EAS Journal of Nursing and Midwifery
Abbreviated Key Title: EAS J Nurs Midwifery
ISSN: 2663-0966 (Print) & ISSN: 2663-6735 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-2 | Issue-1 | Jan-Feb-2020 | DOI: 10.36349/easjnm.2020.v02i01.007

Research Article

The Use of New Information and Communication Technologies in Nursing Practice

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Article History
Received: 04.01.2020
Accepted: 18.01.2020
Published: 27.01.2020

Journal homepage:
https://www.easpublisher.com/easjnm

Quick Response Code

Abstract: **Introduction:** Information and communication technologies (ICTs) have also invaded the health sector with many nursing departments being affected by their use. **Purpose:** The purpose of this review is to delve into the utility of various technological applications such as information and communication in supporting and providing patient health care in the hospital setting. **Methodology:** The study material consisted of articles on the topic found in Greek and international databases such as: Google Scholar, Mednet, Pubmed, Medline and the Hellenic Academic Libraries Association (HEAL-Link). The exclusion criterion for the articles was the language, except for Greek and English. Mostly, only articles and studies accessible to authors were used. **Results:** Information usually indicates an action, while not necessarily identifying a person, an object, or an abstract concept. It is a 'fact' that occurs in the field of interaction amongst thoughts, objects or additional information. The value of the information depends directly on the presence of a specially structured material database responsible for sharing it. Without the material basis and proper sharing service, the information becomes marginal regarding its ability to optimize outcomes and processes. **Conclusions:** Training and life-long education of the health personnel in the use of computers and ICT applications is a very important factor for the success of the whole project.

Keywords: Information and Communication Technologies, Patient, and Health Care.

INTRODUCTION

Information and communication technologies (ICTs) have also invaded the health sector with many parts of nursing care being affected by their use. The use of ICTs in health, also referred to as e-health, is a means of supporting health care delivery. (Huckvale *et al.*, 2010) The use of various technology applications in the hospital setting can significantly help employees, and especially nurses, as well as health care providers in general, improve the level of health care provided to patients. The contribution of this use is particularly significant and it contributes to the improvement of the various quality-related services in health indicators and parameters (Agranioti, 2017).

After all, a health system is a chain of many different health care providers. When providers and processes involved in a health system are gears of the same machine, the desired effect may be produced. It is understood that education as well as scientific and clinical research requires the immediate use of ICT for greater efficiency (Koupouros, 2015).

Health care providers around the world are constantly adopting various technologies to meet ever-increasing regulatory requirements for patient care and safety. Furthermore, they address the increasing need to reduce healthcare costs and the increasing need to improve the quality of care provided, while maintaining the operational effectiveness of healthcare organizations (Govette, 2016).

These technologies are changing the way nurses design, deliver, document, and review clinical care; this will only continue as technology advances. The processes by which nurses make and revise

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diagnostic information, make clinical decisions, communicate and collaborate with patients and their relatives, and implement clinical interventions will fundamentally be modified by further integrating ICT in nursing practice (Carrington, 2013).

There is a wide range of information and communication technologies used to support and provide health care. Mair *et al.*, proposed four general fields of e-Health that include a variety of ICTs such as management systems, communication systems, electronic decision support systems and information systems. Management systems allow for the acquisition, storage, transmission and display of administrative or clinical activities related to patients, such as e.g. electronic health records (EHRs) or electronic medical records (EMRs) (Majr *et al.*, 2009).

In general, education and lifelong training of health staff considering the use of computers and ICT applications is a very important factor in reducing errors and increasing the efficiency of their work (Kountzeris, 2009).

The ***purpose*** of this prospective study is to investigate the utility of various technological applications such as information and communication in supporting and providing patient health care in the hospital setting.

MATERIALS AND METHODS

The study material consisted of articles on the subject found in Greek and international databases such as: Google Scholar, Mednet, Pubmed, Medline and the Hellenic Academic Libraries Association (HEAL-Link), using keywords: information technologies and communications, patient, and health care. The exclusion criterion for the articles was the language, except for Greek and English. Mostly, only articles and studies accessible to authors were used.

RESULT AND DISCUSSION

GENERAL ATTITUDE TOWARDS HEALTH INFORMATION AND COMPUTER SYSTEMS

Information usually indicates an action, while not necessarily identifying a person, an object, or an abstract concept. It is a 'fact' that occurs in the field of interaction between thoughts, objects or additional information. "(Agranioti, 2017 & Tachtsoglou *et al.*, 2019).

The value of the information depends directly on the presence of a specially structured material database responsible for sharing it. Without the material basis and proper sharing service, the information becomes marginal concerning its ability to optimize outcomes and processes (Hayles, 1999 & Lera *et al.*, 2019).

The information mentioned in the field of health has several peculiarities in relation to information in other sciences. In medicine, as well as in other Health Sciences, processes of high complexity are observed, which refer to living organisms and their functions (Barda, 2016).

A health information system includes those activities which have the primary role of promoting, restoring or maintaining health "(WHO, 1998).

In a simpler form, the Information System receives data as input, which it processes them, and assigns them to the output of the system as information. In addition to coordination and control, along with the support that an information system offers in decision making, it is able to assist health care staff and executives in visualizing the various issues presented, in analyzing the various problems (Kelley, 2011).

After all, the complexity in the field of health sciences is supposed to be evidenced even, for when describing a function or some property of the human body, concepts of other sciences, such as mathematics or physics, are used. Abstract concepts are also used such as the concept of perception, consciousness, psychology or behavior, as well as other complex issues for which basic sciences have not yet been able to interpret them (Christodoulou, 2017).

The rapid development of technology has, moreover, contributed to the development of ICT. In this way, it is taken advantage of all possibilities offered by the use of the Internet. As a result, new challenges have arisen to pursue the proper and efficient functioning of public enterprises, and public hospitals in particular.(Koumpouros, 2015).

Moreover, there is a need at a national and pan-European level for a public hospital to be able to meet all the needs and issues of all social groups. Therefore, the introduction of integrated information systems is considered necessary to strengthen the whole health system. Despite the large number of promising technologies as well as the benefits of using them, the experience internationally has shown many difficulties in adopting them in daily clinical practice so far. (Apostolakis *et al.*, 2007 & Tachtsoglou *et al.*, 2019)
ICTs should therefore be used in the health sector with the main purpose to (Koumpouros, 2015):

- Reduction of operating costs when providing clinical services.
- Provision of completely new forms of health care.
- Increase of the efficiency and quality of health care.
- Reduction in management costs.

However, achieving the desired result requires appropriate applications and tools that will be linked to each other and to the core services.

INFORMATION AND COMMUNICATION TECHNOLOGIES TOWARDS PATIENT CARE

Communication systems can be used for a variety of purposes such as diagnosis, management, counseling, education or support. They can be applied to facilitate communication amongst healthcare professionals or between healthcare professionals and patients. There is a wide range of communication systems, ranging from email and mobile phones to telemedicine and tele-healthcare systems. Decision support systems are automated systems accessible from various devices, such as computers, mobile phones or personal digital assistants (PDAs) (Iakovidis, 2000).

They support decision making for healthcare professionals and may help them practice within clinical guidelines and care plans. Information systems, such as Web-based resources and e-health portals, refer to the use of Internet technology to access health-related information resources (Rouleau, 2017).

According to the review conducted by Rouleau *et al.,* much of the provision of nursing care appeared to be affected by the use of ICT; time management, time dedicated to patient care, time spent on documentation, quality and access to information, quality of documentation, information updating and utilization, nursing autonomy, nursing and inter-professional cooperation, nurses' abilities and skills are also included (Rouleau, 2017).

What's more, nursing includes the nurse-patient relationship, evaluation, planning and evaluation of nursing care, teaching patients and their families, communication and coordination of care, prospects for quality of care provided, satisfaction or dissatisfaction. ICT nurses and patients, the comfort and quality of life of the patient in relation to their care, empowerment and functional status (Riley, 2016).

The initiation of computers into hospital setting and the installation of Hospital Information Systems (HIS) cannot only rely on the supply of suitable machinery and software but it should be given the utmost importance to end users, without whom, no machine can operate and deliver any results as expected. A positive end-user attitude is a prerequisite for successful implementation of Hospital Information Systems (HIS). The most crucial end-users are nurses. That is the reason why a number of studies have been conducted to study their attitude towards the use of computers in the hospital setting (Ameryoun *et al.*, 2017).

As some surveys have highlighted, various factors can influence nurses' attitudes such as age, years of service, level of education and previous experience in using computers. Brumini *et al.,* revealed in their research that the level of education along with computer training and previous experience in their use are the most important parameters that substantially contribute to the development of positive attitudes towards their use in the hospital setting (Brumini *et al.,* 2005).

The age of nurses has been a factor in differentiating nurses' attitude towards computer use in the research of Kipturgo *et al.,* it showed that nurses under 40 possess a more positive attitude than those older than 40. On the contrary, the parameter working experience did not appear to significantly affect nurses' attitude toward computer use (Kipturgo *et al.,* 2014).

Ifinedo found in a study carried out in Canada that neither the age nor the nurses' backgrounds were factors that could influence their attitude towards using computers in their workplace. On the other hand, the level of nursing education of and previous experience in using computers were factors that could positively influenced the perceived ease of computer use in the workplace and, hence the attitude of nurses and their intention to use them. Their attitude was generally positive (Ifinedo, 2017).

Positive attitude was also recorded by the nurses who participated in the Kaya's research where there was a significant difference in their attitudes depending on age, marital status, education, job position, computer experience, duration and location of computer use (Kaya, 2017)

Additionally, the level of education appeared to influence nurses' attitude towards computer use in the study conducted by Kipturgo *et al.,* where those with a higher level of education had a more positive attitude towards their use. It was also found that nurses who used computers for a longer period (at least 3 years) had a more positive attitude toward their use. This can be explained by the fact that the use of computers improves them. This can be explained by the fact that using computers improves users' skills, and thus, it leads to a more positive attitude towards their use (Kipturgo *et al.,* 2014).

Nevertheless, Garland and Noyes's found out in their research that previous computer experience was not an important predictor of positive attitude toward their use. (Garland, 2004) Antithetically, increased experience in computer use was the main factor that shaped nurses' positive attitude towards their use in Huryk research (Huryk, 2010).

Nurses who participated in the research of Kipturgo *et al.,* believed that computers were related to the science of nursing; they were even aware of the benefits of computers in their professional practice. As a result, it seemed to influence their attitude, which was generally positive (Kaya, 2011).

In a study carried out by Tsoromokos *et al.,* where the nurses' attitude ranged from neutral to positive towards the use of computers and general information systems (IS) in the hospital setting regarding the improvement of the care provided. It was claimed, based on the results of the research that the use of computers could improve the quality of care provided. (Tsoromokos *et al.,* 2014) Nurses had a neutral attitude regarding the potential benefits for the hospital and the possible reduction in the number of jobs provided. In other words, they did not observe any benefit arising from using computers and Information System in the hospital setting; nurses appeared uncertain about the possibility that computer use might threaten their jobs. Finally, their attitude was neutral to positive not only in terms of increasing the efficiency and capability but also of the legal responsibility of the nursing staff. To put it simply, they believed that using computers and PCs could help them increase both their efficiency and their legal responsibility. Nurses' attitude towards the use of computers in the hospital environment is changing (Malliarou, 2009).

However, some concerns that may affect nurses' attitude towards using computers in their workplace are arising such as poor system design, system slowdown, and possible system downtime. Nurses also fear that using technology will industrialize patients' care (Huryk, 2010).

The findings of the systematic review of Moloney and Becarria provided credible evidence that the flow of information and real-time decision-making by nurses is enhanced by the use of PDA in a clinical setting. It was clarified that that technology is able to play a particularly important role in nurses who are still interested in their education. The support of this nursing team would be fundamental, and therefore the additional support provided by the use of technology appears to enhance critical thinking skills and the ability to analyze information-based practices. (Moloney, 2009) Wireless connection to the World Wide Web can extend the range of information available to nursing staff and promote a safer and more therapeutic environment. E-learning through the use of this technology seems to have great potential as it can significantly increase nurses' access to educational resources (Pavlatou, 2012).

CONCLUSIONS

Significant technological developments have taken place in recent decades whereas nowadays there is a real potential to apply these technological developments to improve healthcare provision worldwide. (Huckvale, 2010) It is essential policymakers be aware of the technological developments and innovations available and make use of appropriate technologies at all times, taking into account the positive experience of other countries and institutions that have implemented them and the specific characteristics of their patients and the organizations they manage so as to optimize the quality of services provided to patients. (Vangelatos, 2005) Indeed, education and lifelong training of health personnel in the use of computers and applications of Information and communication technologies (ICTs) is a most vital factor for the success of the whole venture.

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