

THE APPLICATION OF INFORMATION TECHNOLOGIES IN THE PROCESS OF NURSING CARE

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Healthcare professionals are witnessing numerous innovations and technologies that have made it possible to perform more complex diagnostic procedures, treatments and numerous multidisciplinary researches.

This paper presents the importance of information technology from the aspect of its applicability in the process of nursing.

A systematic review of quantitative studies published in the Serbian Library Consortium for Coordinated Acquisition (KOBSON).

The use of information technologies significantly improves the work of healthcare institutions. In addition to the application in the nursing process, proper design and implementation of information technology should contribute to significant improvement in the education and research work of nurses.

The use of information technologies is essential in the daily work of nurses in the health care process.

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Key words: health care, information technologies, education, scientific research

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Introduction

Independently or in a team work, nurses are constantly working to promote and improve health, to treat and rehabilitate patients, provide health care, as well as organize and provide continuing education. Therefore, the success of a nurse's work depends not only on the application of nursing care, but also on the ability to apply modern technology, which helps the advancement of the nursing profession through continuous learning and improvement.

Nursing care process

In the professional literature, Nursing Health

Care is cited as a basic discipline in nursing theory and practice within which a system of specific nursing knowledge and skills is studied (1). It is also implemented in all forms of organization of health, social and child care, including private practice (2). Medical and nursing records can be defined as documents created in healthcare institutions (3). A broader concept of documentation is found in the law of the Republic of Serbia, according to which health documentation is defined as:

- patient and population health monitoring document;
- fulfilling the obligations of all health care entities;
- environmental risk factor and assessment of their impact on population health;
- health care resource;
- continuous improvement of the quality of health care;
- financing health care;
- health care planning and programming;
- monitoring and evaluating the implementation of health care curriculum;
- conducting statistical and scientific research;
- informing the public;
- fulfillment of international obligations in the field of health care and for the development of health care and health insurance systems.

From this it follows that health institutions, private practices and other legal entities are obliged to keep health records, in the manner and according to the procedure and within the deadlines set by this law. Health records can be kept in written or electronic form (4).

Nursing care users are primarily patients with impaired medical conditions, but they may also be healthy patients who can be influenced by the nurse to preserve and prevent diseases in the area of their competence (5).

Nursing health care can be interpreted as a standard based on the rules of the profession (6). In order to implement care procedures as soon as possible, standards and criteria need to be set (7).

There are several defined stages through which the nursing care process takes place:

- identifying nursing care needs
- making a nursing diagnosis
- planning
- performing care and
- evaluation of the results achieved (1).

Collecting data in the health care process is the first stage in the patient's health (8). The implementation of the process is shown in Table 1.

Table 1. The nursing care processes supported by data collection

Better organization, systematization and implementation of healthcare
Provision of individualized and problem-oriented healthcare
Flexibility in care - fast adjustment of care to the changing needs of users and conditions
Active participation of users in the care, protection and promotion of health
Documenting all stages of work in health care
Continuity in healthcare delivery
Better coordination within the nursing team, and implementation of the process provides cost-effective care
Better communication and better coordination of nurses with physicians and health and other professionals

Objective

This paper presents the importance of information technology from the aspect of its applicability in the process of nursing.

Method

A systematic review of quantitative studies published in the Serbian Library Consortium for Coordinated Acquisition (KOBSON).

Results and discussion

Application of information technologies

Information technology is a term that describes computers and related technologies (9).

Medical or health informatics is a discipline that deals with the theory and practice of information processes in medical work and is first mentioned in the 1970s in Europe. Information processes include data transfer, i.e., data processing, development of methods that can be used in a more efficient, reliable and economical way to use medical data, knowledge, information sharing and can make it accessible to a wide range of medical users through computer networks. Because of all of the above, information technologies are a modern tool for medical informatics (10). Information technology

is global, and as a result, the amount of information available is increasing (11). Today, in the 21st century, attention has been focused on improving the quality of overall health care (12). Proper use of the medical information system should contribute to the advancement of education and research (13).

Medical informatics is an interdisciplinary science that is also linked to medical records and other disciplines in and out of medicine. In order to avoid misuse of patient data and impairment of quality of life, all data must be protected (14).

Medical information is said to be an integral part of the information system, which is why computer scientists need to provide a secure system for implementation, and make it available to certain healthcare providers. The introduction of information technology into the healthcare system is an important segment that helps to rationalize healthcare resources. This enables healthcare institutions to plan well and provide adequate treatment at any-time, anywhere (15). Nurses use data in all workplaces, both in decision-making in nursing process and for management purposes.

It is of particular importance to emphasize the quality of the data used by nurses, because information that is inaccurate and incorrect can cause harm (16). In their professional work, they face the challenge of applying information technology in the nursing care delivery process (17).

An effective healthcare system must be seriously designed and must use modern information, electronic and telecommunication achievements. According to the World Health Organization definition, healthcare system is a part of a general information system and involves a mechanism for collecting, processing, analyzing and receiving information required for the organization and delivery of health care, as well as for research and organization in healthcare (15). Health information systems are one of the most important trends in health care development, as the possibility of reducing health services prices, conducting quality control and increasing efficiency of health care.

The importance of application of information technologies in the nursing process

The use of modern information technology such as electronic health, telehealth, telemedicine etc. is widespread (18).

Citation in the literature indicates that in medicine, 5,000 types of medical information-communication-technical devices are used to provide about 1,000,000 health care services. Technology is thought to improve health care efficiency and safety, but can also lead to errors and adverse events if not used in accordance with regulations (19).

The use of modern information technology in healthcare according to some authors enables: access to the healthcare system using mobile devices, functions designed for patient management, diagnostics and therapy via the Internet, automation of the health system and management system, delivery of health services based on the application of information technology, relocation of the healthcare system in the Internet environment, as well as the implementation of an electronic way of conducting business processes within healthcare institutions to increase efficiency and reduce costs (18). Nurses need the knowledge, skills and equipment to use informatics and data to achieve better quality of healthcare services and performances in workplace (16).

Healthcare computerization is implemented in several ways, and one of the basic forms is computer equipment, nursing organization and nursing education. The organization enables the available resources to be applied, and the training empowers the nurses to plan, implement and evaluate, thus facilitating communication and accessibility of information, regardless of physical distance (8).

In countries with advanced information technologies, numerous programs are being implemented for patient care and care processes, nursing education, nursing scientific research, and improving nursing service organization. The nursing care process has proven to be very suitable for the application of information technology and it is precisely in the countries in which it is applied that they achieve significant quality of healthcare care (20).

In the world, the nursing care information system is defined as a priority and has six goals:

1. Nursing Dictionary Development
2. Establishment of a clinical database
3. Develop an information system to support measures for patient care
4. Developing a decision support system based on patient care
5. Development of nurse work units of the information system associated with the integrated information system
6. Develop methodologies that evaluate the impact of the information system on the development of health care and patient/user care (7).

The electronic method of record keeping enables the evaluation of nurses' work and the quality of services provided (20). According to some authors, a classification was made shown in Table 2.

The proper functioning of the health information system requires the application of technical, technological infrastructures, education, ethics and legislation (17). According to the requirements of the World Health Organization, education of a nurse in the field of informatics should enable all of the following in Table 3.

Table 2. Classification of nursing care by technology application

1.	Care with direct application of technology
2.	Care with the indirect application of technology
3.	Communication technologies
4.	Patient and Nurse Assistance Devices
5.	Diagnostic and monitoring devices
6.	Remote monitoring device
7.	Teaching Aids
8.	Identification systems

Table 3. Presentation of the World Health Organization's IT requirements for nursing education

Selection of information for health care planning, implementation and evaluation
Application of research findings relevant to nursing practice
Independence in solving problems related to nursing practice
Participation in the organization and development of nursing care
Participating in training and monitoring of others
Valuing your own work achievements
Collaboration with all institutions that contribute to the well-being of individuals, family, community
Understanding Ethics in nursing care and its impact on nursing practice
Application of current legal regulations in the implementation of nursing care
Tracking changes that affect nursing care delivery

The application of information technologies in nursing contributes to better rationalization and organization (20). Nurses must embrace, understand and apply the concept of information technologies in the nursing healthcare process (21).

The importance of practical implications and research

Nurses need to participate in the selection of technologies and equipment, and should test and give their opinion on what is best for patients (19).

The application of monitoring in hospital conditions is very important, which implies continuous monitoring of vital functions of patients. The alarm systems within the monitoring record changes in the set parameters and alert healthcare professionals about various disturbances.

The use of pulse oximetry and electrocardiography (23) is significant in pre-hospital conditions, on the field, in the ambulance, and during transportation. Information technologies are becoming indispensable in large healthcare institutions (22).

Planning for the introduction of a central information system in the future will enable faster and better communication between all health profiles, regardless of physical distance, faster dissemination of data and better information exchange. All this will enable the integration of information systems into a single, centralized system (8). Nurses around the world use health portals to promote questions related to their field of work in health promotion. The health facilities on their websites contain a 24-hour nurse contact who is in charge of educating patients and families (24).

Through day-to-day work and contact with new technologies, nurses have a significant role in the early detection of errors during nursing care process, and are required to report adverse events and incidents that may contribute to patient illness, injury, or death.

One example of modern technology is electric lifts that assist them through transfer during various interventions. If the lift fails because the batteries are not sufficiently charged, the nurse is at risk of injury, as is the patient. At the suggestion of the nurse, the manufacturer installed an alarm and battery indicator, which contributed to safety (19). They must also have sufficient knowledge and skills regarding the technology they use (22).

Every healthcare institution is obligated to improve nursing care through the use of information technology (19).

Conclusion

Law and the profession require the nurse to document procedures in the implementation of the nursing process, so that work can be monitored and evaluated, in order to allow ongoing monitoring of the patient and to prevent unnecessary duplication of data. The application of information technologies increases the quality and efficiency of work, reduces the possibility of error, saves time and costs and thus provides high quality nursing care.

The application of medical information technologies is very important in the process of education of students, medical staff, patients and their families. They are also widely used for research and professional development purposes.

References

1. Tijanić M, Tijanić M, Đuranović D, Rudić R, Milović Lj. Zdravstvena nega i savremeno sestrinstvo. Beograd: Naučna KMD;2010.
2. Komora medicinskih sestara i zdravstvenih radnika R. Srbije. Nacrt Zakona, uredbe, pravilnika o sestrinstvu. [citirano 2018 decembar 28] Dostupno: <http://www.kmszts.org.rs/akti/nacrt.pdf>
3. Vižintin K. Uloga bolničkog povjerenstva u stvaranju pravila za upravljanje elektroničkom medicinskom i sestriškom dokumentacijom. Acta Med Croatica 2014;68:61-4. [[CrossRef](#)][[PubMed](#)]
4. Republika Srbija. Zakon o zdravstvenoj dokumentaciji i evidenciji u oblasti zdravstva.[citirano 2018 decembar 28] Dostupno:https://www.paragraf.rs/propisi_download/zakon-o-zdravstvenoj-dokumentaciji-i-evidencijama-u-oblasti-zdravstva.pdf
5. Vlasiavljević T. Sestrinstvo odraz u ogledalu. Inspirium2015; 14: 51-53. [[CrossRef](#)]
6. Babić D, Vico M. Sestrinska dokumentacija kao indikator zdravstvene njege. U: Pavić J, Turuk V. Zbornik radova konferencije " Hrvatsko sestrinstvo ususret Europskoj uniji ", Opatija,2011;31-9.[[CrossRef](#)]
7. Bošković S, Milovanović V, Polak S. Primena dobre prakse zdravstvene nege – preduslov za povećanje kvaliteta u zdravstvenoj nezi. Tehnika - Kvalitet, standardizacija i metrologija2008;8(4):9-15. [[CrossRef](#)]
8. Kurtović B, Bile-Grgas C, Kundra D. Informatizacija zdravstvene nege. Acta Med Croatica2014;68:55-9. [[CrossRef](#)][[PubMed](#)]
9. Dačić M. Biomedicinska naučna i stručna informatika. Beograd: Medicinska knjiga; 1988.
10. Deželić G. Medicinska informatika-nastanak naziva i njegovo značenje. Medix 2004;10:54-6. [[CrossRef](#)]
11. Cvekan P. Informatičke tehnologije ikomuniciranje. Polit Misao 1998;35(2): 235-43. [[CrossRef](#)]
12. Aleksijević A. Stavovi medicinskih sestara prema uporabi računala u zdravstvenoj njezi. Sestrinski glasnik2015;20(2):110-14. [[CrossRef](#)]
13. Janković D, Rajković P, Stanković T, Milenković A, Kocić I. Primjena medicinskih informacionih tehnologija u edukaciji i istraživanjima u medicini. Acta Med Medianae2012;51(1):73-80. [[CrossRef](#)]
14. Ivanešić D. Mišljenja medicinskih sestara/tehničara o čuvanju profesionalne sestriške tajne s obzirom na razvoj informatičke tehnologije (Diplomski rad). Osijek; 2016. [[CrossRef](#)]
15. Anđelić S, Kostić L. Virtualni timovi u telemedicini. Infotehn-Jahorina 2012; 11:709-14. [[CrossRef](#)]
16. Režek B, Benceković Ž. Informatički aspekti primjene sestriške dokumentacije u praksi. U: Pavić J, Turuk V. Zbornik radova konferencije " Hrvatsko sestrinstvo ususret Europskoj uniji ", Opatija,2011;31-9. [[CrossRef](#)]
17. Kern J. Informacijske i komunikacijske tehnologije u sestrištvu. Acta Med Croatica 2014;68:3-5. [[CrossRef](#)][[PubMed](#)]
18. Milović B. Informaciono komunikacione tehnologije u zdravstvu i u razvoju E- Health-a. [[CrossRef](#)]
19. Rauche. Osnove informatike i tehnologije u sestrištvu. [citirano 2018 decembar 28] Dostupno:<http://www.rauche.net/izdanja/broj-1/osnove-informatike-i-tehnologije-u-sestrištvu/>
20. Informatika u sestrištvu - program MONEZIS. [citirano 2018 decembar 28] Dostupno:<https://wordpress72416.files.wordpress.com/2016/11/modul-nege-monezis.pdf>
21. Marinković FM. Kontinuirana odgovornost za profesionalnost i informacijsku pismenost medicinskih sestara. Acta Med Croatica 2014;68:33-6. [[CrossRef](#)][[PubMed](#)]
22. Sivić S. Osnovi zdravstvene informatike. Zenica: Zdravstveni fakultet Univerziteta u Zenici;2014. [[CrossRef](#)]
23. Janković R, Stamenković D, Budić I, Bradić Ž, Bojičić-Petrov I, Kalezić N. Monitoring vitalnih funkcija u urgentnom zbrinjavanju. U: Kalezić N, editor. Inicijalni tretman urgentnih stanja u medicini. 1st. Beograd: Medicinski fakultet Beograd; 2013.p.221-36. [[CrossRef](#)]
24. Kičić M. E-zdravlje – Savjetodavna uloga medicinskih sestara. Acta Med Croatica2014;68:65-9. [[CrossRef](#)][[PubMed](#)]

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PRIMENA INFORMACIONIH TEHNOLOGIJA U PROCESU ZDRAVSTVENE NEGE

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Zdravstveni radnici svedoci su brojnih inovacija i tehnologija koje su omogućile izvođenje složenijih dijagnostičkih postupaka, lečenja i brojnih multidisciplinarnih istraživanja.

Ovaj rad predstavlja značaj informacione tehnologije, sa aspekta njene primenljivosti u procesu zdravstvene nege.

Dat je sistematski pregled kvantitativnih studija, objavljenih u Konzorcijumu biblioteke za objedinjenu nabavku (KOBSON).

Upotreba informacionih tehnologija značajno poboljšava rad zdravstvenih ustanova. Pored primene u sestrinskom procesu, pravilno oblikovanje i primena informacionih tehnologija trebalo bi da doprinesu značajnom poboljšanju obrazovnog i istraživačkog rada medicinskih sestara.

Upotreba informacionih tehnologija od suštinskog je značaja u svakodnevnom radu medicinskih sestara u procesu zdravstvene zaštite.

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Ključne reči: zdravstvena zaštita, informacione tehnologije, obrazovanje, naučna istraživanja