY ON NURSING PRACTICES IN INDIA: A THEORETICAL PRESPECTIVE

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ABSTRACT

In this Article to study the impact of Information Technology (IT) on Indian nursing practices in a private and government hospitals. Numerous advances in technology during the past decade require that nurses not only be knowledgeable in nursing science but that they also become educated in information technology (IT). Perioperative IT has the potential to improve the quality of health care, reduce costs, decrease medication administration errors, reduce time spent on paperwork, increase management efficacy, patient care and allow affordable access to health care. Nursing knowledge is needed for designing, implementing, and updating software, including an electronic healthcare. With the support of information data, nurses will be able to develop best practices for patient care and support research for evidence-based practice. When a standardized terminology, such as the Perioperative Nursing Data Set, is incorporated into an information technology, consistent documentation can be shared among systems. With advances in technology, perioperative nursing roles are expanding in relation to Information Technology requirements and nurses are pursuing additional education. In addition to traditional methods, e-learning is an effective way to provide ongoing technological education. The paper also highlights the purpose and the extent of use of IT in nursing practices.

KEYWORDS

Nursing Informatics, Health Informatics, Nursing Practices, E Healthcare etc.

INTRODUCTION

Information Technology has revolutionized the way of living. It has changed the economy, political structure, industries, financial markets and culture. Health care sector is also not far behind in opting for information technology as they have come to realize the importance of information required for timely decision making. Nursing is one of the most rewarding professions, but is also one of the most challenging and exhausting professions both physically and emotionally. Advances in technology in nursing are indeed helping to make life easier for nurses. It is good to remember that, in our high tech world, the human touch cannot be substituted. Nursing is about combining the art of caring with the science of health care. While the safe use of technology may reduce human error, humans still need to program, input data and ensure the proper outcome. This safeguard also protects the job security of the nursing profession. Physicians need to make accurate and fast decisions every day with best utilization of resources available to them. With the help of existing Information Technology technologies and developing new ones at the same time, accurate information is being made available to the decision makers so that treatment and service provided to patients will be faster, safer, affordable, and cost effective and resources employed for these services will be used efficiently.

Nurses are expected to provide safe, competent and compassionate care in an increasingly technical and digital environment. With the development of computers and evolution of internet, Information Technology has had a positive impact on health care delivery system worldwide, particularly in the areas of disease control, diagnosis, and patient management and teaching. Technology will not soon be replacing nurses. Under Health Informatics umbrella Nursing Informatics is a contrasted area, which means intersection of the information science, computer science and Nursing science with Technology in India,

NURSING INFORMATICS

Access and attitudes to information technology by nurses have been demonstrated by others to be affected by a number of factors including: geographical location; age of the nurse; length of time in nursing; level of position; and employment sector. Analysis of the current data was undertaken using all these factors. Health care is an information intensive industry, in which quality and timely information is a critical resource.

Computer systems are used within most health care entities such as pharmacies, general medical practices, pathology and radiology services and hospitals. However many of the information exchanges between health care providers are still paper based with the attendant inefficiencies of data entry, the difficulty of sharing paper based records between clinicians, loss of the physical record, difficulties in reading handwriting, the potential for error, and the difficulties in extracting information from large paper files.

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Health and nursing information science is the study of how health care data is acquired, communicated, stored, and managed, and how it is processed into information and knowledge. This knowledge is useful to nurses in decision-making at the operational, tactical, and strategic planning levels of health care.

Figure-1
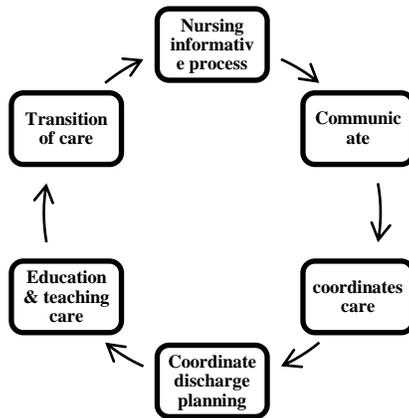
Sources: Authors Compilation

Information systems used in health care include the people, structures, processes, and manual as well as automated tools that collect, store, interpret, transform, and report pact practice and management information. The realization that health care data and information can be effectively managed and communicated using computer systems, networks, modems and telecommunications has catalyzed the emergence of the science of nursing informatics.

Nursing informatics process support is accomplished with information structures, information processes, and information technology like (i) Communicate (ii) coordinates care with ALL other clinical disciplines (iii) Coordinate discharge planning, (iv) Education & teaching, (v) Transition of care, Manages ALL information related to the nursing process and patient.

In hospitals, information systems support patient administration, billing and finance; staff roistering and human resource management; and departmental management, such as pathology, medical imaging and pharmacy. Clinical systems, including systems to support the specific needs for nursing care, are less common. Its benefits for in the practice of professional nursing and in the delivery of patient care in the healthcare continuum.

NURSING HEALTH INFORMATICS

Health Informatics (HI) defines how health information is technically captured, transmitted and utilized. New technology can be an integral part of medicine, and health informatics is no exception. Healthcare informatics is the science that underlies the fusion of health care, information technology, and business administration, and guides into all aspects of the patient health experience, including clinical care, nursing, pharmacy and public health. Not only does healthcare informatics focus on the implementation and optimization of the information systems that support clinical practice, it creates the infrastructure that connects and enables the flow of critical information to and from each of the stakeholders in a patient's care.

Health care informatics is the rapidly developing scientific field that deals with the storage, retrieval and use of biomedical data, information and knowledge for problem solving and decision-making. Biomedical and Health informatics are related fields. Health Informatics deals with four major interdisciplinary components; emerging technologies, epidemiology and health management, advanced statistics and health systems. Nursing involves taking care of patients suffering from all sorts of physical and psychological maladies. Nurses constantly have to monitor the condition of these patients and administer prescribed medicines at regular intervals. They also assist doctors and help set up medical equipment in operation theatres and clinical laboratories. They also assist the doctors in telling the medical condition of patients.

Furthermore, nurses assist people who are unable to lead a normal life due to one reason or another. They assist patients who are recovering from illness. Other than these general activities, nurses can acquire specialization in a particular area such as cardiac care, intensive care, orthopedics, pediatrics and so on. Nurses also have to keep abreast with the latest technological developments in the field of medicine.

NURSING HEALTH INFORMATICS FORUM

As knowledge expands and requires better management, role of I.T in health care can only become more important. India has a large number of trained I.T professionals (doctors, and nurses etc.,) and is in a position to leverage its Brainpower to take Health informatics to new heights. Health informatics can also help nurses attain Health rights for all in many ways (lower costs, better quality, better-informed patients, etc.). Few points about Use of Health Informatics in India as well as the various educational courses available within India. The Three major uses of Health informatics in India:

- For better training of Health care professionals (includes Doctors, Nurses, Paramedical and Non-medicals) - e-learning for improved delivery of high quality health care services to the remote areas like Telemedicine, EMRs, CDSS.
- To bring about a transparency in public health care delivery system (e-governance) - Public participation

The three major obstacles to Health Informatics in India:

- Inadequate Skills of health care personnel / others,
- Inadequate Physical infrastructure
- Inadequate access to I. T. (Digital divide).

The Three major Post Graduate Health care Informatics courses in India:

- Med varsity online P.G Diploma in Medical Informatics, associated with Apollo group of Hospitals.
- Amrita Institute of Medical sciences MSc / P.G. Diploma in Medical Informatics at Kochi, India.
- Post Graduate Programs at BII (Bioinformatics Institute of India), Noida, with good Industry integration.

The Three short online courses for Medical Informatics in India:

- eHCF School of Medical Informatics, Delhi provides Certificate course in medical informatics
- IAHI online course on Health Informatics
- BII provides various online/distance educations courses in Health care Informatics

Nursing Informatics, as an Independent speciality is not launched in India, It is a self -directed and independent endeavor, which can be achieved through online courses from other developed countries. So in India Programmes that offers basic and further education in Nursing informatics is needed to provide easy access for motivated Nurses in India. Indian Nurses use computers in Health care delivery but not for Nursing care delivery. National and State Nursing Councils and Associations have to support for Nursing Informatics to develop and grow in India.

HEALTHCARE INFORMATIVE

Health informatics or medical informatics is the intersection of information science, computer science and health care. It deals with the resources, devices and methods required to optimize the acquisition, storage, retrieval and use of information in health and biomedicine. Health informatics tools include not only computers but also clinical guidelines, formal medical terminologies, and information and communication systems. Health information technology (Health IT) allows comprehensive management of medical information and its secure exchange between health care consumers and providers.

The healthcare industry is one of the biggest spenders on IT across the globe but despite the IT revolution in India the use of IT in healthcare is confined to peripheral functions. Currently the IT investment in Government run hospitals and private hospitals is negligible may be 3 to 7 per cent of the overall hospital infrastructure budgets. However, the experts predict that the growth rate of IT in healthcare is going to be 15 to 20 per cent CAGR.

The Internet has made healthcare more accessible, interactive, and highly useful. Telemedicine, picture archiving and communication systems (PACS), and healthcare information systems (HIS) are a few of the many IT applications in healthcare. Telemedicine, a good combination of medicine and modern technology, is also raising new hopes in health care. Telemedicine means providing medical assistance at a distance with the help of Information and communication Technologies. Telemedicine is a method by which patients can be examined, monitored and treated, while the patient and doctor are located in different places. The patient's reports can be sent via text, voice, images or even video and medical advice offered from a remote location.

The Tele-health segment is growing at a rapid pace and requires professionally qualified people to support this segment. Currently, there are a few institutes in India providing courses in Telemedicine like Centre for Development of Advanced Computing(CDAC), Mohali, School of Telemedicine and Biomedicine Informatics, Lucknow, the Apollo Telemedicine Networking Foundation in a tie up with the Anna University and Tamil Nadu Dr. MGR Medical University. There are several institutes and universities running a course in Medical Informatics like Medvarsity; Amrita Institute of Medical sciences, Kochi; Bioinformatics Institute of India, Noida; eHCF School of Medical Informatics, Delhi; and Indian Academy of Health Informatics, Delhi.

NURSING PRACTICES

Many emerging technologies will change the practice of nursing in the coming decade. Seven are discussed here; genetics and genomics; less invasive and more accurate tools for diagnosis and treatment; 3-D printing; robotics; biometrics; electronic health

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records; and computerized physician / provider order entry and clinical decision support (See Table-1 for a discussion of the benefits and challenges of each).

Table-1: Seven Emerging Technologies that Are Changing the Practice of Nursing

Technology	Benefits	Challenges
Genetics and Genomics	The majority of disease risk, health conditions and the therapies used to treat those conditions have a genetic and / or genomic element influenced by environmental, lifestyle, and other factors therefore affecting the entire nursing profession (Calzone et. al, 2010).	Many nurses currently in practice know little about genetics and genomics, lack the competence needed to effectively counsel, and teach patients in this regard.
Less Invasive and More Accurate Tools for Diagnostics and Treatment	Non-invasive and minimally invasive tools for diagnostics and treatment generally result in lower patient risk and cost.	The rate at which noninvasive and minimally invasive tools are being introduced makes ongoing competency regarding their use a challenge for nurses.
3-D Printing	Bio-printers, using a "bio-ink" made of living cell mixtures can build a 3D structure of cells, layer by layer, to form human tissue and eventually human organs for replacement (Thompson, 2012).	Healthcare is just beginning to explore the limits of this technology. There are limits to the materials, which can be used for printing, and materials science is a laggard in 3D printing (Nusca, 2012).
Robotics	Robotics can provide improved diagnostic abilities; a less invasive and more comfortable experience for the patient; and the ability to do smaller and more precise interventions (Newell, n.d). In addition, robots can be used as adjunct care providers for some physical and mental health care provision.	More research is needed on comparative effectiveness of robotics and human care providers. Many healthcare providers have expressed concern about the lack of emotion in robots, suggesting that this is the element that will never replace human caregivers.
Biometrics	Biometrics increases the security of confidential healthcare information and eliminates the costs of managing lost passwords.	The measurement of biometric markers may occur in less than ideal situations in healthcare settings and in a rapidly changing workforce, cost may become an issue.
Electronic Healthcare Records (EHR)	Healthcare providers have access to critical patient information from multiple providers, literally 24 hours a day, 7 days a week, allowing for better-coordinated care.	Implementation costs, getting computers to talk to each other and debates about who "owns" the data in the EHR continue to challenge its required implementation.
Computerized Physician/Provider Order; Entry (CPOE) and Clinical Decision Support	CPOE and clinical decision support fundamentally change the ordering process resulting in lower costs, reduced medical errors, and more interventions based on evidence and best practices.	The introduction of CPOE and clinical decision support requires providers to alter their practice. Resistance is common due to the time spent on order entry. Implementation and training costs are often significant.

Sources: Huston, C., (May 31, 2013) "The Impact of Emerging Technology on Nursing Care: Warp Speed Ahead" *OJIN: The Online Journal of Issues in Nursing* Vol. 18, No. 2, Manuscript 1.

In 7 stages, the hospital no longer uses paper charts to deliver and manage patient care and has a mixture of discrete data, document images, and medical images within its electronic medical record environment. Clinical data warehouses are used to analyze patterns of clinical data to improve quality of care and patient safety and clinical information can be readily shared via standardized electronic transactions with all entities within an integrated delivery system, or a health information exchange. Furthermore, there is a continuity of data flows for patients between the inpatient, emergency department, and outpatient service modalities.
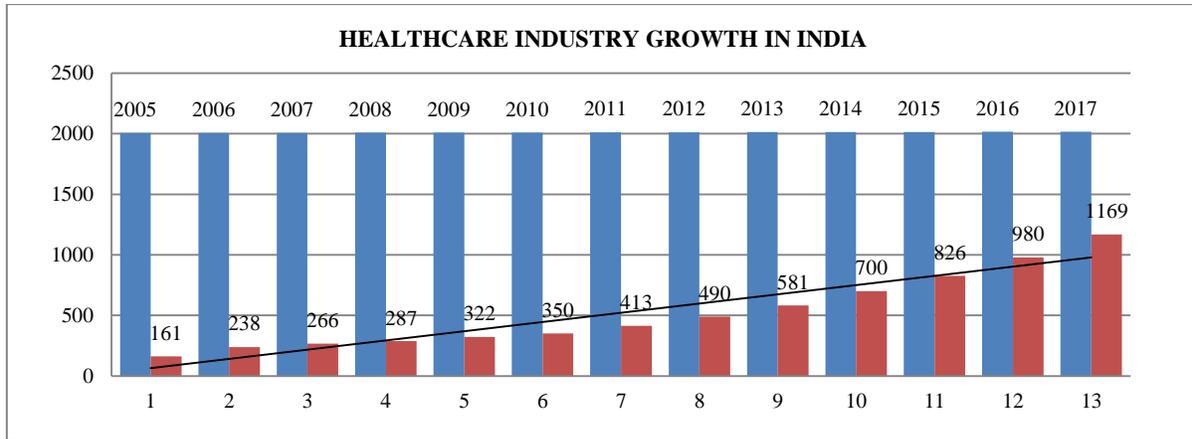
E-HEALTHCARE

Healthcare industry in India is rapidly emerging as one of the key industries that are driving economic growth in India.

It is expected to grow from SEK 161 billion (USD 23 Billion) in 2005 to SEK 1169 billion (USD 167 billon) in 2017, thereby witnessing an annual average growth of around 17%-18% per annum. Major factors that are likely to drive this growth include growing population improving health insurance penetration, increasing disposable income, government initiatives and focus on Public Private Partnership (PPP) models.

Below chart depicts the growth in the Indian healthcare industry during 2005-2017
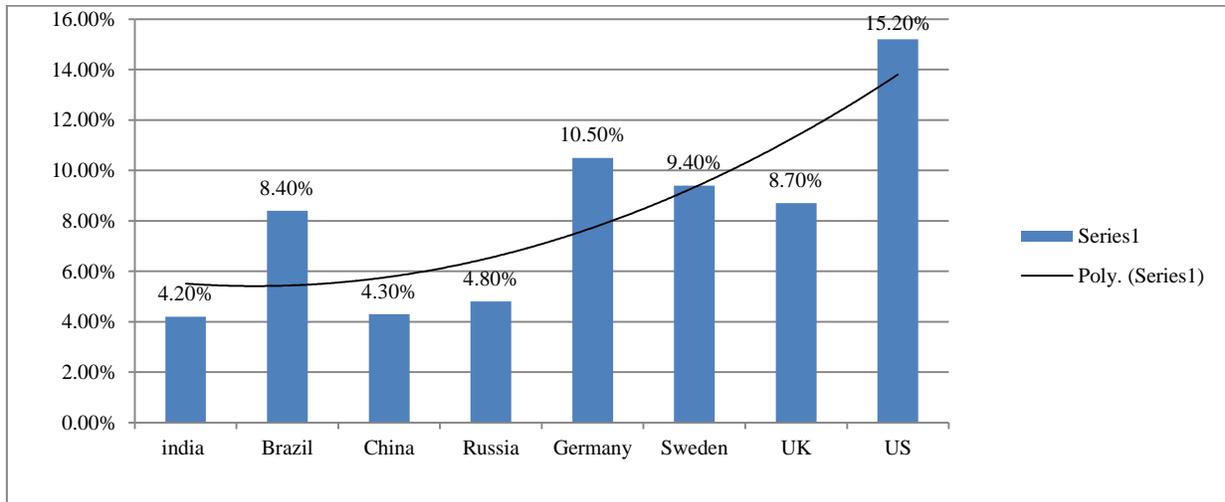
Graph-1

Sources: STC Analysis, Hospital Market - India by Research on India, Arnaca Research

GOVERNMENT SPEND ON HEALTHCARE

According to the WHO's World Health Statistics 2011, the Indian government spends around 4.2% of GDP on healthcare. Although growing, the expenditure is relatively low as compare to other countries as depicted in the chart below:

Graph-2

Sources: STC Analysis, Hospital Market - India by Research on India, Arnaca Research

A considerable portion of this expenditure is undertaken through various programs including National Rural Health Mission (NRHM), National Vector Borne Disease Control Program (NVBDCP) etc. Because of this, the county has improved its ranking on a number of health parameters including maternal and child mortality rates, life expectancy etc. Nurses are using new, innovative technology to help them with many of basic nursing procedures such as passing NG tubes, inserting Foley catheters, caring for chest tubes and other drainage devices. This technology provides student nurses with many learning experiences they might never have in their clinical rotations. Consequently, their skills are improved, but this technology does not provide the physical and emotional response nurses will encounter and have to work with in real world circumstances. The overall health care market in India is about $150 billion. However, the way internet penetration and awareness about health care is increasing in India, the e-health care services would grow at a very healthy rate. Nearly 80% of physician's reside in urban areas leaving only 20% of doctors to address the health and treatments needs of rural population in India. People staying in rural areas usually have to travel long distance to reach a doctor even for most basic healthcare services.

An Indian government understands these inherent problems in delivery of healthcare services to all and has taken several initiatives including development of supporting infrastructure, which includes internet and satellite connectivity, development of special software etc. Therefore, the telemedicine market in India is likely to witness an average growth of around 20% per annum thereby growing from SEK 50 million at present to around SEK 124 million by 2016. Along with the Ministry of Health and |Family Welfare, Department of Information Technology, Indian Space Research Organization, and Centre for Development of Advanced Computing are the major public sector entities involved in telemedicine and e-health projects in the country. Major opportunities are available in the form of provision of enabling solution and technologies i.e. devices and better software for integration of satellite telemedicine centers with nodal super speciality hospitals.

There are also possibilities that medical institutions from both countries collaborate and consult each other for critical requirements and special cases. The government is also in the process of starting an e-healthcare service that will intensify health awareness in the country. E-healthcare services include helping people contact and interact with good doctors, buying medicines and taking e-prescriptions. On the private front, Apollo Hospitals group, Columbia Asia and Narayana Hrudayalaya are among the leading players providing telemedicine services in India. Despite significant advantages, lack of infrastructure in rural areas, illiteracy and existing consumer behaviour of patients requiring human touch are among the major factors hampering widespread deployment of telemedicine technologies in India.

CONCLUSION

At present, nursing informatics is an emerging field of study. National nursing organizations support the need for nurses to become computer literate and versed in the dynamics of nursing informatics. We are at a transition period. Becoming educated in nursing informatics is, for the most party, a self-directed and independent endeavor. Programs that offer basic and further education in nursing informatics are beginning to spring up around the globe, but many more are needed to provide easy access for motivated nurses. They may also make recommendations as to how to improve the processes and uses of computer programs in order to improve patient outcomes. For this reason, many nurse informaticists work as consultants. Other nurse informaticists work in an administrative capacity, and contribute to decision-making on medical information technology. Some nurse informaticists educate nurses on how to effectively enter medical information into a computer system, as well as train nurses how to use new technology.

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