

Perioperative Electronic System

A New Approach for Perioperative Nursing Performance

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Keywords: Electronic Health Records, Perioperative System, Performance.

Abstract: Nowadays, IT and informatics are permanently and highly integrated into the delivery of quality health care and in the perioperative care is no exception. At Dr. Nélio Mendonça Hospital the implementation of a perioperative electronic system was a major step. The purpose of this study was to contribute to the perioperative nursing care improvement by recreating innovated nursing practices through the conception and implementation of a perioperative electronic system. Before the perioperative electronic system implementation in the OR only 1,2 % of the nurses registered the preoperative visit and after its implementation 87,6 % of the nurses registered it. The patient features assessed exhibited inferior anxiety levels (1st group: 13,72/ 2nd group: 10,97) and lower pain levels in the preoperative stage (1st group: 2,66/ 2nd group: 1,19), intraoperative stage (1st group: 2,05/ 2nd group: 0,72) and postoperative stage (1st group: 4,5/ 2nd group: 0,45) after the implementation of the perioperative electronic system (p-value <0,05). The results indicate that this system was beneficial to the nurses and to the surgery patients.

1 INTRODUCTION

According to World Health Organization (WHO), information and communication technologies (ICTs) have great potential to improve health in both developed and developing countries by enhancing access to health information and making health services more efficient. They can also contribute to improving the quality of services and reducing their cost. Patient information systems have the ability to track individual health problems and treatment over time, giving insight into optimal diagnosis and treatment of the individual as well as improving the delivery of services and care. An opportunity emerges to centre the patient in the care sphere, ensuring security, efficiency, accessibility and quality, in health assistance. Soon, ICT will establish fast and effective communication among stakeholders, providing information and producing knowledge and we all will benefit from its implementation.

2 BACKGROUND AND SIGNIFICANCE

The perioperative background is a unique environment that includes many challenging variables: complex clinical care performed by teams, high cost, sophisticated technologies that often do not interoperate and a large array of supplies, instruments, and implants that are difficult to manage. These variables create a setting of massive complexity and are a source of a significant percentage of patient safety-related adverse events (Jacques and Minear, 2008).

Surgical procedures are often the most intensive and efficacious therapeutic interventions available in medicine and these treatments are frequently curative and are sometimes the only alternative for patients. Surgeons and other professionals are highly trained in the technology and resources that they employ are typically advanced, expensive and scarce. So the optimization of these limited resources is paramount to the safe, effective, and efficient delivery of healthcare (Doebbeling *et al.*, 2012).

Perioperative information technology has the potential to improve the quality of health care, reduce costs, decrease medication administration errors, reduce time spent on paperwork, increase management efficacy and allow affordable access to health care. Researchers concluded that IT or automation of aspects of the surgical patient preparation process and the coordination and management of surgical equipment has the potential to increase the speed of information exchange, reduce interruptions to clinicians and decrease the possibility of adverse events in the perioperative setting. With migration to the use of an electronic health record (EHR) in the operating room (OR), time that nurses previously spent on paperwork and administrative functions can be dedicated to providing better patient care and ensuring accuracy in documentation (Sweeney, 2010).

2.1 Electronic Health Record

The electronic health record (EHR) is a particular document consisting on a set of information, signs and images recorded, generated from facts, such as, events and health situations; the assistance he provided and can be of legal character, confidential and scientific, enabling communication between the members of the multidisciplinary team and continuity of care to the client. HER systems have the potential to transform the health care system from a mostly paper-based industry to one that utilizes clinical and other pieces of information to assist providers in delivering higher quality of care to their patients (Menachemi and Collum, 2011).

The use of the EHR in the perioperative set offers great advantages to the perioperative team through the creation of accessibility of all patients' information in one location. Additionally, for many patients, the perioperative setting is the initial entry point into the health care system, either through scheduled or unscheduled surgery. Correct and efficient use of the EHR can improve communication throughout the system and help create a safer and more efficient patient-centered experience. Additional advantages of EHR use in the perioperative setting include clear communication of information to other departments and effectively capturing workload, standardize perioperative nursing procedures, optimize the OR management process, adapt the nursing interventions to the patient needs, improve the quality of *customer service* in the OR. Patient care is enhanced and improved when information can be easily accessed. In addition, there is less repetition of patient

information gathered and included in documentation. These advantages aid in the provision of safe handoffs, leading to safe patient care and improved communication throughout the health care system. These advantages also address the exposed gap involving the transfer of care that takes place every day as patients move in and out of the operative areas (Yontz *et al*, 2015).

This trend will continue as improvements are made in computer hardware, software, and telecommunication infrastructure and as countries develop the skills necessary to implement electronic data storage and transmission systems (WHO, 2012).

3 STUDY PURPOSE

Contribute to the perioperative nursing care improvement by recreating innovated nursing practices through the conception and implementation of a perioperative electronic system.

4 STUDY OBJECTIVES

Construct and implement a perioperative nursing electronic system at Doctor Nélio Mendonça Hospital;

Evaluate health gains through the application of a dynamic and holistic model created for surgery patient features and perioperative nursing practices;

Calculate perioperative nursing production and quality indicators.

5 METHODOLOGY

5.1 Sample and Setting

The setting for this project was the OR at Dr. Nélio Mendonça Hospital.

Perioperative nurses and surgery patients divided in two stages: before and after the implementation of the electronic system were the targeted populations for this project.

This sample population was considered as causal or as a matter of convenience and it was characterized as non-probabilistic. The 113 nurses were divided in two groups: the 1st group had 83 nurses and 2nd had 30 nurses. These nurses came from all areas of operative services. All the nurses were invited to participate in the study. Inclusion

criteria for the sample included the following: must be a perioperative registered nurse.

There was a second sample of 460 surgery patients also divide in two groups with 230 patients in each one. Inclusion criteria for this sample included patients with 65 years old and more for elective surgery with no signs of cognitive deficit.

5.2 Design

An observational, quantitative and descriptive survey design was used to determine perioperative nursing practices towards the use of the electronic system in providing.

Regarding the surgery patients, a correlational and longitudinal study design was performed to evaluate health gains.

5.3 Data Collection

An observation grid was prepared for the perioperative nurses in the intraoperative, postoperative and preoperative stages. For the surgery patients, a questionnaire was used to gather demographic data, clinical data, the Amsterdam Preoperative Anxiety and Information Scale (APAIS), Spielberg State-Trait Anxiety Inventory (STAI), postoperative pain, pressure ulcers, the Barthel scale and the risk of falling.

5.4 Preparedness Planning

5.4.1 Electronic Perioperative System Creation and Implementation

First of all, for the Electronic Perioperative System conception and implementation a task force was gathered, including surgeons, anesthesiologists, nurses and computer engineers.

The main stages included:

- Presentation of the Perioperative Electronic System to surgeons, anaesthetists, perioperative nurses and others involved in the surgical process;
- Clarification of its implementation;
- Elucidation of the advantages of improving assistance care, with greater security to the surgical process, not only for the patient, but also for health professionals and units;
- Alert to the importance of this system as a knowledge management tool, innovating and developing the perioperative process by gathering production, structure, process and outcome indicators.

A literature review on perioperative nursing was performed with special consideration for external / internal norms, guidelines and mandatory protocols inherent to the OR and perioperative nursing records from imperative organizations (DGS, ACSS, Dr. Nélio Mendonça Hospital) to assure its execution.

The intervention strategies established periodic meetings with the different intervening areas; training session's development for surgical services nurses in the OR and in the "Perioperative Nursing" situation; monitoring and evaluating perioperative electronic system procedures; continued adjustment and development and confidentiality concerning the use of clinical data.

This system was designed with a specific layout, for the surgical procedure which gathers the main stages: intraoperative, postoperative and preoperative processes. This system implementation led all professionals like surgeons, anaesthesiologists, nurses and other technicians to work in an organized manner in one platform, with more detailed, standard, completed and updated procedures following Direção Geral da Saúde guidelines and policies. New data was registered like patients surgical times, which were not yet accounted for, surgical safety checklist was also filled, with direct connection to the national database, surgical infection HELICS epidemiological surveillance, updated waiting lists and others, and therefore suitable for perioperative reality.

5.4.2 Perioperative Nurses Observation

In the preoperative stage a preoperative visit was conducted and applied a preoperative checklist (service and block) observing the patient reception at the OR and recorded registration.

In the intraoperative stage the action plan continuity, nursing diagnoses and record registration were observed.

In the postoperative stage the post anaesthetic care, postoperative visit and record registration were observed.

5.5 Statistical Methods

The statistical methods used descriptive measures, T-Student teste for independent samples and One-way Anova. The statistical package was IBM SPSS 22.0 and the significance level $\alpha=0,05$.

5.6 Ethical Procedures

The perioperative nurses were informed before the observation was conducted and given their written

and informed consent. To the surgery patients was assured anonymous participation and given their written and informed consent. They were also informed about the importance of the study.

6 FINDINGS

The study principal results showed that before the perioperative electronic system implementation in the OR only 1,2 % of the nurses registered the preoperative visit and after its implementation 87,6 % of the nurses registered it.

In the intraoperative stage, before the perioperative electronic system implementation in the OR the nursing plan was registered by 62,7% nurses; there was no register about the security checklist and time indicators like the operative times. After the electronic system implementation the nursing plan was registered by 96,7% of the nurses, security checklist and operative times was recorded by 100%.

In the postoperative stage, before the perioperative electronic system implementation in the OR the acute pain monitoring was not registered and the register of the postoperative visit was recorded by only 4,8% of the nurses. After the electronic system implementation the acute pain monitoring and the postoperative visit was registered by 86,7% of the nurses.

Note that the register made before the electronic system was on paper.

The surgery patients were mostly women (1st group: 57,8%/ 2nd group: 63%) between 65 and 69 years old (1st group: 36,5%/ 2nd group: 30%). The surgery performed was mainly major (1st group: 70%/ 2nd group: 78,7%) with general anaesthetic (1st group: 58,7%/ 2nd group: 59,1%). The medium time of surgery was 2 hours and 58 minutes in the first group. In the second group was 3h and 2 minutes.

The different patient features assessed exhibited that after the implementation of the perioperative electronic system the anxiety levels (1st group: 13,72/ 2nd group: 10,97) monitored and the falling risk (1st group: 57,0%/ 2nd group: 48,3%) were lower than before (p-value <0,05). The pain level observed in the preoperative stage (1st group: 2,66/ 2nd group: 1,19), intraoperative stage (1st group: 2,05/ 2nd group: 0,72) and postoperative stage (1st group: 4,5/ 2nd group: 0,45) were inferior too (p-value <0,05).

7 DISCUSSION

The purpose of this study was to develop and implement a perioperative electronic system at Dr. Nélio Mendonça Hospital OR. The records in paper form were now computerized. By assessing health gains through the application of a dynamic and holistic model created for surgery patient features and perioperative nursing practices the results indicate that the perioperative electronic system was beneficial to the nurses and to the surgery patients. The new registry units interdisciplinary in the perioperative period was achieved like recorded operative times, which were not counted in the patients, surgical safety checklist application, direct link to the national database, epidemiological surveillance of surgical site infection HELICS-Surgical Site Infection, updated waiting lists and others.

Perioperative nursing practices included preoperative visit, hospitalization, intraoperative interventions, postoperative visit, monitoring of postoperative acute pain and anxiety levels which were lower than before implementing the perioperative electronic system.

With the reorganization and compilation of various components and instruments, professionals cooperated by resolving many problems, never discussed before, and that, in a way, converged for the quality assurance and safety of perioperative care conditions, for all the intervenient.

8 CONCLUSION

Perioperative care is complex and involves multiple interconnected subsystems which are a microcosm of the hospital. Delayed starts, prolonged cases and overtime are common. Surgical procedures are major drivers of patient morbidity, mortality, satisfaction, and overall hospital costs and profitability. These challenges in perioperative and surgical care are overwhelming. To fulfill the promise of new informatics and technology approaches, a dramatic change is needed in how technology is designed, deployed, and supported within the perioperative environment. Technology that is designed expressly for and adequately tailored to the demands of the perioperative care process and requirements will result in optimal clinical adoption and outcomes. New digital equipment can decrease surgery time and created a safer environment for both patients and staff members. Through the design

and implementation of such systems, the perioperative process can help maximize improvements to safety, patient and clinician satisfaction, and ultimately the success of this highly complex and financially important area of clinical care.

9 FINAL RECOMMENDATIONS

As technology changes the OR environment, perioperative nurses and surgery patients are faced with new challenges and opportunities. The best possible outcome for patients and institutions requires the electronic system continuous improvement, construction of management and quality indicators in the OR, cost control assessment and adverse event monitoring.

At Dr. Nélio Mendonça Hospital the implementation of this perioperative electronic system was a major step and faced some challenges. In order to evolve to the next stage of its development it is vital to assess the acceptance and satisfaction among the end users and assess the maturity's system.

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