

## New Technology in Nursing Education and Practice

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### 1. Introduction:

The use of technology in nursing is too earlier, in fact nurses have become capable of utilizing and familiarizing complex technology into caring nursing practice for years, at least since the time of Florence Nightingale in the United Kingdom and even past, when Jeanne Mance (1606-1673) founded the first hospital in Montreal, Canada in 1642 <sup>[1]</sup>. Various procedures of machinery such as ventilators and physiological monitors were first used in intensive and critical care settings, and are now presently used in adapting form in less acute areas, even in home care <sup>[2]</sup>.

#### 1.1. e Health services

The use of information and communication technologies (ICTs) for health, referred to as eHealth represents a means to support health care delivery. These technologies change how nurses plan, deliver, document, and review clinical care; this will only continue as technology advances <sup>[3,4]</sup>. The process whereby nurses receive and review diagnostic information, make clinical decisions, communicate and socialize with patients and their relatives, and implement clinical interventions will be fundamentally modified with further integration of ICTs into nursing practice <sup>[5]</sup>.

There are many different forms that eHealth can take. It can involve: A telephone consultation between patient and a health care provider to triage symptoms, deliver instruction, monitor vital signs and provide guidance on the use of medication telephone or text on health promotion advice and management or appointment reminders patient-submitted health information using a mobile device for

example, a mobile phone or hand-held computer applications resulting in a referral or consultation appointment a remote consultation between a patient and doctor using video conferencing patient started interaction with practitioners local internet based support group with a chat room, blog or social network for sharing information with other users <sup>[6,7]</sup>.

#### 1.2. Technology in nursing education

Working with trajectories: The role of digital technology in higher education teaching and learning over the near term. Working with trajectories is an admission that we cannot predict the unexpected factors and developments that might affect the trajectory, quickening it or maybe derailing the trajectory entirely. Digital technology is the very fabric of nearly everything associated with teaching and learning. A core trajectory of digital technology in higher education is the shift away from thinking of it as Information Technology (IT) infrastructure and toward conceiving it as a digital learning engagement environment <sup>[8]</sup>.

#### 1.3. Technology and its Impact on Nursing Education

Nursing educators have to prepare clinicians to promote health and increase wellbeing, but the basics of nursing education need to be redesigned in many countries as technology, science, and the demands of the public for effective and responsive health care, become more complex. In some countries and regions nursing curricula are outdated, not preparing nurses for further practice. The technology has many benefits, but there are huge gaps in technology access and training in nurse

education and health settings, and challenges regarding the nature, cost, and high turnover of technology used in teaching-learning spheres. Other challenges include understandings about how technology influences on the well being of patients, clinicians, learners, and educators. Technological innovation and improved globalization are closely interlinked, and nursing education has to respond in a measured and carefully executed way, if it is to be relevant<sup>[9, 10]</sup>.

## **II. The Impact of Emerging Technology on Nursing Care**

There are many emerging technologies that will change the practice of nursing in the coming decade.

### **2.1 Genetics and Genomics**

Genetic testing is already being used for many reasons. Future applications of genetics and genomics will transform the health care system even further. By the year 2020 the health care system will have transitioned from one which fixed people after they were sick with one of preventive, diagnostic, genomic-based medicine where patients will be treated for conditions we know they are likely to develop. Despite these concerns, there is no doubt that Geno-typing and genetic sequencing will continue to significantly improve diagnostic and Interventional medicine. Gene therapy is expected to make significant inroads in curing cancer and preventing birth defects within the next two decades<sup>[11,12]</sup>.

### **2.2 Dimensional (3D) Printing**

Bioprinters, using a "bio-ink" made of living cell mixtures can build a 3D structure of cells, layer by layer, to form human tissue and eventually human organs for replacement [8]. Healthcare is just beginning to explore the limits of this technology. There are limits to the materials which can be used for printing and materials science is a laggard in 3D printing<sup>[13]</sup>.

### **2.3 Robotics**

Robotics can provide improved diagnostic abilities; a less invasive and more comfortable experience for the patient; and the ability to do smaller and more precise interventions. In addition, robots can be used as adjunct care providers for some physical and mental health care provision<sup>[14]</sup>.

### **2.4 Less Invasive and More Accurate Tools for Diagnosis**

There are several different types of less invasive meters being developed for monitoring blood glucose. One of these includes a sort of Nano-tattoo, and Symphony CGM System. It was developed by a medical device company with expertise in advanced skin permeation technology<sup>[15]</sup>.

### **2.5 Biometrics**

Biometrics is the automated recognition of individuals based on their behavioral and biological characteristics. It is a tool for establishing confidence that one is dealing with individuals who are already known (or not known) and consequently that they belong to a group with certain rights (or to a group to be denied certain privileges)<sup>[16,17]</sup>.

## **III. Impact of technology on nursing practice**

Information and communication technologies (ICTs) embody all digital technologies that support the electronic capture, storage, processing, and exchange of information in order to promote health, prevent illness, treat disease, manage chronic illness, and so on. In the health sector ICTs refers to a set of projects or services that allow for remote nursing care (Tele-health), interdisciplinary clinical support, as well as knowledge transfer<sup>[18]</sup>.

## **IV. Technologies that changed nursing forever**

### **4.1 Electronic IV monitors**

Drip detects sensor as introtek's optical technology, non-invasive designed sensor

measures the instantaneous drip rate by accurately outputting a pulse for each drop of liquid, the drip detects sensor is designed to be utilized as a technique for monitoring media flow rate during patient Iv infusion. The sensor can be used to enhance and improve processes in the following applications.

- IV infusion administration system
- Liquid dispensing
- Pharmaceutical manufacturing
- Clinical laboratory <sup>[19]</sup>.

#### **4.2 The Sphygmomanometer**

The accurate measurement and control of blood pressure are key elements in the prevention of cardiovascular disease and stroke. Mercury Sphygmomanometers, first developed over 100 years ago and largely unchanged since, are used in both hospital and ambulatory settings. They have been considered the "gold standard" blood pressure measuring devices from which treatment guidelines are developed <sup>[20]</sup>.

#### **4.3 Information management**

The health information management (HIM) profession is dedicated to the effective management of the patient information and health care data needed to deliver quality treatment and care to the public. The basic duties of the professional continue to evolve over time, as patient records become less paper-based and increasingly electronic. HIM professionals play a critical role in the successful implementation of electronic health records and ensure that providers, healthcare organizations and patients have access to the right health information when and where it is needed while maintaining the highest standards of confidentiality and security <sup>[21]</sup>.

#### **4.4 The portable defibrillator**

Electrical defibrillation is the only effective therapy for cardiac arrest caused by ventricular fibrillation or pulseless

ventricular tachycardia. Scientific evidence to support early defibrillation is overwhelming, being delayed from collapse to delivery of the first shock the single most important determinant of survival. If defibrillation is delivered promptly, survival rates as high as 75% have been reported. The chance of a favorable outcome decline at a rate of about 10% for each minute cardiac defibrillation is delayed <sup>[22]</sup>.

#### **4.5 Sturdy, portable IT devices**

Tablet computers and mobile wireless computer stations are now a standard part of the day-to-day methods of delivering care to patients. Charts are updated continuously, in real time, providing nurses with immediate access to essential patient information.

#### **4.6 Readily accessible base of information**

Wireless Internet connections quickly make reference materials available. This can prove very helpful for diagnosis, especially when using a resource like WebMD.

#### **4.7 The sonogram/ultrasound**

Ultrasound devices provide nurses working with pregnant patients the ability to see inside the womb. Ultrasound has been nothing short of revolutionary in the field of Women's Health and pregnancy, allowing nurses and doctors to noninvasively identify the health of the baby throughout pregnancy. Now, with the advent of 4-D ultrasound, unprecedented detail is available for diagnosing fetal well-being. In addition to pregnancy monitoring, sonogram technology also offers many other new diagnostic advances such as the ability to easily identify cancer tumors in the bladder, and to tell whether the liver is enlarged.

#### **4.8. Patient remote monitoring**

In addition to high-tech and ultra-sensitive vital signs monitoring equipment, web cams and other technologies make the close monitoring of multiple patients much

easier, changing how environments are staffed and operated.

#### **4.9 Compact, portable medical devices**

Combined with portable IT and communication equipment, these small, high-tech types of devices allow well-equipped nurses to take their skills on the road. They can travel to patients' homes and treat conditions that once had to be treated on an in-patient basis.

#### **4.10 Neo-natal nursing advancement**

New, more affordable portable devices for the care of tinier and more health compromised babies.

#### **4.11 Drug management technologies**

High-tech systems of medication retrieval and delivery, such as bar coding and verification, have greatly reduced the potential for dangerous error. Infusion equipment advances have made the delivery of slow-administer drugs much easier, with computerized machines able to control dosages and rates.

#### **4.12 Configurable nursing environments**

Configurable work spaces increase efficiency and safety, reduces stress, and prevents accidents and injuries.

#### **4.13 Learning technologies**

The availability of individual and off-site learning opportunities and degree programs, via specialized software and online classes, allows for more rapid career advancement.

#### **4.14 Video conferencing**

The ability to interact with nursing professionals throughout the world, through such means as video conferencing, offers advantages and opportunities like never before, both in terms of the further development of the nursing profession and the continued improvement in patient care outcomes.

#### **4.15 The blogosphere**

Medical technologies have brought changes to the process of life and death

and the role of the nurse. The Internet allows nurses to share their experiences and feelings. As technology transforms the profession, nurses adapt and change as well. The big question is: What will the rest of the twenty-first century bring?

### **V. Nursing and implementation of modern technology**

The application of modern technologies is an essential factor required for the advancement of nursing.

Health care itself and continuous monitoring of patients requires use of the information-communication system. However, the information -communication system is essential for efficient implementation of nursing documentation and effective providing of health care [23]. Information technology in health care involves the processing and application of information and easier access to the patient's history of care. Data entry, data conversion into useful information, and the application of data affecting the health care system are the factors included in this process. Nurses who provide direct health care are among other specialists, registered nurses with advanced practice, coordinators of care, visiting nurses, and health promoters and so on. In short, they are everywhere where nurses work [24,25].

### **VI. Informatics and technology in professional nursing practice**

Technology has increased rapidly over the past four decades, and has become an integral part of health care. Nurses have participated in the purchase, design, and implementation of information technology in health care. The knowledge required for the field of nursing informatics has expanded and it is now a recognized specialty in the profession. Nursing informatics are considered both a science and a system, including process and data. The term "nursing informatics" was initially seen in literature in the 1980s, including a

definition of combining nursing, information, and computer sciences for managing and processing data into knowledge for using in nursing practice [26]. Since the digitization of nursing records began in the late 1980s, a vast amount of data has been accumulated in electronic nursing records (ENR) systems, and there has been a heightened interest in collecting, sharing, and reusing patient information generated during nursing care. To effectively share and reuse data of ENR systems, ensuring semantic interoperability is a key factor. To ensure full semantic interoperability, one approach is to

document nursing records using a data model, such as a detailed clinical model (DCM) [27]. As the use of information technology in healthcare increases, the demand for healthcare professionals equipped with the necessary knowledge and skills for utilizing and managing information also increases (Figure1,2,) [28,29,30,31].



Figure (1)



Figure (2)

### VII. Conclusion

The use of technologies in nursing is not recent, these technologies change how nurses plan, deliver, document, and review clinical care; this will only continue as technology advances. The technology has many benefits, but there are huge gaps in technology access and training in nurse

education and health settings, and challenges regarding the nature, cost, and high turnover of technology used in teaching-learning spheres. To prepare nurses for the challenge of the complex, dynamic healthcare environment, the faculty envisioned curricula infused with technological innovations.

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