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Nursing Informatics/ Information Management: Review

Nursing Knowledge Tree
An Initiative by CBS Nursing Division

UNIT OUTLINE

- Nursing Informatics and Information Management
- Patient Records (Computerized Patient Records)
- Electronic Nursing Records
- Role of Computers in Nursing
- Telemedicine
- Telenursing
- Electronic Medical/Health Records

NURSING INFORMATICS AND INFORMATION MANAGEMENT

Health care is delivered in a dynamic, complex, and ever-changing environment. Changes in medical treatments, regulations for federal and state reimbursement and public knowledge create growing demands for information. The computer has moved from “nice to know” luxury item to “need to know”. On average, medical/surgical nurses spend 34% of their time handling information.

Informatics comes from the French word “Informatique”, which means “computer science”. Informatics is defined as computer science + information science. Nursing informatics is a field of nursing that incorporates nursing, computer, and information sciences to maintain and develop medical data and systems to support the practice of nursing, and to improve patient care outcomes. Technologies that have evolved due to health care/nursing informatics include:

- Computerized provider order entry (CPOE)
- Electronic medical records (EMRs) (Test results, progress notes, nursing notes, and medication records)

There are three “building blocks” of nursing communications—data, information, and knowledge. Data includes direct observations that do not need interpretation, such as the patient’s name, age, vital signs and disease history. Information is data that has been interpreted. Examples include the prevalence of hospital-acquired infections, by care unit, percentage of patient care delays in outpatient clinics, by specialty. Knowledge is the amalgam of information to identify relationships that provide further observation on an issue. For example, the effect of nurse-patient ratios and patient outcomes. Developing care protocols (i.e., anaphylactic reaction protocols, pressure ulcer protocols, etc.)

While nurses incorporate all three communication “building blocks” in their daily routines, the three concepts are also stored in computer programs and software to assist health care providers across the continuum to provide high-quality, safe patient care.

Nurse informaticists work to develop communication and information technologies in health care. They also serve as educators, researchers, software engineers, and chief nursing officers. Using the “building blocks” listed above, they help develop evidence-based policies and procedures for organizations.

Definitions

Nursing informatics is a combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information, and knowledge.

—Graves and Corcoran, 1989

Nursing informatics is defined as the use of computer technology to support nursing, including clinical practice, administration, education, and research.

—Hebda, 1998

Nursing informatics is defined as the development and evaluation of applications, tools, processes, and structures that assist nurses with the management of data in taking care of patients or supporting the practice of nursing.

—American Nurses Association (ANA), 1994

Nursing informatics is the integration of nursing, information and information management with information processing and communication technologies to support health efforts.

—ICN, 2006

Nursing informatics is a specialty that integrates nursing sciences, computer science, and information science to manage and communicate data; information, knowledge, and wisdom in nursing practice.

—ANA, 2008

Nursing informatics is the application of computer technology in all fields of nursing, nursing services, nurse education, and nursing research.

—Scholes and Barber, 1980

Dimensions of Nursing Informatics

Nursing informatics is using technology, research, and professional experience to manage nursing data, information, and knowledge to improve practice and deliver better health care (Fig. 1).

Data: Data are discrete observations that are not interpreted, organized or structured.

Information: Information is the data that can be interpreted, organized or structured to give meaning to the data. Information is an essential phenomenon of study for an information-based discipline such as nursing.

Knowledge: Knowledge is the synthesis of the information to identify the relationship that provides further insight into the subject area.

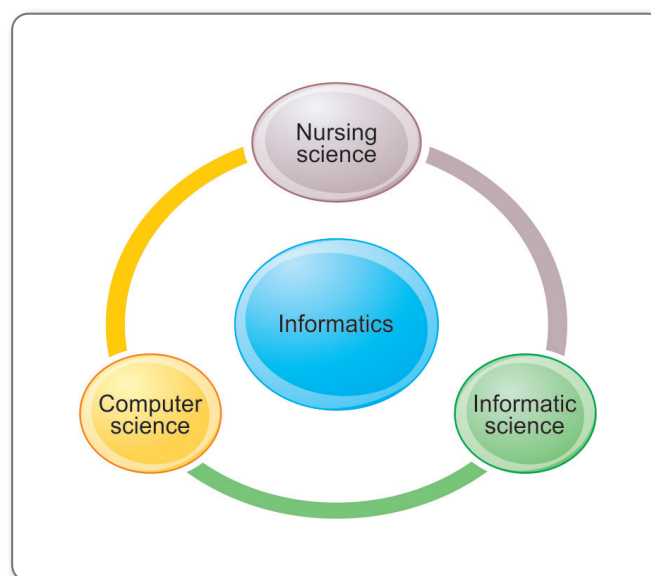


Fig. 1: Dimensions of nursing informatics

Historical Development of Nursing Informatics

- Healthcare began to use computers in the 1950s.
- Computers, in this era, were typically used in the business office.
- In the 1970s, nursing began to realize the importance of computers to the nursing profession and became involved in the design, purchase, and implementation of information systems.
- 1977—the first Nursing Information System Conference was held in the United States.
- In the 1980s, medical and nursing informatics specialties emerged.
- October 1995—the first ANA certification examination in Nursing Informatics was given.
- The post-2000 era saw an unprecedented explosion in the number and sophistication of both computer hardware and software.
- Telemedicine became possible and was recognized as a specialty in the late 1990s.
- 1999—a study was performed to identify International Standards for health information and their adaptability in the Philippines referred to as “Standards of Health Information in the Philippines, 1999 ver. (SHIP99).
- 2003—Master of Science in Health Informatics was proposed to be offered by UP—Manila College of Medicine (major in medical informatics) and the College of Arts and Science (major in bioinformatics) and was later approved to be offered to start the academic year 2005-2006.
- The Technology Informatics Guiding Education Reform (TIGER) Initiative was established in 2006 in the United States to develop key areas of informatics in nursing.
- 2008—Nursing Informatics course in the undergraduate curriculum was defined by the Commission on Higher Education (CHED).
- 2009—Mr Kristian R. Sumabat and Ms Mia Alcantara-Santiago, both nurses and graduate students of Master of Science in Health Informatics at the University of the Philippines, Manila began drafting plans to create a nursing informatics organization.
- 2010—they began recruiting other nursing informatics specialists and practitioners to organize a group that later became the Philippine Nursing Informatics, a sub-specialty organization of PNA for nursing informatics.
- NI has experienced rapid growth in the last 40 years which does not appear to be slowing.

Purposes of Nursing Informatics

- To enhance all aspects of patient care and health management.
- To study the process and structure of nursing information to support clinical decision making and the delivery of nursing care at the micro-level.

- To help in retrieving evidence-based standards of practice, legislation acts, statistical analysis, of the profession of nursing and practitioners of nursing at any given time or interval of time at the macro level.
- To streamline the handling of data. The traditional method of documentation of a nurse was confined to paper and it was difficult to file the massive number of documents.
- Efficient information management to access relevant information.
- To have easy access to sharing vital data within co-workers and other health care disciplines.
- To safeguard personal records of patients while at the same time allowing the easiest possible access to the information for those who need it.
- To develop an information-sharing network and data handling standards to work nationally and worldwide.

Applications of Nursing Informatics

- **Nursing clinical practice:**
 - Worklists to remind staff of planned nursing interventions.
 - Computer-generated client documentation.
 - Electronic medical record (EMR) and Computer-based Patient Record (CPR).
 - Monitoring devices that record vital signs and other measurements directly into the client record (EMR).
 - Computer-generated nursing care plans and critical pathways.
 - Automatic billing for supplies or procedures with nursing documentation.
 - Reminders and prompts that appear during documentation to ensure comprehensive charting.
- **Nursing administration (health care information system)**
 - Automated staff scheduling.
 - E-mail for improved communication.
 - Cost analysis and finding trends for budget purposes.
 - Quality assurance and outcomes analysis.
- **Nursing education:**
 - Computerized record keeping.
 - Computerized assisted instruction.
 - Interactive video technology.
 - Distance learning—web-based courses and degree programs.
 - Internet resources- formal nursing courses and degree programs.
 - Presentation software for preparing slides and
 - Handouts- power points and MS words.
- **Nursing research:**
 - Computerized literature searching—CINHAL, Medline and web sources.
 - The adoption of standardized language related to nursing terms—NANDA, etc.
 - The ability to find trends in aggregate data, that is data derived from large population groups—SPSS.

- **Patient education:** Nursing informatics can be used for symptom management and patient education. The nurses can access the information for the patient or teach the patient where to find appropriate and helpful information. For example, in an oncology unit, nursing informatics can be used to teach patients effective symptom management of the treatment modalities, which often cause pain, fatigue, and poor nutritional status. Nursing informatics can also aid in other nursing interventions of the oncology nurse, such as analgesic administration and stress-reduction techniques.
- **Clinical alert system:** The computerized clinical alert system can be used in conjunction with the hospital pharmacy. System design is created to alert both pharmacy and health staff when two or more drug prescriptions are incompatible.
- **Patient data:** Nursing informatics can also be useful in a physician's clinic. In a managed care environment, information systems make administrative management more efficient. The private practitioner, program or facility to manage every aspect of patient care can use one data management system. In each of these health care settings, data management systems can be applied to treatments, diagnostics, documentation, practice management, insurance claims and referrals, and protocols as well as treatment and diagnostic results.
- **Telehealth:** Telehealth includes the use of telephones and sophisticated image transmission systems like ECG, faxes and remote camera imaging. Telehealth places the ambulance personnel in touch with the Emergency Department and it also operates to put the generalist "nurses and doctors" at the ED in touch with specialists. Telehealth is used to evaluate the stroke victims while they are in transit so appropriate therapy can be initiated quickly upon arrival at the ED. Similarly, a nurse practitioner in a remote ED might be guided via telephone in the proper procedure for inserting chest tubes so a man with a collapsed lung could be stabilized for subsequent transport to a major hospital. Finally, nursing informatics can be useful for interdepartmental communication such as ordering supplies from a central supply, lab work, etc.

PATIENT RECORDS (COMPUTERIZED PATIENT RECORDS)

Nursing documentation is a vital component of safe, ethical and effective nursing practice, regardless of the context of practice or whether the documentation is paper-based or electronic. The documentation is intended to provide registered nurses (RNs) with professional accountability. Although different documentation systems and technology may be used throughout the province, quality nursing documentation is expected in every area of care or service delivery and every

setting. Nurses must be familiar with and follow, agencies' documentation policies, standards, and protocols. Nurses are subject to increasing scrutiny regarding their record-keeping. Legislations such as the Human Rights Act 1998 and the Data Protection Act 1998 have increased the profile of and access to, health records, while patients are increasingly willing to complain about their care. Whether complaints are resolved by health care providers or settled in court, comprehensive records are essential. It is important, therefore, that nurses keep abreast of legal requirements and best practice in record-keeping. The Code of Professional Conduct (NMC, 2002a) advises that good note-taking is a vital tool of communication between nurses.

Definitions

Documentation is anything written or electronically generated that describes the status of a client or the care or services given to that client.

—Perry, A G, Potter, P A, 2010

Nursing documentation refers to written or electronically generated client information obtained through the nursing process.

—ARNNL, 2010

A computer-based patient record system is a repository of electronically maintained information about an individual's lifetime health status and health care, stored so that it can serve multiple legitimate users. It may be linked with an information management tool to provide clinical reminders, link to knowledge sources for health care decision support and aggregate data for further analysis.

Functional Components of CPR

- **An integrated view of patient data:** Data usually needs to be acquired using interface engines and even mature standards (such as Health Level Seven or HL7 is a set of international standards to support clinical practice including its management, delivery and evaluation.). The data should comprise all details about the care and treatment of patients such as demographic features, laboratory features, radiology features, pharmacy features, bills and finance related aspects, diagnosis and treatment-related aspects including medication and surgical remarks. The data must be accessible to all health care professionals at multiple points.
- **Clinical decision support:** A clinical decision support system (CDSS) is a health information technology system that is designed to provide physicians and other health professionals with clinical decision support (CDS), that is, assistance with clinical decision-making tasks. CDSSs constitute a major topic in artificial intelligence in medicine. This implies that a CDSS is simply a decision support system that is focused on using knowledge management in such a way to achieve clinical advice for patient care based on multiple items of patient data. The main purpose of modern CDSS is to assist clinicians at the point of care. This means

that clinicians interact with a CDSS to help and analyze and reach a diagnosis based on patient data. The CDS may be of two types such as knowledge-based or non-knowledge-based systems. The knowledge-based system operates based on the information or decision-making inputs that are fed in the electronic system. For example, if the drug X is administered to a patient, the drug Y should not be given. The non-knowledge-based system makes use of artificial intelligence to support decision making.

- **Clinician order entry:** Computerized physician order entry (CPOE), sometimes referred to as computerized provider order entry or computerized provider order management (CPOM), is a process of electronic entry of medical practitioner instructions for the treatment of patients (particularly hospitalized patients) under his or her care. The entered orders are communicated over a computer network to the medical staff or to the departments (pharmacy, laboratory or radiology) responsible for fulfilling the order. CPOE reduces the time it takes to distribute and complete orders while increasing efficiency by reducing transcription errors including preventing duplicate order entry while simplifying inventory management and billing.
- **Access to knowledge resources:** This feature can help in the decision making process.
- **Integrated communication support:** This feature allows to confer messages to other members of the treatment team that may be localized elsewhere or when the patient is transferred. Can be used as a tracking tool, e.g., are prescribed orders carried out?

Advantages of CPR

- CPR is flexible.
- The input process may be facilitated if linked to other data storage devices.
- Usable for both individualized patient care, and management needs, plus public health demands.
- Better accessibility than a paper record.
- Better legible, and better organized.
- Interactive control of completeness and accuracy.
- Reusability of data, e.g., in discharge letters.

Disadvantages of CPR

- CPR is costlier.
- The input process must be learned by staff.
- The use of CPR will change workflow, and interaction with patients.
- Conversion from paper to CPR takes time.

Fundamental Issues of CPR

- **Data entry:** It includes data capture, quality of input data, prevention of error in data entry and manual feeding of data.

- **Data display:** The issues related to data display include, flowsheets of patient data, summaries and abstracts. They are only available and dynamic displays.
- **Query and surveillance-related:** Issues in clinical care clinical research, retrospective studies, and administration related queries.

ELECTRONIC NURSING RECORDS

Health records are an important and easily accessible source of healthcare information, and their use has greatly improved with the introduction of electronic health record (EHR) systems. EHRs help create large electronic databases during routine clinical practice, reducing the time, cost, and effort required for data collection. Compared to traditional paper-based methods, electronic systems provide faster processing, better data management, and fewer errors. These large electronic databases are becoming increasingly valuable for effectiveness research and improving the quality of healthcare services.

Nursing documentation is a significant indicator of effective patient care delivery. Documentation can be either paper-based or electronic-based, as per the electronic health records (EHRs), which include all information related to patient care. Regardless of the method of documentation, nursing documentation has to be conducted at the highest standard, to ensure the delivery of safe and high-quality healthcare services. High quality of nursing documentation is expected in every area of care and every setting; it is considered an important responsibility of nursing, to ensure the continuity of effective patient care and to improve patients' outcomes.

Nurses, the largest group of healthcare providers in the healthcare system, play a crucial role in every area of performance improvement in healthcare organizations. The role demands to document and manage patient information through coordinating patient care and communicating with other interdisciplinary team members. It is believed that paper-based documentation does not meet the requirements of high-quality documentation and communication among healthcare providers, because it is time-consuming, repetitive and inaccurate. Problems arise when attempting to obtain information from paper-based records, as it is considered labor-intensive. Health care is built upon and revolves around information. The introduction of electronic health records (EHRs) as a method of documentation is more legible and more accessible.

The increasing amount of data makes managing information difficult to assemble and more importantly, more difficult to provide the best care to patients. Electronic health record documentation has been used by many nurses for documenting nursing care including the nursing process, such as entering orders and accessing laboratory results, as well as supporting healthcare professionals in processing, managing

and communicating data in a variety of settings. It has the potential to improve patients' safety, enhance healthcare professionals' access to a patient's healthcare information, ensure the appropriate use of resources and finally, improve communication among healthcare professionals.

With the transition from paper-based nursing records to electronic nursing record (ENR) systems, nurses have focused on the development and use of nursing databases to accomplish nursing effectiveness research. Despite this, ENR systems that enable nurses to document on-screen virtually all the components of the nursing process (diagnosis, intervention, and outcome evaluation) and store them in databases are still rare.

Functional Components of Electronic Nursing Records

The nursing care of the patients is purely based on the concept of providing a nursing care plan. The electronic Nursing Records ensure accurate recording and recognizing the nursing diagnosis based on the pre-fed guidelines of the system. The elements of ENR are briefed below:

- **Standardized nursing languages:** For the nursing diagnosis component, the North American Nursing Diagnosis Association-International (NANDA-I), nursing diagnoses including defining characteristics (signs and symptoms) and related factors must be incorporated into the Electronic health management System. The Nursing Outcomes Classification (NOC), a comprehensive standardized classification of patient outcomes responsive to nursing interventions, also must be defined to measure patient outcomes.
- **Preparation of nursing care interface:** The Nursing care interface must allow for updating nursing documents by adding, revising, deleting or saving. The nurses can see patients' personal information and medical diagnoses delivered from the clinical data server. The Nursing Care Interface lets nurses: (1) Search and select the nursing process elements from the existing database, (2) Enter free texts of nursing care that do not exist in the depository, (3) Save and print the information, and (4) Review the documented nursing care by patient and date/period. It includes the provision for selecting appropriate nursing diagnoses and setting up the desired goals.
- **Developing the decision support system:** Although the use of Standardized Nursing Languages helps describe the nursing care delivered in a standardized way, developing the decision support system helps prevent errors and duplication. The decision support system includes assistance in the selection of appropriate nursing diagnoses, interventions, and outcomes.
- **Environment of the electronic nursing record system:** The ENR system must be incorporated with the Order

Communication System within the hospital information system. The ENR system is organized as a client/server type, and its database lies within a server.

- **Evaluating the electronic nursing record system:** The system guides nurses to re-evaluate patients' status using the nursing outcomes evaluation screen. This evaluation is available after completing nursing interventions. Because this system allows nurses to assess more than once and shows all results, and thus nurses can document changes in the patient's condition.

ROLE OF COMPUTERS IN NURSING

Computers play a key role in almost every sphere of life. They facilitate the storage of huge amounts of data, they enable speedy processing of information and they possess an inbuilt intelligence. Owing to these unique capabilities, computers function on levels close to that of a human brain. Computers can hence be employed in a wide variety of fields like engineering, data processing, and storage, planning and scheduling, networking, education as well as health and medicine.

- Computers are an excellent means for the storage of patient-related data. Big hospitals employ computer systems to maintain patient records. It is often necessary to maintain detailed records of the medical history of patients. Doctors often require information about a patient's family history, physical ailments, already diagnosed diseases, and prescribed medicines. This information can be effectively stored in a computer database.
- Computers can keep track of prescriptions and billing information. They can be used to store the information about the medicines prescribed to a patient as well as those, which cannot be prescribed to him/her.
- Computers enable the efficient storage of huge amounts of medical data. Medicine comprises a vast base of knowledge. Computer storage can serve as the best means of housing this information.
- Medical journals, research and diagnosis papers, important medical documents and reference books can best be stored in an electronic format.
- Many of the modern-day medical equipment have small, programmed computers. Many of the medical appliances of today work on pre-programmed instructions. The circuitry and logic in most of the medical equipment is a computer.
- The functioning of hospital-bed beeping systems, emergency alarm systems, X-ray machines, and several such medical appliances is based on computer logic.
- Computer software is used for the diagnosis of diseases. It can be used for the examination of the internal organs of the body. Advanced computer-based systems are used to examine the delicate organs of the body. Some of the

complex surgeries can be performed with the aid of computers.

- The different types of monitoring equipment in hospitals are often based on computer programming. Medical imaging is a vast field that deals with the techniques to create images of the human body for medical purposes. Many of the modern methods of scanning and imaging are largely based on computer technology.
- Magnetic resonance imaging employs computer software. Computed tomography makes use of digital geometry processing techniques to obtain 3-D images. Sophisticated computers and infrared cameras are used for obtaining high-resolution images. Computers are widely used for the generation of 3-D images in medicine.
- Computer networking enables quicker communication. In the field of medicine, computers allow for faster communication between a patient and a doctor. Medical professionals sitting on opposite sides of the globe can communicate within minutes employing the Internet. Medical practitioners can discuss medical issues in medical forums.

The importance of computers cannot be stressed enough as computer technology has revolutionized the field of medicine.

TELEMEDICINE

Telemedicine has been defined as the use of telecommunications to provide medical information and services. It may be as simple as two health professionals discussing a case over the telephone or as sophisticated as using satellite technology to broadcast a consultation between providers at facilities in two countries, using videoconferencing equipment or robotic technology. Telemedicine generally refers to the use of ICT for the delivery of clinical care.

Types of Telemedicine

- **Real-time (synchronous):** Real-time telemedicine could be as simple as a telephone call or as complex as robotic surgery. It requires the presence of both parties at the same time and a communications link between them that allows a real-time interaction to take place. Videoconferencing equipment is one of the most common forms of technologies used in synchronous telemedicine. There are also peripheral devices that can be attached to computers, which can aid in an interactive examination. For instance, a tele-otoscope allows a remote physician to 'see' inside a patient's ear; a tele stethoscope allows the consulting remote physician to hear the patient's heartbeat.
- **Store-and-forward (asynchronous):** It involves acquiring medical data (like medical images, biosignals, etc.) and then transmitting this data to a doctor or medical specialist at a convenient time for assessment offline. It does not require the presence of both parties at the same time. Dermatology,

radiology, and pathology are common specialties that are conducive to asynchronous telemedicine. Teleradiology, the sending of X-rays, CT scans or MRIs (store-and-forward images) is the most common application of telemedicine in use today.

Use of Telemedicine

- Telemedicine is the most beneficial for populations living in isolated communities and remote regions and is currently being applied in virtually all medical domains.
- Telemedicine is also useful as a communication tool between a general practitioner and a specialist available at a remote location.
- Telepathology is another common use of this technology. Images of pathology slides may be sent from one location to another for diagnostic consultation.
- The other widely used technology, two-way interactive television (IATV), is used when a 'face-to-face' consultation is necessary. The patient and sometimes their provider or more commonly a nurse practitioner or telemedicine coordinator (or any combination of the three), are at the originating site. The specialist is at the referral site, most often at an urban medical center.

Scope of Telemedicine

- It can make specialty care more accessible to underserved rural and urban populations.
- Video consultations from a rural clinic to a specialist can alleviate prohibitive travel and associated costs for patients.
- Video conferencing also opens up new possibilities for continuing education or training for isolated or rural health practitioners, who may not be able to leave a rural practice to take part in professional meetings or educational opportunities.
- The use of telemedicine can also cut costs of medical care for those in rural areas.

Barriers to Telemedicine

- License related problems. Many states will not allow out-of-state physicians to practice unless licensed in their state.
- Many private insurers will not reimburse, the cost of medical service.
- Lack of appropriate telecommunications technology.
- Lack of funding for developing state-of-the-art telemedicine infrastructure.

Need for Telemedicine in India

The health of a nation is the product of many factors and forces that combine and interact. Economic growth, per capita income, literacy, education, age at marriage, birth rates, information on health care and nutrition, access to safe

drinking water, public and private health care infrastructure, access to preventive health and medical care and health insurance are among the contributing factors. The advances in Medical science, biomedical engineering on one side and Telecommunication and Information Technology on the other side are offering wide opportunities for improved health care.

Despite making huge strides in overall development, the health coverage to the majority of our population is still a distant dream. India is a vast country gifted with rich and ancient historic background and geographically nature has provided India with all the varieties like the mountain regions like Ladakh, deserts, green planes and far-flung areas in the northeast and offshore islands of Andaman's and Lakshadweep.

India today has more than 1 billion population and there is a finite limit of elasticity in providing health care in terms of infrastructure, facility, the manpower, and the funds. Wide disparities persist between different income groups, between rural and urban communities, and between different states and even districts within States.

Further, this is compounded by the following factors like high cost of health care and lack of investment for health care in rural areas. Inadequate medical facilities in rural and inaccessible areas is due to the problem of retaining doctors in rural areas where they are required to serve and propagate widespread health awareness. Specialist doctors cannot be retained in rural areas as they will be professionally isolated and become obsolete and even monetary incentives also cannot prevent it.

A recent survey by the Indian Medical society has found 75% of a qualified consulting doctor practice in urban centers and 23% in semi-urban areas and only 2% from rural areas whereas the majority of the patients come from rural areas. Hospital beds/1000 people are 0.19 in rural and 2.2 in urban areas. This calls for innovative methods of utilization of science and technology for the benefit, of our society and telemedicine assumes a great significance to revolutionize the health care system in India.

TELENURSING

Telenursing is the use of telecommunications technology in nursing to enhance patient care. It involved the use of electromagnetic channels (e.g., wire, radio, and optical) to transmit voice, data, and video communications signals. It is defined as distance communication, using electrical or optical transmissions between humans and/or computers.

Telenursing refers to the use of information technology in the provision of nursing services whenever physical distance exists between patient and nurse or between any number of nurses. As a field, it is part of telemedicine and has many points of contact with other medical and non-medical applications, such as telediagnosis, teleconsultation, and telemonitoring.

Telenursing is growing in many countries because of the preoccupation in driving down the costs of health care, an increase in the number of aging and chronically ill population, and the increase in coverage of health care to distant, rural, small or sparsely populated regions. Among its many benefits, telenursing may help solve increasing shortages of nurses; to reduce distances and save travel time, and to keep patients out of the hospital.

Nursing informatics, a branch of health informatics, has been defined by Judith Rae Graves and Sheila Corcoran 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." Telenursing is a potential application of nursing informatics and as such, nursing informatics has served as a critical background concept of its development.

Need of Telenursing

- Demographic changes
- Nursing and health care workers, shortage
- Chronic diseases and conditions
- Educated consumers
- Economic conditions

Applications/Scope of Telenursing

- **Home care:** One of the most distinctive telenursing applications is home care. For example, patients who are immobilized or live in remote or difficult to reach places, citizens who have chronic ailments, such as chronic obstructive pulmonary disease, diabetes, congestive heart disease or debilitating diseases, such as neural degenerative diseases (Parkinson's disease, Alzheimer's disease or ALS), may stay at home and be "visited" and assisted regularly by a nurse via video conferencing, internet or video phone.
- **Case management:** A common application of telenursing is also used by call centers operated by managed care organizations, which are staffed by registered nurses who act as case managers or perform patient triage, information, and counseling as a means of regulating patient access and flow and decrease the use of emergency rooms.
- **Telephone triage:** Telephone triage refers to the symptom or clinically-based calls. Clinicians perform symptom assessment by asking detailed questions about the patient's illness or injury. The clinician's task is to estimate and/or rule out urgent symptoms. They may use pattern recognition and other problem-solving processes as well. Clinicians may utilize guidelines, in paper or electronic format, to determine how urgent the symptoms are. Telephone triage requires clinicians to determine if the symptoms are life-threatening, emergency, urgent, acute or non-acute.

Advantages of Telenursing

- Increase public access to health care.
- Provide access to rural areas.
- Decrease wait times.
- Decrease unnecessary hospital visits.
- The decrease in healthcare costs.
- Increase continuity of care.
- Increase patient compliance with aftercare.

Disadvantages of Telenursing

- Decreased face-to-face interaction.
- Risk of decreasing quality of care.
- May increase liability.
- Concerns with security.
- Concerns with maintaining confidentiality.

Legal Issues and Ethical Issues Related to Telenursing

- Maintaining patient privacy
- Verifying consent
- Nursing Licensure across state lines
- Maintaining compliance with the scope of practice
- Maintaining autonomy (identity, privacy)
- Maintaining the patient's integrity and preventing harm.

- **Decision support:** It entails the use of computer reminders and alerts to improve the diagnosis and care of a patient, including screening for correct drug selection and dosing, screening for medication interactions with other medications, preventive health reminders in such areas as vaccinations, health risk screening and detection, and clinical guidelines for patient disease treatment.
- **Electronic communication and connectivity:** It includes online communication among healthcare team members, their care partners, and patients including email, web messaging, and an integrated health record within and across settings, institutions, and telemedicine.
- **Patient support:** It encompasses patient education and self-monitoring tools, including interactive computer-based patient education, home telemonitoring, and telehealth systems.
- **Administrative processes:** These are activities carried out by the electronic scheduling, billing, and claims management systems, including electronic scheduling for inpatient and outpatient visits and procedures, electronic insurance eligibility validation, claim authorization and so on.
- **Reporting and population health management:** These are data collection tools to support public and private reporting requirements, including data represented in a standardized terminology and machine-readable format.

ELECTRONIC MEDICAL/HEALTH RECORDS

The significance of electronic health records (EHRs) to nursing cannot be underestimated. Although EHRs on the surface suggest simple automation of clinical documentation their implications are broad, ranging from how care is delivered, to the types of interactions nurses have with patients in conjunction with the use of technology to the research surrounding EHRs that will inform nursing practice for tomorrow. Basic knowledge of EHRs and nursing informatics is now considered by many to be an entry-level nursing competency.

Components of Electronic Health Records

- **Health information and data:** Health Information and data comprises the patient data required to make sound clinical decisions, including demographics, medical and nursing diagnoses, medication lists, allergies, and test results.
- **Results management:** It is the ability to manage results of all types electronically, including laboratory and radiology procedure reports, both current and historical.
- **Order entry management:** A clinician can enter medication and other orders, including laboratory, microbiology, pathology, radiology, nursing, supply orders, ancillary services, and consultations directly into a computer.

Advantages of EMR/EHR

Electronic Medical Record systems are much more fitting, important, and efficient than manual medical records, says the Mayo Clinic. Several doctors can update the patient record at the same time. Furthermore, Electronic Medical Record does not need a huge capacity for space and manual work to record and accumulate data.

- **Organization:** The most important benefit of EMR is the way that a patient's records can be managed and arranged. Paper records or files can simply be misplaced in a file room at the clinic, but an electronic medical record is accumulated on a network that is available throughout the service.
- **Access:** Physicians can access quickly to patient files using the electronic medical record system. In each of the patients' rooms and practice rooms, there are computers that are provided with the facilities that are prepared with this technology. The patient's record can be logged on from any computer to update conditions, medications, and procedures that have been performed on the patient.
- **Decision support:** Improved health decisions can be prepared for the patient when his EMR is accessible by more than one physician. Repeatedly a patient is sent from one physician to another when health problem appears to be dangerous or need to be diagnosed. These physicians may not have the ability to communicate or transmit the

patient's medical records to every facility. In this case, the patient can be subjected to repetitive or unwarranted actions because of the lack of transmission.

- **Standardization:** Electronic medical record systems will also provide better standardization once it takes place to keep patient records throughout the health care system. Several medical services apply various terminologies for similar procedures. Other services apply structures that are dissimilar from other facilities. Electronic medical record systems will make it easier for physicians and nurses to get the information they want for every patient by providing a standard way of filling out data on a patient's file.
- **Patients:** A few Electronic medical record systems give the patients the ability to log on their test results and other vital information from their health record through a protected

site on the internet. This helps patients better understand their healthcare choice.

Barriers to Using EMR

- **Technical barriers:** It is expensive to implement an Electronic Medical Record system in a physician's office, mainly for minor practices. Moreover, install such a system in minor hospital institutions require external industrial support.
- **Cultural barriers:** An Electronic Medical Record will extensively change a physician's flow and potentially decrease the quality of service the doctor provides by giving him more patients, however, before physicians expected a specific amount of workflow because they were spending time filling out paperwork.

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STUDENT ASSIGNMENT

SHORT AND LONG ANSWER QUESTIONS

1. Define nursing informatics. List down the purpose and explain the scope of nursing informatics.
2. What are computerized patient records? Explain its function to the health care sector.
3. Explain the role of computers in nursing.
4. What is Telemedicine? What are its types? Explain the uses and scope of telemedicine in India.
5. Briefly explain Telenursing and its scope.