ROBOTIC SURGERY TRAINING IN THE PERIOPERATIVE NURSING RESIDENCY PROGRAM

Capacitação em cirurgia robótica no programa de residência em enfermagem perioperatória

Capacitación en cirugía robótica en el programa de residencia en enfermería perioperatoria

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ABSTRACT: Objective: To develop a training program in robotic surgery addressed to resident nurses. **Method:** This is a case report conducted in a major private, philanthropic hospital in the city of São Paulo. For the Nursing Residency Program, resident nurses were trained focusing on the specialization in robotic surgery, including theory and practice, to use the Da Vinci robot system. **Results:** The resident nurses developed cognitive knowledge through virtual training, and technical skills during the simulation of robot handling, as well as the instruments and the equipment. They were referred to practical initiation, supervised by an expert nurse, until they were confident to execute the procedure of assembling the Da Vinci robot. **Conclusion:** The residents considered the training satisfactory to acquire theoretical and practical knowledge. The training of professionals specialized in robotic surgery is a differential in perioperative Nursing residency.
Keywords: Perioperative nursing. Simulation training. Robotic surgical procedures. Education, Nursing. Internship, nonmedical.

RESUMO: Objetivo: Desenvolver um programa de treinamento para enfermeiros residentes em cirurgia robótica. **Método:** Trata-se de um relato de experiência em um hospital filantrópico privado de grande porte no município de São Paulo. Para o programa de residência em Enfermagem foi desenvolvido um treinamento para enfermeiras residentes com foco na especialização em cirurgia robótica com carga teórico-prática para o sistema do robô Da Vinci. **Resultados:** As enfermeiras residentes desenvolveram o conhecimento cognitivo com o treinamento virtual e a habilidade técnica durante a simulação com o manuseio do robô, dos instrumentais e dos equipamentos. Foram liberadas para iniciação prática com supervisão de enfermeiro especialista até que possuam segurança na execução do procedimento de montagem do robô Da Vinci. **Conclusão:** O treinamento foi avaliado pelas residentes como satisfatório para aquisição de conhecimento teórico-prático. A capacitação de profissionais especialistas em cirurgia robótica é um diferencial na residência de Enfermagem perioperatória.
Palavras-chave: Enfermagem perioperatória. Treinamento por simulação. Procedimentos cirúrgicos robóticos. Educação em Enfermagem. Internato não médico.

RESUMEN: Objetivo: Desarrollar un programa de capacitación para enfermeros residentes en cirugía robótica. **Método:** Se trata de un relato de experiencia en un hospital filantrópico privado de grande porte en el municipio de São Paulo. Para el programa de residencia en Enfermería fue desarrollada una capacitación para enfermeras residentes con enfoque en la especialización en cirugía robótica con carga teórico-práctica para el sistema del robot Da Vinci. **Resultados:** Las enfermeras residentes desarrollaron el conocimiento cognitivo con la capacitación virtual y la habilidad técnica durante la simulación con el manejo del robot, de los instrumentos y de los equipos. Fueron liberadas para iniciación práctica con supervisión de enfermero especialista hasta que posean seguridad en la ejecución del procedimiento de montaje del robot Da Vinci. **Conclusión:** La capacitación fue evaluada por las residentes como satisfactorio para adquisición de conocimiento teórico-práctico. La capacitación de profesionales especialistas en cirugía robótica es un diferencial en la residencia de Enfermería perioperatoria.
Palabras clave: Enfermería perioperatoria. Entrenamiento simulado. Procedimientos quirúrgicos robotizados. Educación en Enfermería. Internado no médico.

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INTRODUCTION

Robotic surgery has become popular and has been growing fast since the 2000s. The procedure provides safety and efficiency, and is in between laparoscopy and minimally invasive surgery[1]. Literature describes robotic procedures in the following specialties: urology, gynecology, general surgery, thorax, heart, head and neck, maxillofacial, and pediatrics[14]. Such technological advancement is in accordance with the objective of reducing operative morbidity and mortality rates, as well as of performing less aggressive surgeries, with early recovery of the patient[5].

The XXI century nurse faces the challenge of technological diversity, which requires that this professional catch up with new demands, constant update and search for training to work with different resources[6]. Robotics has provided the perioperative nurse with the opportunity to adjust their practice, to think creatively, and to develop efficient and safe clinical practices to care for their patients[7].

The safety of the patient and the efficiency of the procedure can be compromised if the perioperative nurse is unexperienced regarding the care for patients who undergo robotic procedures. By offering a training program for nurses involved with robotic surgery, hospitals provide skills for the practice of these professionals, reducing risks, and promoting positive results for nursing care[1].

Clinical simulation has become an important tool in nursing education, as a feasible alternative for the practice with patients. Even though simulation cannot replace the real clinical practice, it is a useful tool to create realism before the apprentice can actually care for the patient. Simulation encourages the active learning process, stimulating the students[8].

This article allows coordinators and teachers in the surgery department to get to know a training program intended to develop nurses to become specialists in robotic surgery. This model can be used in other centers, improving the expertise of these professionals. The objective of this study was to develop a training program on robotic surgery for resident nurses.

METHOD

This is a case report conducted in a major private, philanthropic hospital in the city of São Paulo. This hospital has 19 operating rooms and an average of 1,200 surgeries/month. In 2015, this hospital began a nursing residency program in surgery center and in central sterile services department, with ten openings.

As part of the pedagogical agenda of the residency program, the robotic surgery training was planned to provide theoretical and practical information. Therefore, the course was conducted with the company in charge of the Da Vinci system: Intuitive (Figure 1).

Theoretical training was available in Da Vinci's official website[9], and consists of video lessons with interactive exercises about the basic principles of electrosurgery, the Da Vinci's functioning system, the robot assembly, the attachment of Da Vinci to the patient, and problem solving. An evaluation of the learning process is applied at the end of the course – minimum grade for approval is 7.0. After being approved, the participant receives a certificate issued by the company's website, which has to be sent to the tutors of the residency program, as well as to the representative of the company that sells the system.

The online training could be concluded in 60 days. In case of non-approval at this stage, it would not be possible to continue with the practical training.

The tutor of the residency program who accompanies the practical training was in charge of: organizing the operating room and displaying the system with clinical engineering; of the disposable items; of the devices withdrawal and return to the central sterile services department; of supervising the hand antisepsis technique; of proper wearing of surgical attire; and of the evaluation of the practical training.

Practical training was scheduled 60 days ahead, with a representative of Intuitive, to be conducted on a Sunday in the robotics operating room at the referred hospital. The period to conduct this phase lasts six hours, and consists of revising the theoretical concepts learned in the first phase, in the demonstration of specific instruments for robotic surgery, and in the presentation of the console, the video system, and the Da Vinci robot by the company's representative. The tutor accompanying the group reviews the techniques of surgical antisepsis and proper wearing of surgical attire.

During the process, the resident nurses discuss the concepts learned in the group and initiate the practical activities by handling robotic instruments. Afterwards, they are encouraged to individually initiate the robot assembly and execute handling techniques, as well as to evaluate the system functioning and possible flaws. For the robot assembly,

surgical antisepsis and proper wearing of surgical attire are required to keep the procedure sterile.

At the end of practical training, the tutor fills out the evaluation form on competences acquisition that is expected for a nurse who is specialized in robotic surgery. Therefore, an instrument of evaluation was used with the concepts "needs improvements" and "satisfactory" (Chart 1).

RESULTS

Nine resident nurses were trained from September to December 2015. The online training that was launched in September was concluded until November. The practical training was conducted in December 2015.

For the theoretical training, the resident nurses accessed the website and registered their personal data. After this registration, they received a login and a password to access the training area.

The theoretical training included the knowledge of basic principles until the final stage with the Da Vinci robot dock; in each phase, there are exercises to reinforce the learning process and, at the end, there is an evaluation on the specific field of knowledge. It is possible to rewind the content many times, and there is no determination of time to execute each phase.

The training evaluation by the residents was satisfactory, and even though the content is in English, it did not compromise the learning process. The resident nurses were able to conclude the online training in the proposed time.

The practical training was essential to visualize the placement and the operation of the equipment in the operating room, as well as to understand the position of the team members and the organization of materials and instruments,

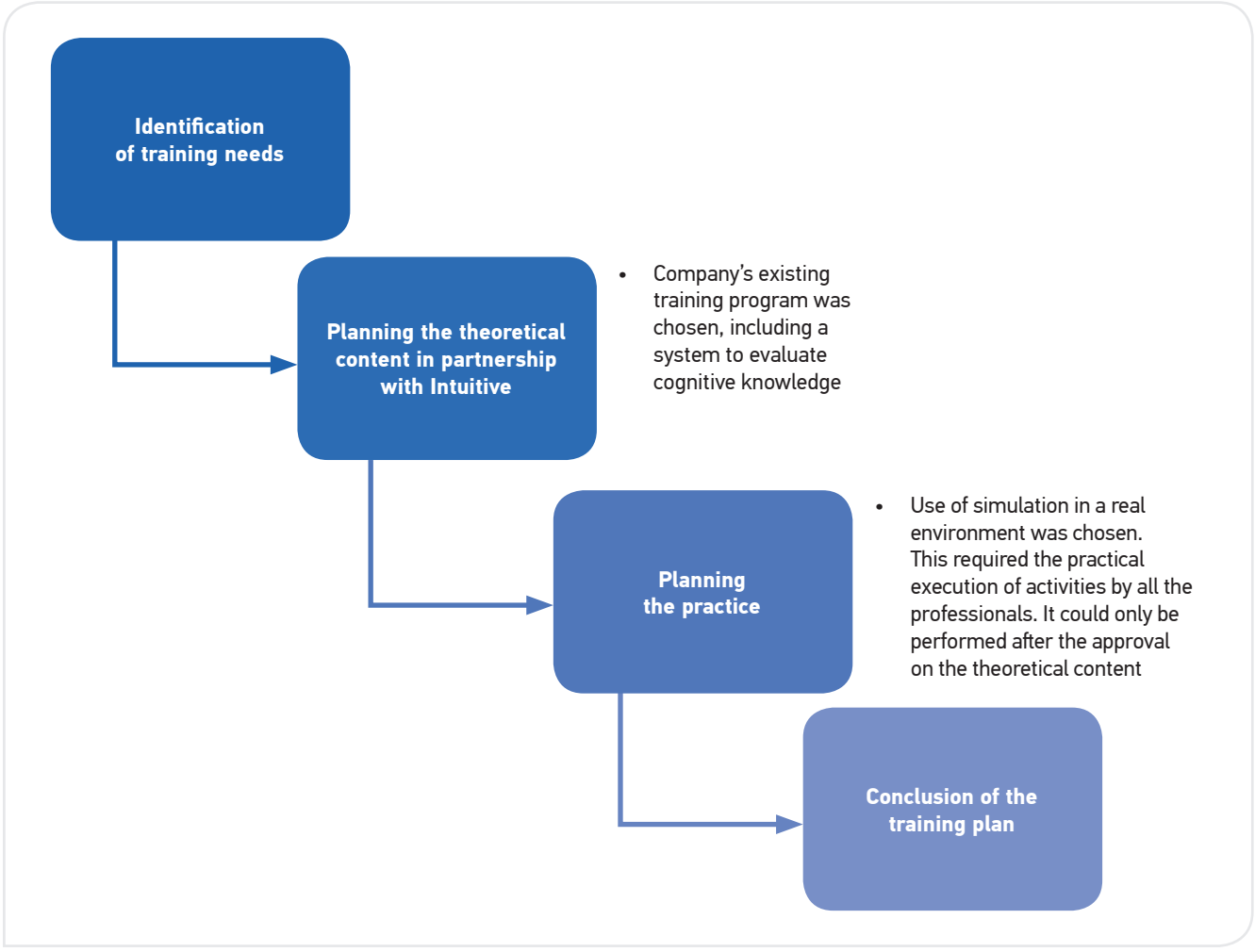

Figure 1. Training program for nurse specialist in robotic surgery.

to practice the content learned, and to provide the unique opportunity to handle the console, the robot, and the video system. The tutor revisited the hand antisepsis technique and the definitions on proper wearing of surgical attire with the residents and observed the execution of the robot assembly and attachment processes, which were executed individually by each of the participant nurses.

The residents handled the instruments, performed surgical antisepsis, and wore surgical attire as recommended. They also assembled the robot for surgery, put together the desk for the optical system, identified the number of times the tweezers were used, by video, and disassembled the system. During the optical calibration and the alignment of images, the group had some doubts, which were clarified. Therefore, they conducted all stages in the process.

At the end of the training, the residents were approved to execute the assembly of the robot in the intraoperative scenario. At first, the participants should be supervised by the nurse who is specialized in robotics, until they are confident enough to assemble the system. In general, professionals need three supervised assemblies in order to execute it without supervision.

The result of our experience was considered effective to train nurses in robotic surgery. The deadlines were properly established, and the members of the group could acquire the necessary skills.

DISCUSSION

The technological advancement and the growth of robotic surgery require skilled professionals to guarantee the safety of the patient and the assertiveness of the procedure. Such technological advancement and the generation of young nurses lead to significant change in the practice of care. For this new profile of perioperative nurses, a training model associating theory and practice makes the development of these professionals more dynamic, being effective in the learning process.

Learning is an active and dynamic process, with the potential to transform the apprentice. Efficient educational strategies should be cooperative, collaborative, and attractive to capture and catch the attention of new generations of perioperative nurses[10].

The strategy used to develop nurses to become specialists in robotic surgery aimed at training resident nurses in a simulated environment of professional practice, using the operating room, the placement of the equipment, the disposable items, and the instruments which are identical to those used in the intraoperative period.

The use of simulation in professional health training became prominent owing to the campaign for the safety of the patient. Simulation as a teaching method has grown around the world, and is more frequent in graduate and

Chart 1. Evaluation of the practical training for robotic surgery. São Paulo, 2015.

Actions	Concept	
To describe the movements of the three arms of the robot before and after the procedure	NI	S
To demonstrate how to turn on the robotic system adequately		
To demonstrate the connections of the robotic system		
To do the *"homing"*		
To turn off the equipment properly after use		
To adjust the camera and the alignment of the system properly		
To place the cloaks on the robot's arms, ensuring the perfect fitting of the tweezer		
To identify the basic instruments of the robotic surgery		
To demonstrate the adequate position and the withdrawal of the robotic instruments		
To identify the location of the emergency key		
To verbalize an emergency situation (loss of electric energy or an irrecoverable flaw)		
To verbalize correct actions for recoverable flaws		
To identify the number of times the tweezers were used		
To verbalize how to proceed with the records for control		
To remove the cloak and keep the optical cables		

NI: needs improvement; S: satisfactory.

postgraduate programs in Nursing[11]. In this study, the assembly and the attachment of the robotic system, technical skills, such as hand antisepsis and wearing of surgical attire, and handling of robotic materials are reinforced during the simulation phase, enabling the participants to associate the previous knowledge with the development of the practical skills.

Postgraduate programs with residency are known as a practical learning process in health services. Residency enables the resident to experience health practices, helping this usually recently graduated professional to become familiar with work processes and to acquire professional confidence, together with his or her critical and reflexive development[12]. This type of qualification improves the quality of care and prepares professionals for the labor market[13].

This training model is very similar to that demonstrated in an American study which include theory and practice in robotic surgery, and was addressed to nurses. However, in this study, the theoretical part was carried out by the Nursing department and was based on the needs of the staff; the practical part was initiated afterwards. The process took five weeks[1].

Another study used online training, a practical half-day session, and simulation exercises. Participants were divided in two groups: experienced staff and beginners in robotic practice. This study showed significant efficacy results of this training model[14].

A few studies report how nurses are trained for robotic surgery. In many health institutions, the nurse who is not aware of this technology is involved in the process gradually, followed-up by an experienced professional.

In this type of training, previous cognitive knowledge associated with a practice simulation provides more safety to the professional who begins the execution of care in robotic surgery.

CONCLUSION

The proposed training was satisfactory and occurred in accordance with the desired competences. The residents evaluated the training well, owing to theoretical and practical knowledge acquisition. The development of professionals to become specialists in robotic surgery is a differential in the perioperative nurse residency.

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