NURSING INFORMATICS (LEC)

NRCM0110
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TERM 03

TOPIC 1: HISTORICAL PERSPECTIVE OF NURSING AND COMPUTER

NURSING INFORMATICS (NI)

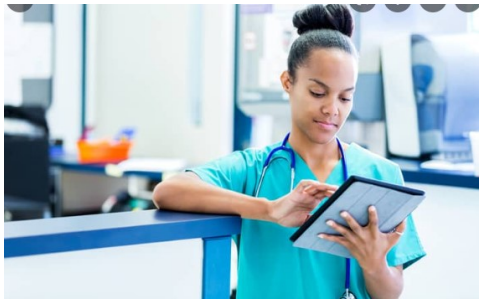
- It is a ***title*** that ***evolved*** from the ***French word*** "***informatics***" which ***referred*** to the ***field*** of ***applied computer science concerned*** with the ***processing*** of ***information*** such as ***nursing information*** (Nelson, 2013).
- "***NI***" has ***emerged*** as ***new term encompassing*** these ***technologies enabling nurses*** to ***manage health care*** and ***patient care more efficiently*** and ***effectively*** and, ***at the same time***, ***make nurses more accountable***.

HIT

- It is an ***all-encompassing term referring*** to ***technology*** that ***captures***, ***processes***, and ***generates healthcare information***.
- ***Computerization*** and/or ***electronic processing affect all aspects*** of ***healthcare delivery including***:
  - ***(a) Provision*** and ***documentation*** of ***patient care***
  - ***(b) Education*** of ***healthcare providers***
  - ***(c) Scientific research*** for ***advancing healthcare delivery***
  - ***(d) Administration*** of ***healthcare delivery services***
  - ***(e) Reimbursement*** for ***patient care***
  - ***(f) Legal*** and ***ethical implications***
  - (g) ***Safety*** and ***quality issues***

PAPER–BASED

COMPUTER–BASED



COMPUTER

- The ***computer*** is the ***most powerful technological tool*** to ***transform*** the ***nursing profession prior*** to the ***new century***.
- The ***computer*** has ***transformed*** the ***nursing paper-based records*** to ***computer-based records***.
- The ***computer*** and the ***internet*** have ***become essential*** to the ***modern day*** which ***functions*** a ***lot***.
- "***Computer***" is an ***all encompassing term referring*** to ***information technology*** (***IT***), ***computer systems***, and when they are ***used*** in ***nursing information systems*** (***NISs***), ***nursing applications***, and/or ***nursing informatics*** (***NI***).

COMPUTERS IN NURSING CARE

- ***Computers*** in ***nursing care*** are ***used*** to ***manage information*** in ***patient care***, ***monitor*** the ***quality*** of ***care***, and ***evaluate*** the ***outcomes*** of ***care***.

COMPUTERS AND NETWORKS

- ***Computers*** and ***networks*** are ***now used*** for ***communicating*** (***sending***/***receiving***) ***data*** and ***messages via*** the ***Internet***, ***accessing resources***, and ***interacting*** with ***patients*** on the ***World Wide Web***.

COMPUTER TECHNOLOGY

- ***Computer technology emerged*** in ***nursing*** in ***response*** to the ***changing*** and ***developing technologies*** in the ***health care industry*** and in ***nursing practice***.
- It is ***analyzed according*** to:

SIX TIME PERIODS

- ***Prior*** to the ***1960s***
- The ***1960s***
- The ***1970s***
- The ***1980s***
- The ***1990s***
- ***Post-2000***

FOUR MAJOR NURSING AREAS

- ***PERA***:
  - ***Nursing practice***
  - ***Administration***
  - ***Education***
  - ***Research***

STANDARD INITIATIVES

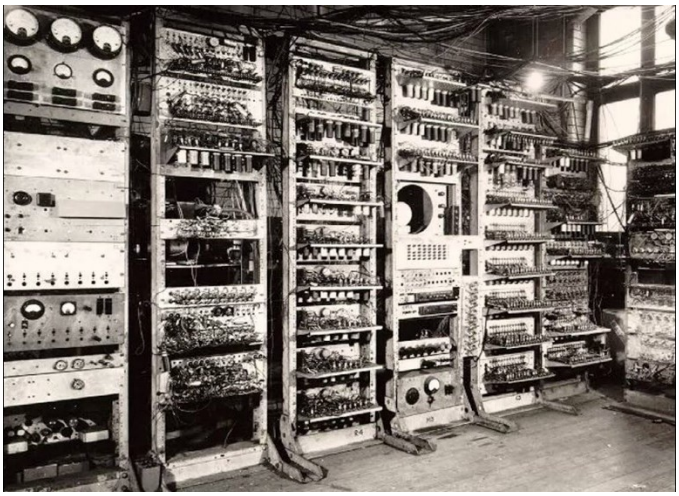
- ***Nursing practice***
- ***Nursing data***
- ***Health care data standards***

SIGNIFICANT LANDMARK EVENTS

MAJOR LANDMARK MILESTONE CHART LISTING

- Those ***events*** that ***influenced*** the ***introduction*** of ***computers into*** the ***nursing profession including*** the ***key*** "***computer/informatics***" ***nurse*** that ***directed*** the ***activity***.

ENIAC (1946)



SIX TIME PERIODS

PRIOR TO THE 1960s

- ***Starting*** in the ***1950s***, and as the ***computer industry grew***, the ***use*** of ***computers*** in the ***health care industry also grew***.
- ***During*** this ***time***, there were ***only*** a ***few experts*** who ***formed*** a ***cadre*** of ***pioneers*** that ***attempted*** to ***adapt computers*** to ***health care*** and ***nursing***.
- ***During*** this ***time***, the ***nursing profession*** was ***also undergoing major changes***.
- The ***image*** of ***nursing*** was ***improving***, ***nursing practices*** and ***services*** were ***expanding*** in ***scope*** and ***complexity***, and the ***number*** of ***nurses*** was ***increasing***.
- These ***events provided*** the ***impetus*** for the ***profession*** to ***embrace computers***.

1960s

- ***During*** the ***1960s*** the ***uses*** of ***computer technology*** in ***health care settings began*** to be ***questioned***.
  - ***Questions*** such as "***Why computers***?" and "***What*** should be ***computerized***?" were ***discussed***.
- ***Nursing practice standards*** were ***reviewed***, and ***nursing resources*** were ***analyzed***.
- ***Studies*** were ***conducted*** to ***determine*** how ***computer technology*** could be ***utilized effectively*** in the ***health care industry*** and what ***areas*** of ***nursing*** should be ***automated***.
- ***During*** this ***period***, ***computer technology advanced***, while the ***number*** of ***health care facilities increased***.

NURSES' STATION

➢ The ***nurses' station*** in the ***hospital*** was ***viewed*** as the ***hub*** of ***information exchange***, the ***most appropriate center*** for the ***development*** of the ***computer applications***.

CATHODE RAY TUBE (CRT)

➢ The ***introduction*** of ***cathode ray tube*** (***CRT***) ***terminals***, ***online data communication***, and ***real-time processing added important dimensions*** to the ***computer systems providing more accessible*** and "***user-friendly***" ***machines***.

1970s

- In the ***1970s***, the ***inevitable continued integration*** of ***computers into nursing***.
- ***Nurses began*** to ***recognize*** the ***value*** of the ***computer*** for their ***profession***.
- ***During*** this ***decade***, ***giant steps*** were ***taken*** in ***both dimensions***:
  - ***Nursing***
  - ***Computer technology***
- ***Nurses recognized*** the ***computer's potential*** for ***improving*** the ***documentation*** of ***nursing practice***, the ***quality*** of ***patient care***, and the ***repetitive aspects*** of ***managing patient care***.
- They ***assisted*** in the ***design*** and ***development*** of ***nursing applications*** for the ***HISs*** and ***other environments*** where ***nurses functioned***.
- ***During*** this ***period***, ***several states*** and ***large community health agencies developed*** and/or ***contracted*** for their ***own computer-based management information systems***.
- ***Generally***, ***public health MISs provided statistical information required*** by ***local***, ***state***, and ***federal agencies*** for ***specific program funds***, whereas ***home health agencies provided billing*** and ***other financial information required*** for ***reimbursement*** of ***patient services*** by:
  - ***Medicare***
  - ***Medicaid***
  - ***Other third-party payers***

1980s

- ***During*** the ***1980s***, the ***field*** of ***informatics emerged*** in the ***health care industry*** and ***nursing***.
- ***NI became*** an ***accepted specialty*** and ***many nursing experts entered*** the ***field***.
- ***Technology challenged creative professionals*** and the ***use*** of ***computers*** in ***nursing became revolutionary***.
- As ***computer systems*** were ***implemented***, the ***needs*** of ***nursing took*** on a ***cause-and-effect modality***; that is, as ***new computer technologies emerged*** and as ***computer architecture advanced***, the ***need*** for ***nursing software evolved***.
- ***During*** this ***period***, ***many mainframe HIS emerged*** with ***nursing subsystems***.
- These ***systems documented several aspects*** of the ***patient record***; ***namely***, ***order entry emulating*** the ***Kardex***, ***results reporting***, ***vital signs***, and ***other systems*** that ***documented narrative nursing notes via word-processing packages***.

DISCHARGE PLANNING SYSTEMS

- ***Discharge planning systems*** were ***developed*** and ***used*** as ***referrals*** to ***community health care facilities*** in the ***continuum*** of ***care***.

MICROCOMPUTER or PERSONAL COMPUTER (PC)

- In the ***1980s***, the ***microcomputer*** or ***personal computer*** (***PC***) ***emerged***.
- This ***revolutionary technology made computers more accessible***, ***affordable***, and ***usable*** by ***nurses*** and ***other health care providers***.
- ***PCs brought computing power*** to the ***workplace*** and, ***more importantly***, to the ***point-of-care***.
- ***PCs served not only*** as ***terminals linked*** to the ***mainframe computers*** but ***also*** as ***stand-alone systems*** (***workstations***).
- They were ***user-friendly*** and ***allowed nurses*** to ***create*** their ***own applications***.

1990s

- ***Computer technology become integral part*** of ***healthcare***.
- ***NI*** was ***approved*** by ***ANA*** as a ***new nursing specialty*** (***1992***).
- ***Laptops*** or ***notebook*** to the ***bedside*** and ***all point*** of ***care settings***.
- ***Linking across*** the ***different system***.
- ***Introduction*** of ***internet***
  - ***Information superhighway***
  - ***Mainstream social Milieu***
  - ***Electronic Mail*** (***e-mail***)
  - ***File transfer Protocol*** (***FTP***)

LOCAL AREA NETWORK (LAN)

- ***Local Area Network*** (***LAN***) were ***developed***
- ***Linking hospital care units***

WIDE AREA NETWORK (WAN)

- ***Wide area network*** were ***developed*** (***WAN***).

WEB

- The ***web*** became the ***means*** for ***online communications*** and ***resources*** to the ***nursing practice***.
- ***Integral component*** of ***all IT system***.

WORLD WIDE WEB (WWW)

- ***WWW use*** to ***browse*** the ***internet*** and ***search worldwide resources***.

POST–2000

- The ***early years*** of the ***new millennium continued*** the ***torrid pace*** of ***hardware*** and ***software development*** and ***growth***.
- This ***growth*** is ***reflected*** in ***healthcare*** and ***nursing***, with ***developments*** such as:
  - ***Wireless point-of-care***
  - ***Serious consideration*** for ***open source solutions***
  - ***Regional database projects***
  - ***Increase IT solutions targeted*** at ***all healthcare environments***
- ***Information technologies continued*** to ***advance*** with ***mobile technology*** such as with:
  - ***Wireless tablet computers***
  - ***Personal digital assistants*** (***PDAs***)
  - ***Smart cellular telephones***
- ***Post-2000 also witnessed*** the ***continued impact*** of ***legislation*** on the ***U.S healthcare industry***.

ELECTRONIC PATIENT RECORD (EPR)

- ***Further***, ***clinical information systems became individualized*** in the ***electronic patient record*** (***EPR***).

ELECTRONIC HEALTH RECORD (HER)

- ***Patient specific systems considered*** for the ***lifelong longitudinal record*** or the ***electronic health record*** (***EHR***).

VOICE OVER INTERNET PROTOCOL (VoIP)

- The ***development*** and ***subsequent refinement*** of ***voice over Internet protocol*** (***VoIP***) ***promises*** to ***provide cheap voice communication*** for ***health care organizations***.

4 MAJOR NURSING IDEAS

- "***PERA***"
  - ***P – Practice***
  - ***E – Education***
  - ***R – Research***
  - ***A – Administration***

PRACTICE
"NURSING PRACTICE"

- ***Nursing practice*** has ***evolved*** and ***changed radically***.
- It has ***become*** an ***integral part*** of the ***EHR***.
- ***Computer systems*** with ***nursing*** and ***patient care data***, ***nursing care plans*** are ***no longer separate subsystems*** of the ***computerized Hospital Information Systems*** (***HISs***), but ***rather integrated into one interdisciplinary patient health record*** in the ***EHR***.
- The ***need*** for an ***interdisciplinary HER resulted*** because of ***many initiatives proposed*** and ***promoted*** by the ***nursing profession*** as well as by ***other health care providers***.
- They ***all require patient care data*** to ***track*** the ***care process***.

NURSING PRACTICE DATA

- ***Further nursing practice data emerged*** with the ***introduction*** of ***several nursing terminologies*** that were ***recognized*** by the ***ANA*** as ***coded terminologies usable*** for the ***EHR***.
- They are ***used*** to ***assess problems***, ***document care***, and ***track*** the ***care process***, and ***measure outcomes***.

COMPUTER

- Thus, the ***electronic version nursing practice*** – the ***computer*** – has ***revolutionized*** and ***transformed nursing practice***.

ADMINISTRATION
"NURSING ADMINISTRATION"

- ***Nursing administration*** in ***hospitals*** has ***also changed*** with the ***introduction*** of the ***computer*** that ***links nursing departments together***.
- ***Most policy*** and ***procedure manuals*** are ***accessed*** and ***retrieved*** by ***computer***.
- ***Further***, ***workload measures***, ***acuity systems***, and ***other nursing department systems*** are ***online*** and ***integrated*** with the ***hospital*** or ***patient's EHR system*** or in ***separate nursing department systems***.

INTERNET

- The ***Internet*** is ***being used*** by ***nurses*** to ***access digital libraries***, ***online resources***, and ***research protocols*** at the ***bedside***.

RESEARCH
"NURSING RESEARCH"

- ***Nursing research provides*** the ***impetus*** to ***use*** the ***computer*** for ***analyzing nursing data***.
- With the ***advancement*** of ***computer technology databases supporting nursing research emerged***, ***principally*** for ***online searching*** and ***retrieving information*** from the ***electronic bibliographic literature systems*** or ***other databases*** that ***contain relevant health care content***, such as ***drug data***.

SOFTWARE PROGRAMS

- ***Software programs*** are ***available*** for ***processing both quantitative*** and ***qualitative research data***.

INTERNET

- The ***Internet also provides online access*** to the ***millions*** of ***Web resources around*** the ***world*** which have ***increased*** the ***capabilities*** and ***expanded*** the ***field*** of ***nursing research***.

STANDARD INITIATIVES

- ***Nursing practice standards*** have been ***developed*** and ***recommended*** by the ***ANA***.

AMERICAN NURSES ASSOCIATION (ANA)

- The ***official professional nursing organization***.
- The ***ANA published*** The ***Standards*** of ***Clinical Nursing Practice*** (***ANA***, ***1998***) which ***focused not only*** on the ***organizing principles*** of ***clinical nursing practice*** but ***also*** the ***standards*** of ***professional performance***.
- They ***recommended*** that the ***nursing process serve*** as the ***conceptual framework*** for the ***documentation*** of ***nursing practice***.

JOINT COMMISSION ON ACCREDITATION OF HOSPITAL ORGANIZATION (JCAHO)

- ***Nursing practice standards*** have ***also*** been ***set*** by the ***Joint Commission*** on ***Accreditation*** of ***Hospital Organization*** (***JCAHO***) which ***stressed*** the ***need*** for ***adequate records*** on ***patients*** in ***hospitals*** and ***practice standards*** for the ***documentation*** of ***care*** by ***nurses*** (***Namdi*** and ***Hutelmyer***, ***1970***).
- ***Further***, they have ***included*** in their ***recent manual*** the ***required contents*** of an ***EHR***, such as what ***data*** should be ***collected*** and how the ***data*** should be ***organized*** on the ***electronic database*** (***Corum***, ***1993***).
- These ***standards*** have ***evolved*** and ***continue*** to ***increase*** as the ***federal requirements evolve*** and/or are ***implemented***.

NURSING DATA STANDARDS

- ***Nursing data standards*** have ***emerged*** as a ***new requirement*** for the ***EHR***.
- The ***ANA*** is ***responsible*** for the ***recognition*** of the ***terminologies*** and for ***determining*** if they have ***met*** the ***criteria*** to be ***included*** in the ***National Library*** of ***Medicine*** (***NLM***) ***Unified Medical Language Systems***.

HEALTHCARE DATA STANDARDS ORGANIZATIONS

- It is ***critical*** to ***review*** the ***standards organizations*** that have ***emerged*** to ***either develop*** or ***recommend health care data standards*** that should be ***recommended*** to the ***federal government*** as ***required health care data standards***.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- The ***American National Standards Institute*** (***ANSI***) is a ***private nonprofit membership organization***, ***instituted*** to ***coordinate*** and ***approve voluntary standards efforts*** in the ***United States***.
- ***ANSI*** was ***combined*** with the ***Health Care Informatics Standards Board*** (***HISB***) to ***form ANSI-HISB*** to ***fulfill*** a ***request*** by the ***European standards coordinating organization*** (***CEN TC/251***) to ***represent*** the ***U.S. standards effort***.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- The ***ASTM E-31 Committee*** on ***Healthcare Informatics*** is an ***accredited committee*** that ***develops standards*** for ***health information*** and ***health information systems designed*** to ***assist vendors***, ***users***, and ***anyone interested*** in ***systematizing health information***.

ELECTRONIC HEALTH / MEDICAL RECORD

- An ***electronic record*** of ***health-related information*** on an ***individual*** that can be ***created***, ***gathered***, ***managed***, and ***consulted*** by ***authorized clinicians*** and ***staff within one health care organization***.
- Have the ***potential*** to ***provide substantial benefits*** to ***physicians***, ***clinic practices***, and ***health care organizations***.
- These ***systems*** can ***facilitate workflow*** and ***improve*** the ***quality*** of ***patient care*** and ***patient safety***.
- ***Despite*** these ***benefits***, ***widespread adoption*** of ***EMRs*** in the ***United States*** is ***low***; a ***recent survey indicated*** that ***only 4 percent*** of ***ambulatory physicians reported*** having an ***extensive***, ***fully functional electronic records system*** and ***13 percent reported*** having a ***basic system***.
- ***Among*** the ***most significant barriers*** to ***adoption*** are:
  - ***High capital cost*** and ***insufficient return*** on ***investment*** for ***small practices*** and ***safety net providers***.
  - ***Underestimation*** of the ***organizational capabilities*** and ***change management required***.
  - ***Failure*** to ***redesign clinical process*** and ***workflow*** to ***incorporate*** the ***technology systems***.

INSTITUTE OF MEDICINE

- The ***Institute*** of ***Medicine issued*** a ***group*** of ***8 key functions*** for ***safety***, ***quality***, and ***care efficiency*** that ***EMRs*** should ***support***, ***after recognizing*** the ***role*** that ***EMRs*** can ***play*** in ***transforming health care***, in ***2003***
  1. ***Physician access*** to ***patient information***, such as ***diagnoses***, ***allergies***, ***lab results***, and ***medications***.
  2. ***Access*** to ***new*** and ***past test results among providers*** in ***multiple care settings***.
  3. ***Computerized provider order entry***.
  4. ***Computerized decision-support systems*** to ***prevent drug interactions*** and ***improve compliance*** with ***best practices***.
  5. ***Secure electronic communication among providers*** and ***patients***.
  6. ***Patient access*** to ***health records***, ***disease management tools***, and ***health information resources***.
  7. ***Computerized administration processes***, such as ***scheduling systems***.
  8. ***Standards-based electronic data storage*** and ***reporting*** for ***patient safety*** and ***disease surveillance efforts***.