ACTIVE LEARNING METHODOLOGIES IN PERIOPERATIVE NURSING EDUCATION

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The inclusion of active methodologies in the teaching-learning process in the Health and Nursing fields is a relevant and effective strategy that has been used in different countries. In Brazil, this practice has been driven by the National Curricular Guidelines of undergraduate nursing departments, which highlight the need for curricular transformations. The objective is to provide critical and reflexive professional training through student-centered methodologies and the inclusion of educational technologies[1].

Given this context, it is important to consider the influence of a wide variety of information that is available to students, which has no time or space restrictions and which highlights a new position for teachers as mediators in the teaching-learning process[2]. The mediation allows for the establishment of connections between the previous knowledge of the student, the information available at the present time, and teaching expertise, all of which are fundamental aspects in view of the complex knowledge necessary for nurses to perform perioperative nursing.

Thus, the need for a careful look at the training of new professionals becomes evident, and active methodologies are an effective way to improve the quality of the teaching-learning process, as they are based on problematic situations. They consider the students' knowledge and previous experiences, in order to stimulate critical and reflexive thinking, as well as to encourage students' autonomy in their learning process[3,4].

Among a wide variety of active learning methodologies available today, some of which have great potential for the teaching of perioperative nursing care, are: flipped classrooms, problem-based learning, role playing, peer instruction, case studies, simulations, and team-based learning.

However, the success of these methodologies depends on paradigm changes in teacher and student work, as well as a revision of the training courses' curricula, all of which provides new challenges for everyone.

It is not a question of just replacing the traditional methodology of teaching, which is important for the approach of certain themes, but rather of adding on new methods that favor the student as a protagonist through experimentation, individual or group discussion and reflection in opportunity-rich environments. All of this results in meaningful learning[5].

Nursing care in the pre, trans and postoperative periods is a complex activity that demands a set of knowledge, skills, behaviors and attitudes that is fundamental for safe and qualified assistance, and which requires professional nurses to take immediate and effective actions[6].

In this regard, the inclusion of active methodologies in the teaching-learning process of perioperative nursing allows for the training of critical, reflexive and creative professionals. Once they are capable to act based off of meaningful knowledge, their theory, practice and professional reality will be more connected, stimulating active participation and clinical reasoning, in addition to promoting closer ties to the practice of care[7].

The challenge is emerging and the need for changes in teaching-learning methods is becoming increasingly evident. The adoption of active methodologies in training course curricula can lead to profound changes in the way perioperative nursing care is provided, resulting in the promotion of safer and more qualified care.

Ana Graziela Alvarez
PhD in Nursing. Adjunct Professor, Nursing Department at Federal University of Santa Catarina
Juliana Balbinot Reis Girondi
PhD in Nursing. Adjunct Professor III, Nursing Department of Federal University of Santa Catarina
Neide da Silva Knhis
PhD in Nursing. Adjunct Professor, Nursing Department at Federal University of Santa Catarina

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CAUSES OF REWORK OF HEALTH PRODUCTS AT THE MATERIAL AND STERILIZATION CENTER

Causas de retrabalho de produtos para saúde no centro de materiais e esterilização

Causas de retrabajo de productos para salud en el centro de materiales y esterilización

André Luiz Silva Alvim[1]*, Karinne Ferreira de Souza[2]

ABSTRACT: Objective: To identify the main causes of rework of health products detected at the Materials and Sterilization Center of a private hospital in Belo Horizonte, Minas Gerais, Brazil. **Methods:** A descriptive study was developed in a class II Sterilization Center of a private hospital in Belo Horizonte, Minas Gerais, Brazil. Documentary analysis was performed between January and June 2016, through 181 checklist records and working documents. For data treatment, descriptive statistical analysis was used for the presentation of absolute values and percentages generated by the Epi Info 7® program. **Results:** We found 605 rework items, which represented the rate of 0.75% of the total boxes and packages produced. The main causes were related to overdue products (74%) and post-sterilization organic wastes (13%). **Conclusion:** The nurse must work with its team to reduce the causes of rework, that impact unnecessary waste and costs.

Keywords: Sterilization. Indicators. Surgical Instruments. Nursing.

RESUMO: Objetivo: Identificar as principais causas de retrabalho de produtos para saúde (PPS) detectadas no Centro de Materiais e Esterilização (CME) de um hospital particular de Belo Horizonte, Minas Gerais, Brasil. **Método:** Estudo descritivo, desenvolvido em um CME de classe II de um hospital privado de Belo Horizonte. Foi realizada análise documental entre janeiro e junho de 2016, por meio de 181 registros de *checklist* e documentos de trabalho. Para tratamento dos dados, utilizou-se análise estatística descritiva para apresentação de valores absolutos e porcentagens geradas pelo programa EpiInfo 7®. **Resultados:** Foram encontrados 605 itens de retrabalho, que representaram uma taxa de 0,75% do total de caixas e pacotes produzidos. As principais causas foram relacionadas a produtos vencidos (74%) e resíduos orgânicos pós-esterilização (13%). **Conclusão:** O enfermeiro deve trabalhar com a equipe para redução das causas de retrabalho que impactam em desperdícios e custos desnecessários.

Palavras-chave: Esterilização. Indicadores. Instrumentos cirúrgicos. Enfermagem.

RESUMEN: Objetivo: Identificar las principales causas de retrabajo de productos para salud (PPS) detectadas en el Centro de Materiales y Esterilización (CME) de un hospital privado de Belo Horizonte, Minas Gerais, Brasil. **Método:** Estudio descriptivo, desarrollado en un CME de clase II de un hospital privado de Belo Horizonte. Se realizó un análisis documental entre enero y junio de 2016, a través de 181 registros de checklist y documentos de trabajo. Para el tratamiento de los datos, se utilizó análisis estadístico descriptivo para presentación de valores absolutos y porcentajes generados por el programa EpiInfo 7®. **Resultados:** Se encontraron 605 ítems de retrabajo, que representaron una tasa del 0,75% del total de cajas y paquetes producidos. Las principales causas fueron relacionadas con productos vencidos (74%) y residuos orgánicos post-esterilización (13%). **Conclusión:** El enfermero debe trabajar con un equipo para reducir las causas de retrabajo, que impactan en desperdicios y costos innecesarios.

Palabras clave: Esterilización. Indicadores. Instrumentos Quirúrgicos. Enfermería.

[1]Master nurse by the Federal Unit of Minas Gerais; MBA in Audit and Quality Management applied to Health Services – Belo Horizonte (MG), Brazil.
[2]Master nurse in Business by Faculdade de Estudos Administrativos de Minas Gerais; postdoctoral degree in Strategic Management and Hospital Infection – Belo Horizonte (MG), Brazil.
*Corresponding author: andrealvim1@hotmail.com
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INTRODUCTION

The Materials and Sterilization Center (CME) is intended for the processing of health products (HP) involved in the patient's critical and semi-critical procedures. This functional unit has a history that accompanies the surgical procedures in order to ensure the prevention of Health Care-Related Infections (HCRI)[1,2].

In this sense, the search for quality in the processing of HP has been considered an essential requirement for CME. Among various tools available for monitoring the results of work processes, the more relevant ones are the quality indicators[3-5].

Indicators are quantitative measures that reflect the reality of the changes occurring in a given reality and allow the directing of behaviors to increase the organizational performance by managers. The CME has several indicators that can be incorporated into various processes. However, there are no studies in the literature that evaluated and quantified causes of HP rework[3-5].

This knowledge gap motivated the researchers to uncover the following guiding question: What are the main causes of rework detected at the CME? This study may contribute to the knowledge of factors that interfere with the costs of the CME and that may unbalance financial resources destined to the support unit, considering the current economic situation of the country[6].

OBJECTIVE

Identify the main causes of rework of HP, detected at the CME.

METHOD

This is a descriptive, quantitative study developed in a CME class II of a private hospital in Belo Horizonte, Minas Gerais, Brazil. The CME class II is defined as the one that performs the processing of non-critical, semi-critical and critical HP, of complex and non-complex conformation, subject to processing[1].

In 2010, among the several indicators linked to the CME of the studied hospital, an evaluation of the rework rate of HP was started. Since then, this indicator has contributed to the verification of the factors that have an impact on the causes of waste and unnecessary costs. In the studied hospital, the shelf-life of non-woven fabric protective wrappers/barriers (spunbond/meltblown/spunbond — SMS) and surgical grade is 30 and 180 days, respectively. In low temperature sterilization, Tyvek® expires after 365 days.

A documentary analysis was carried out between January and June of 2016 by the first researcher, through 181 checklist registers and working documents that were available in physical form and posted in the hospital quality management system. The causes of rework were recorded by the nursing technician assigned in the arsenal in a specific checklist, containing the following variables: overdue products, post-sterilization organic waste, label loss or erasure, incorrect label, wet packs, non-integral packaging and oxidation residue.

After data collection, a spreadsheet was used to group the recorded data. At the end, 605 items of rework were found in the period proposed for the study. The data was released in the Microsoft Excel® program. For the data treatment, a descriptive statistical analysis was used to present absolute values and percentages generated by the Epi Info 7® program. Because it is a study that does not involve research with human beings, an opinion from the Research Ethics Committee was not necessary. However, an institutional authorization was granted to carry out the study, elaborated by the nursing manager.

RESULTS

The total of 605 items were detected out of 80,568 HP produced, representing the rework rate of 0.75%. Table 1 shows

Table 1. Causes of rework of health products detected at the Materials and Sterilization Center, Belo Horizonte, Minas Gerais, Brazil, 2016.

Description of rework items	Number	%
Overdue health products	449	74.2
Post-sterilization organic waste	79	13.0
Wrong label	18	3.0
Wet packs	18	3.0
Label loss or erasure	17	2.8
Non-integral packaging	12	2.0
Oxidation residue	12	2.0
Total	605	100.0

that the main causes of rework were related to overdue products (74.2%) and to post-sterilization organic waste (13.0%).

Other causes of rework were less frequent, such as: wet packages (3.0%), incorrect label (3.0%), label loss or erasure (2.8%), oxidation residue (2.0%) and non-integral packaging (2.0%).

DISCUSSION

The CME is considered a vital unit of a hospital, which performs complex cleaning, preparation, sterilization and distribution of HP to various care units. These units include actions of third parties, doctors and nursing professionals, performed with the patient[1,6-8].

In this way, it becomes intrinsic to the sector to seek the quality of each stage of HP processing in order to reduce unwanted events. Based on this premise, the incorporation of quality indicators has turned into essential for monitoring the results of work processes[9].

In the studied period, it was verified that the items of rework for overdue products were prevalent when compared to the other causes. This was attributed, mainly, to the expiration date and the consequent non-use of the product by the care and surgical areas.

There is no consensus to determine a fixed expiration date for HP. Authors consider that surgical boxes remained sterile even after deliberate contamination by microorganisms and inadequate storage[10]. However, researchers say that a limit date should be established, taking into account several factors, such as cleaning, wrapping and storage, that can guarantee the maintenance of sterility[11,12].

Regarding post-sterilization organic waste, the main cause related to rework was inadequate cleaning. At the studied hospital, there were problems regarding the maintenance of the ultrasonic washing machines, preventing automated cleaning from being effective in this stage of processing.

Cleaning is defined as the removal of organic and inorganic dirt and reduction of the microbial load present in HP, using water, detergents, products and cleaning accessories. It requires mechanical action (manual or automated), and acts on internal (lumens) and external surfaces in order to make the product safe for handling and prepared for disinfection or sterilization[1]. When CME professionals do not become aware of the importance of this stage and perform it in a condescending or superficial manner, dirt will not be totally removed and may create barriers that protect microorganisms[2,7,13-15].

At the CME, the cleaning of HP is performed by the nursing team. This stage is essential to guarantee the effectiveness of the steps that will take place, avoiding that materials or instruments used in the patient become vehicles for contamination of microorganisms[1,2,7].

Other causes of rework were less frequent in the results of the CME studied. However, it is important to work with all staff to promote care management in order to eliminate unnecessary expenses with HP. Studies have shown that factors related to the quality of the packaging used for sterilization, as well as the type of material standardized by the manager, can contribute to the reduction of the rework rate[16,17].

Knowing the causes of rework for cost management is important for waste reduction. Authors assert that rework may be related to poorly structured institutional processes[16]. Thus, continuing education of professionals, through training and refresher courses, is a contributing factor to this indicator declination. In addition, it is essential that the CME nurse determines the rework causes with the nursing team for the investigation of process failures and, at the same time, an effective root-cause analysis[6,18,19].

FINAL CONSIDERATIONS

It is essential that the CME nurse works together with the nursing team to reduce the causes of rework related to overdue products and post-sterilization organic waste. In this way, one can create strategies for cost management, as well as know the factors that impact on the increase of expenses related to the functional unit.

This indicator allows the knowledge of the factors of waste that impact the generation of unnecessary costs in the CME processes. Although the rework rate represented only 0.75% of all HP produced in the studied unit, it is important to periodically evaluate the data to subsidize the cost management performed by the nurse.

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APPLYING ANESTHESIA DURING SURGERY: AN EXCHANGE BETWEEN NURSING KNOWLEDGE AND CARE

Momento anestésico-cirúrgico: transitando entre o conhecimento dos(as) enfermeiros(as) e o cuidado de enfermagem

Momento anestésico y quirúrgico: transitando entre el conocimiento de los(las) enfermeros(as) y el cuidado de enfermería

Tania Marisa Koch[1], Denise Consuelo Moser Aguiar[2], Gelson Aguiar da Silva Moser[2], Marceli Cleunice Hanauer[3]*, Dulcimar de Oliveira[3], Suellen Rodrigues de Oliveira Maier[4]

ABSTRACT: Objective: To check the knowledge of nurses with regard to nursing care at the moment of applying anesthesia during surgery at a public hospital in the western region of the state of Santa Catarina. **Method:** A descriptive-exploratory and qualitative field study that performed semi-structured interviews with seven nurses, and used observation and logbook records. **Results:** The results were categorized into knowledge and care and they demonstrated that nursing professionals are concerned with both, thus minimizing humanized and individualized care. It was observed that the essence of caring is difficult to integrate with scientific knowledge. **Conclusion:** It was found that some nurses do not perform essential functions, for they enter into a work routine in order follow norms and rules.

Keywords: Anesthesia. Perioperative nursing. Nursing care.

RESUMO: Objetivo: Verificar o conhecimento dos enfermeiros(as) de um hospital público da região oeste do estado de Santa Catarina sobre o cuidado de enfermagem no momento anestésico-cirúrgico. **Método:** Estudo de campo, descritivo-exploratório, qualitativo, utilizando-se entrevista semiestruturada com sete enfermeiros, observação e registros em diário de bordo. **Resultados:** Os resultados foram categorizados em conhecimento e cuidado e demonstram que os profissionais estão preocupados com o fazer, minimizando o cuidado humanizado e individualizado. Observou-se que a essência do cuidar reluta em emergir e permanecer integrada ao conhecimento científico. **Conclusão:** Percebemos que alguns enfermeiros não exercem funções prioritárias, entrando na rotina de trabalho, de modo a seguir normas e regras.

Palavras-chave: Anestesia. Enfermagem perioperatória. Cuidados de enfermagem.

RESUMEN: Objetivo: Verificar el conocimiento de los(las) enfermeros(as) de un hospital público de la región oeste del estado de Santa Catarina sobre el cuidado de enfermería durante el momento anestésico y quirúrgico. **Método:** Estudio de campo, descriptivo y exploratorio, cualitativo, utilizándose entrevista semiestructurada con siete enfermeros, por medio de observación y registros en cuaderno de bitácora. **Resultados:** Los resultados fueron categorizados en conocimiento y cuidado y demuestran que los profesionales están preocupados con el hacer, minimizando el cuidado humanizado e individualizado. Se observó que la esencia del cuidar resiste en emerger y permanecer integrada al conocimiento científico. **Conclusión:** Percibimos que algunos enfermeros no ejercen funciones prioritarias y por lo tanto entran en la rutina de trabajo de modo a seguir normas y reglas.

Palabras clave: Anestesia. Enfermería perioperatoria. Atención de enfermería.

[1]Nurse, Universidade Federal da Fronteira Sul (UFFS) – Chapecó (SC), Brazil.
[2]PhD in Nursing; Professor in the nursing department, UFFS – Chapecó (SC), Brazil.
[3]Nursing undergraduate student in the 10th semester, UFFS – Chapecó (SC), Brazil.
[4]Master, Professor in the nursing department, UFMT – Rondonópolis (MT), Brazil.
*Corresponding author: tilihanauer@hotmail.com
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INTRODUCTION

A surgical center (SC) is a highly complex unit that has technologies and procedures that invade patients' privacy. Thus, the importance of individuality within nursing care and the humanization of the nurses involved in this process requires that nursing professionals have extensive knowledge about the perioperative period, especially in relation to when anesthesia is applied during surgery.

A patient's minimal time in the SC does not exclude the need for excellent and qualified multi-professional nursing care. The Systematization of Perioperative Nursing Care (*Sistematização da Assistência de Enfermagem Perioperatória* — SAEP) aims to ensure the safety of the patients and the team involved in the operation. The nursing team should establish and develop strategies for pre-surgical patient care. These strategies should be developed according to the particularities of each of the patient's surgical procedures. Care must be given according to specialized knowledge and in order to meet the needs arising from the procedure performed[1].

The main objective of the SAEP is to guarantee that care is properly planned throughout the perioperative period. The perioperative period takes place during the preoperative period (when the patient is informed of the need to perform a surgical procedure and be hospitalized), the intraoperative period (the surgery itself), and the postoperative period (after surgery, the recovery period). In the postoperative period, the patient may present complications due to the anesthesia applied during surgery, since there may be inadequate preoperative preparation. Starting in 2002, the SAEP became a requirement of the Federal Nursing Council (COFEn) in order to assist nursing and medical teams, in addition to all other parties involved in ensuring safe patient care[2].

Nurses are able to coordinate all of the stages of the perioperative period, allowing for a safe, appropriate, and aseptic environment for the patient and the team during the application of anesthesia in surgery. Given this context, nurses must be alert to any and all reactions that the patient may present[1].

It is suggested that the SAEP be applied as a strategy to provide comprehensive and individualized care with the intention of informing patients and family members and helping them understand the whole process that will be performed. This includes reassuring them about the risks to which the patient may be exposed. As such, pre and post-operative visits are recommended, in order to qualify the systematization. For this, guidance, physical and emotional preparation, evaluation and a referral to the SC are also included in order to reduce risks and promote a more effective recovery, taking into account the dependence and/or vulnerability of each person[3,4].

Patients' uncertainty is unrelated to the complexity of the surgery, and is directly related to miscommunication regarding surgical procedures, anesthesia and postoperative care. Educating patients and family members is part of nurses' responsibilities in the perioperative period and should continue into the preoperative period, so that patients feel calm and secure. With this in mind, two care-giving tools are essential — communication and interaction with the patient — leading to more specific care, according to the needs and expectations of the surgical patient[4].

During the theoretical and practical activities in the SC, there were concerns and questions regarding the care provided by nurse practitioners. Thus, the guiding question of the present research was: what do nursing professionals know about nursing care when anesthesia is being applied during surgery?

In an attempt to guide and explore possibilities that could answer this question, we searched scientific literature and performed field research in order to find information on the knowledge of nursing professionals with regard to the nursing care performed when anesthesia is applied during surgery and when the patient is in post-anesthetic recovery (PAR).

OBJECTIVE

To verify nurses' knowledge about nursing care when anesthesia is applied during surgery in a public hospital in the state of Santa Catarina.

METHOD

The present study was performed at the SC of a public hospital in the western region of the state of Santa Catarina. The protagonists of the study were the nurses involved in application of anesthesia during surgery at the hospital, and who agreed to participate in the project. Seven higher-level nursing professionals participated: a nurse coordinator, two nursing assistants who work in the PAR room, and four nursing assistants in the SC, two of whom work at night.

After approval by the Research Ethics Committee of the Universidade Federal da Fronteira Sul, by means of Report nº 785613 and the authorization of the host institution, a free and informed consent form was prepared, which was then given to the participants for them to sign. The nurses were invited to take part in the study spontaneously. Initial contact was made with the professionals of the unit and two to three meetings were established and scheduled. Each meeting lasted an average of 20 to 30 minutes.

At first, the interviews were performed with semi-structured script. They were then recorded and transcribed in full. In the second part of the research, observations of records in the form of logbook were performed. This occurred between the second fortnight of September 2014 and October of the same year. After the data collection steps were complete, the material for data analysis began and was carried out based on an examination of content, proposed by Bardin. In order to make it possible to identify the participants' responses while maintaining their confidentiality, codenames based on scales (Ramsey, Richmond, Jouvet, Steward, Mallampatti, Cromack and Lehane) were applied to the surgical patients.

RESULTS

After an analysis and codification of the data using interviews and observations at the institution, two categories were obtained, which were organized and highlighted according to Charts 1 and 2.

The first chart presents questions referring to the knowledge of the unit nurses about nursing care during the application of anesthesia in surgery, and considers that assistance be offered in a humanized and caring way. In this regard, two more questions arise: what constitutes care that goes beyond technical assistance? Is it possible to carry out humanized, specialized and individualized assistance based on theories and considering technical and scientific knowledge?

Chart 2 presents the questions that permeate care giving and how nurses show it when a patient is receiving anesthesia.

DISCUSSION

Under the influence of Florence Nightingale, nursing began its journey towards the use of practices based on scientific

Chart 1. Data coding for the first category of analysis.

First category of analysis: knowledge
Knowledge in the course of care: a possible advancement
Research question: What knowledge do nursing professionals have with regard to nursing care when anesthesia is being applied during surgert?
Nurse Ramsey: "The patient is initially sedated, then intubated, and shortly after extubated and referred to the recovery room."
Nurse Richmond: "In the beginning, intubation occurs, then sedation, and in the end, we wake up the patient and extubate him"
Nurse Steward: "This process can be divided into phases, the first is called induction, then maintenance, and recovery."

Chart 2. Data coding for the second category of analysis.

Second category of analysis: care
The care unveiled in the assistance provided: interweaving powers and possibilities
Research Question: What is the knowledge of nursing professionals about nursing care at the anesthetic-surgical moment?
Nurse Cromack: "In anesthetic recovery, you receive the patient and interview him or her if possible. If not, you read the notes and the right thing to do is to prescribe a care plan, but this does not occur."
Nurse Steward: "Providing comfort to the client, monitoring, vital signs, oxygenation, administering medications as prescribed."
Nurse Lehane: "When possible, holistic theory is used as well as the nursing process".
Nurse Mallampatti: "Watching the patient and passing tranquility, confirming fasting and allergies of the patient, taking care of exposure of the patient's body. To maintain a regular temperature, performing a safe surgery checklist, using the appropriate equipment as assessed by the patient."
Nurse Richmond: "(...) when the patient arrives in the recovery room, at the first moment, regardless of the type of surgery or anesthesia that they had, oxygen must be installed for them, mainly to prevent hypoxia...". The patient comes in half asleep, so sometimes they end up forgetting to breathe, so it is important to put on oxygen... Monitor, control vital signs, prevent hypothermia (by warming the patient). Watch out for nausea and vomiting, and be aware if the patient stops breathing. And monitoring continuously the vital signs... Patient admission form; at first we fill in the patient's data, then there's a checklist... After that there is a scale to check the vital signs... I do the Aldrete scale the moment they arrive and when I see that they are well recovered, this document is attached to the medical record."

evidence and knowledge, and gradually abandoned the idea of a kind, intuitive activity and/or life experience. In this regard, several concepts, theories and models that are specific to nursing sciences have been developed in order to provide systematized assistance. This allows for care provided to the patient when he or she is receiving anesthesia to be qualified in a holistic way.

It has been observed recently that nursing work developed in the SC and focused on the application of anesthesia during surgery consists of providing necessary materials, equipment and human resources. This may distance nurses from the idea of care that is directed to the needs of patients and their well-being in a comprehensive way, thus preserving nurses' integrity, according to the Levine theory.

When questioned about the anesthetic process and its stages, the nurses describe how the steps occur, but they do not mention nursing care for the patient.

> "... The patient is initially sedated, then intubated, and shortly after extubated and referred to the recovery room." (Nurse Ramsey)

> "... In the beginning, intubation occurs, then sedation, and in the end, we wake up the patient and extubate him ..." (Nurse Richmond)

> "... This process can be divided into phases, the first is called induction, then maintenance, and recovery ..." (Nurse Steward)

There is a relevant and outstanding concern regarding the technical aspects of the assistance. It is possible to perform routine and systematic activities in the patient care process when the patient is receiving anesthesia. This routine seems to consume the nurses, with regard to both workload and the deficit of human resources. It is observed that the actions of these nursing professionals is often still authoritarian, concerned with following rules and routines, with formal and objective aspects. This, despite the fact that it is known that the bond between nurses and patients in care giving seeks to contemplate the real needs of the patient and to plan quality, humanized and individualized nursing care. It is noteworthy that some nursing professionals attend to the needs that arise as a result of this dynamic and seek to associate technical-scientific knowledge with nursing care.

The preoperative period is defined as an interactive period that aims at detecting patients' current physical and psychological needs, which then aids in the planning of care. Such assistance requires knowledge with regard to the probable emotional or physiological reactions that the patient may present in the face of anesthesia and surgery. Therefore, the nurses will achieve the goals outlined in the care plan, promoting integrity, and bio-psychosocial and spiritual fulfillment[5].

Preoperative guidance requires that the responsible nurse take frequent actions, which then become part of the professional practice. Through the guidance, the nursing professional can welcome the patient and their family, establishing bonds that go beyond the guidance itself, acting as a health educator.

With regard to nursing care provided in the PAR, nurses can use risk management protocols that correspond to good care practice instructions, in order to prevent a certain risk or adverse event, which ensures greater patient safety in the PAR room. In this process, the importance of looking at the patient as a human being in need of care is emphasized, considering that the care process is not only about managing and applying technical processes, norms and routines, but also about providing a humanized and welcoming approach to understand the human being in all its dimensions.

> "... In anesthetic recovery, you receive the patient and interview him or her if possible. If not, you read the notes and the right thing to do is to prescribe a care plan, but this does not occur..." (Nurse Cromack)

It is incumbent upon nurses to adopt guidelines that focus on the safety and quality in the PAR in addition to the prevention of adverse events, in accordance with patient safety policies. Following this logic, the SAEP is an important tool for clinical reasoning because it helps the nurses understand the patients' needs while he or she is receiving anesthesia. When the patient is in a highly complex environment and with restricted access, he or she needs specific and qualified care from the team of surgical professionals[1].

It is also worth noting that the use of SAEP as a specific scientific nursing methods provides that care is managed and improved in an organized, safe, dynamic and competent manner. It also gives scientific weight to the

profession of nursing and assists its in its growth, implying the joint nature of action and knowledge and the development of critical thinking. In addition, it is a tool that promotes problem solving and decision-making, improving professional recognition, which often serves as a stimulus to workers[6].

These changes may be closer to a more organized nursing practice, making it possible to implement SAEP as an important nursing work tool[3].

Nurses' participation in educational programs, and in the evaluation and the control of pain is essential, because they spend the most amount of time with the patient. Thus, nurses should use this contact to identify the demands of changes in analgesia methods, to provide adjustments when necessary, and to educate/advise patients and their families about pain, since it is one of the main undesirable effects in the postoperative period. From the patient's point of view, this is an important perspective in controlling the quality of care provided in the PAR room. When pain occurs, in addition to pharmacological methods, the nurse must implement therapies that relieve the pain, such as applying cold or heat, performing massages, providing cushions, and changing the patients' position. Furthermore, the nurse must communicate effectively, strengthening the nursing-patient bond and providing individualized care that improves the quality of life of patients with pain[7-9].

During his or her period in the PAR, it is known that the patient is exposed to clinical risks, such as respiratory depression, cardiovascular instability, the inability to walk, the lowering of his or her consciousness level, nausea and vomiting, hypothermia, bleeding, urinary retention and medication errors. It is up to the nursing professional to manage and minimize the incidence of these risks.

SAEP aims to use a work methodology that is separate from the theoretical framework adopted, and which requires the nurse to get to know the patient as an individual. They are to use their knowledge and skills, as well as guidance and training from the nursing team to implement systematized actions. Therefore, nursing articulates and directs all the processes that result in care and, in this sense, it is believed that the knowledge of this process is a possible advancement.

Routine and daily life, both of which were quoted as limiting advancements, can also be spaces of creativity, since in routine we discover ways to escape norms and conventions. It is important to emphasize that highlighting difficulties and repeating what we already know does not allow us to develop other ways of caring and approaching care giving. As such, we must think of possible strategies in order to reinvent the art of caring, which can be through touch, affection, and respect for others.

In this sense, it is expected that nurses and their team develop specific skills to care for this individual in a humanized and welcoming way. This requires that the nurse be sensitive enough to assist the surgical patient in all aspects. Some professionals even cite the nursing process, but for some reason they do not use it routinely. The SAEP, which is an excellent tool, also shows other care methods that help in the qualification of care. It cites nursing care methodology and the nursing process[9].

> "When possible, holistic theory is used as well as the nursing process..." (Nurse Lehane)

Care is not considered to be limited in its stages, even when guided by the nursing process, since it is a constant back and forth within the relationship established between the nurse and the patient, especially in the SC, as it is an extremely complex unit. This back and forth movement is attributed not only to the patient and his or her condition, but also to the sophistication of advanced equipment and technologies, the high volume of information that is transmitted, the nature of communication, and the coordination of the team.

These aspects, associated with fatigue, stress, production pressures and heavy workloads, cause the SC to become a vulnerable place for adverse events to occur. Surgical adverse events may occur due to poor communication among the team, poor surgical technique of the surgeon and staff members, and malfunctions or improper use of equipment. They are further aggravated by resource and organizational problems. In the midst of all this, there is the nurse, who must provide and guarantee a qualified, safe, humanized and welcoming nursing care. To do so, the use of the nursing process is an extremely important instrument, as it allows for the objectives outlined to be met.

Nurses' commitment to offer surgical patients a differentiated nursing care is sought. The objective of this form of care is to prevent complications from arising when anesthesia is applied during surgery. The following can be demonstrated by the responses of the participants, who emphasize the importance of watching the patient, transmitting tranquility and providing comfort and care when the patient's body is exposed:

"Providing comfort to the client ..." (Nurse Steward)

"... To assist the patient, to transmit tranquility [...] to take care of the patient when his or her body is exposed, to use appropriate equipment according to the patient's evaluation. To maintain a regular temperature, to perform a safe surgery checklist ... "(Nurse Mallampatti).

The preoperative nursing visit is another factor that may help and be beneficial. It is considered to be an effective tool with potential for when the anesthesia is applied during surgery. It may be useful in promoting individualized care, obtaining data on the personality and physical and emotional characteristics of the patient, as well as assisting in post-surgical recovery.

The preoperative visit can be conducted in such a way as to minimize tension, fear and anxiety, and thus making it very beneficial to the patient. It aims to protect all parties involved in the care process: providing well-being to the patient, promoting care visibility to the nursing professional, and offering assistance to care planning in a continuous and individualized manner.

In this regard, after the publication of the National Patient Safety Program (PNSP) by the Ministry of Health (MS), which sought to prevent the occurrence of adverse events in health services, preoperative visits became more prominent and relevant in surgical units. However, the presence of obstacles in the execution of this stage are still observed in daily practices[10].

A study[9] showed the importance of nursing with respect to the care provided in anesthetic recovery rooms (ARR), as it aims to assist, monitor, prevent complications, ensure safety and contribute as much as possible the patient's well-being. The same authors consider the immediate postoperative period in the PAR to be critical, since the patient undergoes a surgical procedure and receives anesthetic medications. As such he or she requires constant surveillance from the nursing team. It is essential to provide comprehensive care to patients and always register it in the medical record. Care should be given appropriately, preventing the occurrence of complications and/or adverse events. These aspects can be observed in the participants' responses:

"... Install oxygen primarily to prevent hypoxia ... monitor, control vital signs, prevent hypothermia (by warming up the patient). Watch out for nausea and vomiting, and be aware if the patient stops breathing... I do the Aldrete scale." (Nurse Richmond)

There is a great need for nursing professionals who seek further knowledge after completing their professional training, so that they are up to date. This supports the quality of their practice and patient safety. Nurses daily seek ways to confront the operational barriers of the profession, in an attempt to provide qualified care. It is necessary to develop actions starting from nurse training and from academic life, planting the seed of care that touches, cares, heals and lives.

FINAL CONSIDERATIONS

This study approached necessary nurse competencies, and described nurses' daily activities into four spheres (management, research, teaching and care). Thus, it was demonstrated that there are still gaps on the subject, which allowed for the evaluation of the knowledge of nursing professionals that are involved in the care process in the SC and in the PAR. This was evaluated mainly with regard to the moment when anesthesia is applied during surgery, especially the anesthesia and knowledge about the nursing care provided to the anesthetized patient.

It is important that nurses follow good practices to ensure good results in order to provide a humanized, welcoming and high quality care, with the attention focused on the patient as a whole and not only on the disease or a specific part of their body.

Choosing to be a health professional requires technical skills in order to utilize relevant equipment and procedures, scientific knowledge, the ability to dialogue, perceive, experience and see the patient as a whole. Although many hospital institutions do not yet fully adopt this process of caring and systematizing, SAEP is seen as a method to articulate and integrate nursing care when anesthesia is being applied, as well as in the continuation of this care.

We conclude by pointing out that the moment when anesthesia is being applied is unique for the patient, who experiences the procedure, and for their family. The research described and presented here allowed for an exchange between the knowledge of nurses and nursing care, in order to promote various reflections on the professional life of those who work in perioperative nursing.

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PERCEPTION OF THE PEDIATRIC PATIENT ACCOMPANY DURING ANESTHESIA INDUCTION AND AWAKENING

Percepção do acompanhante do paciente pediátrico durante a indução e o despertar da anestesia

Percepción del acompañante del paciente pediátrico durante la inducción y el despertar de la anestesia

Sabrina Binkowski[1], Gisele Pereira de Carvalho[2], Rita Catalina Aquino Caregnato[2]*

ABSTRACT: Objective: To know the perceptions o children's companion in anesthetic induction and awakening. **Method**: An exploratory, descriptive, qualitative study carried out in the surgical center (SC) of a pediatric hospital in Porto Alegre, Rio Grande do Sul, Brazil, with seven mothers present during anesthetic induction and awakening of the child. Data collection was carried out in two parts: 1. Non-participatory observation in anesthetic pre-induction and induction; 2. Semi structured interview in the post-anesthetic recovery room (PARR). **Results**: Two categories emerged from the contents analysis of field journals: strategies used by companions and tranquility. The strategies used were: crying, love and affection. Two categories emerged from the interviews: positive and negative experiences, the former being the most outstanding one. **Conclusion**: Accompanying a child in the anesthetic-surgical process triggered more positive than negative impressions on mothers. In addition to giving support and tranquility to the child, companions themselves would feel safer.
Keywords: Anesthesia. Operating Room Nursing. Child. Mothers. Pediatrics.

RESUMO: Objetivo: Conhecer as percepções de acompanhantes das crianças na indução anestésica e no despertar da anestesia. **Método**: Estudo exploratório, descritivo, qualitativo, realizado em um centro cirúrgico (CC) de um hospital pediátrico de Porto Alegre, Rio Grande do Sul, Brasil, com sete mães presentes na indução anestésica e no despertar da criança da anestesia. A coleta de dados foi realizada em duas fases: 1. observação não participativa na pré-indução e na indução anestésica; 2. entrevista semiestruturada na sala de recuperação pós-anestésica (SRPA). **Resultados**: Da análise de conteúdo dos diários de campo emergiram duas categorias: estratégias utilizadas pelos acompanhantes e tranquilidade. As estratégias usadas foram: choro, amor e carinho. Das entrevistas emergiram duas categorias: experiência positiva e experiência negativa, sendo a primeira a mais destacada. **Conclusão**: Acompanhar o filho no processo anestésico-cirúrgico desencadeou mais percepções positivas do que negativas nas mães. Além de dar suporte e tranquilidade à criança, as acompanhantes se sentiram mais seguras.
Palavras-chave: Anestesia. Enfermagem de centro cirúrgico. Criança. Mães. Pediatria.

RESUMEN: Objetivo: Conocer las percepciones de acompañantes de los niños en la inducción anestésica y en el despertar de la anestesia. **Método**: Estudio exploratorio, descriptivo y cualitativo, realizado en un centro quirúrgico (CQ) de un hospital pediátrico de Porto Alegre, Rio Grande do Sul, Brasil, con siete madres presentes em la inducción anestésica y el despertar del niño de la anestesia. La recolección de datos fue realizada em dos fases: 1. Observación no participativa em la pre-inducción y en la inducción anestésica; 2. Entrevista semiestructurada en la sala de recuperación postanestésica (SRPA). **Resultados**: Dos categorías surgieron del análisis del contenido de los diarios de campo: estrategias utilizadas por los acompañantes y tranquilidad. Las estrategias usadas fueron: llanto, amor y afecto. Dos categorías surgieron de las entrevistas: experiencia positiva y experiencia negativa, siendo la primera la más destacada. **Conclusión**: Acompañar a niños en el proceso anestésico-quirúrgico desencadenó más percepciones positivas que negativas em las madres. Además de dar suporto y tranquilidad al niño, las acompañantes se sintieron más seguras.
Palabras clave: Anestesia. Enfermería de Quirófano. Niño. Madres. Pediatría.

[1]Nursing student, Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA) – Porto Alegre (RS), Brazil.
[2]PhD; nurse, UFCSPA – Porto Alegre (RS), Brazil.
*Corresponding author: ritac.ufcspa@gmail.com
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INTRODUCTION

Surgery, as well as hospitalization, is an experience that brings a lot of anxiety to children and their accompany parties, causing changes to the routine of the whole family and producing several feelings, such as stress, by withdrawing the child from both their family and social contacts to which they are accustomed to. In the surgical center (SC), this situation is usually potentialized, once it is an enclosed and different environment, with restricted access and people dressed in uniforms[1].

In this context, it is important to take into account the meaning of perception and feelings. "Perception" is understood in the sense of "[...] process by which the nature and the meaning of sensory stimuli are recognized and interpreted"[2]; the word "feelings" is understood as a synonym of "emotions", that is, "[...] affective states that may be experienced and have the property to excite and motivate individuals" [2].

Anxiety can manifest itself in different ways in pediatric patients, according to age range and to patient's degree of development. The higher the child's anxiety in the preoperative period, the greater the chance of developing postoperative disorders, especially the ones related to behavior (such as nightmares, irritability, eating problems anddisobedience)[3].

In this sense, Law No. 8.069 of 1990, of the Brazilian Child and Adolescent Statute, in article 12, contemplates that: "health care establishments should provide conditions for the full-time stay of a parent or guardian, in cases of hospitalization of children and adolescents" [4].

The presence of a family member during anesthesia induction may decrease the child's anxiety, which also reduces the need for physical restraint and improves the nurse-patient relation. However, there is still resistance to the presence of parents at that moment, an attitude resulting from values yet ingrained in the area of health[5].

Anesthesia induction of pediatric patients is a moment of great discomfort, both for them and their companions. Young children often do not understand what is happening, and can relate the time of hospitalization and surgical procedure to a punishment. This may hinder their recovery, once that experiencing unpleasant situations influences the immediate postoperative period and may bring about some negative memories, which will last for years[6].

In this context, the guiding question to our research is: what are the perceptions raised in children's companions in anesthesia induction and awakening in pediatric surgeries?

This research is justified due to the lack of studies addressing the theme of the presence of pediatric patient companions during anesthetic procedures.

OBJECTIVES

1. To know the perceptions of patients' accompanying parties during anesthesia induction and awakening.
2. To identify the feelings raised and the strategies used by accompanying parties who took part in anesthesia induction and monitored the child's anesthesia awakening.

METHOD

This is an exploratory, descriptive study with a qualitative approach, following the theoretical basis of the content analysis of Bardin, with thematic categorization, which allows for the understanding and description of the phenomenon under investigation, based on the opinions of companions[7].

The research was carried out in the SC of a pediatric hospital, located in Porto Alegre, Rio Grande do Sul, Brazil.

The population chosen for this study consisted of accompanying parties of children undergoing surgical procedures. Inclusion criteria were: accompanying (family member or guardian) children undergoing surgical procedures, being present during anesthesia induction and awakening. Exclusion criteria included:

1. Accompanying parties who were not present in both phases of data collection;
2. Accompanying parties of children who underwent surgical procedures with local or regional anesthesia or large-sized surgeries, considering these patients do not usually go to the post-anesthetic recovery room (PARR) after surgery.

The sample consisted of seven mothers who met the inclusion criteria. The number of subjects included in thepresent study was determined by the saturation of the data, since this is a qualitative research.

Data collection was carried out from May to July 2017, in the morning and afternoon shifts. Accompanying parties were invited to take part in the research according to the order of their arrival in the pre-induction room, where children and mothers waited before going into the operating

room. The study was explained, and those who accepted to participate in it signed an informed consent for later data collection.

Information collection was carried out in two phases. The first consisted of non-participatory observation in anesthesia pre-induction and induction, in which the participants were accompanying the child, whose experiences observed, together with the researcher's reflections, were recorded in a field log for each subject in the research, totaling seven information logs. The instrument was identified as the interviewee's field log, presented throughout the text as IFL, followed by a serial ID number for each interviewee.

The second phase occurred in the PARR, after the child's awakening from anesthesia. A semi-structured interview was performed at this moment, using a script with guiding questions, which aimed at meeting the study's objectives. This was recorded and subsequently transcribed at the child's bed in the PARR. Three questions were asked:

1. "Tell me how was the child's awakening from anesthesia".
2. "How did you feel when you saw the child waking up?".
3. "Now that the surgical procedure is over, and you are standing next to the child, tell me what was it like to have the opportunity of being next to them during anesthesia induction".

The information was assessed by thematic categorization, according to Bardin[7]. The NVivo® software was used in order to carry out the cutouts of the most important records in logs and interviews.

The present project was sent through *Plataforma Brasil* to the Research Ethics Committees of the proposing and co-participating institutions, in order to obtain authorization for their execution. Data collection occurred only after the due approvals (CAAE # 62523016.0.0000.5683 and CAAE # 62523016.0.3001.5345). To that end, the rules in Resolution No. 466/2012[8], which provides guidelines and rules for researches involving human beings, were followed. The subjects selected for this research were informed of its objectives and signed the informed consent, having the option to discontinue their participation in the study if they wished so, without any harm done.

In order to ensure participants' anonymity, their initials were coded by a capitalized letter I (interviewee), followed by a serial number (1, 2, 3...), according to their order of participation in the study.

RESULTS

Seven mothers of children aged between 2 and 11 years, submitted to combined general anesthesia, participated in the study.

Two categories emerged from the analysis of the field logs: tranquility and strategies used by companions. The former figured in all field logs and the later was observed in five registry units (71.42%).

It was observed that five mothers expressed, as a strategy, crying at the time of anesthesia induction in their children. Other strategies were also demonstrated, such as providing love and affection, in addition to the role of circulating nurses, as shown below:

1. IFL5 – [...] when they slept, the anesthesiologist informed the mother that the child had already slept [...] The mother kissed them and left crying. The circulating nurse escorted them to the exit, asked if everything was okay and explained she could go downstairs, have some coffee, and that she would be summoned when the surgery was over.
2. IFL7 – Pre-induction: Very calm mother [...] the child plays with toys and other children in the induction room. Very agitated [...]. Anesthetic induction: Mother apparently calm. The child laid down on the surgery bed on their own. Anesthesia and nursing staff communicated well with mother and child [...]. The child soon fell asleep [...]. As she kissed the child's forehead, the mother started to cry. The circulating nurse escorted the mother to the exit [...] she told her to go have some coffee and eat something, because it would take long [...] for the surgery to be over, and that as soon as the child would go to the recovery rom she would be summoned.

Tranquility was observed in all field logs, both for children and mothers, according to the following excerpts:

1. IFL2 – In the pre-induction room, the child was playing a lot with toys and the mother was very calm [...]. In the surgery room, the staff kept talking to the mother [...]. mother and child were very calm [...]. After the child fell asleep, the mother kissed their forehead and the circulating nurse escorted her to the waiting room and explained the time it would take, that she could go downstairs and have some coffee,

and that as soon as the child would go to the recovery room, she would be summoned.

2. IFL4 – In the pre-induction room: very calm mother, child playing with toys. During induction: mother apparently calm, so is the child. The induction was very fast [...]. As soon as the child fell asleep, the mother left crying, with no one from the staff to accompany her.

The contents of the interviews resulted in two thematic categories: positive and negative experiences. The former was observed in six records and, the later, in only one.

Six mothers expressed happiness and relief as positive feelings (85.7%). Only one (14.3%) participant informed that being present during anesthesia induction brought feelings that were difficult to deal with, making this opportunity a rather negative experience:

1. I1 – It's because this is her first time, so I didn't know how she was going to react [...]. Oh, I was very…nervous, I don't know...it was a very bad feeling...with her alone in there and all [...].
2. I1 – (laughs) It's not a very good experience... Because it is a feeling of uncertainty of what awaits for you in there, right... How to react [...] I didn't like it much (laughs) [...]. I was…like, crazy, asking to know if she was okay… You don't know…What happens in there after you leave, right [...]. I, for one, was scared, right, you know... Thinking there was [...] some complication, right [...]. I felt very bad when I was in there [...]. Now I feel calmer.

Even if difficult feelings were experienced, the mothers reported that having participated in the whole anesthetic-surgical process was a positive experience, as shown in their statements:

1. I3 – Oh, I was a little....a little nervous. I was a little nervous, mostly for seeing her like that [...]. Oh, I'm happy [...]. Her father called just now [...] I told him everything is fine [...]. Yeah, it was good, for us to accompany her, right?... It gives more…credibility to her, to keep calmer, right? [...]. Being together was better [...]. It's much better.
2. I4 – What a relief (laughs) [...]. I was tense [...] nervous, because…well, we know, right, that a general anesthesia is scary because it's called general (laughs) [...]. It was... Everything, right... Both for me and for him. For me to stay calm and him too.
3. I6 – What a relief [...]. As good as it gets, because we... See he's being taken good care of, right... We don't keep wondering how he is [...]. This is much better [...] I would've been so nervous.
4. I7 – Oh, it was great [...]. When I walked in here, I remembered of when he was born... So... It was a shock, you know? [...]. But he's okay, thank God [...]. I would rather have participated in the whole thing, even the surgery [...]. Of course… I felt…Safe, right [...] but it's our son, right? So we… Can't... leave and go somewhere… And leave them, right? [...].

When asked about the child's anesthesia awakening, there were expressions related to tranquility, as can be seen in the following statements:

1. I1 – It's the first time, right... I, uh, I didn't know how she was going to react, but she woke up very calm.
2. I4 – No, he woke up quietly... He looked at me, still sleepy, he was calm.
3. I7 – No, it was calm, it was calm...

According to the results obtained in the present study, it is possible to verify that, although mother seemed calm during anesthesia pre-induction and induction, they reported having struggled with feelings during these moments, but their wish of being with their children during the anesthetic-surgical process, as well as the benefits obtained from doing that, prevailed over these negative feelings. Crying, a strategy observed in anesthetic induction, expressed the feelings of some mothers in the situation just mentioned.

Tranquility, a fact observed in anesthesia pre-induction and induction periods, was reported by mothers in the PARR. Furthermore, they described positive feeling at the time of the child's awakening.

DISCUSSION

The present research cast a light on the accompanying parties of children about to undergo surgery, evidencing that, in all cases, children were accompanied by their mothers. In a study carried out in São Paulo, mothers were also the majority of accompany parties of pediatric patients undergoing surgical procedures and who ended up fasting along with their children[9]. This data was similar to the findings of this research, since the field logs' records verified that the circulating nurse would usually tell the mother to go eat something or have

some coffee. Possibly, professionals do that as a routine procedure, once that mother would usually not feed themselves, considering their children should have "nothing by mouth" (NBM) in the immediate preoperative period.

In the research mentioned previously[9], feelings such as nervousness, anxiety and concern have been observed. In this research, the manifestation of crying was observed in five of the seven mothers in the anesthesia induction period. Although some of them were "anxious" (IFL1), "apprehensive" (IFL3) and "tearful" (IFL5) during pre-induction, they seemed calm during induction until the child fell asleep.

In another study, the feelings of accompanying parties of children in pediatric surgery were expressed by anxiety, nervousness and fear. This occurs at the moment in which mother and child are separated, when the child is taken into the operating room, and their companions need to stay in the waiting room, wondering what could be happening during the intervention[10].

Furthermore, mothers had different manifestations of fear and anxiety, through crying or agitation, caused by the unknown, and related to the surgery itself. Even with the aid of health professionals regarding the surgical process, many companions were not able to remain completely at ease[10].

The results of the present study showed that, when mothers accompanied their children to the operating room, they seemed calm; but after witnessing their child's loss of consciousness, they cried — evidencing the same feeling displayed by other accompanying parties in the previously mentioned study[10].

As much as companions try to remain calm in front of the hospitalization situation, the lack of knowledge of what could occur makes them feel very distressed. The strategies most often used by parents are: giving love and affection, looking for tranquility and spiritual support[11]. The results of the present study agree with what was reported by the authors, once that most mothers demonstrated this feeling by kissing their child after anesthesia induction. Although spirituality was not observed in the manifestations of the mothers in the research, it is not unlikely that they may have used this strategy.

The field logs showed that patients, in their majority, were calm, characterizing an important factor, considering that the anesthesia induction, at times, may be seen by the child as a punishment for something they did[6]. Thus, it is sometimes necessary to prepare the parents beforehand to introduce the child in the SC.

The inability to actively take part in the process, i.e., just looking and being together, may sometimes result in negative feelings. In some cases, seeing your child in a distress situation, when you are not in charge of such situation, may be cause of great anxiety in some progenitors. The feelings of fear, anxiety and nervousness are caused by the unknown, as in not knowing how the anesthesia induction will be, how the child will react and how they will be during the period their companions are not allowed to be present. In this context, the presence of parents during anesthesia induction considerably increases their satisfaction, contributing to a positive experience[12].

A study analyzed the experience of using volunteers to accompany parents to the operating room, helping them and clarifying the process. Before the child's elective surgery, parents received a pamphlet with information about their presence in anesthesia induction. Of the parents who took part in the process, 99% of them reported feeling well-prepared for the procedure[13]. Similarly, most mothers in this research reported that being with their children at that time was a positive experience.

The presence of parents during the procedure improves the quality of anesthesia induction in children who were not medicated in the preoperative period, thus increasing the occurrence of smoother inductions; also, there is lesser need for physical restraint[14]. In this investigation, anesthesia inductions went on smoothly, as well as the child's awakening. There was only one situation in which a kind of physical restraint was necessary, where the mother and the circulating nurse had to hold the child, due to their becoming extremely agitated and nervous at the time the inhalation anesthesia mask was placed on their face.

In the field log records, it was verified that only one child was not distracted by the toys available in the pre-induction room. This child was 11 years old, which may suggest that new forms of distraction should be used for this age range. An easy and time-saving method which may be used to reduce anxiety in pediatric patients is the use of tablet interventions[15]. The use of this equipment was shown to be superior to midazolam, regarding the reduction of anxiety of children aged between 1 and 11 years old, at the moment they are separated from their parents and during anesthesia induction [16].

Although one mother interviewed reported not having enjoyed the experience of participating in anesthesia induction, the staff interacted a great deal with both mother and child, talking to and entertaining them both during the process. Also, the mother was accompanied by the nursing

staff to the exit after the process was over, and received recommendations on the postoperative period. Some factors which can contribute to parental anxiety may be related to personality, age, education, marital status, occupation, previous hospital experiences, concerns regarding the surgery and the anesthesia itself[17].

In another study[18], the participating mothers expressed feelings of anguish, impotence, loneliness, guilt, fear, sadness and anxiety. Authors[12] recognize that entering an operating room is stressful, regardless of the absence or presence of parents. It should be noted that the results in this study are similar to the ones of previously mentioned studies[12,18], considering research subjects expressed fear and anxiety. Moreover, it was possible to observe that, even though the anesthetic-surgical process is challenging, with the occurrence of negative feelings, mothers prefer to take part in these moments.

The I1 and I5 subjects expressed similar feelings regarding the act of anesthesia itself and about not knowing how the child would respond. However, subject I1 reported it not having been a good experience. The stress of parents may interfere in the ability to meet the emotional needs of the child, such as helping them to create managerial strategies for these feelings during hospitalization. When parents are calm and present, they contribute to the cooperation of their kids during the procedures[6]. Negative feelings may be part of this process, since surgical procedures involve some risks, but they do not turn the experience of participating in anesthesia induction into a negative thing.

In a study[19] carried out in the city of Porto, in Portugal, parents believed their presence during the induction period and in the PARR decreased anxiety and provided greater comfort and safety to the child. On the other hand, when asked about the arrival of the child in the PARR, 42.9% of parents stated that the child was agitated. The data of the aforementioned study[19] differs from the present research, in which the subjects expressed tranquility in their statements.

During data collection, a difficulty was observed when conducting further interviews, provided that mothers were living a moment of reasonable tension, with concentration and stress focused on the situation at hand, meaning the anesthetic-surgical procedure their children were going through, which resulted in little involvement between interviewee and interviewer. This is an understandable fact in a health situation involving children and their accompanying parties, when attention is focused on the event itself, placing any other situations that may occur at the same time in the background.

FINAL CONSIDERATIONS

This research allowed the observation of the perception of children's accompanying parties (seven mothers) in anesthesia induction and awakening. In pre-induction, the manifestation of tranquility prevailed both in children and in their mothers. As for anesthesia induction, some mothers reported negative feelings during the anesthetic-surgical procedure, though having a positive overall experience, once that it was possible to take part in the whole process and to ensure support and tranquility to the child.

When identifying the feelings experienced in the PARR, there was a predominance of relief and happiness. Also, most children experienced a smooth awakening from the anesthesia. The strategies used by mothers / companions were providing love and affection, crying at the moment the child fell asleep. The role of the circulating nurse is noteworthy as a support to mothers.

The role of SC and PARR nurses, committed and able to act out to calm down and comfort children and mothers, is essential, generating ways to care for and assist others.

Accompanying parties should be considered to become an active part of the process, providing greater safety to children and greater satisfactions to their companions, in order to make the anesthesia induction a moment of greater tranquility to all who are involved, aiming at a better pediatric patient awakening.

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A QUALITY ASSESSMENT OF IMMEDIATE POSTOPERATIVE NURSING CARE DOCUMENTATION

Avaliação da qualidade dos registros de enfermagem nos cuidados pós-operatórios imediatos

Evaluación de la calidad de los registros de enfermería en los cuidados postoperatorios inmediatos

Emanuela Batista Ferreira e Pereira[1]*, Gedalva Pereira de Lima[2], Heloise Agnes Gomes Batista da Silva[3], Kássia Maria da Hora Teixeira[4], Brenna Cavalcanti Maciel Modesto[5], Magdala de Araújo Novaes[6]

ABSTRACT: Objective: To assess the quality of immediate postoperative nursing care documentation in reference units in the state of Pernambuco, Brazil. **Method:** A descriptive, cross-sectional, documental and comparison study with a qualitative approach performed in three hospitals (A, B, C). The sample was comprised of 130 health records from October to November 2015 and the data was collected from a semi-structured form. **Results:** The records, checking and evaluation of procedures were performed differently in each of the assessed hospitals. In hospital A, there was no recording of vital signs, whereas in hospitals B and C, there was. In institutions A and C, in 100% of the cases, there was no calculation performed that used the Aldrete-Kroulik scale. The three institutions demonstrated good results with legible documentation that did not have many erased items. **Conclusion:** It was found that the hospitals analyzed don't meet the standards proposed by the predominant postoperative care literature regarding nursing documentation.

Keywords: Quality of health care. Nursing records. Postoperative care. Operating room nursing.

RESUMO: Objetivo: Avaliar a qualidade dos registros de enfermagem nos cuidados pós-operatórios imediatos em unidades de referência no estado de Pernambuco. **Método:** Estudo transversal, descritivo, documental e comparativo com abordagem quantitativa, realizado em três hospitais (A, B, C). A amostra foi composta por 130 prontuários no período de outubro a novembro de 2015 com dados coletados por meio de um formulário semiestruturado. **Resultados:** Os registros, a checagem e as avaliações dos procedimentos foram feitos de formas diferentes nos hospitais avaliados. No hospital A não houve registro dos sinais vitais, enquanto nos hospitais B e C, os mesmos foram verificados. Sobre a escala de Aldrete e Kroulik (AK), nas instituições A e C não houve realização do cálculo em 100% dos casos. As três instituições apresentaram bons resultados, como prontuários legíveis e sem a presença de rasuras. **Conclusão:** Os hospitais analisados não atendem aos padrões preconizados pelas principais literaturas na área de cuidados pós-operatórios quanto aos registros de enfermagem.

Palavras-chave: Qualidade da assistência à saúde. Registros de enfermagem. Cuidados pós-operatórios. Enfermagem de centro cirúrgico.

[1]Undergraduate degree in Nursing; PhD student in Surgery through the Graduate Program in Surgery at the Universidade Federal de Pernambuco (UFPE); Assistant Professor of the Nossa Senhora das Graças (FENSG) School of Nursing at the Universidade de Pernambuco (UPE) – Recife (PE), Brazil.
[2]Undergraduate degree in Nursing through the FENSG of the UPE; Post-graduate student in the Intensive Care Unit through the Instituto de Desenvolvimento Educacional (IDE); Nurse in the Emergency Room at the Hospital Miguel Arraes – Recife (PE), Brazil.
[3]Undergraduate degree in Nursing through the FENSG of the UPE; Resident in Intensive Care at the Instituto de Medicina Integral Professor Fernando Figueira (IMIP) through the Pernambuco State Health Department – Recife (PE), Brazil.
[4]Undergraduate degree in Nursing through the FENSG of the UPE – Recife (PE), Brazil.
[5]Nursing degree from the FENSG of the UPE; resident at the Surgery Center of the Hospital da Restauração (HR) through the Pernambuco State Health Department – Recife (PE), Brazil.
[6]Undergraduate degree in Computer Science; PhD in Bioinformatics from the Universidade Aix-Marseille II; Associate Professor in the Clinical Medicine Department of the UFPE; Coordinator of the Telehealth Center of the Hospital das Clínicas at the UFPE – Recife (PE), Brazil.
*Corresponding author: emanuela.pereira@upe.br
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RESUMEN: Objetivo: Evaluar la calidad de los registros de enfermería en el cuidado postoperatorio inmediato en las unidades de referencia en el Estado de Pernambuco, Brazil. **Métodos:** Estudio transversal, descriptivo, documental y comparativo con enfoque cuantitativo realizado en tres hospitales (A, B, C). La muestra estuvo compuesta por 130 registros médicos durante el período de octubre a noviembre de 2015 con los datos recolectados a través de un formulario semi-estructurado. **Resultados:** Los registros, el control y la evaluación de procedimientos fueron hechos de diferentes maneras en los hospitales evaluados. En el hospital A, no hubo registro de signos vitales, mientras que en los hospitales B y C, han sido verificados. En la escala de Aldrete y Kroulik, en las instituciones A y C, no había ninguna realización del cálculo en el 100% de los casos. Las tres instituciones mostraron buenos resultados en lectura de cartas y la presencia de raspaduras. **Conclusión:** Parece que los hospitales analizados no cumplen con las normas recomendadas por las principales literaturas en el área de cuidados postoperatorios acerca de los registros de enfermería.
Palabras clave: Calidad de la atención de salud. Registros de enfermería. Cuidados posoperatorios. Enfermería de quirófano.

INTRODUCTION

Nursing notes are primary documents that record the actions and activities performed by the nursing team, proving that they provided quality care. The notes are records that are meant for the entire nursing team and they are essential for the systematization of nursing care (*sistematização da assistência de enfermagem* — SAE). They should evaluate and reflect the complexities of the patient and should involve, in particular, biopsychosocial aspects that allow for the case to evolve, and for strategies to me made that aim at completing comprehensive care[1].

These records guarantee more effective communication among the members of the health team and are used as ethical and legal tools to reveal negligence from the part of nursing professionals and from the hospital itself to evaluate the quality of the services[2]. To manage the quality of nursing care and the costs associated with the rendering of services, auditing has been the most widely used evaluating instrument[3].

The practice of auditing in the health field emerged with the purpose of evaluating the quality of care provided to patients. It is a method that systematically and independently evaluates facts obtained through observations and through the assessment of recommendations established in the current norms, and it aims to determine if the health services and their results are in agreement with the quality indicators[3].

Thus, an evaluation of the quality of services provided by the nursing team reflects the analysis of the records identified in the audit. The lack of records results in less continuous care and a decrease in care in the sectors with high complexity procedures, such as the post-anesthetic care unit (PACU). Nurses should ensure that patients are evaluated comprehensively, especially with regard to the recording of vital signs and the occurrence of complications[4].

The PACU has peculiar routines for patient care. It is characterized by critical care and aims to provide intensive care in the immediate postoperative period (IPO) of patients who undergo surgeries with anesthesia and diagnostic procedures[4, 5].

This hospital unit is intended for patients at the end of their procedure and lasts until their vital signs and consciousness are stable, in order to detect and avoid complications that may occur as a result of anesthesia or surgery[5].

The relevance of this issue is corroborated by the need for nursing documentation in the medical records and, particularly, by the care given to vital signs and nursing interventions. The gaps in research on record quality in the PACU deserve attention considering the kind of evidence that such records represent for the classification of practices carried out by the nursing team.

OBJECTIVE

To assess the quality of immediate postoperative nursing care documentation in reference units in the state of Pernambuco, Brazil.

METHOD

A descriptive, cross-sectional, documental and comparative study was implemented with a qualitative approach that performed a quality assessment of nursing documentation in the PACU of reference units in the state of Pernambuco.

A quantitative approach was chosen because it corresponds to the stage of the descriptive analysis process that allows for the exploration of data that comes as close as possible to the studied reality. Furthermore, it searches for some relevant pattern or behavior that is present in the data set[6].

Data collection was carried out from October to November of 2015, at the PACU of three reference hospital units in the city of Recife, Pernambuco, Brazil. The institutions are here designated as hospital A, hospital B and hospital C, with 16, 7 and 9 beds, respectively.

The inclusion criteria were records of patients admitted to these POI care units, and who were undergoing elective surgical procedures. The patients were over 18 years of age, were of both genders and had a minimum stay of 2 hours in the PACU. Considering these criteria, the study sample consisted of 130 medical records, 50 from hospital A, 50 from hospital B, and 30 from hospital C.

For the data collection, a semi-structured form composed of three parts was used. From this form, the identification of nursing admission data, the characterization of nursing records related to hemodynamic monitoring, the Aldrete and Kroulik (AK) index, and the identification of the main complications and actions registered by the nursing team in the reference units were carried out.

Part I of the instrument was comprised of eight objective and subjective questions, which dealt with the quality of nursing records with regard to epidemiological and clinical aspects, such as gender, age, diagnostic hypothesis, allergies, surgical specialty, type of anesthesia, and clinical history (CH)[7].

Part II included the recording of hemodynamic monitoring and vital signs (HMVS) and patterns such as blood pressure (BP), heart rate (HR), oxygen saturation (Sat O_2), respiratory rate (RR) and temperature (T)[7].

Part III was comprised of complication records that occurred during the stay in the PACU and the nursing care applied with each complication. It is highlighted that the data collection instrument was based on similar studies and underwent some changes and adaptations[7].

For data analysis, a database was built in a Microsoft Excel® spreadsheet, which was then exported to the Statistical Package for the Social Sciences (SPSS) software. In order to evaluate the quality of the nursing records with regard to the epidemiological and clinical profile of the charts from each hospital, the percentage frequencies and the frequency distributions were calculated.

A survey of the factors related to hemodynamic monitoring and HMVS of the patients, the factors related to the admission record and nursing actions, the complication records and the nursing interventions performed was also carried out for each institution evaluated. To compare the factors evaluated between institutions, the χ^2 test for homogeneity was applied. All analyses were performed considering a significance level of 5%.

The study was approved by the Research Ethics Committee of the University of Pernambuco (CEP / UPE), in compliance with Resolution No. 466/2012 of the National Health Council (opinion number 1,265,296). For the present research, it was not necessary to use a Free and Informed Consent Form (*Termo de Consentimento Livre e Esclarecido*--TCLE), since it was a study that only used documents.

RESULTS

Table 1 shows the distribution of the epidemiological and clinical profile of the patients, according to each hospital evaluated.

When observing the homogeneity test, it was verified to be significant in all factors (p value = 0.002 for gender and p value <0.001 for the others), indicating that there is a difference in the prevalence of these factors in the hospitals evaluated.

The distribution of factors related to the hemodynamic monitoring of patients is shown in Table 2.

The homogeneity test of the distribution of factors related to hemodynamic monitoring and vital signs among the hospitals evaluated was significant for all factors (p value <0.001), indicating that the records, checks and evaluations of the procedures are done in different ways in the three institutions. Hospital A's results were the most distinct from the ones recommended in the literature.

Table 3 shows the distribution of factors related to admission records and nursing activities, according to the hospital evaluated.

The homogeneity test of the distribution of factors related to nursing records and activities in the three hospitals evaluated was significant in all factors, (p value <0.05), indicating that the admission records and nursing activities are done in different ways in hospitals A, B and C. Hospital C had the best record situation, except in the case

Table 1. The distribution of nursing records with regard to the epidemiological and clinical profile of the patients, by hospital.

Variables	Hospital			p value
	A	B	C	
Gender n (%)				
Male	35 (70.0)	18 (36.0)	19 (63.3)	0.002*
Female	15 (30.0)	32 (64.0)	11 (36.7)	
Age (years)				
Minimum	19	18	34	–
Maximum	87	81	84	–
Average±SD	48.0±18.5	56.5±16.3	60.9±13.0	–
Surgical specialty n (%)				
Bucomaxilofacial	3 (6.0)	–	–	–
Cardiovascular	–	–	28 (93.3)	
General	7 (14.0)	14 (28.0)	–	
Neurosurgery	13 (26.0)	–	–	
Oncology	5 (10.0)	23 (46.0)	–	
Orthopedics	13 (26.0)	–	–	
Plastic	2 (4.0)	1 (2.0)	–	
Urology	–	12 (24.0)	–	
Vascular	7 (14.0)	–	2 (6.7)	
Type of anesthesia n (%)				
Block	4 (6.7)	–	–	–
Sedation	8 (13.3)	6 (9.0)	–	
General	17 (28.3)	23 (34.3)	27 (90.0)	
General balanced	9 (15.0)	6 (9.0)	2 (6.7)	
Local	1 (1.7)	3 (4.5)	1 (3.3)	
Epidural	3 (5.0)	11 (16.4)	–	
Spinal	14 (23.3)	17 (25.4)	–	
Total intraveneous	4 (6.7)	1 (1.5)	–	
Allergies n (%)				
Yes	8 (16.0)	12 (24.0)	2 (6.7)	<0.001*
No	27 (54.0)	38 (76.0)	28 (93.3)	
Not informed	15 (30.0)	–	–	
Clinical history n (%)				
Yes	25 (50.0)	33 (66.0)	28 (93.3)	<0.001*
No	10 (20.0)	17 (34.0)	2 (6.7)	
Not informed	15 (30.0)	–	–	

SD: standard deviation; *p-value of the χ^2 test for homogeneity (if p<0.05, the distribution factor evaluated is identical in the hospitals evaluated).

of complications and nursing interventions, in which there was no notification in any of the hospitals.

DISCUSSION

Based on the data obtained, it was observed that more men were admitted to the PACU in hospitals A and C. Only institution B recorded a larger number of women admitted. The prevalence of males in the present study differs from the literature. In a study analyzing the medical records of 260 surgical patients admitted to the PACU, more than 50% were female[4].

Table 2. The distribution of nursing records with regard to factors related to hemodynamic monitoring and patients' vital signs, by hospital.

Factor evaluated	Hospital			p value
	A	B	C	
	n (%)	n (%)	n (%)	
Record of vital signs				
Yes	20 (40.0)	39 (78.0)	30 (100.0)	<0.001*
No	30 (60.0)	11 (22.0)	–	
Verifying the heart-rate record				
Yes	14 (28.0)	39 (78.0)	30 (100.0)	<0.001*
No	36 (72.0)	11 (22.0)	–	
Verifying the respiratory frequency record				
Yes	12 (24.0)	38 (76.0)	30 (100.0)	<0.001*
No	38 (76.0)	12 (24.0)	–	
Verifying the blood pressure record				
Yes	15 (30.0)	39 (78.0)	30 (100.0)	<0.001*
No	35 (70.0)	11 (22.0)	–	
Verifying the oxygen saturation record				
Yes	14 (28.0)	38 (76.0)	30 (100.0)	<0.001*
No	36 (72.0)	12 (24.0)	–	
Verifying the temperature record				
Yes	–	6 (12.0)	30 (100.0)	<0.001*
No	50 (100.0)	44 (88.0)	–	
Application of the Aldrete and Kroulik Index				
Yes	–	15 (30.0)	–	<0.001*
No	50 (100.0)	35 (70.0)	30 (100.0)	
Correct application of the Aldrete and Kroulik Index				
Yes	–	6 (40.0)	–	–
No	–	9 (60,0)	–	

*p-value of the χ^2 test for homogeneity (if p<0.05, the distribution factor evaluated is identical in the hospitals evaluated).

The predominant surgical interventions performed in the hospitals were neuro, orthopedic, oncological and cardiovascular surgeries. When associated to the variables "type of surgery" and "gender", the National Policy on Men's Health Care (Política Nacional de Atenção à Saúde do Homem) points to a greater number of accidents due to external causes. Furthermore, it shows the aversion these individuals have with regard to their own self-care and to the prevention of morbidities, which forces the system to assist them in the more advanced stages of diseases and treatment[8].

It was observed that general anesthesia was the anesthesia most often used in the hospitals. It is of great importance to record the type of anesthesia used in surgical procedures, because through correct and effective monitoring, it is possible to quickly identify changes presented in the post-anesthetic period and, consequently, a greater understanding of the drugs[4].

Table 3. The distribution of factors related to the quality of nursing records, according to the hospital evaluated.

Factor evaluated	Hospital			p value
	A	B	C	
	n (%)	n (%)	n (%)	
Legible Medical Record				
Yes	33 (66.0)	35 (70.0)	30 (100.0)	0.002*
No	17 (34.0)	15 (30.0)	–	
Medical Record with erasures				
Yes	11 (22.0)	19 (38.0)	–	<0.001*
No	39 (78.0)	31 (62.0)	30 (100.0)	
Records are signed and initialed				
Yes	32 (64.0)	23 (46.0)	30 (100.0)	<0.001*
No	18 (36.0)	27 (54.0)	–	
Record of the time of the interventions				
Yes	8 (16.0)	39 (78.0)	30 (100.0)	<0.001*
No	42 (84.0)	11 (22.0)	–	
Record of the complications				
Yes	3 (6.0)	5 (10.0)	8 (26.7)	0.020*
No	47 (94.0)	45 (90.0)	22 (73.3)	
Record of the nursing intervention				
Yes	1 (2.0)	3 (6.0)	7 (23.3)	0.003*
No	49 (98.0)	47 (94.0)	23 (76.7)	

* p-value of the χ^2 test for homogeneity (if $p<0.05$, the distribution factor evaluated is identical in the hospitals evaluated).

To ensure patients' safety, it is imperative that their allergies are recorded in their medical record. When nurses correctly identify and check the prescriptions before the patients take them, the risk of allergic reactions and complications is minimized. In hospitals B and C, allergies were recorded in all of the medical records analyzed. However in hospital A, this information was missing in 30% of the records, showing a failing in the care[9,10].

With regard to clinical history, it was observed that in a significant number of the medical records from hospital A, the comorbidities of the patients were not present. Patient information was collected from nursing records, with the purpose of evaluating personal and family history, as well as analyzing risk factors for patients' overall health[11]. The lack of this information makes patients more vulnerable and increases their risk for postoperative complications[12].

The patients in the three hospitals studied were primarily adults. Findings from studies that include age as a variable affirm that it is necessary to assist patients of an advanced age with more caution, since morbidities and the aging process increase the risk of complications in the postoperative period, due to the imbalance of basal functions. In a comprehensive study review, complications during the post-anesthetic period were investigated, and blank spaces were detected in the verification of complications and nursing management. Thus, it is critical to record this information in order to plan care throughout the postoperative period and to identify problems early on[13,14].

According to the Brazilian Association of Surgery Center, Anesthetic Recovery and Central Sterile Supply Department Nurses (*Associação Brasileira de Enfermeiros de Centro-Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização* — SOBECC)[15], it is essential to perform hemodynamic and HMVS monitoring during the patient's stay in the PACU. Furthermore, it is necessary to perform an evaluation using the AK scale in order to discharge the patient. The PACU is a place where patients receive intensive care. Its main objective is to prevent and detect early postoperative complications, emphasizing vital sign stability and regaining consciousness[16].

The hospitals studied each presented different results regarding the hemodynamic verification and the vital signs check. No consensus was observed when measuring certain parameters, including the failure to record items such as temperature.

When patients are admitted to and stay in the PACU, especially in the IPO, there is a period with a greater incidence of complications. As such, nurses must perform adequate physical examinations, stabilize the HMVS, and assess the patient's level of consciousness, ensuring that he or she is seen comprehensively, taking the surgical procedure, the anesthetic agents used, and potential risks into account[4].

Nurses should always be attuned to hemodynamic monitoring. Verifying RF is essential, since it is significantly affected by the residual action of neuromuscular blockers found in anesthetics. The instability of the cardiovascular system requires attention to CF, since hypotension is one of the most common findings and it has different causes, such as vasodilation and decreased cardiac output[4,16].

BP monitoring should also be performed rigorously, since its increase may be related to pain in the IPO, bladder distension, neuromuscular agitation, among others. Sat O^2 should always be measured and evaluated, considering that respiratory function is significantly affected by the residual action of the anesthetics used[4,16].

It is also important to evaluate the thermoregulatory system, since the T can vary up and down. Hypothermia is one of the most prevalent findings and may be a consequence of a delayed awakening or a long hospital stay[4,16].

The AK scale evaluates parameters such as muscle activity, respiration, circulation, consciousness and Sat O_2, and is a simple, effective scale that is easy to apply. Applying this scale is the basis for the PACU patient discharge criteria. Neglecting these criteria poses risks to patients' hemodynamic stability[16,17].

For the item that showed the application of the AK scale, it was observed that hospitals A and C did not perform the calculation in all cases. In hospital B the calculation of AK was performed, however, an evaluation of the patients' expressive percentage was incorrect. In the evaluated hospitals, there was a sample that was worrisome because the discharge criteria instrument was not used, which could contribute to the morbimortality of the patients.

In line with such evidence, the PACU is characterized by highly complex care. The absence of nursing records in this sector can harm the patients assisted and cause damages to the institution, decreasing the safety of care performed by the nurse and his or her team[18].

The three hospitals analyzed presented good results from the medical records that were legible and had the presence of erasures. These results are in line with the recommendations from the Federal Nursing Council Resolution (*Resolução do Conselho Federal de Enfermagem* — COFEn) nº 311/2007, the Code of Ethics of Nursing Professionals (*Código de Ética dos Profissionais de Enfermagem*). In its description, nursing documentation must be recorded in an objective and readable way, guaranteeing that the information may be correctly identified by other health professionals[19].

The absence of records makes it difficult to identify the health professional working with the patient, the procedure performed and the medication prescribed, as well as whether alterations were observed during the patient's stay in the PACU[19].

The limitations found in the study include the limited amount of evidence on the subject, as well as the difficulty of accessing medical records, and the inability to understand notes and records made by the nursing team in the PACU.

CONCLUSION

The findings of this study allowed us to conclude that the nursing record practices performed in the hospitals analyzed are not in line with the standards recommended by the literature in the area of postoperative care.

There are deficits in the records of the three hospitals evaluated. The deficits in the records of hemodynamic monitoring and the anesthetic recovery index through the AK scale, for example, are prone to procedure failure and diminished quality of care, which compromise the assessment, the severity classification, and the general condition of the patient.

It should be noted that the absence of intervention records makes the health-sickness process less known, but also makes it difficult to prove that the specified clinical-surgical procedures were performed on the patient.

Finally, the nurse, as leader of the nursing team, must be attentive to the records as a way to guarantee comprehensive care, as it is he or she guides the nursing care plan during the patient's stay in the PACU, and protects against possible ethical or legal sanctions.

Therefore, it is recommended that studies be carried out that seek to characterize nursing records and annotations, as well as to understand the particularities and priorities of the postoperative nursing field.

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PATIENTS UNDERGOING BARIATRIC SURGERIES: FACTORS ASSOCIATED WITH POST-OPERATIVE COMPLICATIONS FROM THE SURGICAL SITE

Pacientes submetidos a cirurgias bariátricas: fatores associados a complicações pós-operatórias de sítio cirúrgico

Pacientes sometidos a cirugías bariátricas: factores asociados con complicaciones postoperatorias del sitio quirúrgico

Priscilla Vasconcelos Aguiar[1], Eduardo Tavares Gomes[2]*, Iraneide Nascimento dos Santos[3], Aracele Tenório de Almeida e Cavalcanti[4]

ABSTRACT: Objective: To verify the prevalence and the factors associated with postoperative surgical site complications in patients undergoing bariatric surgeries. **Method:** A cross-sectional, retrospective, analytical study with a quantitative approach. 197 cases of obese patients undergoing bariatric surgery were analyzed between January 2013 and January 2016 in Pernambuco, Brazil. Dichotomized variables were analyzed using the χ^2 test. The risk of complications was estimated by the *odds ratio* (OR). A significance of $p < 0.05$ was assumed. **Results:** Among the 30 patients that made up the sample, 45 postoperative surgical site complications were observed. There was a higher incidence in individuals over 45 years of age (70.0%). The factors that stood out as possibly being associated with the outcomes were: an open surgical approach (OR = 5.35), the insertion of drains (OR = 4.48), and a postoperative period longer than 3 days of hospitalization (OR = 5.03). **Conclusion:** The following showed a high disposition for the development of complications from the surgical site: a high prevalence of seroma, the Roux-en-Y bypass surgical technique, the patient's age over 45 years old, a conventional/open surgical approach, the insertion of cavitary drainage, and a hospitalization stay longer than 3 days.

Keywords: Postoperative complications. Bariatric surgery. Morbid obesity.

RESUMO: Objetivo: Verificar a prevalência e os fatores associados às complicações pós-operatórias de sítio cirúrgico em pacientes submetidos a cirurgias bariátricas**. Método:** Estudo transversal, retrospectivo, analítico, com abordagem quantitativa. Foram analisados 197 casos de pacientes obesos submetidos à cirurgia bariátrica entre janeiro de 2013 e janeiro de 2016 em Pernambuco, Brasil. As variáveis relacionadas dicotomizadas foram analisadas por teste do χ^2. O risco de complicações foi estimado pela *odds ratio* (OR). Assumiu-se significância de $p<0,05$. **Resultados:** Entre os 30 pacientes que compuseram a amostra, foram observadas 45 complicações pós-operatórias de sítio cirúrgico. Houve maior incidência nos indivíduos acima de 45 anos (70,0%). Dos fatores que poderiam estar associados aos desfechos, destacaram-se abordagem cirúrgica aberta (OR=5,35), inserção de drenos (OR=4,48) e período de tempo de pós-operatório superior a 3 dias de internação (OR=5,03). **Conclusão:** Comprovou-se maior prevalência de seroma como complicação de sítio cirúrgico, além da técnica cirúrgica (bypass em Y de Roux), faixa etária maior de 45 anos, tipo de abordagem cirúrgica convencional/aberta, presença de inserção de dreno cavitário e tempo de internação superior a 3 dias como predisponentes a um maior desenvolvimento de complicações.

Palavras-chave: Complicações pós-operatórias. Cirurgia bariátrica. Obesidade mórbida.

[1]Undergraduate degree in nursing; Master's student in Neuropsychiatry and Behavioral Sciences at the Universidade Federal de Pernambuco (UFPE); specialization in Surgical Nursing as part of the Nursing Residency at the Universidade Federal de Pernambuco (UFPE) – Recife (PE), Brazil.
[2]Assistant nurse at the Surgical Center Unit of Hospital das Clínicas (HC) at UFPE; Master's degree in Nursing through the Associate Graduate Program in Nursing (Programa Associado de Pós-Graduação em Enfermagem – PAPGEnf) at the Universidade de Pernambuco (UPE)/Universidade Estadual da Paraíba (UEPB); specialist in Nursing in Advanced Life Support through the Nossa Senhora das Graças School of Nursing at the Universidade de Pernambuco (FENSG/UPE); specialist in Cardiology Nursing through the Cardiovascular Emergency Medicine Program of Pernambuco (Pronto-Socorro Cardiológico de Pernambuco – PROCAPE) from the State Department of Health of Pernambuco (SES-PE) – Olinda (PE), Brazil.
[3]Undergraduate degree in Nursing; Master's degree in Pathology; Specialist in Labor Nursing at UFPE – Recife (PE), Brazil.
[4]Current PhD student in Health Sciences through the school of Medical Sciences at UPE; specialist in Infections and Parasitic diseases at UPE; coordinator of the Nursing Residency Program of the HC at UFPE – Recife (PE), Brazil.
*Corresponding author: edutgs@hotmail.com
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RESUMEN: Objetivo: Verificar la prevalencia y los factores asociados con las complicaciones del sitio quirúrgico postoperatorio em pacientes sometidos a cirugías bariátricas. **Método:** Estudio transversal, retrospectivo y analítico con enfoque cuantitativo. Se analizaron 197 casos de pacientes obesos sometidos a cirugía bariátrica entre enero de 2013 y enero de 2016, em Pernambuco, Brasil. Las variables dicotomizadas se analizaron usando la prueba χ^2. Le riesgo de complicaciones es estimó mediante la *odds ratio* (OR). Se asumió una significancia de $p<0,05$. **Resultados:** entre los 30 pacientes em la muestra, 45 complicaciones postoperatorias fueran observadas en el sitio quirúrgico. Hubo una mayor incidencia em individuos mayores de 45 años (70,0%). Los factores que se destacaron como posiblemente asociados con los resultados fueron: un abordaje quirúrgico abierto (OR = 5,35), la inserción de drenajes (OR = 4,48), y un periodo postoperatorio mayor a 3 días de hospitalización (OR = 5,03). **Conclusión:** Los siguientes mostraron una alta disposición para el desarrollo de complicaciones del sitio quirúrgico: alta prevalencia de seroma, técnica quirúrgica de derivación Roux-em-Y, edad del paciente mayor de 45 años, abordaje quirúrgico convencional/abierto, inserción de denaje cavitario y hospitalización por más de 3 días.

Palablas clave: Complicaciones posoperatorias. Cirurgía bariátrca. Obesidad mórbida.

INTRODUCTION

Surgical intervention is only part of the comprehensive treatment for obesity, which is primarily based on health promotion and longitudinal clinical care. Healthcare costs are significantly higher for patients who treat obesity with surgical techniques than for those who treat it with noninvasive techniques. Therefore, it is essential to define safe criteria for the recommendation of surgery, to be sure that other approaches will fail, and to be in constant reflection about potential complications[1,2].

Bariatric surgery is recommended for individuals who have: body mass index (BMI)> 50 kg / m²; BMI> 40 kg / m² with or without comorbidities and who have had no success from longitudinal clinical treatment for at least 2 years, and who have followed the clinical protocol; or patients with BMI> 35 kg / m², with comorbidities such as diabetes mellitus (DM) and/or hypertension (HT), cardiovascular risks, sleep apnea, among others[3].

The occurrence of postoperative complications, in general, is related to several factors, among them: associated clinical pathology, type of anesthesia, the stage of the illness that led to surgery, and postoperative care. Certain patients are at a greater risk of presenting complications due to their preoperative clinical state, as can be seen in obese individuals[4].

Surgical site complications are important causes of immediate and delayed postoperative morbidity, especially post-laparotomy. The healing of surgical wounds in normal and healthy individuals occurs in an orderly sequence of physiological events, which include inflammation, epithelization, fibroplasia, and maturation. Mechanical failure or wound healing failure at the site of surgery may cause a rupture in its closure, leading to seroma, bruised area, wound dehiscence, or hernia. Other complications include surgical site infections (SSI), hemorrhage and ischemia[5]. As such, obesity may make it difficult for the surgical incision to heal, as it is associated with an increased incidence of SSI, bruises, incisional hernias and complications in general[6].

The appearance of postoperative fistulas is also a serious complication which may occur in patients undergoing an operative obesity treatment. Increased intraluminal pressure caused by distal stenosis, excessive tension in the suture line, tissue ischemia, and bruises are their predisposing factors[7].

Bruises and seromas are collections of blood and serum, respectively. These are the most common surgical site complications and usually result from the failure of primary haemostasis or a hemorrhagic diathesis (e.g. anticoagulation), which may cause the surgical wound to open and predispose it to infection, once that bacteria will have access to deeper layers of the skin and can multiply in the stagnant fluid[8].

Thus, recognizing characteristics that define an obese patient's particular complications in relation to post-surgical complications is beneficial to providing care, since it will guide nurses, who are an integral part of the multidisciplinary medical team, to investigate and diagnose clinical conditions and risk controls, indicating the possibility of uniting the organization and standardization of scientific language and the qualification nursing practice.

OBJECTIVE

To verify the prevalence and factors associated with postoperative surgical site complications in patients undergoing bariatric surgeries.

METHOD

This is a cross-sectional, retrospective, analytical study, with a quantitative approach, carried out at the *Hospital das Clínicas* (HC) of the *Universidade Federal de Pernambuco* (UFPE). The hospital is a reference for bariatric surgery in the state, and has received high-degree obesity patients since it began its activities in 1997. The hospital has ten rooms for large surgeries, and there is no room exclusively for digestive surgery.

The study sample was found through the census and was composed of all obese patients undergoing bariatric surgeries at the HC between January 2013 and January 2016. During the period, 220 surgeries were performed, and 197 patients were included in the study. The others were not available in the Medical Archive Service (*Serviço de Arquivo Médico* — SAME).

Initially, the names and records of the patients undergoing gastroplasties were identified by means of an active outpatient search, and then their medical records were collected in the SAME.

The instrument of collection was a form made up of a checklist that referred to the sociodemographic, clinical and surgical aspects of the study sample. Complications were considered when occurred up to 30 days after surgery.

BMI was the indicator used to estimate fat associated with body composition, since it is the most widely used measure in the world to classify individuals with obesity problems[8]. In the study, the degrees of obesity were considered according to the Ministry of Health (*Ministério da Saúde* — MS), which defines it as having a BMI equal to or greater than 30.0 kg/m^2. They also subdivide it in terms of severity, related to the association of other morbidities. Thus: a BMI between 30.0 and 34.9 kg/m^2 indicates grade I obesity; a BMI between 35.0 and 39.9 kg/m^2 indicates a grade II obesity; and a BMI between 40.0 and 44.9 kg/m^2 indicates grade III obesity[9]. Individuals with a BMI> 45.0 kg/m^2 are considered to be super-obese[3].

The software used to create the database and to perform statistical analyses was the Statistical Package for Social Sciences (SPSS) for Windows, version 17.0.

A descriptive statistical analysis was performed, which calculated simple and collective frequencies, mean, standard deviation and median. A comparison of the proportions of complications according to dichotomized related variables was performed using the χ^2 test. The risk of complications was estimated by the *odds ratio* (OR), which was presented with a 95% confidence interval (95%CI). A significance level was set for results with a value of $p<0.05$.

The project was approved by the Research Ethics Committee of the *Universidade Federal de Pernambuco*, through CAAE 52533116.4.0000.5208.

RESULTS

The sample evaluated in the study had a total of 197 patients undergoing bariatric surgeries. There was a prevalence of female subjects, with 77.2% women (152 patients). The age group of up to 45 years old was the most operated one, with 82.2% (162 patients), compared to patients over 45 years old (n=35; 17.8%).

Of the patients who underwent surgery in the analyzed period, 59.9% (n=118) had HT and 25.4% (n=50) had DM. In addition, several comorbidities were observed, such as dyslipidemia in 11.7% (n=23) of the individuals, chronic kidney disease in 1.5% (n=3) of them, and other comorbidities in 10.7% (n=21). The comorbidities presented could include more than one. Regarding BMI classification, 44.2% (n=87) of the patients were classified as super-obese and 38.0% (n=75) had grade III obesity. Among the remainders, 15.7% (n=31) had grade II and 2.0% (n=4) had grade I obesity. The mean BMI was 45.3 kg/m^2, which characterizes high degrees of obesity.

With regard to the surgical techniques used, 51.3% (n=101) underwent Roux-en-Y bypass and 48.7% (n=96) underwent the sleeve. A videolaparoscopic approach was performed in 84.3% (n=166) of the procedures. In addition, of the 197 patients analyzed, 20.3% (n=40) reported intraoperative cavitary drainage insertion. Of these, 75.0% (n=30) used suction drains and 25.0% (n=10) used active open drainage. The mean preoperative hospitalization time was 4.7 days (±15.462) and the mean number of days in the postoperative period was 4.2 days (±6.591). 58.9% (n=116) of patients remained hospitalized for up to 3 days in the infirmary ward and 41.1% (n=81) of them remained in inpatient care for more than 3 days in the unit. The data are described in Table 1.

With regard to complications, 2 complications were recorded for 6 patients and 3 complications for 1 of them, totaling 45 records of complications. The main complications from the surgical site shown in the study were bruises in 8.9% (n=4), seroma in 31.1% (n=14), hemorrhage in 4.4% (n=2), ischemia in 2.2% (n=1), infection in 6.7% (n=3), incisional hernia in 15.5% (n=7), fistula in 6.7% (n=3), superficial dehiscence in 11.1% (n=5), deep dehiscence in 11.1% (n=5) and skin lesions in 2.2% (n=1), with a total of 45 (15.2%) postoperative complications in surgical sites. The three cases of infection were superficial. Table 2 describes these complications.

Table 3 presents the analysis of dichotomous variables by OR for postoperative surgical site complications. For this calculation, the number of individuals who presented complications (30 patients) was considered, rather than the individual complications (45 complications), since the same patient could present more than one complication.

It should be noted that patients who had more complications were older than 45 years of age (p=0.057, OR=2.340) and the surgical technique with the greatest evidence of complications was the Roux-en-Y bypass (p=0.0067; OR=1.9000). In addition, the variables that presented a significance level of p <0.05 were: surgical approach — the open approach had a greater occurrence of surgical site complications (p <0.001, OR=5.350) —, drain insertion (p < 0.001, OR=4.488) and postoperative period (p <0.001, OR=5.030). There was no significant association between the number of days hospitalized in the preoperative period and the occurrence of the outcome.

Table 1. Characteristics of the patients undergoing bariatric surgery in the *Hospital das Clínicas* at the *Universidade Federal de Pernambuco*, 2013–2016.

Variables	n	%
Gender		
Female	152	77.2
Male	045	22.8
Age group (years old)		
Up to 45	162	82.2
Over 45	035	17.8
Comorbidities		
Diabetes	050	25.4
Hypertension	118	59.9
Dyslipidemia	023	11.7
Chronic kidney disease	003	1.5
Others	021	10.7
Body mass index		
30 to 34.9 kg/m² (stage I)	004	2.0
35 to 39.9 kg/m² (stage II)	031	15.7
40 to 44.9 kg/m² (stage III)	075	38.0
≥45 kg/m² (super-obese)	087	44.2
Surgical technique		
Y de Roux Bypass	101	51.3
Sleeve	096	48.7
Approach		
Videolaparoscopy	166	84.3
Open	031	15.7
Surgical time (hours)		
Up to 3	087	44.2
Over 3	110	55.8
Use of prophylactic antibiotics	196	99.5
Drain insertion	040	20.3
Surgical reapproach	008	4.1
Hospitalization in the intensive care unit	030	15.2
Post-operative in the infirmary (days)		
Up to 3	116	58.9
Over 3	081	41.1

DISCUSSION

When analyzing the occurrence of surgical site complications, 15.2% of patients who underwent the procedure presented some type of complication, the most common one being the seroma (31.1%). A systematic review including studies performed in the last decade presented a complication rate of 17.0%[9].

The age group up to 45 years old was the most operated one (82.2% of surgeries) compared to the group over 45 years old (17.8%). However, when analyzing the association between age and the presence of complications, it was observed that patients older than 45 years of age had a higher number of postoperative surgical site complications, whose statistical analysis emphasizes a nearly significant value

Table 2. Complications from the surgical site among patients undergoing bariatric surgery in the *Hospital das Clínicas* at the *Universidade Federal de Pernambuco*, 2013–2016.

Complications*	n	%
Seroma	14	31.1
Incisional hernia	07	15.6
Superficial dehiscence	05	11.1
Deep dehiscence	05	11.1
Bruises	04	8.9
Infection	03	6.7
Fistula	03	6.7
Bleeding	02	4.4
Ischemia	01	2.2
Skin lesions	01	2.2
Total	45	15.2

*One patient may present more than one complication.

(p=0.057, OR=2.340). Studies show that the surgical treatment of obesity in individuals over 45 years of age remains controversial. Although the guidelines of the Brazilian Public Health System (*Sistema Único de Saúde* — SUS) do not consider age to be a limiting factor, a risk-benefit analysis of the procedure should be evaluated for each individual patient[10,11].

In addition, the risk of comorbidities is related to BMI and advanced age. The higher the BMI and the age, the greater the independent risks for diseases associated with being overweight and obese, as well as the greater number of risks of postoperative complications[12]. High numbers of comorbidities, such as hypertension (59.9%) and DM (25.4%), were found in the study. There is evidence that surgical complications do not increase specifically because of age, and it is a safe procedure for patients over 60 years old[13]. In other words, with age, comorbidities that increase risk may be present, but age alone is not a significant risk factor.

Table 3. The *odds ratio* for complications from the surgical site as a function of dichotomous variables of patients undergoing to bariatric surgery in the *Hospital das Clínicas* at the *Universidade Federal de Pernambuco*, 2013–2016.

Variables	No complications	Complications	OR (95%CI)	p-value
	n (%)	n (%)		
Gender				
Female	131 (86.20)	21 (13.80)	1.56 (0.66–3.69)	0.310
Male	36(80.00)	9 (20.00)		
Age group (years old)				
Up to 45	141 (87.00)	21 (12.90)	2.34 (0.96–5.64)	0.057
Over 45	26 (74.30)	9 (25.70)		
Diabetes mellitus				
Diabetes	40 (80.00)	10 (20.00)	1.58 (0.69–3.67)	0.277
No diabetes	127 (86.39)	20 (13.61)		
Hypertension				
Hypertension	70 (88.61)	9 (11.39)	1.68 (0.73–3.89)	0.221
No hypertension	97 (82.20)	21 (17.80)		
Surgical technique				
Y de Roux Bypass	81 (80.20)	20 (19.80)	1.90 (0.94–3.85)	0.067
Sleeve	86 (89.60)	10 (10.40)		
Approach				
Videolaparoscopy	151 (90.90)	15 (9.00)	5.35 (2.92–9.79)	<0.001
Open	16 (51.60)	15 (48.40)		
Surgical time (hours)				
Up to 3	101 (85.60)	17 (14.40)	0.87 (0.45–1.7)	0.695
Over 3	66 (83.50)	13 (16.40)		
Drain insertion				
Drains	24 (68.50)	11 (31.40)	4.48 (2.39–8.41)	<0.001
No drains	143 (92.20)	12 (7.70)		
Hospitalization in ICU				
Hospitalized	23 (76.60)	7 (23.30)	1.91 (0.73–4.94)	0.181
Not hospitalized	144 (86.20)	23 (13.70)		
Post-operative in the infirmary (days)				
Up to 3	108 (93.10)	8 (6.90)	5.03 (2.11–12.01)	<0.001
More than 3	59 (72.80)	22 (27.10)		

OR: *odds ratio*; 95%CI: 95% confidence interval; ICU: intensive care unit.

Regarding the increased risk of postoperative complications and BMI, there are controversies. In the present study, although there was a greater number of patients with grade III obesity and super-obesity, it was not possible to perform an association that demonstrated a higher incidence of complications in this group, as was observed in another national study[14].

Options for surgery for obesity treatment include the Roux-en-Y bypass, vertical or sleeve gastrectomy, gastric banding, and the biliopancreatic bypass. Bypasses are the most performed procedure in Brazil and worldwide. Although they are widely performed, they are not free of complications[14,15]. The bypass and sleeve surgeries were chosen for analysis because they are the most common procedures in the hospital for the treatment of obesity. In the period studied, the performance of both procedures was similar. There were 51.3% bypasses and 48.7% sleeves. Furthermore, with the advances of minimally invasive surgery and the development of videolaparoscopic techniques, video surgery has become the most commonly one to be used worldwide[5,16]. As such, it was observed that more laparoscopic surgeries were performed in the present sample when compared to conventional/open procedures (84.3 *versus* 15.7%). Although requiring a greater learning curve and the development of advanced laparoscopic skills, the video technique presents significantly lower complications and mortality rates[17].

With increased access to these surgeries, there are increased costs for obesity treatment. However, the cost with regard to the benefits the patient receives, makes them feasible and, considering the complications of the disease, it may be even lower[18-20]. Costs decrease over time and increase directly when surgical complications occur[20]. The longer the recommend surgeries take to be performed, the greater the costs and the preoperative risks[21]. In this segment, the study shows a high occurrence of postoperative surgical site complications in the Roux-en-Y bypass technique with 19.8% (OR=1.90), and a 48.4% rate (OR=5.35) of complications in the conventional/open approach.

A systematic review found reoperation rates of 6.7 to 24.0% for the Roux-en-Y bypass laparoscopy, and from 3.3 to 34.0% for the gastric sleeve[22]. Effects on comorbidities, complications, and additional surgical procedures were not different in the studies evaluated, except in a randomized clinical trial that found more gastroesophageal reflux among patients undergoing bypass surgeries[22]. Both procedures presented better results than the gastric band; however, biliopancreatic derivation was the technique associated with the best weight loss[22]. In another review, gastric banding was referred to as the technique that least reduces body weight and results in fewer reoperations and fewer complications[23]. The present authors report, finally, that the complications are poorly described in the studies, which is reported in the same way in other systematic reviews. This justifies the difficulty of finding results that corroborate or diverge from the findings of this research[22,23]. The weight loss described in the literature is similar between the two techniques studied[22,23]

Drains were present in 17.8% of patients undergoing an operation, and their use was associated with a greater chance of postoperative surgical site complications (OR=4.48). The purpose of drain placement could not be assessed. However, it is understood that maintaining the suction drain for long periods of time does not prevent postoperative complications, including SSI[2].

A retrospective study of 408 cases of Roux-en-Y gastric bypass and gastric sleeve surgery, using only the videolaparoscopic technique, showed that complications occurred in 7.3% of the sample. There was a significant increase in the risks for higher BMI on the preoperative period and on the day of surgery, for longer surgical time and fewer staples used[16]. The type of surgery, in the cited study, did not present a significant difference in the incidence of perioperative complications[16].

To prevent complications, the hospital must have a protocol for thromboembolic prophylaxis, including adequate pneumatic boots and compression socks, as well as pharmacological therapy[24-25]. The most common complications are: pulmonary artery embolisms, bleeding and anastomosis fistulas, and marginal ulcers, which require the use of gastric shields for six months[16].

An index that predicts values of postoperative complications from bariatric surgery, the Bariatric Surgery Index for Complications (BASIC), has yet to be translated and validated for Portuguese[26]. According to this index, patients are classified in: class I, when they present from zero to one risk factor; class II, two factors; and class III, with three or more risk factors[26]. In the index development study, complications varied significantly according to class, between 13.5, 21.6 and 31.4%, respectively[26].

Specific perioperative care is fundamental and aims to prevent and assist in the treatment of possible complications, in addition to offer support from before the bariatric surgery and lasting postoperatively. As members of the multidisciplinary medical team, nurses must ensure that patients receive proper health care and education, helping them adapt to a new way of life. A recent study showed that patients who underwent a preoperative education process were discharged

in less time than the control group. On average, those who received the education were discharged on the first day after surgery, versus two days for the group that received no guidance, which highlights the role of nurses in this educational process and their performance[27].

Finally, the present study presented the following as limitations: the type of collection (secondary data); the size of the sample in relation to the prevalence of events, which hindered other significant associations between the variables; and the fact that it was performed in a single hospital. The association between the type of drain (suction or active drainage) with the presence of infections or seroma was not tested. In addition, patients were not stratified into risk groups for complications before being included in the study.

CONCLUSION

Among the 197 patients undergoing bariatric surgery that composed the sample, 30 of them had 45 complications. The following were predisposed variables to a higher development of complications: a higher prevalence of seroma as a complication from surgical site, the Roux-en-Y bypass surgical technique, the age range over 45 years old, conventional/open surgical approach, the presence of cavity drainage, and hospitalization time longer than 3 days.

Among this research's main contributions is the feedback given to the health services where the study was carried out. Furthermore, it helps prepare preventive action planning, by describing the main risk factors associated with complications of surgical wounds after bariatric surgeries.

The present study demonstrated the importance of a proper evaluation of these patients, and it is imperative that all of the criteria that may influence the appearance of postoperative complications from the surgical site be analyzed. The complications can lead to emotional problems and longer hospitalization time and elevated costs to the service, in addition to severe complications (which can cause a high number of deaths in this population).

Thus, the nursing team always needs to be attentive and help in the early identification of complications, as well as provide adequate care for the prevention and treatment of these complications.

This study serves to fill gaps in this area of research, as well as to encourage health managers to make resources available for the development of further studies on this issue. It is suggested that further research continue this investigation, evaluating other factors, such as the association between the type of drain and the type of infection, and enable the creation and validation of a systematized nursing care system for patients with complications from bariatric surgery.

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SURGICAL CHECKLIST ACCESSION IN LIGHT OF PATIENT SAFETY CULTURE

Adesão do cheklist cirúrgico à luz da cultura de segurança do paciente

Adhesión del checklist quirúrgico a la luz de la cultura de seguridad del paciente

Maíra Cássia Borges de Oliveira[1]*, Amildo Korb[2], Denise Antunes de Azambuja Zocche[3], Danielle Cabral Bezerra[4], Fabiane Pertille[5], Jucimar Frigo[6]

ABSTRACT: Objective: To analyze the national and international scientific production on adherence to the surgical checklist regarding patient safety. **Method:** Integrative literature review using the following databases: Scientific Electronic Library Online (SciELO), Literatura Latino-Americana em Ciências da Saúde (LILACS), PubMed and Scopus, from January 2007 to July 2017. **Results:** Of the 32 studies that included the objective of this study, 53.1% were published in Portuguese, and 40.6% in the year 2015. Among the subjects analyzed, special reference is made to protocol compliance (40.6%), records on safe surgery (37.5%), preparation and implementation of the checklist (9.4%), professionals' perception (9.4%) and importance of the postoperative visit (3.1%). Regarding the implementation of safe surgery protocols, 40.6% reported on permanent education and 21.9% on communication. **Conclusion:** The use of checklist for safe surgery is being increasingly elucidated in health services, using communication to to promote patient-centered care.
Keywords: Surgicenters. Patient safety. Communication. Nursing.

RESUMO: Objetivo: Analisar a produção científica nacional e internacional sobre a adesão de *checklist* cirúrgico quanto à segurança do paciente. **Método:** Revisão integrativa da literatura utilizando as bases de dados *Scientific Eletronic Library Online* (SciELO), Literatura Latino-Americana em Ciências da Saúde (LILACS), PubMed e Scopus, no período de janeiro de 2007 a julho de 2017. **Resultados:** Dos 32 estudos que contemplaram o objetivo deste trabalho, 53,1% foram publicados em língua portuguesa e 40,6% no ano de 2015. Entre os temas analisados, destacam-se adesão ao protocolo (40,6%), registros sobre cirurgia segura (37,5%), elaboração e implementação da lista de verificação (9,4%), percepção dos profissionais (9,4%) e importância da visita pós-operatória (3,1%). Quanto à implementação dos protocolos de cirurgia segura, 40,6% relataram sobre educação permanente e 21,9%, sobre comunicação. **Conclusão:** A utilização de *checklist* para cirurgia segura está sendo cada vez mais elucidada nos serviços de saúde, a partir da comunicação, buscando promover cuidado centrado no paciente.
Palavras-chave: Centros cirúrgicos. Segurança do paciente. Comunicação. Enfermagem.

RESUMEN: Objetivo: Analizar la producción científica nacional e internacional sobre la adhesión de checklist quirúrgico en cuanto a la seguridad del paciente. **Método:** Revisión integrativa de la literatura usando las bases de datos Scientific Eletronic Library Online (SciELO), Literatura Latino-Americana em Ciências da Saúde (LILACS), PubMed y Scopus, en el período de enero de 2007 a julio de 2017. **Resultados:** De los 32 estudios que abarcan el objetivo de este estudio, 53,1% fueron publicados en portugués y 40,6% en 2015. Entre los temas analizados, se destacan adhesión al protocolo (40,6%), registros sobre cirugía segura (37,5%), elaboración e implementación de la lista de verificación (9,4%), percepción de los profesionales (9,4%) y importancia de la visita postoperatoria (3,1%). En cuanto a la implementación de los protocolos de cirugía segura, 40,6% relató sobre educación permanente y 21,9%, sobre comunicación. **Conclusión:** La utilización de checklist para cirugía segura está siendo cada vez más elucidada en los servicios de salud, a partir de la comunicación, buscando promover cuidado centrado en el paciente.
Palabras clave: Centros quirúrgicos. Seguridad del paciente. Comunicación. Enfermería.

[1]Nursing student, Universidade do Estado de Santa Catarina (Udesc Oeste) – Chapecó (SC), Brazil.
[2]Biologist; PhD in Environment and Development, Universidade Federal do Paraná (UFPR); Professor at the Department of Nursing of Udesc Oeste – Chapecó (SC), Brazil.
[3]Nurse; PhD in Nursing, Universidade Federal do Rio Grande do Sul (UFRGS); Associate Professor in the Nursing course of Udesc (campus Chapecó) – Chapecó (SC), Brazil.
[4]PhD in Nursing, Universidade de São Paulo; Nurse; Professor at the Nursing Department of Udesc Oeste – Chapecó (SC), Brazil.
[5]Nurse; Postgraduate degree in Health Services Auditing, Faculdade São Fidelis (FSF); Postgraduate degree in Intensive Care, Universidade do Contestado (UNC) (campus Concórdia) – Concórdia (SC), Brazil.
[6]Nurse; Master's degree in Intensive Care, Brazilian Society of Intensive Care (Sociedade Brasileira de Terapia Intensiva – Sobrati) – Santo André (SP), Brazil.
*Corresponding author: mairaacassia@gmail.com
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INTRODUCTION

In 2004, the World Health Organization (WHO) established the World Alliance for Patient Safety, which aims to organize concepts and definitions about patient safety. Measures to reduce harm and to implement checklists are proposed, focusing on health and safety management, in order to substitute blame with learning from flaws in the health work process[1,2].

In Brazil, this issue was highlighted in 2013, with the elaboration of the National Patient Safety Program (*Programa Nacional de Segurança do Paciente* – PNSP), which supported the implementation of risk management and of the Patient Safety Nucleus (*Núcleos de Segurança do Paciente* – NSS) in health facilities[2,3].

In this context, safe and effective communication among the health team is a determining factor in reducing risks, based on the valuation of the perception, attitudes and behavior of all professionals involved in patient care, with a view to promoting the culture of safety. In this sense, participative leadership is present in the communication of the work process, and the team must communicate openly about concerns on safety breaches, without fear of blame or punishment[4]. To this end, the health service must be structured safely, with adequate risk management to use technologies, processes and human resources, as errors and damages have multifactorial causes[5].

In view of the above, permanent education in nursing is essential, since it establishes an institutional safety culture with changes in habits and attitudes, that is, learning and resignifying professional practices. In addition, the nurse, as a leader or manager, has, among other duties, the role of coordinating teams and work processes, whether in the hospital or basic care. Therefore, nurses must educate themselves, train and raise awareness in order to provide qualified, safe and patient-centered care[6].

OBJECTIVE

To analyze the national and international scientific production on adherence to the surgical checklist, with a view to the implementation of safe surgery in hospital health services.

METHOD

This is an integrative review, which enables the construction of an ample analysis of the chosen literature, contributing to discussions and reflections on the proposed theme. The construction of this review involved the identification of the theme and formulation of the research question, application of inclusion and exclusion criteria, definition of information extracted from the studies, evaluation of the included studies, interpretation of results and presentation of the results' synthesis[7].

For the selection of articles, the following databases were surveyed: Scientific Electronic Library Online (SciELO), Literatura Latino-Americana em Ciências da Saúde (LILACS), PubMed and Scopus. The health terminology found in the Health Sciences Descriptors (DeCS) and in the Medical Subject Headings (MeSH), both with vocabulary that allows standard and unified language for indexing scientific studies and journals, was used in the study. The terms "Checklist", "Guideline Adherence", "Patient Safety" and "Surgery" were used in the search of articles, combined with the Boolean operators "and" and "or": "Checklist AND Guideline Adherence OR Patient Safety"; "Patient Safety AND Checklist AND Surgery"; "Checklist AND Surgery OR Guideline Adherence".

Data collection took place between July and August 2017, with the following guiding question: how is the use of the checklist aimed at the implementation of safe surgery inserted in the care provided to surgical patients?

Inclusion criteria were: studies published in full article format, related to the topic of safe surgery, and published from January 2007 to July 2017. The studies included were published in Portuguese, English and Spanish. Publications such as theses, dissertations, abstracts and course papers were excluded.

Of the total of 70 studies found, 18 studies were excluded because they were not in full; 11 for not addressing the study topic, 8 for being repeated in the selected databases and 1 for being a dissertation. Therefore, of the 70 initial publications, 32 studies were used as samples.

To facilitate the analysis of the eligible studies, a spreadsheet was used in Microsoft Excel® for data collection, containing year of publication, Qualis/impact factor, country of origin, language, type of study, thematic addressed and descriptors.

With respect to the data obtained according to the descriptors, a conceptual map was elaborated which allowed structuring the course of data analysis through a hierarchy of ideas, effectively helping to understand what was being analyzed[8].

To facilitate the visualization of the surveying method, a Prisma-type[9] flowchart was elaborated (Figure 1).

Because this is a literature review, there was no direct involvement with human beings, however, it is important to

point out that the ethical precepts contained in the national and international norms that regulate the Research Ethics Committees have been followed.

RESULTS

Of the 70 studies analyzed, 32 addressed the topic of safe surgery in health services. Of these, 13 (40.6%) were published in 2015, 8 (25.0%) in 2014, 6 (18.5%) in 2013, 3 (9.4%) in 2016 and 2 (6.2%) in 2012.

As to the distribution of the journals, 19 (59.40%) were national, with emphasis on *Revista SOBECC* and *Revista Latino-Americana de Enfermagem*, with 4 (12.50%) and 3 (9.37%) studies published, respectively. As for the Qualis-CAPES (Coordination for Improvement of Higher Level Personnel), 12 national journals present the following stratification: 1 – A1; 2 – A2; 5 – B1; 1 – B2 and 1 – B3. Regarding the impact factor of the journals, *Revista Latino-Americana de Enfermagem* is attributed 0.5797, according to Table 1. In the international journals, 13 (40.60%) were included, with 2 studies (6.30%) from the

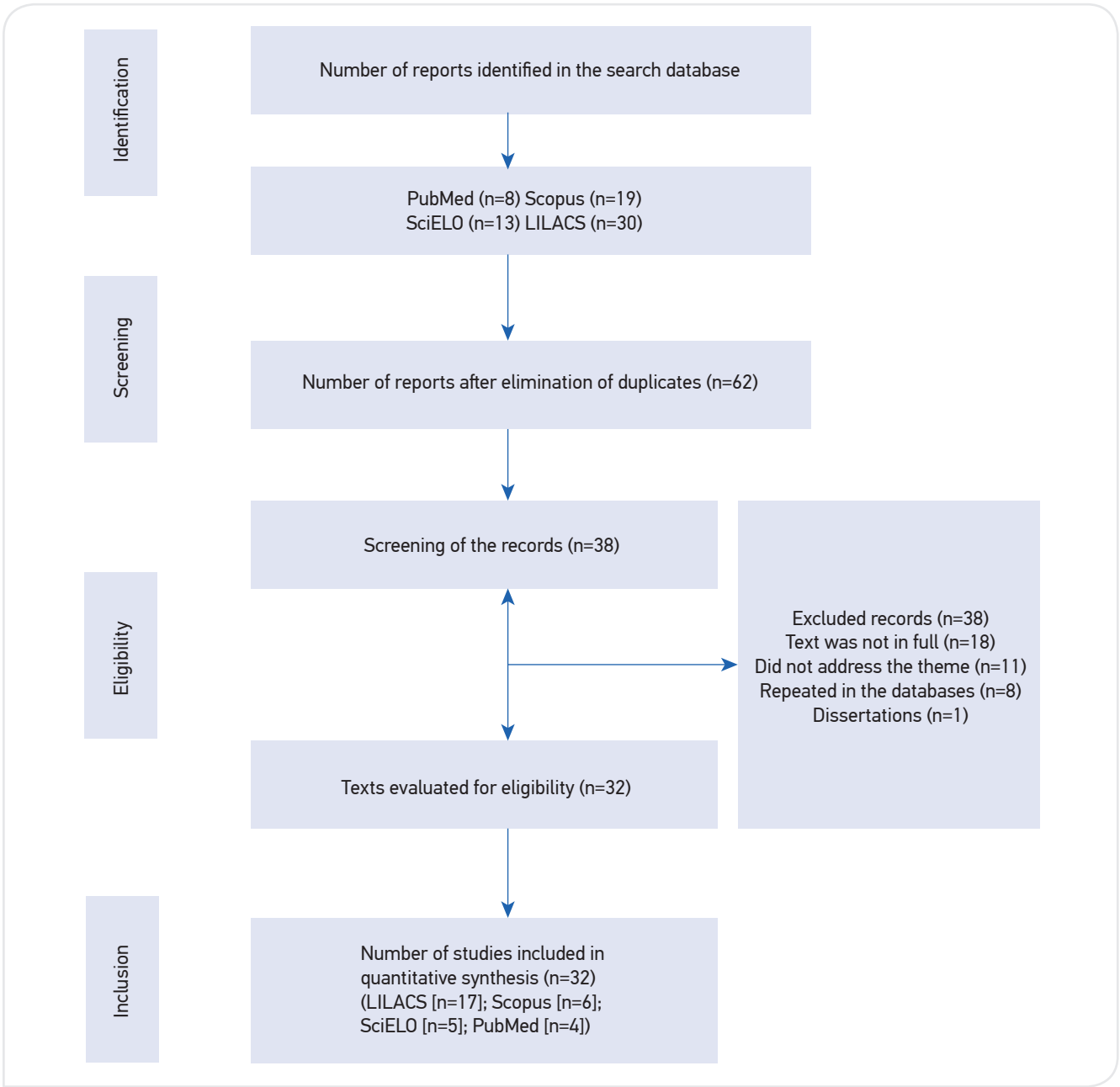

Figure 1. Flowchart of the search method of the studies in the integrative review.

BMJ Open Journals, followed by other journals with 1 (3.10%) each. Of the total of the international journals, 2 are focused on the publication surgery-related topics: ANZ Journal of Surgery and International Journal of Surgery. As for the Qualis for international journals, 4 have their stratification distributed as follows: 2 – B1; 1 – B2 and 1 – B3. The largest impact factor attributed was to the journal Implementation Science, with 3,354, according to Table 1.

Regarding the methodological approach of the studies, 10 (31.25%) were surveys; 5 (15.62%) were retrospective; 4 (12.50%) were observational; 3 (9.37%) were field studies; 3 (9.37%) were reviews; 3 (9.37%) were cross-sectional; 1 (3.12%) was comparative; 1 (3.12%) was documental; 1 (3.12%) was theoretical and 1 (3.12%) was prospective.

Regarding the language, 17 (53.1%) are in Portuguese, 13 (40.6%) are in English and 2 (6.3%) are in Spanish.

After analyzing the studies, the main themes of this review were: adherence to protocols for surgery (40.60%), records on safe surgery (37.50%), preparation and implementation of checklists (9.40%), professionals' perceptions

Table 1. Distribution of national and international scientific production, according to the journal, impact factor and Qualis-CAPES classification.

National Journals	n (%)	Qualis	Impact factor
Revista SOBECC	04 (12.5)	B3	–
Revista Latino-Americana de Enfermagem	03 (9.4)	A1	0.5797
Revista Acta Paulista de Enfermagem	02 (6.3)	A2	0.5083
Revista Gaúcha de Enfermagem	02 (6.3)	B1	0.4048
Escola Anna Nery Revista de Enfermagem	01 (3.1)	B1	0.3651
Cadernos de Saúde Pública	01 (3.1)	B1	0.4860
Revista da Escola de Enfermagem da USP	01 (3.1)	A2	0.4585
Revista de Enfermagem da UERJ	01 (3.1)	B1	–
Revista Brasileira de Ortopedia	01 (3.1)	B4	0.1667
Revista de Enfermagem do Centro-Oeste Mineiro	01 (3.1)	B2	–
Revista Brasileira de Anestesiologia	01 (3.1)	B1	0.0719
Cuidado é Fundamental Online	01 (3.1)	B2	–
Subtotal	19 (59.4)		
International Journals	**n (%)**	**Qualis**	**Impact factor**
BMJ Open Journals	2 (6.3)	–	2.369
Revista del Hospital Aeronáutico Central	1 (3.1)	–	–
Archivos Argentinos de Pediatría	1 (3.1)	B3	0.403
International Journal for Quality in Health Care	1 (3.1)	–	2.342
Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine	1 (3.1)	–	2.036
Enfermería Global	1 (3.1)	B1	0.2549
The Journal of Laryngology & Otology	1 (3.1)	–	0.8440
Plos One	1 (3.1)	–	2.8060
Implementation Science	1 (3.1)	–	3.3540
ANZ Journal of Surgery	1 (3.1)	–	1.1220
Journal of Infection and Public Health	1 (3.1)	B1	1.4390
International Journal of Surgery	1 (3.1)	B2	0.6900
Subtotal	13 (40.6)		
Total	32 (100.0)		

CAPES: Coordenação de Pessoal de Nível Superior (Coordination of Higher Level Personnel); USP: Universidade de São Paulo; UERJ: Universidade do Estado do Rio de Janeiro.

regarding safe surgery (9.40%) and importance of the post-operative visit (3.10%). Regarding the implementation of safe surgery protocols based on the references in the manual *"Cirurgias Seguras Salvam Vidas"* (Safe Surgeries Save Lives)[10], 13 (40.60%) addressed permanent education as an important tool for patient safety and 7 (21.90%) reported on the importance of communication between health teams. Regarding the keywords, the descriptors most frequently used by the authors were "patient safety", in 22 (68.75%) studies, and "checklist", used in 10 (31.25%) publications.

After analyzing the descriptors and grouping the themes, a conceptual map was created, represented in Figure 2.

The thematic groups that emerged from the descriptors in the publications were: dependent factors, related factors and factors that influence the incorporation of protocols for safe surgery.

DISCUSSION

The publications analyzed in this study are recent, as they have focused on the last 5 years (2012 to 2017). This can be explained by the publication of the guidelines recommended by the WHO in 2008, and of the PNSP in 2013 in Brazil. This is important evidence, both nationally and internationally, because adverse events (AE) in surgical procedures are precedents for injury or damage to the patient, which can lead to incapacities and/or death[1,3,11]. In addition, section three of the WHO document "Second Global Challenge for Patient Safety: Safe Surgery Saves Lives" provides templates for checklists to be used in surgical work processes, and they can be adapted or modified according to the needs of each institution and to the demands brought by the surgical team[1,12,13].

It should be emphasized that this list guarantees patient safety prior to the induction of anesthesia (identification/sign in), after the induction and prior to the surgical incision (confirmation/timeout), and during or immediately after wound closure (registration/sign out)[1].

In Brazil, adherence to the checklists has been procedural in health services, albeit with some challenges, such as improper awareness of the importance of its use by professionals in the surgical team, with signs of blame and compensation for unsafe practices[14]. The viability of the surgical safety checklist has been shown to be promising in several Brazilian hospitals, although there is still low engagement of the surgical team regarding adherence. The nurse, as coordinator of the surgical sector, can appropriate this tool as a way to measure and evaluate the care provided.

In addition, medical skills, effective communication and the integral awareness of the surgical team about the risks involved in the anesthetic-surgical act qualify the process and the results as a safe and effective therapy to the surgical patient.

Thus, the presence of the list coordinator is necessary to verbally verify with the patient their identity, surgery site, procedure and consent obtained[12]. The coordinator will visually confirm if the operative site has been marked (if applicable) and will verbally review the risk of blood loss, airway difficulties, allergies, and the availability and safety of anesthetic equipment and medications, with the anesthesia team[1,12,15].

All of these actions aim at improving care standards through secure interprofessional communication and at reducing physical and psychological harm to the patient in this health environment.

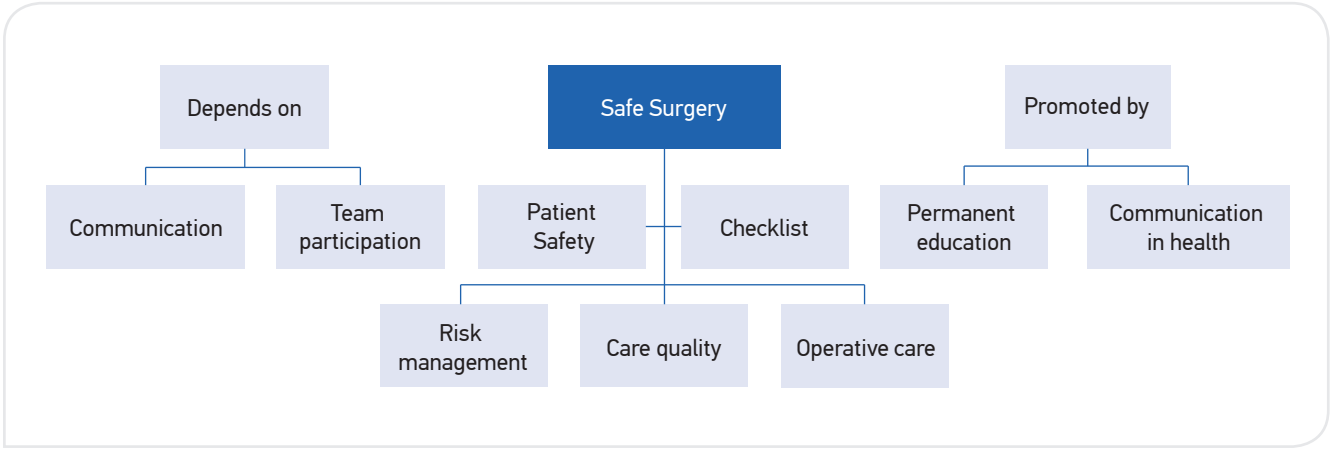

Figure 2. Conceptual map drawn from the descriptors used in the eligible publications.

Thus, the nursing team has an essential role in the adherence to the checklist, since it is responsible for the qualification, communication and professional qualification, with a view to the improvement of the service and the reduction of AE.

To this end, the team must be engaged and committed individually and collectively in order to understand the importance and necessity of using the checklist and, afterwards, to assign corrective actions through safe indicators. The nursing staff is responsible for the planning of their actions, for the dimensioning of the staff, as recommended by Administrative Rule 543/2017 of the Brazilian Federal Nursing Council (Cofen), and for the training and education of the work teams on safe care[5].

Permanent education is an instrument of nursing care management, as it comprehends the potentialities and difficulties that exist in these professional's daily lives[16]. In addition, it favors interpersonal communication, guided by the exchange of knowledge, horizontality, the listening and receptivity of new ideas, leading the whole team towards understanding and comprehension[17].

Thus, patient safety should be monitored and measured by a clear and precise definition of the clinical problem to be investigated in the health service. In a study conducted in Texas, United States, researchers developed the Safety Attitudes Questionnaire (SAQ), which measures the safety environment perceived by healthcare professionals in the operating room (OR). This instrument made it possible to obtain data on the perspective of health and clinical professionals and administrative managers, proposing interventions, directions and alternatives for promoting patient safety[18,19]. From the representation of the institution's values and actions, with respect to the perceptions of the professionals about the safety management in the institution, it is possible to identify and administer the safety of the patient in the surgical environment.

FINAL CONSIDERATIONS

Safe surgery is being increasingly elucidated in health services and discussed among peers. The use of a checklist is being implemented by various health institutions, according to their values and organizational culture, which results in benefit to both professionals and patients. In fact, with the implementation of checklists for safe surgery in the past decade and with the present analysis of reliable clinical indicators on adverse events, more reliable and systematic intervention data can be obtained from high-level organizational models that represent improvements in the safety of health services as a whole. A decade ago, we understood the phenomenology of the damage and its causes, but today, there is no strong evidence to indicate significant improvements in patient safety within all of the WHO guidelines, as well as in any organizational structure of health services.

It is also worth noting that participatory nursing leadership through communication among the team, the patient, family members and hospital managers promotes patient-centered care in a continuous and safe manner.

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NURSE ROLE IN ROBOTIC SURGERY: CHALLENGES AND PROSPECTS

Atuação do enfermeiro na cirurgia robótica: desafios e perspectivas

Actuación del enfermero en la cirugía robótica: retos y perspectivas

Elisandra Venzke Pinto[1], Liege Segabinazzi Lunardi[2], Patrícia Treviso[3]*, Daisy Zanchi de Abreu Botene[4]

ABSTRACT: Objective: To identify the main challenges and prospects of the nurse's role in robotic surgery. **Method:** Integrative review carried out in the *Literatura Latino-Americana e do Caribe em Ciências da Saúde* (LILACS), PubMed and Science Direct databases, of articles published between 2008 and April 2015; sample consisted of 11 articles. The data analysis was carried out by synthesizing the information obtained according to the objective, seeking to identify evidences. **Results:** The search resulted in the identification of 281 studies, 225 in ScienceDirect, 51 in PubMed and 5 in LILACS. Eleven studies meeting the inclusion criteria and the guiding questioning presented here were selected, being 9 qualitative ones, 1 systematic review of randomized clinical trial and 1 validation study. **Conclusion:** The challenges presented were: patient safety, team training and skills development. Regarding the possibilities, a new area of development, the importance of permanent education and innovation for the improvement of care of surgical patients were observed.
Keywords: Robotics. Nursing. Operating rooms. Surgical procedures, operative. Minimally invasive surgical procedures.

RESUMO: Objetivo: Identificar os principais desafios e perspectivas da atuação do enfermeiro na cirurgia robótica. **Método:** Revisão integrativa, realizada nas bases de dados Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), PubMed e ScienceDirect, de artigos publicados entre 2008 e abril de 2015; amostra constituída por 11 artigos. Para análise dos dados, realizou-se síntese das informações extraídas conforme o objetivo, buscando identificar as evidências. **Resultados:** A busca resultou na identificação de 281 estudos, sendo 225 na ScienceDirect, 51 na PubMed e cinco na LILACS. Foram selecionados 11 estudos que atendiam aos critérios de inclusão e estavam alinhados à questão norteadora, sendo 9 qualitativos, 1 revisão sistemática de ensaio clínico randomizado e 1 estudo de validação. **Conclusão:** Evidenciaram-se como desafios: segurança do paciente, capacitação da equipe e desenvolvimento de competências. Em relação às possibilidades, observaram-se uma nova área de atuação em desenvolvimento, a importância da educação permanente e da inovação para a melhoria no atendimento aos pacientes cirúrgicos.
Palavras-chave: Robótica. Enfermagem. Sala de cirurgia. Procedimento cirúrgico. Procedimento cirúrgico minimamente invasivo.

RESUMEN: Objetivo: Identificar los principales desafiós y perspectivas de la actuación del enfermero en la cirugía robótica. **Método:** Revisión integrative, llevada a cabo en las bases de datos Literatura Latinoamericana y del Caribe en Ciências de la Salud (LILACS), PubMed y Science Direct, de artículos publicados entre 2008 y abril de 2015; muestra constituida por 11 artículos. Para el análisis de losdatos, se realize una síntesis de las informaciones extraídas conforme el objetivo, buscando identificar las evidencias. **Resultados:** La búsqueda result en la identificación de 281 estudios, 225 en la ScienceDirect, 51 en PubMed y 5 en LILACS. Se seleccionaron 11 estudios que atendían a los criterios de inclusion y estaban alineados a la ceustión orientadora, siendo 9 cuaitativos, 1 revisión sistemática de ensayo clínico randomizado y 1 estudio de validación. **Conclusión:** Se evidenció como desafios: seguridad del paciente, capacitación del equipo y desarollo de competencias. En cuanto a las posibilidades, se observó una nueva área de actuación en desarollo, la importancia de la educación permanente y de la innovación para la mejora en la atención a los pacientes quirúrgicos.
Palabras clave: Robótica. Enfermería. Quirófanos. Procedimientos quirúrgicos operativos. Procedimientos quirúrgicos mínimamente invasivos.

[1]Nurse; post-graduation in Intensive Care Unit, Hospital Mãe de Deus – Porto Alegre (RS), Brazil.
[2]Nurse; post-graduation in Surgical Center; Hospital de Clínicas de Porto Alegre – Porto Alegre (RS), Brazil.
[3]Nurse; PhD in Health Sciences, Centro Universitário Metodista IPA – Porto Alegre (RS), Brazil.
[4]Nurse; PhD in Nursing, Centro Universitário Metodista IPA – Porto Alegre (RS), Brazil.
*Corresponding author: ptreviso15@gmail.com
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INTRODUCTION

Robotic surgery has been the focus of attention today due to its relevance in the area of health. In several segments of prevention and rehabilitation, there is an increased technology use, which is essential in the area of health and a challenge for nursing professionals, who should be up to date at all times, considering the fugacity of technological evolution[1].

This technological evolution may provide benefits to nursing by enabling professionals to relate the whole and the parts of cases based on the information, events and knowledge available. This can favor the unifying thought and the integration of elements from the gathering of multiple information which, interconnected, allow for the association and interpretation of the parts for understanding the patient. Thus, it can be said that the human being would be better understood and cared for in their complexity with the aid of these technologies, if such aspects are considered[2].

When technology is properly used and administered, it benefits the practice of care in several areas[3]. One example is the surgical center unit (SC), where an exponential increase in technological and scientific complexity has been occurring, causing patients to experience numerous benefits with the implementation of these new forms of care[4]. The robotic surgery, a new model of videolaparoscopic surgery, may be included in this context of renovation, changes, knowledge and scientific principles.

This innovative model intends to perform procedures with reduced operative trauma and fast post-surgical recovery, resulting in lower morbidity and directly influencing the patients' well-being. The advantages are: performing high-complexity procedures in a simpler and more practical way; reducing the aggression to organs and systems; easiness in sutures considered difficult, especially in obese patients; and comfort for the surgeon, as it allows for comfortable ergonomics during operation, resulting in more tranquility to the professional that carries out exhausting procedures[5-7].

In Brazil, this kind of surgery was implemented in 2008, although there are currently only a few systems installed in our country, due to the high costs for implementation[6]. In addition to financial matters, implementing this new technology in a SC demands great effort, numerous remodelings of the area, training of the personnel and other professionals involved, as well as various resources and general modifications.

Therefore, there is an urgent need to update nurses, so they are efficient and in tune with the new requirements which have been established by the market[8]. This could allow for the use of state-of-the-art resources in order to ensure patients' safety and the rehabilitation of health and well-being in a faster, safer and more efficient way[9].

OBJECTIVE

To identify the main challenges and prospects of the role of nurses in robotic surgery.

METHOD

This study is characterized as an integrative review and the methodology consists of six steps: formulation of problem, literature search, data collection, critical analysis of the studies included, discussion and presentation of results. Following the steps, our northing question was: what are the challenges and prospects of the nurse's role in robotic surgery?

The inclusion criteria for selection of the articles were: articles published in Brazilian Portuguese, English and Spanish, from 2008 on — period when robotic surgery was implemented in Brazil — and available online. Publications in books, theses and articles which did not address our northing question, or incomplete texts, were excluded from this study.

The research was carried out in PubMed, LILACS and Science Direct databases, using the descriptors: *robótica* (robotics), *enfermagem de centro cirúrgico* (operating room nursing), *procedimento cirúrgico* (surgical procedure, operative), *procedimentos cirúrgicos minimamente invasivos* (minimally invasive surgical procedures) and *enfermagem* (nursing).

First, the titles and abstracts of the articles found were read. Subsequently, the pre-selected studies, i.e., articles that met the inclusion criteria and answered our northing question, were meticulously read.

Data collection took place in April 2015, through an instrument containing: titles, authors, journals, year of publication, objectives, methods, results and conclusions — in order to enable the organization of the studies selected and to enable the analytical and descriptive phases.

The analysis and interpretation of data were carried out through a synthesis of the information extracted from the

articles selected, searching for available evidence, according to the Oxford Center of Evidence-Based Medicine[10]. The results found were analyzed as the objectives traced.

This study follows ethical aspects, in accordance with copyrights, as Law No. 9.610/98[11].

RESULTS

The search resulted in the identification of 281 studies, distributed into: ScienceDirect (225), PubMed (51) and LILACS (5). Eleven studies were selected for the sample, in accordance to the inclusion criteria and aligned with the study's northing question, with 9 qualitative studies, 1 systematic review of randomized clinical trials and 1 validation methodological study. Discarded publications regarded repeated publications in the databases, those that did not address the questioning of the research, or that did not meet the inclusion criteria.

In order to facilitate presenting the results and discussion, a code was attributed to each selected study (from A1 to A11), as a reference basis throughout the analysis. The studies included in the review are presented in Chart 1.

The frequency of publications in their respective journals is described in Table 1.

The frequency of evidence level in the publications used is represented in Table 2.

Chart 1. Summarized studies included in the integrative review according to year, title, author(s), journal and evidence level.

Study/year	Title	Author(s)	Journal	Type of study	Evidence Level
A1[12] 2009	Technological advances in the operating room	Schmock BA	Pennsylvania Nurse Journal	Qualitative	5
A2[13] 2010	Robotics in nursing	Booth BE	Journal of Nursing Practice	Qualitative	5
A3[14] 2010	Best practices for minimally invasive procedures	Ulmer BC	AORN Journal	Qualitative	5
A4[15] 2010	The effects of information technology on perioperative nursing	Sweeney P	AORN Journal	Qualitative	5
A5[16] 2010	Developing a successful robotic surgery program in a rural hospital	Zender J, Thell C	AORN Journal	Case study	5
A6[17] 2011	Keeping up with technology	Stanton C	AORN Journal	Qualitative	5
A7[18] 2011	Role of the perioperative nurse in robotic surgery	Thomas CC	Perioperative Nursing Clinics	Qualitative	5
A8[19] 2011	Robotic-assisted surgery and the need for standardized pathways and clinical guidelines	Walters L, Eley S	AORN Journal	Systematic review of randomized studies	2
A9[20] 2013	Positioning injuries associated with robotic-assisted urological surgery	Mills JT, Burris MB, Warburton DJ, Conaway MR, Schenkman NS, Krupski TL	Journal of Urology	Case study	5
A10[21] 2013	Modifiable factors to decrease the cost of robotic-assisted procedures	Nayeemuddi NM, Daley SC, Ellsworth P	AORN Journal	Qualitative	5
A11[22] 2013	Evaluating the influence of perceived organizational learning capability on user acceptance of information technology among operating room nurse staff	Lee CC, Lin SP, Yang SL, Tsou MY, Chang KY	Acta Anaesthesiologica Taiwanica	Validation quantitative	4

AORN: Association of periOperative Registered Nurses.

Two main themes were listed from the compilation of revised articles, contemplating a synthesis of knowledge regarding the theme of the period studied:

1. Challenges faced by nurses in robotic surgery;
2. Prospects and possibilities of this new field of action for nurses.

DISCUSSIONS

As for the year of publication, in the exploratory phase, it was observed that all publications had remained regular since 2008, although no article with the answer for our guiding question was found in the year of 2012. It should be noted that, during our search through the databases, no studies published in Portuguese were found, reinforcing the idea that this subject is recent in Brazil.

Table 1. Distribution of studies according to the journal published.

Journal	Article	Frequency (%)
AORN Journal	06	54.55
Acta Anaesthesiologica Taiwanica	01	9.09
Journal of Urology	01	9.09
Perioperative Nursing Clinics	01	9.09
Pennsylvania Nurse Journal	01	9.09
Journal of Nursing Practice	01	9.09
Total	11	100

AORN: Association of periOperative Registered Nurses.

Table 2. Level of evidence of the articles included in the study, according to the Oxford Center of Evidence-Based Medicine[10].

Level of evidence	Articles	Frequency (%)
Systematic review of randomized clinical trials	01	9.09
Individual randomized clinical trial	00	0.0
Cohort studies, almost experimental	00	0.0
Case series, case control, longitudinal, prospective, retrospective, validation methodology	01	9.09
Qualitative, case study, exploratory, descriptive quantitative	09	81.82
Total	11	100

Regarding journals, the Association of periOperative Registered Nurses (AORN) Journal had six articles published, and the remained journals only one publication each. Qualitative researches were predominant when considering methods. Most articles were classified as 5 according to their evidence level, one was classified as 4 and another as 2.

No author stood out in the publications on the role of nurses in robotic surgery, considering that all authors of the articles selected had only one publication each.

Given the established objectives, the descriptive and analytical analysis made possible to delimit two topics, described in the sequence.

Challenges faced by nurses in robotic surgery

The development of new competences, team building and patient safety regarding robotic surgery are among the main challenges observed in the reviewed articles.

New competences to be developed by the nursing team

The technological advance aims to increase the efficiency in meeting the demand, improving equipment and instruments as well as techniques and procedures (A8[19]). The robotic surgery also brings new challenges to nurses and to their work, once that all these evolutions demand the development of skills, dexterity and progressive and continuous improvement.

SC nurses and other members of the team are essential in order to continue the advances and ensure the complete safety of patients submitted to this surgical procedure (A3[14]). The role of nurses in robotic surgery is dynamic and multifaceted, including numerous responsibilities, such as: assurance of available instruments, team organization and patient safety. It is also the nursing professional's responsibility to record all the material used in the procedure (A2[13], A3[14], A4[15]).

A robotic surgery nurse is able to build a comprehensive view of *how, why* and *when* a system is being used. This allows for more accurate decision making related to several competences (A2[13]). The constant presence of the nurse in procedures also provides the accurate assessment of the educational and human resources needs (A1[12], A3[14]).

With the participation of nurses in a dynamic and efficient way, routine problems such as the ones with equipment or

with instruments of the robotic system may be solved in a faster and more precise way, bringing improvement and also success to the program in the institution. The robotic system has the technology and capabilities of a computer focused on health care; it is able to store past events and errors in the system, as well as to allow live interaction with engineers, technicians and support personnel of the manufacturer company. In case of errors, staff members can receive live technical support by phone from these engineers. The current system is connected to the internet, which transmits computerized messages to the company's headquarters, no matter where in the world the surgical team is located at. And the nurse is connected to all this technology (A5[16]).

It should be noted that developing a robotic surgery program in a hospital requires intensive training of both surgeons and the nursing staff. Nurses have an important role in these learning and development processes, once they are responsible for offering this training to their nursing team (A2[13], A3[14], A5[16], A10[21]).

Teambuilding

Many steps are involved in educating and training the team to receive the robot. The educating process begins weeks before the robot's arrival. The surgeon begins studying a CD-ROM provided by the company's robotic representative and then completes an online exam (A5[16]).

Some barriers in the implementation of the robotic surgery program include the lack of time for doctors to become more experienced in the use of the robot, the fragility of continued education, financial resources, time and limited resources to provide relevant information for team learning (A5[16], A8[19]). These are challenges faced by nurses who have the responsibility of training new and current members of the nursing staff. The professional should always be attentive to their insertion in programs and training would be provided with the objective of keeping the team up-to-date and enabled for their practice. There should be continued and permanent education for the orientation and training of new employees (A3[14], A6[17], A10[21]).

It is considered that the role of nurses in the formation of the team should be active, motivating and proactive, being able to develop a compromised and dynamic profile. It is imperative for nurses to have good knowledge of computers and other languages, preferably English, in order to access the international literature and to be ready to perform trainings in institutions already using these techniques in other countries[1].

When beginning a robotic surgery program, well-trained employees are as important as the necessary equipment and instruments (A2[13], A10[21]). The analysis of the progress should occur in regular intervals; one way to conduct this periodic review is through team meetings (A5[16]).

Patient safety

Creating a safety culture is the responsibility of each member of the surgical team. The nurse should always be attentive to maintain an adequate and aseptic environment. The nursing team often acts as the patient's spokesperson, when compared to other professionals. One of the safety-related responsibilities of nurses is managing equipment and materials so that surgical procedures are carried out uneventfully (A8[19]).

The use of checklists is recommended in surgical procedures in order to reduce mistakes. A standardized care is also suggested (A3[14]). Improved practices during surgical procedures must be based on evidence and supported by professional standards, contributing to positive outcomes (A6[17], A8[19]).

It is imperative that all professionals understand the robotic system, including the nuances of the program, correct preoperative and postoperative care guidelines (A1[12]).

In robotics, specifically with regard to safety, the position of the patient should be emphasized. The team is confronted with new surgical positions, requiring attention to ensure patient safety, once that the robotic surgery is a different procedure from laparoscopy, when more equipment and steeper positions are often used — Trendelenburg (A9[20]).

During procedures, there may be two major categories of injuries, classified as mechanical and thermal traumas. These complications or lesions resulting from the surgery do not have to be called "events", as they should never happen because they are avoidable (A6[17], A9[20]). Lesions associated to the positioning of patients throughout surgeries are well documented, such as the compression of a nerve, for instance — although mild in some cases, it may cause temporary problems in the vascular system, which are possibly reversible with reperfusion. The more severe the compression or stretching of a nerve, the greater the possibility of an endoneural edema, or even degeneration (A9[20]).

The importance of fixing the patient to the surgical table with special bands and cushions should be noted, in

order to avoid them to slide from the surgical table during its mobilization through the procedure (A9[20]). It is essential that nurses and the surgical team have full control over the patient's immobilization technique and know how to recognize how harmful the consequences of malpractice, recklessness or even negligence can be. In addition to the issue of incorrect positioning, equipment failures can be especially dangerous for the patient's safety during the procedures, since their complexity and sophistication increase the possibility of errors and the failure in early identifying them (A6[17]).

Chart 2 summarizes the main findings regarding the challenges faced by nurses in the context of robotic surgery.

Prospects and possibilities in this new field of action for nurses

With regard to the main prospects found in the reviewed articles, we highlight: the future of the robotic surgery, specificity, improvements in patient care and permanent education.

Future of the robotic surgery

The robotic surgery became a pattern in large hospitals in the United States and in the world (A5[16]).

In 1999, the Food and Drug Administration (FDA) approved the Da Vinci Surgical System® to be used in the United States. The surgical robot offers the surgeons a tridimensional vision and increased dexterity, in addition to offering patients the benefits of a laparoscopic surgery (A5[16], A8[19]).

Since then, the surgical procedures performed through the Da Vinci system continue to grow. This system had four robotic arms: three instrumental arms and an endoscopic one. The surgeon sits at a console away from the patient's head and manipulates these items. The arms attach the trocars, which are inserted into the patient through small incisions. The monitor provides the surgeon with a three-dimensional vision of the surgical field. The surgeon may increase up to 15 times the view of the local where the procedure is being performed by adjusting pedals in the console (A8[19], A10[21]).

One of the problems in the implementation of the program is costs, since they include the initial purchase (US$ 1 million to US$ 2.5 million), plus annual maintenance and the cost of limited instrument use, which are disposable (A8[18], A10[21]). The increased number of procedures carried out with the robotic system may reduce the costs per procedure. There are modifiable factors able to contribute to the increased annual volume of surgeries, such as increasing the number of surgeons capable of using the system and having a properly instructed nursing team (A10[21]).

Chart 3 presents the costs of two common procedures in dollars.

Despite being an exciting surgical tool, its cost may be a problem. This is due to the fact that it has no competition in the market. The Da Vinci Surgical System® is currently the only surgical robot in the market (A10[21]).

Although the initial cost is high, a robotic program can provide the hospital with competitive advantage, becoming a leader in exceptional care. Though the acquisition of technology itself is not enough. Developing a robotics program requires intensive training, marketing, dedication and passion from the members of the surgical team, ready to take on high-level care. The first step to the creation of a robotic surgery program anywhere is to perform a geographic market research. It helps to determine if there is potential need for robotic surgeries and whether or not the program will succeed. If the research shows the program is necessary, the next step is to find out whether the surgical team members are interested in taking on robotic procedures. A well-developed robotics program provides the institution with the opportunity for great success in every aspect (A5[16], A11[22]).

Chart 2. Challenges faced by nurses in robotic surgery.

Challenges	Articles
New competencies	A1; A2; A3; A4; A5; A8; A10
Teambuilding	A1; A3; A5; A6; A8
Patient safety	A1; A3; A6; A8; A9

Chart 3. Costs of two common procedures (in dollars).

Procedure	Instruments cost Conventional surgery	Instruments cost Laparoscopic surgery	Instruments cost Robotic surgery
Hysterectomy	US$ 198.00	US$ 1,138.00	US$ 2,210.00
Prostatectomy	US$ 78.00	US$ 533.00	US$ 1,705.00

Patients are benefited from such changes in surgery, smaller scars being only one of the benefits this kind of procedure holds. They also report less discomfort and shorter recovery time, which facilitates a faster return to their normal daily activities. There is also lower blood loss, which assists in a faster recovery (A3[14], A7[18], A8[19]). With so many advantages robot-assisted surgeries provide patients with, it is believed to be the future of operative procedures worldwide.

Field of activity: specificity

Training is particularly important for nurses who work in robot-assisted surgeries, due to their multiple responsibilities. In addition to having the same responsibilities regarding management, as any other nurse - for example, the positioning and safety of the patient, and the sterility of surgical instruments and room - this professional must also know how to operate the robotic system, how to handle and care for the robot and how to solve any possible problems (A4[15], A10[21]).

The role of nurses in robotic surgery involves specific fields of actions and functions, according to Chart 4.

Nurses have the potential to improve the quality of health care, reducing costs, mistakes and the duration of surgery; thus, increasing management efficiency (A3[14], A7[18], A10[21]).

Improvements in patient care

The technological advances have improved minimally invasive surgeries, executing surgeries with even smaller incisions. The instruments themselves eliminate the need for large incisions, promoting ergonomics, independent activation of monopolar and bipolar energy, lesser exposure of the team to fluids and secretions and decreasing chances of contamination, due to the robot's performing of the surgical manipulation (A8[19]). However, clinical standards or guidelines must be developed to define the ideal use of robot-assisted surgery, in order to ensure standard of care aimed at patient safety (A8[19]). The implementation of a clinical path or evidence-based practice guidelines involves changes. Patients are, currently, more aware of the new surgical technology (A7[18], A8[19]).

The literature available also suggests that patients are benefited from robotic techniques, by reducing costs related to hospitalization and decreasing infection treatments. The hospital benefits from the patients' short hospitalization period. Hence, more patients are treated (A8[19]).

Technology is increasingly used to improve the quality of health care and it should benefit patients in various aspects (A4[15]). It should be noted that the advances in knowledge and technology have a strong repercussion in the area of health, both for diagnosis and treatment, all directly reflecting on personal comfort, quality of life and people's longevity.

However, the technological advance should not bring about a cold, mechanical nor inhumane aspect to the relation between those involved with health care. The balance between sophistication and human relationships must be sought, with the understanding of the affective needs of people[23].

Chart 4. The role of nurses in robotic surgery.

Area of work	Specific functions
Clinical practice	Works as coordinator of care. Provides direct care to the patient. Maintains clinical experience and professional competencies. Develops and engages in management and consulting competencies.
Education	Guides and trains nursing professionals and health students. Educates and guides patients. Ministers lectures and trainings.
Management	Acts as a link within the institution. Establishes a relationship with manufacturers and suppliers.
Research	Takes part in data collection. Takes part in data management. Ensures data dissemination.

Permanent education

Nurses are health care professionals selected to take on the role of coordinator and educator (A1[12]). Some important responsibilities of nurses are to ensure, maintain and develop competencies and skills in the team, as well as to promote evidence-based researches (A4[15]), to make sure employees have the necessary knowledge to develop their functions safely. Nurses should foster the growth, development and autonomy of all; they are responsible for ensuring that each member of the team have whatever necessary training. They must also be trained in information technologies to better apply their knowledge (A4[15], A11[22]).

The education of nursing professionals requires attention, since there is a need to prepare people for the changes which have been taking place in health institutions, so that the need for personal and group development are

reconciled with the needs of the institution and the society[24]. Permanent education is a process which allows for the onset of a space to think and do at work, highlighting the role of health institutions in the development of professionals' skills, thus contributing to several situations of improvement[24,25].

Chart 5 summarizes the main findings regarding the prospect and possibilities for nurses in the context of robotic surgery.

With the increasing use of robotic surgery, there is a need for evidence-based results to support it (A8[19]). The success of the robotic program involves focus on the patient, combining safety, human resources, permanent education, public awareness and an efficient management model (A1[12], A8[19]).

FINAL CONSIDERATIONS

The robotic surgery is a growing technology in hospitals, triggering the need to prepare, train and update health professionals, especially nurses, to provide the necessary support that a robotics program requires.

The aspects discussed in this article contribute to new knowledge regarding robotic surgery and nurses' performance, allowing for the identification of challenges present in the program and in the performance of these professionals. This can provide new possibilities and prospects, creating opportunities for further reflections on the scenario.

Patient safety, training of the team and new competencies to be developed are identified as the challenges faced by nurses. They must play a role greater than the one of a manager in this challenge, but rather the role of a leader, i.e., a true facilitator in their work environment. It is up to them to develop their leadership skills as a way to motivate their team, provoking the desire for knowledge and the availability to transcend the obstacles ahead by implementing this new technique. The focus is mainly on the development of patient care, in order to provide total security in its service.

As for new possibilities, a new area of action is being developed, an important innovation for improvements in patient care, which should be the main axis of all efforts. Thus, a permanent education of the team is essential.

It should be noted that this integrative review did not exhaust the different faces of this subject. Thus, we suggest new studies on the work of nurses in robotics procedures should be developed. The scarce bibliography on the subject in the country, observed by this study, justifies the need and importance of new studies.

Quadro 5. Perspectivas e possibilidades para o enfermeiro na cirurgia robótica.

Prospects	Articles
Future of robotic surgery	A3; A5; A7; A8; A10; A11
Specificity	A3; A4; A7; A10
Improvements for the patient	A4; A7; A8
Permanent education	A1; A4; A8; A11

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A SYSTEMATIC APPROACH FOR THE RATIONALIZATION OF SURGICAL TRAY INSTRUMENTS

Sistemática para racionalização de instrumentais de bandejas cirúrgicas

Sistemática para racionalización de instrumentales de bandejas quirúrgicas

Daniela Silva dos Santos Schneider[1]*, Michel José Anzanello[2], Rosane Silva Veiga Pirovano[3], Flávio Sanson Fogliatto[4]

ABSTRACT: Objective: To report the experience of developing a systematic approach for the rationalization of instruments in surgical trays. **Method:** Study of the development of a systematic approach for the rationalization of instruments, carried out in 2015, using a qualitative method, in the Central Sterile Supply Department (CSSD) of a federal university hospital in Porto Alegre, Brazil. **Results:** There was a 10.92% average reduction in the number of instruments in institutional trays, a reduction in the number of trays owned by medical teams — 84.06% belonged to the otorhinolaryngology team — and a definitive inactivation of 369 orthopedic surgery instruments, which represented 72.84% of the total number of inactivated instruments. In addition, improvements were made to the management of instruments, the optimization of preparation time and the reduction of sterilization by expiration date. **Conclusion:** The relocation of instruments and the addition of items in specific trays allowed for the reappraisal of requests for purchase of instruments and the improvement of relationships between the teams. This systematic approach contributed significantly to the management of instruments, the optimizing processes and the involvement of the surgical teams in the work of the CSSD, thus demonstrating that it can be applied in other institutions.
Keywords: Surgical instruments. Organization and administration. Quality indicators in health care.

RESUMO: Objetivo: Relatar a experiência de desenvolver uma sistemática para racionalização de instrumentais em bandejas cirúrgicas. **Método:** Estudo de desenvolvimento de sistemática para racionalização de instrumentais, realizado em 2015, a partir do método qualitativo, em um centro de materiais e esterilização (CME) de um hospital universitário federal de Porto Alegre, Brasil. **Resultados:** Houve redução média do quantitativo de instrumentais em bandejas institucionais em 10,92%; diminuição de bandejas de propriedade das equipes médicas, sendo 84,06% pertencentes à equipe da otorrinolaringologia; e inativação definitiva de 369 instrumentais da cirurgia ortopédica, o que significou 72,84% do total dos instrumentais inativados. Além disso, houve condução de melhorias no gerenciamento de instrumentais, otimização do tempo de preparo e redução da esterilização por expiração do prazo de utilização. **Conclusão:** A realocação de instrumentais e o acréscimo de peças em bandejas específicas permitiu a reavaliação das solicitações de compras de instrumentais e a melhoria das relações entre as equipes. Essa sistemática contribuiu significativamente para o gerenciamento de instrumentais, otimizando processos e envolvendo as equipes cirúrgicas no trabalho do CME e evidenciou que pode ser aplicada em outras instituições.
Palavras-chave: Instrumentos cirúrgicos. Organização e administração. Indicadores de qualidade em assistência à saúde.

RESUMEN: Objetivo: Relatar la experiencia de desarrollar una sistemática para racionalización de instrumentales en bandejas quirúrgicas. **Método:** Estudio de desarrollo de sistemática para racionalización de instrumentales, realizado en 2015, desde el método cualitativo, en un centro de materiales y esterilización (CSSD) de un hospital universitario federal de Porto Alegre, Brasil. **Resultados:** Hubo reducción media del cuantitativo de instrumentales en bandejas institucionales en el 10,92%; disminución de bandejas de propiedad de los equipos médicos, siendo el 84,06% pertenecientes al equipo de la otorrinolaringología; e inactivación definitiva de 369 instrumentales de la cirugía ortopédica, lo que significó el 72,84% del total de los instrumentales

[1]Undergraduate degree in Nursing; Master's degree in Toxicology; Specialization in Management of Health Operations in Nursing Services in the Surgical Center and the Central Sterile Supply Department of the Hospital de Clínicas de Porto Alegre – Porto Alegre (RS), Brazil.
[2]PhD in Industrial and Systems Engineering; Professor in the Industrial Engineering Department of the Universidade Federal do Rio Grande do Sul (UFGRS) – Porto Alegre (RS), Brazil.
[3]Undergraduate degree in Nursing; Specialization in Management of Health Operations in Nursing Services in the Surgical Center, in the Surgical Block Unit of the Hospital de Clínicas de Porto Alegre – Porto Alegre (RS), Brazil.
[4]PhD in Industrial and Systems Engineering; Professor in the Industrial Engineering Department of the UFRGS – Porto Alegre (RS), Brazil.
*Corresponding author: danielassschneider@gmail.com
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inactivados. Además, hubo conducción de mejoras en el gerenciamiento de instrumentales, optimización del tiempo de preparo y reducción de la esterilización por expiración del plazo de utilización. **Conclusión:** La reubicación de instrumentales y el incremento de piezas en bandejas específicas permitió la reevaluación de las solicitaciones de compras de instrumentales y la mejora de las relaciones entre los equipos. Esa sistemática contribuyó significativamente para el gerenciamiento de instrumentales, perfeccionando procesos e involucrando a los equipos quirúrgicos en el trabajo de CSSD y evidenció que puede aplicarse en otras instituciones.

Palabras clave: Instrumentos quirúrgicos. Organización y administración. Indicadores de calidad de la atención de salud.

INTRODUCTION

With each new decade, the challenge increases for hospitals to improve the quality of their services offered to society, especially with regard to performing surgical procedures[1,2]. The quality of the cleaning, disinfection and sterilization processes is directly related to patient safety and the minimization of infection costs[3]. In this context, the Central Sterile Supply Department (CSSD) is responsible for the processing of health products (PHP), including the actions started immediately after direct patient care[4].

In addition to the PHP, the CSSD should manage the inventory of instruments, including registration, follow-up, and the handling and management of materials[5,6]. Such actions seek to reduce operational costs, providing adequate quantification for the surgical procedure and safety in the processing, functionality and durability of materials[5].

Due to the great demand of processed materials from the CSSD, a systematic and periodic review is needed to quantify the number of instruments used in surgical procedures, as a way to help improve the quality of the process, to reduce the time of returning the tray to the team, to reduce the weight of the trays (which may influence sterilization) and to reduce the costs for sterilization of unnecessary parts.

A study carried out in the United States at the Virginia Mason Medical Center (VMMC), in the city of Seattle, identified a reduction of approximately 2.8 million dollars after rationalizing the number of instruments available in surgical trays. This reduction was based on the observation of 20 surgical procedures of different specialties, where instruments were observed returning from operating rooms without having been used. This study demonstrated that the rationalization of instruments, using Lean methodology principles, improved the quality of the processing time at a lower cost, as well as the efficiency of the use of surgical rooms[7]. Similar actions at other heath institutions showed that the management of an instrument inventory from different specialties assists in the prevention of unnecessary sterilization of parts, the optimization of processing, and the considerable reduction of tray weight[8].

Other authors used grouping systematic approaches, based on the frequency of surgical procedures, when using instruments for the rationalization of trays[9]. Applying the algorithm proposed allowed for the identification of new options for the formation of trays, which in turn allowed for the optimization of sterilization processes. The literature shows that the use of clustering techniques, which consists of grouping observations (in this case, instrumental ones) with similar characteristics, and modeling, allows for the proposal of optimal groupings and solutions for the rationalization process[10,12].

OBJECTIVE

To report the experience of developing a systematic approach for the rationalization of surgical tray instruments with the aim of reducing the volume of unused material to be cleaned and sterilized, and to relocate instruments in the trays.

METHOD

A qualitative research method was developed[13], combining focus group approaches[14,15]. Exploratory and descriptive approaches were used in combination with intervention strategies in order to identify opportunities and propose alternatives for the improvement of surgical instrument management.

The systematic approach for the rationalization was conducted in the CSSD of a federal university hospital in the city of Porto Alegre, Brazil. This unit has approximately 80 thousand instruments. Of these, 19,476 pieces are allocated to 993 trays belonging to the institution, 78 belonging to surgeons, and 1,350 pieces are packed individually. These instruments may be used by 17 different specialties and in 38 different operating rooms.

The team responsible for the materials processing consists of 72 health professionals including nursing auxiliaries and technicians, 9 nurses (8 assistants and 1 coordinator of the unit), in addition to 1 administrative assistant. The department works 24 hours a day, 7 days a week. The study is part of a project to develop the follow-up and evaluation of managerial processes in health institutions. It was developed after being analyzed and approved by the Research Ethics Committee of the *Hospital de Clínicas de Porto Alegre*, under consubstantiated opinion number 33705014800005327/2014.

The development method was the one that was proposed and used for the rationalization of surgical trays and is based on seven steps:

- Prioritization: the revision of trays prioritized specialties whose procedures were characterized by greater complexity. In the sequence, specialties were prioritized according to greater surgical production and according to those that did not have the possibility of instrument rotation. Finally, specialties with a greater number of occurrences were reviewed, with regard to the dissatisfaction of the surgical team as well as their availability to perform the review;
- Contact with the specialist and the technician: from the definition of the specialty, an informal interview with specialists from the surgical block (SB) was performed in order to schedule a date and time for the analysis of the materials in each tray, the selection of technicians who would help in the process, and in order to contact the chief surgeon of the specialty;
- Tray revision and instrument selection: the revision of instruments and trays was performed at the CSSD and was accompanied by a nurse and a nursing technician, who belonged to the department, as well as other professionals of the specialty. Initially, the need for individually packed instruments was assessed and, later on, the opening of new trays was evaluated. The revision order of trays prioritized those that were considered basic, being used in all procedures of the specialty. Instruments were grouped according to their use in the surgical plan, with the aim of corresponding them to their sequence of use in the surgery. Next, professionals of the specialty were asked about the need for each material and their respective quantities. The process was repeated for special trays. For these, the head of the team and the technician were asked about the need for larger identical trays based on the demand of the surgical schedule. In the cases this increase in size was not necessary, as a new unit was put together with instruments left over from the trays that were already reviewed;
- Documentation of changes: in conjunction with step 3, a spreadsheet was built (hypothetical example in Chart 1) to record the quantitative and qualitative changes made to the instruments, in addition to register the instruments' reference, size, institutional code and photographs of the items withdrawn and the ones left in the trays. This spreadsheet also allowed for the tracking of materials allocated in new trays as well as their quantity. The records presented in Chart 1 were then forwarded, up to 24 hours after their review, to the CSSD and SB leaders for information, follow-up of alterations and to identify possible inconsistencies in the composition of the reviewed trays;
- Revision of surgical kits: after step 2, a revision of surgical kits was performed, which consisted in identifying the materials that must be sent to each procedure by the CSSD, according to the scheduled surgeries. In other words, in addition to the trays, individual mandatory instruments were also reviewed. The revision of the surgical kits of each specialty prioritized less complex procedures, due to the smaller number of instruments verified in this group. Professionals of the specialty were asked about the need and specificity of the trays and the individual instruments, in addition to the number of textiles to be sent to each surgical procedure. Based on the list of surgeries suitable for surgical scheduling in the institution's computerized system, groupings of the ones that used the same number trays and materials were conducted, as well as the updating of documents;
- Validation by the surgical team: immediately on the shift or the day after the revision, the updated surgical kit (with reviewed instruments and trays) was sent so that the procedure could be performed in the SB. In the moment, or immediately after the surgery, an interview was performed with technicians, surgeons and leaders of the SB, to evaluate and validate the changes made. From the feedback of the professionals, eventual corrections and/or reviews were made;
- Storage organization: subsequently, using a visual management tool, the CSSD stockpile was reorganized. To do this, the storage shelves of the trays were identified so that they were grouped according to specialty. Colors

were used to differentiate specialties with similar trays, according to preexisting records of the specialties.

To place the trays in storage, the amount and weight of trays was considered, so that heavier items were placed in positions to facilitate their handling.

RESULTS

The systematic approach proposed was applied in the 11 surgical specialties, presented in Chart 2, which contemplated instruments belonging to institutions and surgeons. The first column of the cart regards the order in which the revision procedure was carried out in relation to the specialties.

With regard to the results, there was a mean reduction of 10.92% (Chart 1) in the number of pieces belonging to the institution. This reduction was more representative in six specialties, emphasized in Table 1. Of the pieces removed, 841 instruments were reallocated to the CSSD warehouse, representing a storage return of 64.10% for the reallocation or for the making of future trays.

Another 498 pieces were permanently deactivated. This action is justified due to changes in surgical techniques or the loss of integrity of the pieces (Table 1). Such items will be forwarded for specific disposal, according to Brazilian legislation.

It should be noted that there was a quantitative increase of 8.17 and 12.00% in the total number of instruments in the trays for buccomaxillofacial and vascular surgeries, respectively (Table 1). This fact is due to the requests from teams

Chart 2. Surgical specialties reviewed.

Order of rationalization priority	Specialties
1	Neurosurgery
2	Cardiovascular surgery
3	Thoracic surgery
4	Vascular surgery
5	Urological surgery
6	Orthopedic surgery
7	Otorhinolaryngologic surgery
8	Plastic surgery
9	Proctological surgery
10	Pediatric surgery
11	Bucomaxillofacial surgery

Chart 1. A spreadsheet for the registration and control of altered instruments in the otorhinolaryngology tray.

Otorhinolaryngology	Tray for sinusotomy with septoplasty 1 Pieces: 30						
Instrument	Size	Ref.	HC Code	Quantity until 04/16	Withdrawn/ inserted	Current quantity	Destination/source
Curved vacuum	13 cm	STORZ 586030		1		1	
Franck-Pasquini vacuum 20.5 cm	2.5 FR	STORZ 662825	285915	0	1	1	new piece
Thick vacuum	11FR 19 cm	701102		1		1	Source: sinusotomy test
Round tanks	10 cm			2	2		disabled
Round tanks	8 cm			2	2		disabled
Scalpel cord	Nº 3			1	1		disabled
Cottle double stripper	22.5 cm	STORZ 479200		0	1	1	Source: sinusotomy test
Freer stripper		330020		1		1	
Ritter front dilator No. 1	14.5 cm	STORZ 641525	216151	1		1	
Double lift	22.5 cm	STORZ 479000	215970	1		1	
Beckmann nasal speculum (curved)	15 cm	STORZ 400520	282205	0	1	1	new piece
Large nasal speculum 55 mm	13.5 cm	STORZ 403565	285937	0	1	1	new piece
Medium nasal speculum 55 mm	13.5 cm	STORZ 403555	285938	0	1	1	new piece

demanding the inclusion of pieces in the trays, as well as an increase in the quantities of identical trays. There was also the deactivation of other little used pieces in these specialties.

Regarding trays belonging to the doctors, they represented, before rationalization, 26.86% of the total of pieces in the CSSD. After this process, there was a reduction of approximately 10.00%. The results obtained for the otorhinolaryngology specialty are highlighted here, in which a reduction of 84.06% was observed in the delivery and circulation of instruments belonging to medical teams (Table 2).

The rationalization also allowed for the detection of unused medical instruments, which belonged to the arsenal of instruments available and required re-sterilization due to the expiration date. In this inactivation, the specialty of orthopedic surgery, in which a definite idleness of 369 instruments was verified, corresponds to 72.84% of the total unused instruments (Table 2).

Requests for the purchasing of new trays were reevaluated from the rationalization. Of those, we highlight the urology specialty, in which there was a need for the acquisition of 38 instruments to put together a new tray to meet surgical demands. However, from the review of three other specialties (neurology, thoracic and cardiac) and the inclusion of five instruments available in the CSSD warehouse, is was possible to provide the urology team with a new tray containing identical instruments to the ones requested for purchase. This action was responsible for a savings of approximately, R$14.000.00 in the purchase of these instruments. A similar situation occurred in the other ten specialties that had their requested purchase lists reviewed.

DISCUSSION

In addition to the benefits resulting from the reduction indicators presented, the rationalization of tray instruments belonging to 11 specialties also resulted in the improved relation between surgical teams and the CSSD. This is due to the sharing of responsibility in relation to the choice of instruments that should remain in the trays, and the number of identical sets available for procedure schedules, in addition to visitations of the CSSD and the explanation of each step and the time necessary for the processing of materials. This knowledge, held by surgeons and technicians, helped planning the quantity, the order of surgeries to be performed, and the priority of forwarding the materials to the CSSD. Furthermore, it improved confidence in the work performed by professionals of the department. This aspect was verbalized by the feedback provided by the teams.

Table 1. Results of the rationalization of instruments and institutional trays.

Specialty	Rationalization of trays			Rationalization of pieces					
	Before	After	Reduction	Before	After	Reduction	Deactivated	Reallocated	Included
	n	n	%	n	n	%	n	n	n
Neurosurgery	58	44	-24.14	812	648	-20.20	2	141	3
Cardiovascular surgery	32	31	-3.13	862	816	-5.34	20	48	48
Thoracic surgery	21	18	-14.29	769	583	-24.19	25	136	22
Vascular surgery	28	28	–	901	1,016	12.76	1	10	56
Urological surgery	34	31	-8.82	689	625	-9.29	1	75	52
Orthopedic surgery	89	68	-23.60	1,969	1,666	-15.39	263	62	65
Otorhinolaryngologic surgery	31	26	-16.13	1,315	1,171	-10.95	18	198	181
Plastic surgery	25	23	-8.00	1,042	849	-18.52	129	67	41
Proctological surgery	12	11	-8.33	138	113	-18.12	18	–	–
Pediatric surgery	21	19	-9.52	807	752	-6.82	–	11	32
Bucomaxillofacial surgery	10	10	–	257	278	8.17	21	93	138
Total	361	309	-14.40	9,561	8517	-10.92	498	841	638

Table 2. Results of the rationalization of instruments and trays belonging to surgeons.

Specialty	Rationalization of trays			Rationalization of pieces					
	Before	After	Reduction	Before	After	Reduction	Deactivated	Reallocated	Included
	n	n	%	n	n	%	n	n	n
Neurosurgery	7	5	-29	74	61	-17.57	13	–	–
Cardiovascular surgery	37	32	-14	192	182	-5.21	3	-	–
Thoracic surgery	4	4	–	43	42	-2.33	1	–	–
Vascular surgery	5	5	–	13	13	–	–	–	–
Orthopedic surgery	26	6	-77	473	104	-78.01	369	–	–
Otorhinolaryngologic surgery	17	9	-47	138	22	-84.06	116	–	–
Total	96	61	-36	933	424	-54.53	474	–	–

In financial terms, the rationalization of the trays may lead to a reduction in the number of autoclave cycles needed for (re)sterilization, i.e., the need to (re)process trays that are not used and are expired.

Another optimization result is the reduction of preparation time of the trays, which was approximately 28% less (difference between preparation time and packaging of the revised trays), given the chronoanalysis performed before the rationalization and published in another study of the institution[16]. Such results confirm the findings of the literature[7-10,12].

It should also be noted that the reallocation of instruments due to the rationalization procedure and the inclusion of other pieces in specific trays allowed for the scheduling of more subsequent surgeries. From this process, we observed a need to anticipate the step regarding the process of receiving instruments by the CSSD in the SB unit as a way to confirm the instruments, immediately identify the maintenance of them, improve the relationship between perioperative surgical and nursing teams, and optimize processing time.

There were reduced amounts of trays belonging to doctors due, mainly, to the readjustments in institutional trays, which started to better supply the demands of the surgeons. Thus, a reduction was verified in the number of events in which medical instruments were received with little or no time for sterilization.

FINAL CONSIDERATIONS

In this study, the use of a systematic approach developed for the rationalization of instruments in surgical trays helped to improve CSSD management and the relationships among surgical teams. There was a quantitative reduction in the number of instruments, an improvement of work processes and also advances regarding the management of purchase orders for instruments.

Among the positive aspects of the study, it should also be noted that it subsidized planning process for the purchase of surgical instruments.

From the results obtained with the rationalization of instruments of 11 specialties, it is observed that it is essential to extend rationalization to all other surgical specialties with instruments in hospitalization units of the institution. After the conclusion of this step, we propose that a study estimating the costs allocated in the CSSD should be carried out, addressing the number of pieces in the warehouse and the financial investment needed. This could project the creation of new institutional facilities and the consequent increase in surgical production capacity.

These data support the implementation of a computerized instrument management system, including the traceability of the steps in the process, the control of inputs, the costs and the instruments' maintenance records, assisting in the planning of investments for the acquisition of new instruments. Therefore, the systematic approach of the rationalization of instruments contributes to the research and teaching of managerial and assistance aspects, especially because the study directly impacts the safety of the patient that undergoes an anesthetic-surgical procedure.

The exclusive use of the opinion of specialists may be understood as a limitation of the systematic approach proposed in this study. Another limitation could be the lack of continuation with all surgical specialties and the fact that it was carried out in an educational institution.

We propose future studies to be based on field observations and the use of programming tools to be applied in production engineering in the various specialties and in other institutions.

We concluded that this systematics approach contributed significantly to the management of instruments, the optimizing of processes and the involvement of surgical teams in the work of the CSSD. It was demonstrated that this method should be enhanced, and could possibly be used in other institutions, since it contributes directly to the improvement of the work process, which has a positive impact on the care of patients submitted to surgeries in various specialties.

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