N-101 Nursing Informatics
First Semester, Academic Year 2023-2024

STUDY GUIDE
MODULE 4
Use of Nursing Informatics in Healthcare Delivery

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Introduction

As nurses adapt to the changing needs of patients and technology in delivering care, managing healthcare information and data, and collaborating across the multi-professional team and departments, nursing information systems are used as important tools to support practice. However, tools and instruments become mechanisms for optimum care when these are applied with critical thinking, ingenuity, creativity, and advanced skills.

This module focuses on the role of nursing informatics in supporting nurses in the delivery of safe and quality patient care through patient information management systems, remote delivery of care, and the use of devices and artificial intelligence. This module is divided into the following topics: (1) electronic health records and clinical informatics, (2) informatics tools for patient safety, (3) remote access Telehealth, (4) patient engagement, and (5) informatics for population health.

This section discussed examples of the application ICT in Nursing practice. These include:
1. Electronic health records and Nursing documentation
2. Telehealth/ Telemedicine
3. Health technologies/ devices
4. Decision-Support Systems
5. Informatics for Population Health

Likewise, we will examine challenges, opportunities, and mechanisms to promote patient engagement in the application of ICT in delivering Nursing care.

Learning Outcomes

At the end of Module 4, you should be able to:

1. Appreciate the role of innovation to bridge the healthcare service delivery gap.
2. Describe nursing informatics tools and applications for clinical practice.
3. Discuss mechanisms to promote patient engagement when using informatics tools.

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Topics

Electronic Health Records and Clinical Informatics

Benefits of using Electronic Health Records (EHRs)
Electronic health records (EHRs) are the automation of clinical documentation. Although simply described, the application of EHRs goes beyond the automation of our patient charts. EHRs facilitate accurate documentation, continuity of monitoring, and streamlining communication of health information that promotes safe and collaborative care. Here are some examples of how EMRs facilitate safe care: 1 2

Components of Electronic Health Records (EHRs)
Through decades of improvements and development of EHRs, the utility of EHRs has expanded to facilitate decision-making, a repository of clinical data, and use in other branches of healthcare aimed at reducing errors, cost of care, and improving care delivery. Considering the wide use of EHRs, the American Health Information Management Association (AHIMA), in collaboration with the Health Professions Network and the Employment and Training administration, illustrated the competencies that need to be developed by nurses from entry-level users to nursing informatics specialists (McGonigle and Mastrian, 2019).

1. EHRs have the following eight components:
2. Health information and data
3. Results management
4. Order entry management
5. Decision support
6. Electronic communication and connectivity
7. Patient support
8. Administrative processes, and
9. Reporting and population health management

One of the most common uses of EHRs is in the management of health information data through the use of *Electronic Medical Records (EMRs).* EMRs are similar to EHRs in the sense that they both record patient health data. However, compared to EHRs that have a wider scope of applicability, EMRs are focused on the patients' health care records. An example of a local EMR applied in the public health setting is the Community Health Information and Tracking System (CHITS) (Ongkeko et al., 2017). Read more about CHITS and how it continues to assist local government health facilities here.

Decision Support Systems

Decision support systems (DSS) are basic to information systems. It is important for us to understand it, and its various complex permutations. We also need to understand the basic metastructure (DIKW) that aligns with it in order to match its requirements and functions. Once the information is in the right system, it helps nurses and other healthcare professionals in terms of what they wish the system to help them with. Remember that every system has its own level of complexity and data requirements.

The following slides will help you understand these various systems. The second part of this slide presentation is two types of DSS. The administrative and clinical DSS. There will be examples provided to make it easy for you to appreciate the differences between the two. And finally, the third part of the presentation is on data analytics and what this is about.

Informatics Tools for Patient Safety

Information technology to prevent errors

As care becomes more complex, human factors or the factors (environmental, organizational, and individual characteristics) that influence our behavior as we interact within our work setting, predispose us to commit errors. These are usually attributed to exhaustion, distractions, or reliance on memory. As such, systems need to be designed to limit the occurrence of errors through innovative solutions and the promotion of a culture of safety. Culture of safety is defined as the shared values, beliefs, norms, and procedures related to patient safety among members of an organization, unit, or team (Pronovost et al., 2006). As organizations nurses, the safety culture, systems design aim to implement strategies like information technology to address human factors and reduce errors.

Thus, it is essential that when we teach nursing informatics, we underscore the use of information technology as a primary tool to promote safe and quality care. A rich resource to support understanding of the relationship between the nurse and the application of information technology to promote safety is the chapter on 'The nurses' use of technology in delivering care and prevention of adverse events by Powell-Cope, Nelson, and Patterson (2008).

Examples of informatics tools to promote safety

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- Technologies for medication administration (Bar-code medication administration [BCMA]) Reading: Shah et al (2016)
- Clinical Decision Support (CDS) video

Finally, with the expanding technological innovations applied in patient safety science, there are challenges that nurses must anticipate. Here is a recent synthesis that summarized current challenges in health information technology by Sittig et al. (2020).

Telenursing and Remote Access to Health Services

Telehealth is a broad range of health services delivered through telecommunication tools like videos, calls, and computer-mediated communication. Telehealth, in itself, is not a new practice. However, its application has evolved as technology improved. Here are some systematic reviews covering the use of telenursing practice (Sa Yang, Jiang & Li, 2019; Yumamoto, et al, 2012;) and teaching (Asiri and Househ, 2016; Lister et al, 2018). This WHO report provides a more extensive discussion of telehealth.

One use of telehealth has been in the provision of home telehealth. This is usually facilitated by a telehealth device placed in the home that collects patient health data, then transmitted to the agency/health facility. This is where the telenurse determines the appropriate nursing action. Systematically, the process observed by the telehealth nurse involves knowledge acquisition (receiving information from a remote monitoring device either automatically or patient-reported), processing (analysis of patient data), generation (developing a plan and next steps based on the nurses' clinical skills and knowledge), and dissemination (collaboration, referral, and patient education).

McGonigle and Mastrian (2017) summarized the clinical uses and applications:

1. Transmitting images for assessment or diagnosis
2. Transmitting clinical data for assessment, diagnosis, or disease management.
3. Providing information on disease prevention and promotion.
4. Using telephone or video interactive technologies to provide health advice in emergency cases.
5. Using real-time video as videoconference consultation or education.

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Examples of telehealth technology include store-and-forward telehealth transmission, real-time telehealth, telemonitoring, telephone monitoring, mHealth, and point of care devices. Some local examples of telehealth technology include the RxBox, a multi-component program aimed at providing better health access to geographically isolated and disadvantaged communities. The sensitivity and specificity of the RxBox have been examined in community-based services (Decano and Aguilar, 2018; Zhu et al, 2017). With the emergence of the pandemic, telehealth services have become a necessity. Some examples are telehealth services transition of out-patient clinics and delivery of psychotherapy and mental health counseling.

Telehealth models continue to evolve as technology advance. As such, the role of the nurse will continue to evolve in ensuring continuity of care using appropriate technology.

Informatics for Population Health

The utility of nursing informatics in healthcare communication, analysis, and care delivery has become increasingly popular. Since the SARS outbreak in the early 2000s, the global threat of an unknown virus highlighted the global threat. This was eventually followed by Ebola, MERS CoV, and Zika. Understanding the value of timely, accurate, and reliable data has been recognized by the Centers for Disease Control and their Emergency Operations Center has collaborated with local, national, and international response partners. The work of the surveillance center is to develop and implement surveillance systems to collect, analyze, and use data to ensure public health prevention by detecting the early stages of an outbreak. These systems capitalize on technology and informatics tools in order to (1) assess the level of risk, (2) formulate policies, and (3) recommend population-level appropriate and cost-effective practices. This reference provides a comprehensive resource for public health surveillance.

In addition, here are some resources to broaden your understanding of syndromic surveillance systems: Hope et al, 2006; Todkill et al, 2016; CDC on COVID-19; Jia and Yang, 2020.

The same principle in the collection, use, and dissemination of surveillance systems has also been used in disasters (Chrentien et al., 2009; National Center for Environmental Health, CDC).

At present, these systems use technology to ensure timely intervention against the spread of infection and the impact of disasters. However, as social

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media become more popular over the last decade, the use of these platforms to gather data with the application of machine learning provides an opportunity for collecting information directly from health consumers. Gupta and Katarya (2020) reviewed the use of social media posts and machine learning in public health concluding that social media-based surveillance systems are superior to traditional surveillance systems.

In the near future, we may be able to see a seamless collection of data and the sharing of information aimed at prevention and planning.

Informatics in Pandemic Response

The pandemic has created unique challenges to the delivery of safe and quality care. Infection control measures limit the traditional patient care contact and interaction with healthcare providers. However, the pandemic response has also created opportunities for nurses to innovate, use, and adapt to new (even old) technologies to bridge the gap between providers and peoples and communities.

Here are some resources that demonstrate how nurses have utilized ICT to deliver needed care towards the achievement of UHC and attainment of SDGs. Technology has enabled nurses to continue delivering care.

Patient Engagement

Health information is right at our fingertips, literally. It is so easy to meet our information needs through social media posts, blogs, print, and television media. This is further aggravated by the increasing and more complex needs of users/patients.

Mechanisms to engage patients and ensure health connectedness include blogs on varied social media sites, health-themed websites, internet-based strategies like advertisements and subscriptions, and other resources. All these platforms promote engagement by empowering patients to take control and explore their health. With the increasing cost of healthcare, it is not surprising that free resources online are used regularly. For example, it is not surprising that patients would consult with a handful of search results and information they obtained from their online *kapitbahay.* If in the past they would say *'Sabi ng kapitbahay ko, okay daw itong gamot X.'* Now they may say, *'Nakita ko sa (X social media post) na effective daw itong gamot X.'*

As such, the readily available information needs to be balanced in terms of accessed and provided information.

According to the IOM (2013), health literacy is the capacity of individuals to secure, process, and comprehend basic health data, information, and services in order to make appropriate health-related decisions. In the Philippines, a local new agency website reported the low health literacy of Filipinos. Likewise, an opinion piece on the same issue underscored its value in the local healthcare scenario. Finally, a study among high school students showed the variation in actual and perceived literacy that has significant implications on information utility.

A huge component of health literacy and consumerism is access to reliable and understandable content. Difficulty in access, the persistence of unreliable information, and the lack of ability to discern reliable and unreliable health information pose problems to utilization. Here is a study that helps guide approaches to eHealth literacy.

Health consumerism, on the other hand, is a movement that advocates for health literacy through healthcare professionals and consumer partnerships. There are several mechanisms that promote health consumerism targeting different age groups, health needs, and even levels of technology access. Here is a scoping review that explores the potential of nursing informatics in supporting older adults in technology use for health.

As nurses, patient education is no longer limited to one-on-one health education. At baseline, we must consider the patient's learning preference, ability, willingness, preexisting knowledge and understanding, and culture and language. There are challenges and barriers, but there are also opportunities to enhance health literacy through appropriate technology (Study example). Consider your current approaches to educating and engaging patients under your care. How will you use informatics tools to facilitate engagement to reliable and understandable health information?

Learning Activities

1. Read the recommended content discussed above and refer to the linked resources.
2. Work with your group in updating and improving your group project. *See project guide.*
3. Participate in the Discussion Forum.

References:

McGonigle, D., & Mastrian, K. G. (2017). *Nursing informatics and the foundation of knowledge*. Burlington, MA: Jones & Bartlett Learning.

Other references are linked in-text.