NURSING INFORMATICS

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INTRODUCTION

- The term informatics was derived from the French term informatique which means to refer to the computer milieu (Saba, 2001).
- The Healthcare Information and Management Systems Society (HIMSS) defines informatics as "the discipline concerned with the study of information and manipulation of information via computer-based tools" (2006, p. 44).

Nursing informatics (NI) is the integration of computer science and information systems into the practice of nursing. It aims to boost the efficiency of data management and communication in the healthcare field and in so doing, is revolutionizing the field of nursing. The following resources are links to nursing organizations, catalogs of nursing schools and articles detailing the development of this dynamic new field of nursing informatics.

Discovery

Nursing informatics was not discovered so much as it has evolved. Computers and information are used in every area of our lives, including healthcare. Nurses are the largest group of healthcare workers. The emergence of nursing informatics as a specialty was inevitable. As early as the 1600s when the first hospitals came into being, nurses used available technology, including the earliest patient monitoring devices, to interpret data and plan patient care.

Groundwork

In the 1800s, mathematical reasoning, early engineering and analytical thinking was ahead of what could physically be manufactured in the

world. In the 1930s, the first computers existed, but were not yet ready for practical applications. By the 1980s, computers began showing up in hospitals and healthcare centers for basic use. Lab tests could be ordered by computer and results retrieved. It was no longer necessary for a messenger to carry a written paper result to the patient unit for interpretation. The nurse caring for the patient could look at his/her lab results and plan to care more efficiently.

Complications

Computerized information came into use quickly in healthcare. It was seen as an efficient and cost effective way to streamline care, but there were some problems. In 1992, The composite healthcare system at walter reed army medical center was criticized for mixing up information. Doctors orders, prescriptions and patient records were 'bungled.' The system was tested and upgraded extensively and redeployed to store and retrieve millions of patients' information in 2003. Certainly, this was not an isolated circumstance. The early systems took practice as healthcare workers became accustomed to using computers for handling information every day.

Education and Specialties

Nursing informatics specialists are required to be registered nurses (RN). At first, nurses learned to use informatics as they worked and as technology dictated. In some settings, this is still the case, but some subspecialties have emerged. With them, additional educational opportunities are also available. Nursing schools use computers as part of their curriculum so exposure to some degree of informatics comes with a basic education. Nurse programmers are those who develop computer programs for use by other nurses. Nurses who work as IT support and training of others are another example of a branch of informatics. Some NI specialists work for vendors to demonstrate systems to potential buyers and others manage information and computer systems for whole facilities. The demand for nursing informatics specialists continues to grow.

Future

Healthcare changes rapidly. Nursing informatics will watch the climate for parallel change, paying attention to population demographics and to emergent technology to adapt as needs dictate.

INFORMATICS

Everyone resists change—unless it is their idea! Yet change is what computers represent to many healthcare professionals, who liked and trusted the paper system they have been using for so long. It does not help that using computers in the healthcare system has been given the hifalutin term informatics.

In most hospitals today, nurses, respiratory therapists, physical therapists, occupational therapists and other clinicians use a computer to record patient information they have collected in the course of providing care. Increasingly, they do it at the same time they are giving that care, before they move on to the next patient encounter (even, perhaps, before they leave the room). Most busy professionals find that this saves steps, errors of memory and that precious commodity, time.

Technically speaking, *healthcare informatics* is a blend of clinical science, computer technology and information management; it involves the collection, storage, retrieval and use of information for the purpose of providing care, solving problems and making decisions (American Nurses Association, 2006; Thede, 2003). When functioning optimally, this potent combination of resources can make input easier and access readily available to other members of the healthcare team. In addition, it can potentially support cost negotiations and public health data gathering, among many other things.

Informatics is essentially the science and out of turning data into information.

The term informatics can be traced back to a Russian document published in 1968 and was derived from the French term informatique, referring to the 'computer milieu'.

Informatics is defined as *computer science + information science*. Used in conjunction with the name of a discipline, it denotes an

application of computer science and information science to the management and processing of data, information and knowledge in the named discipline. Thus we have, medical informatics, nursing informatics, pharmacy informatics and so on.

Healthcare informatics has been defined as, "the integration of health sciences, computer science, information science and cognitive science to assist in the management of healthcare information".

Healhcare informatics may be decided into specialties like:

1. Medical informatics.
2. Health informatics.
3. Dental informatics.
4. Nursing informatics.

Medical informatics refers to information technologies that concern patient care and the medical decision-making process.

Health informatics refers to educational technology for healthcare clients or the general public .

Nursing informatics refers to electronic information combined with nursing and any aspect of clinical practice, administration, research or education (Guenther, 2006).

Hebda (1998), defines nursing informaticsas "the use of computers technology to support nursing, including clinical practice, administration, education and research."

American Nurses Association (ANA) in 1994 has defined *nursing informatics* as "the development and evaluation of applications, tools, processes and structures, which assist nurses with the management of data in taking care of patients or supporting the practice of nursing."

Graves, J. R., & Corcoran, S. (1989). The Study of Nursing Informatics. Image: Journal of Nursing Scholarship, 27, 227-231. define nursing informatics as "a combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care."

Definitions of Nursing Informatics

A review of definitions of nursing informatics makes apparent three themes for analysis (revised from those suggested by Turley)—information technology–oriented, conceptually oriented, and role-oriented definitions.

Information Technology-oriented Definitions

The earliest series of definitions for nursing informatics highlighted the role of technology for what was a new specialty in nursing. An early definition by Scholes and Barber stated that nursing informatics was "the application of computer technology to all fields of nursing—nursing service, nurse education and nursing research."

Ball and Hannah modified an early definition of medical informatics, acknowledging that all healthcare professionals are part of medical informatics. Therefore, nursing informatics was "those collected informational technologies, which concern themselves with the patient care decision-making process performed by healthcare practitioners." Shortly after this, Hannah continued the emphasis on technology and added the concept of the nursing role within nursing informatics.

The use of information technologies in relation to those functions within the purview of nursing and that are carried out by nurses when performing their duties. Therefore, any use of information technologies by nurses in relation to the care of their patients, the administration of healthcare facilities or the educational preparation of individuals to practice the discipline is considered nursing informatics.

Hannah et al continued with their original definition for nursing informatics and Saba and McCormick provided this new definition:

The use of technology and/or a computer system to collect, store, process, display, retrieve and communicate timely data and information in and across healthcare facilities that administer nursing services and resources, manage the delivery of patient and nursing care, link research resources and findings to nursing practice and apply educational resources to nursing education.

Conceptually-oriented Definitions

A shift from technology—focused definitions to more conceptually oriented definitions began during the mid 1980s. However, this approach did not gain acceptance until nearly 1990.

Schwirian: Schwirian moved away from technology and stressed the need for a "solid foundation of nursing informatics knowledge (that) should have focus, direction, and cumulative properties." She emphasized the need for informatics research to be "proactive and model-driven rather than reactive and problem-driven."

Graves and Corcoran provided the first widely cited definition downplaying the role of technology and incorporating a more conceptually oriented viewpoint.

A combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care.[4]

Turley analyzed previous nursing informatics definitions and then proposed a new nursing informatics model. Turley's major contribution was the addition of cognitive science to a model comprising the original three sciences proposed by Graves and Corcoran. Cognitive science includes such topics as memory, problem solving, mental models, skill acquisition, language processing and visual attention. These concepts can help informatics nurse specialists understand the decision-making and information processing done by nurses and subsequently, assist in the creation appropriate tools to support nursing processes. Therefore, cognitive science is most helpful to informatics nurse specialists concentrating on informatics issues related to users, such as decision making and the construction of computer interfaces for nurses.

Role-oriented Definitions

In the late 1980s, informatics nurse specialists were becoming more prevalent. Individuals were bootstrapping themselves into jobs related primarily to the insertion of computer technology into healthcare settings. The early information technology definitions suited these individuals, because the definitions emphasized the technology aspects of their job descriptions.

As nursing informatics gained recognition as a nursing specialty, the Council of Computer Applications in Nursing, of the American Nurses Association (ANA) provided a new definition for the field.

A specialty that integrates nursing science, computer science, and information science in identifying, collecting, processing and managing data and information to support nursing practice, administration, education and research and to expand nursing knowledge. The purpose of nursing informatics is to analyze information requirements; design, implement and evaluate information systems and data structures that support nursing and identify and apply computer technologies for nursing.

In 1994, the ANA modified their definition in an effort to legitimize the specialty and guide efforts to create a certification examination.

Nursing informatics is the specialty that integrates nursing science, computer science and information science in identifying, collecting, processing and managing data and information to support nursing practice, administration, education, research and expansion of nursing knowledge. It supports the practice of all nursing specialties, in all sites and settings, whether at the basic or advanced level. The practice includes the development of applications, tools, processes and structures that assist nurses with the management of data in taking care of patients or in supporting their practice of nursing.

The Value of Nursing Informatics

- Increase the accuracy and completeness of nursing documentation
- Improve the nurse's workflow
  - Eliminate redundant documentation
- Automate the collection and reuse of nursing data
- Facilitate analysis of clinical data
- Nursing informatics promotes and facilitate. Access to resources and references for nurses and the entire interdisciplinary team in both clinical and administrative settings
- Benefits for nurses and the interdisciplinary team:
  - Support for their mission to deliver high quality, evidence-based care
  - Support for better service by facilitating true interdisciplinary care
  - Promotes improvement in key relationships with physicians, peers
  - Interdisciplinary care team members, patients and families.

- Benefits in the administrative setting
  - Support for cost savings and productivity goals
  - Facilitate change management.

Goals of Nursing Informatics

- It is to improve the health of populations, communities, families and individuals by optimizing information management and communication. This includes the use of technology in the direct provision of care, in establishing effective administrative systems, in managing and delivering education experiences, in supporting lifelong learning and in supporting nursing research.
- Nursing informatics centers on the concepts of data, information, knowledge and wisdom.
- Nursing informatics is a specialty that integrates nursing science, computer science and information science to manage and communicate data, information, knowledge and wisdom in nursing practice.
- Nursing informatics supports consumers, patients, nurses and other providers in their decision-making in all roles and settings.

Scope of Standards of Nursing Informatics Practice—ANA (2000) (Fig. 2.1)

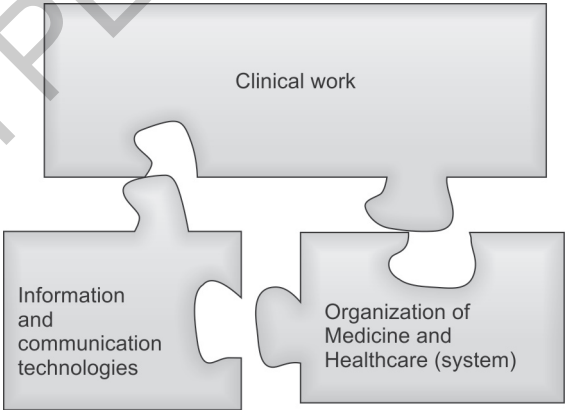

Fig. 2.1: Three domains needing an 'Effective Fit'

Medical Informatics Vs Nursing Informatics

Medical informatics represents more of an umbrella term for the management of health and medical information. Nursing informatics is one area of the wider field of medical informatics. Nursing informatics applies just to specific functions of nursing, but medical informatics applies to various fields, including pharmacy, biomedical applications, public health, dentistry and clinical care, as well as nursing.

Medical informatics represents the way that computer science, information science and healthcare merge together to work toward optimization of the medical system. Medical informatics allows healthcare professionals to better access information and analyze it. The idea is to use technology to streamline different aspects of medicine and health and create a better picture of what needs to be done for patients. Medical informatics creates an information architecture that is easier to access and provides patients and their healthcare providers with a more comprehensive picture.

Medical informatics seeks to integrate medical records with what is going on right now. Additionally, the idea is to help in sending information more widely—and uniformly. Medical informatics, with its architecture, makes it possible to update medical records in real time, providing electronic records that can be accessed easily. Allowing patient information to be easily shared amongst different physicians and members of a healthcare team.

It is also possible to combine biological information with computer science and information technology. Medical informatics makes it possible for machines to connect with each other, meaning that heart monitors and other vital monitors transmit real time information. Images from magnetic resonance imaging (MRIs) and X-rays can be shared instantly, with no need to go to the lab. Lab results can also be conveyed quickly, to healthcare providers in any part of the hospital or clinic. Medical informatics creates a system that lets information flow freely and is accessible quickly.

Another aspect of medical informatics is the use of mobile devices to enhance patient care. This includes mobile phones, tablet personal computers (PCs) and mobile medical stations. Doctors, nurses, lab techs and other healthcare professionals are able to interact

with each other quickly and easily with the help of mobile devices. Medical informatics makes it possible to get information so that decisions can be made at the point of need, with the patient, more quickly. Diagnostic tools are part of the mobile medical informatics architecture.

Nursing Informatics

The main point of nursing informatics is to use technology to enhance patient care and nursing practice. Nursing informatics is a narrower, specialized field inside of the wider medical informatics. Nursing informatics represents the way that nurses utilize technology in their daily duties. This includes using the latest developments to help make nursing more modern and efficient, while still providing excellent personalized patient care. Indeed, with nursing informatics, it is often easier to give the proper individualized patient care because the vital statistics that nurses need are often right at their fingertips.

Nursing informatics is a way of keeping patient information properly organized. Technologies, including tablet computers and mobile devices, can help nurses keep up with what they need. Integrated systems allow nurses to make notes that everyone can access, meaning that each change of shift runs smoothly, and time is not taken up with trying to convey information. All nurses have the information immediately. Nursing informatics can also help with dosing instructions, staff assignments, and lab results. The idea is that technology and information should be easily accessible to nurses so that they can do a better job of caring for their patients.

Another function of nursing informatics is to help to create care plans. Using biometric data, by monitoring patients with special devices that send signals to nurse technology devices, it is possible to create care plans and tweak them as necessary. Nursing informatics makes use of the information coordinated by technology to help nurses make better decisions. With the help of technology, changes to care plans are immediately viewable to other nurses and members of the care team, and it makes it easier to track the progress of patients.

Nursing informatics is the use of information and technology specifically to help nurses more effectively do their jobs.

Informatics Nurse Specialist (INS)

An RN with formal, graduate education in the field of informatics or a related field and is considered a specialist in the field of nursing informatics.

Informatics Nurse (IN)

An RN with an interest or experience working in an informatics field. A generalist in the field of informatics in nursing.

Sciences Underpinning Nursing Informatics

- Nursing informatics is a combination of nursing science information science and computer science to manage and process nursing data information and knowledge to facilitate the delivery of healthcare.
- The combination of sciences creates a unique blend that is greater than the sum of its parts, a unique combination that creates the definitive specialty of NI.

Computer and information science applied in isolation will have less impact than when they are applied within a disciplinary framework.

Nursing skill need related to informatics and technology:

- Use information and communication technology to document and evaluate patient care, advance patient education and enhance the accessibility of care
- Use appropriate technology to assess and monitor patients
- Work on an interdisciplinary team to make ethical decisions regarding the application of technologies and the acquisition of data
- Adapt the use of technologies to meet patient needs
- Teach patients about healthcare technologies
- Protect the safety and privacy of patients in relation to the use of healthcare and information technologies
- Use information technologies to enhance one's own knowledge base.

Challenges of Managing Health-related Informatics and Technology

- Confidentiality of client health information
- Ethics related to new therapies
- Evaluating the quality of information
- Information security
- Potential health and personal problems from too much technology.

Our Future

- Technological advances are advantageous only if nurses find them useful and learn how to use them
- Nurses may tend to focus on machinery rather than persons
- Information overload.

CONCLUSION

Clearly, IT proliferation in healthcare will increasingly challenge nurses to communicate, share and synthesize data. Nurses who can use computer hardware, software, terminology and operating systems will be able to harness the power and efficiency of computer systems in enhancing care delivery and shaping nursing practice.

The time has come for healthcare to leave the manual tools of the past and turn to the enablers of the 21st century. The nursing profession is being transformed to meet the needs of the new world and will be a major player in the revolution.

When speaking about uses of computers in hospitals, we can say, need of advanced healthcare technology. In previous days when patients had to repeatedly tell the nursing staff about their illness and history of medical reports. This has happened because of adapting the uses of computers in hospitals for keeping the record of the same. Among the uses of computers in the medical field, this article will emphasize more on the contribution of computers in hospitals.

NURSING INFORMATICS

Salient Features

- A comprehensive textbook
- Student-oriented presentation
- Covers recent advances in the field of nursing practicals
- Presents nursing informatics in a simplified, up-to-date and easy-to-follow format
- Based on undergraduate (UG) and postgraduate (PG) nursing students level
- As per Indian Nursing Council (INC) syllabus of MSc (Nursing) and PhD (Nursing) courses
- Perfect teaching guide for teachers
- Prepared systematically in a logical manner
- Acts as a guideline regarding various aspects of nursing education, nursing service, nursing administration and nursing research.

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