Nursing Informatics Application as A Tool for Evidence Based Community Practice: Issues and Challenges

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Abstract:

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. Therefore, this paper aimed at assessing the issues and challenges arising from Nursing Informatics application as a tool for evidence based community nursing practice. An extensive literature search was performed and data were sourced from the internet databases Pubmed, Google Scholar, Science Direct, Government Agencies, Public Libraries, Educational Institutions and Commercial Information sources. The four steps of Nursing Informatics Progression Theory which are Assimilation, Acceptance, Application, and Advancement were adapted in this study. It was concluded that the use of technology (NI) can be beneficial in triage, enabling the community nurse to be more productive and to provide a better nursing experience to the patient. It can change the triage process and has the potential to increasingly improve care but can be hindered by legacy technology systems and inter-operability issues, in addition to issues of the digital divide, which means that some patients might access care

easily, while others might have difficulties. It was recommended among others that ICT should be incorporated into schools of nursing curriculum to encourage competency before graduating from their schools.

Keywords: Application, Nursing Informatics, Evidence-Based, Community Practice,

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Introduction

Technology in health care is increasingly becoming an integral part of the Health care delivery system and is declared by strategists as a means whereby sustained improvement in health-care outcomes may be attained. Nurses role in client care delivery have a pivotal role in this technology deployment, maintenance and evolution. Although nurses are involved in technology in health-care, the specific roles are diverse and nursing informatics system has become one of those key roles (American Nurses Association, 2015)

Healthcare providers are expected to be able to provide safe, competent care in a highly technical and digital environment. Nursing Practice in the twenty-first century requires nurses to be constantly aware of current and new innovations in technology, client care and medications among others. Hence, it is crucial for nurses to have access to latest scientific information to support the delivery of high quality services and the development of Nursing knowledge and theory (Kaminski, 2012) as a strong point for evidence based practice.

Nursing informatics emerged over the past two decades to assist Nurses fully use information technology to improve the delivery of care (TIGER Informatics Competencies Collaborative, 2007). Nursing informatics is a specialty in nursing that incorporates nursing science and education with multiple information, management and analytical sciences to identify, define, manage and communicate data, information, knowledge and wisdom in nursing practice (Nursing informatics America Nurses Association (ANA) 2015).Nursing informatics aims to assist nurses, supports nurses, consumers, patients, the inter professional healthcare team, and other stakeholders in their decision-making in all roles and settings to achieve desired outcome.

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, Medication records. (Nursing informatics America Nurses Association (ANA) 2015)

In the past, health care was based on tradition of assumptions and rituals, but recently it has moved towards Professionalism with Information Technology and Evidence Based Practice. Evidence- based practice has gained momentum in nursing. Research findings, knowledge from basic science, clinical knowledge and expert's opinions are all considered evidence. Nurses are engaged with information systems and different digital tools used for their clinical practice as a foundation for evidence-based care, decision-support, and electronic health record (Adedeji, Irinoye, Ikono & Komolafe, 2018).

Evidence-based practice (EBP) is the process of collecting, processing, and implementing research findings to improve clinical practice, the work environment, or patient outcomes (Chrisman et al.,2014). It is vital to note that Evidence-based practice demands changes in education of nurses, more practice-relevant research, and closer working relationships between clinicians and researchers (Ademuyiwa, Folami & Mobolaji, 2019).

Technology is increasingly becoming a crucial part of the day-to-day practice of a community nurse (Dewsbury, 2019) and the benefits of improving client-care outcome plus improving the condition of work for the nurse cannot be overruled. Mobile technology, is being used by

community nurses for various purposes, including knowledge sharing, reporting and caseload planning in the United Kingdom (Dewsbury, 2019).

For a Community nurse to be a professional to carry out his or her duties effectively and efficiently, he/she must possess skills and knowledge of Information Technology, engage in continuing professional development and in research which is a vital source of evidence-based practice.

In view of the above, this paper aimed at assessing the issues and challenges arising from Nursing Informatics application as a tool for evidence based community nursing practice.

Concept of Nursing Informatics (NI), Evidence Based Practice (EBP) and Community Nursing Practice

Nurses need information to care for patients safely and satisfactorily. They need to possess the ability to access medical histories, medication lists, laboratory and imaging results, physician/interdisciplinary team notes and follow-up care to get a complete picture of a patient's clinical status. They use this information to make decisions efficiently to improve patient care outcomes.

Nursing informatics (NI) is the specialty that integrates nursing science with multiple information management and analytical sciences to identify, define, manage, and communicate data, information, knowledge, and wisdom in nursing practice (Huston, 2013).

The term "nursing informatics" was proposed in 1976, when Scholes and Barber (Scholes and Barber, 1976) elaborated on the potentialities of computer technology for a practice discipline like nursing, specifically discussing contributions to service, education, and research. Since then, nursing informatics as a field of inquiry has been established as one of the cornerstones of the interdisciplinary field of health informatics (Moen & Knudsen, 2013).

There are different types of ICT identified by various authors such as;

- Communication technologies
- Email, Short Message Services (SMS) commonly referred to as texting
- Video conferencing and chat services, like Skype, Zoom, Blogs
- Wikis, like Word Press and Mediawiki
- Micro blogging services like Twitter Document
- Calendar sharing services like Google Docs, Postal and shipping services
- Desktop software tools, Microsoft Office or Open Office Suite, Visual design and mockup software, Project management software like Microsoft Project or Open Project.

Nursing professionals have long recognized the importance of research evidence to practice. While nurses' computer skill varies, the ability to locate relevant information in electronic database and the internet is crucial to modern practice. Though nursing informatics have been fully integrated into the healthcare system of several developed countries but in developing countries like Nigeria it is an emerging specialty and the level of IT literacy among health professional is below average (Ajibade et al. 2014) This is a lack of knowledge about the skills of nurses working in hospitals in using databases and the internet for information retrieval and acquisition of treatment modalities for better patient care (Ajibade et al., 2014.)

Evidence Based Nursing (EBN) is an approach to making quality decisions and providing nursing care based upon personal clinical expertise in combination with the most current, relevant research available on the topic. EBN implements the most up to date methods of

providing care, which have been proven through appraisal of high quality studies and statistically significant research findings. Professional practice based on evidence improves healthcare practice, improves patient outcomes, and lowers healthcare costs. An environment that supports evidence-based practice is essential to professional development (Salmond, 2007).

Evidence-based practice has become famous in nursing and has various definitions. Research findings, knowledge from basic science, clinical knowledge, and expert opinion are all sources of "evidence". It could be said that practices based on research findings are more likely to result in the desired patient outcomes across various settings and geographic locations (Ademuyiwa, Folami & Mobolaji, 2019).

The impetus for evidence-based practice comes from payer and healthcare facility pressures for cost containment, greater availability of information, and greater consumer savvy about treatment and care options. Evidence-based practice demands changes in education of nurses, more practice-relevant research, and closer working relationships between clinicians and researchers (Ademuyiwa, Folami & Mobolaji, 2019).

Evidence-based practice is a window of opportunities for nursing care to be more individualized, more effective, streamlined, dynamic and maximize effects of clinical judgment. When evidence is used to define best practices rather than to support existing practices, nursing care keeps pace with the latest technological advances and takes advantage of new knowledge developments. Nurse, the patient's preferences, and multiple studies of evidence must all be collaborated and utilized in order to produce an appropriate solution to the task at hand. These skills are taught in modern nursing education and also as a part of continuing professional training (Ademuyiwa, Folami & Mobolaji, 2019).

Community health Nursing is the synthesis of nursing and public health practice applied to promote and protect the health of population. It combines all the basic elements of professional, clinical nursing with public health and community practice (Mengistu & Misganaw, 2006).

Community health nursing is essential particularly at this point in time because it maximizes the health status of individuals, families, groups and the community through direct approach with them. According to Mercado, informatics is useful for health data collection as well as to identify the underlisted trends:

- Absences from work or school
- Purchases of health-care products, including specific types of over-the-counter and prescription medications
- Symptoms reported to medical providers
- Emergency room admissions
- Laboratory test orders
- Vital statistics from state and local governments
- Financial data
- Facility data
- Internet searches for symptoms of infectious disease such as the flu (Mercado,2013).

Three grand challenges must be faced to ensure realization of the promise of health informatics to community health care: development of knowledge management and information discovery tools for patients, insurance of health information literacy for all persons, and re-engineering clinical practice to capitalize on patients as full partners in health care. (Brennan, 1999).

It is worthy to note that there are limited published studies on the application of Nursing Informatics in Community Nursing.

Methods

An extensive literature search was performed and data were sourced from the internet databases Pubmed, Google Scholar, Science Direct, Government Agencies, Public Libraries, Educational Institutions and Commercial Information sources.

Conceptual Review

In this current age, nurses have duties and responsibilities to keep a dynamic balance with the ever changing needs of the health of the society. Seven major roles of a Community Health Nurse are:

•Clinician

•Educator

•Advocate

•Managerial

•Collaborator

•Leader

(Mona,2015).

For the purpose of this study, community practice is basically nursing services rendered at the Primary Health Centers (PHCs). Community Nursing Practice areas at PHCs include Child welfare services, Reproductive health, Antenatal, delivery and Postnatal services, General outpatient services, Preventive Health services (i.e. roll back malaria initiative, DOTS, etc.), School health services, home visiting, Health Education and research

Empirical Review

A study carried out by Brown in 2017 on the association of knowledge to the attitude of Nurses towards use of informatics revealed that the nurse showed a desirable level of knowledge about nursing informatics and the study concluded that the level of knowledge about nursing informatics is a key factor in its implementation and use.

In a review carried out by Grace, Robisson-Bassey and Edet (2015), the paper examined the current state of nursing informatics education and use in Nigeria and proffer solutions for its future expansion. It is recommended that Nursing programme accrediting bodies in Nigeria (National University Commission [NUC] and Nursing and Midwifery Council of Nigeria [NMCN] should modify their requirements to reflect the value of NI. NI should be incorporated into the nursing curricular at all levels.

Grace, Robisson-Bassey and Edet opined that Nursing administrators such as Deans, Heads of Department, Director of Nursing Services and Principals as well as Nursing associations like National Association of Nigerian Nurses and Midwives [NANNM], should create opportunities for faculty members, Nurse/Midwife educators to develop knowledge & skills required to teach and use nursing informatics. Faculty members & Nurse/Midwife educators should

acquire informatics training and advocate for curricular changes that incorporate informatics and collaborate with colleagues in the clinical settings to provide opportunities for nursing students to utilize informatics tools (Grace, Robisson-Bassey and Edet, 2015).

According to Daniel and Oyetunde, proactive leadership, education, research and nurses' regulatory body's active roles are required to create a supportive environment for nursing informatics in Nigeria. This study concluded that the ultimate goal of nursing informatics is to use technology to bring critical information to the point of care to increase efficiency and make healthcare safer and more effective (Daniel and Oyetunde, 2013).

NI User Satisfaction

A cross-sectional study carried out by Lien (2017) to determine Nurses satisfaction with using nursing informatics system revealed that Nursing information systems can enhance nursing practice and the efficiency and quality of administrative affairs within the nursing department and thus have been widely considered for implementation. Close alignment of human-computer interaction can advance optimal clinical performance with the use of information systems. However, a lack of introduction of the concept of alignment between users' perceptions and technological functionality caused dissatisfaction.

This study provided insight into the alignment between nurses' perceptions and how technological functionality affects their satisfaction with Nursing Information System use through a reductionist perspective of alignment.

Primary care informatics is an emerging academic discipline that remains undefined. The unique nature of primary care necessitates the development of its own informatics discipline (de Lusignan, 2003).

Another study conducted by Khajouei, and Abbasi where Nurses' satisfaction with two nursing information system, it was concluded that Nurses' satisfaction with the evaluated informatics system was at medium level. Most Nurses were relatively satisfied with the information quality and user interface quality of these systems. The results suggested that usability of informatics will be improved if nursing information system is designed according to users' need. (Kajouei, and Abbasi 2017).

Application of Nursing Informatics in Community Health

Nursing informatics in community health care has so much to offer. It can help to provide support and improve collaboration among healthcare practitioners and patients/clients. This is also useful in monitoring and tracking the health status of the community which implies that the profile of the patient can be safely updated by the Community Nurse without dealing with tons of paper work if nursing informatics is used.

Tracking and detection of diseases in the community becomes easy because the spread can be tracked and communication among nurses and other health care provider will be strong.

Primary Focus of Community Health Information System

- Preventing, identifying, investigating and eliminating communicable health problems.
- Accessibility of data and information through communication
- Educating and empowering individuals to adopt healthy life style
- Facilitation of data retrieval
- Effective transformation of data into information
- Effective integration of information to other discipline to concretize knowledge and creates better understanding.
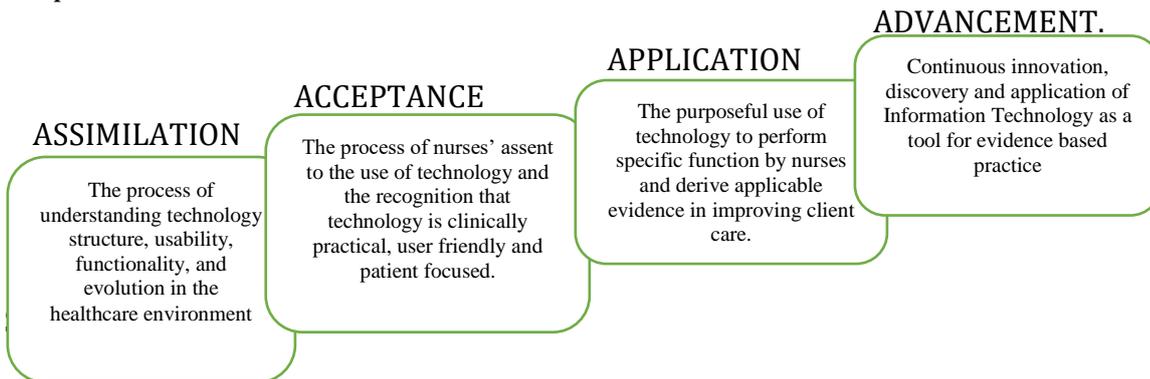
- Creation of computerized patient records, medical information system
- Central repositions of all data such as data warehouse
- Simple Graphical user interface (GUI) for nurses and other healthcare providers, patients and consumers.

Nursing Informatics Progression Theory (NIPT)

The benefits associated with the nurses knowledge of technology is correlated with positive outcomes including standardized nursing language, patient safety, quality of care, and evidenced-based practice. In order to overcome these barriers a theory was developed for nurses that can easily acclimatize to the advanced technology. The adaptability theory is to clarify the various fundamentals of information technology in order to explain the association between perceptions and behaviors and to generate the ability to competently transition to a greater working knowledge of technology (Cassano, 2018).

Adaptability is the process of becoming able to adjust to new conditions. The adaptability process involves four steps required for technology concepts to be disseminated to nurses in an acceptable manner that they can implement in their practice to improve patient outcome and overall elevation of the image of the profession.

The four steps (4A's) for the Adaptability in Nursing Informatics Progression Theory (NIPT) are Assimilation, Acceptance, Application, and Advancement. The informatics progression theory was derived from nursing practice and education, and highlights the importance of increasing nurse's acceptance to translating technology information into practice.

ASSIMILATION
The process of understanding technology structure, usability, functionality, and evolution in the healthcare environment

ACCEPTANCE
The process of nurses' assent to the use of technology and the recognition that technology is clinically practical, user friendly and patient focused.

APPLICATION
The purposeful use of technology to perform specific function by nurses and derive applicable evidence in improving client care.

ADVANCEMENT.
Continuous innovation, discovery and application of Information Technology as a tool for evidence based practice

Assimilation is the process of understanding technology structure, usability, functionality, and evolution in the healthcare environment. The utilization of technology in healthcare advanced through the use of medical diagnostic equipment that evolved over the years to more sophisticated equipment requiring the use of data transfer and monitoring. It is important to note that healthcare system of today was not so few decades ago in term of technological advancement.

Today, many nurses are using laptops, tablets, and smartphones in the healthcare setting to assist them with workflow and patient care. The paramount of healthcare technology assimilation is for nurses to understand the real value, embrace the advancement, and to take advantage of the practical usage of this technology.

Step 2 - Acceptance

Acceptance is the process of nurse's assent to the use of technology and the recognition that technology is clinically practical, user friendly and patient-focused. Technology can be a great advantage for nurses and a positive benefit for patient's safety. Modern nurses need to accept and welcome health information that is available to assist them with the workflow in direct patient care.

The critical element for successful acceptance of technology is the nurse's satisfaction of the application of the clinical computer-based program. The advantages of utilizing the electronic system, including user-friendliness, flexibility, and usage outcome, evaluated by the nurses, are needed in order to accept technology (Cassano, 2018).

Step 3 – Application

Application is the purposeful use of technology information to perform specific functions by nurses. The application of technology information has made patient care safer. Nurses are applying technology information every day in their workflow to assist them with patient for example utilization of digital equipment and smartphones to monitor patient's vitals, receive alerts when critical results are detected and conduct a follow-up or tracking of clients in community practice.

However, the use of technology should not change the ingrained behavior of nursing. Nurses should not rely on technology to perform patient care; patient care should remain as it always has been where nurses use common sense, judgment, and critical care thinking as they were taught in school. Nurses should still depend on their senses of sight, hearing, scent, and touch to monitor and become aware of changes in patient status. When application of technology is embraced by many nurses, it will in turn transform the way nursing care is conceptualized.

Step 4 - Advancement

Advancement is the continuous innovation and the discovery of information technology in nursing practice. More than any other factor, technology changes the healthcare structure where the effect of technology continues to expand into all levels of care. The advancement in technology includes a selection of systems, software, and devices that are developed to decrease the time spent on various tasks and improve accuracy, efficiency and patient safety.

This technology advancement also allows nurses to discover evidence based proof of methods and procedures that improves client care. Nursing practice will be changed by the many emerging technologies that are arising. Some of these technologies are biometrics, genetics, genomics, healthcare robotics, and clinical decision support (Roach & Katende, 2016).

Issues and Challenges

The following issues and challenges are some factors limiting the application of Nursing informatics to Community practice as a tool for evidence based practice.

- There are limited studies to the use of informatics as a tool to EBP in community practice.
- Financial barriers
- Healthcare professional resistance
- Loss of productivity caused by work flow changes.
- Usability issues
- Privacy issues
- Legal concerns

- Inadequate proof of benefits
- Lack of electricity
- Policy issues
- Lack of technical know-how by nurses and/or clients

Conclusion

The use of technology (NI) can be beneficial in triage, enabling the community nurse to be more productive and to provide a better nursing experience to the patient. It can change the triage process and has the potential to increasingly improve care but can be hindered by legacy technology systems and inter-operability issues, in addition to issues of the digital divide, which means that some patients might access care easily, while others might have difficulties. With the application of Nursing Informatics to Community Practice, several questions that requires answers through research will spring up thereby serving as a tool for EBP.

Recommendations

- ICT should be incorporated into schools of nursing curriculum to encourage competency before graduating from their schools.
- Nursing and Midwifery council of Nigeria should introduce computer based examination during their Final Professional Qualify Examination at all levels.
- Employers and organizations to facilitate training and retraining of practicing nurses on ICT.
- ICT should be incorporated into community practice and PHCs should be equipped to promote nursing informatics.
- Research on Nursing Informatics and its application to community practice to contribute to the body professional knowledge.
- The working environment should be conducive for nurses to be able to read and critically interpret research and to find articles related to nursing field or care. This will also stimulate their appetite to conduct researches and apply research findings as their tool of practice.
- Provision of modifiable structures to cater for clients who are not educationally equipped to fit into Nursing Informatics when they seek health care.
- Mentoring will also be beneficial.

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