

# 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*

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**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 desafíos y perspectivas de la actuación del enfermero en la cirugía robótica. **Método:** Revisión integrativa, llevada a cabo en las bases de datos Literatura Latinoamericana y del Caribe en Ciencias 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 los datos, se realizó una síntesis de las informaciones extraídas conforme el objetivo, buscando identificar las evidencias. **Resultados:** La búsqueda resultó 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 inclusión y estaban alineados a la cuestión orientadora, siendo 9 cuaitativos, 1 revisión sistemática de ensayo clínico randomizado y 1 estudio de validación. **Conclusión:** Se evidenció como desafíos: seguridad del paciente, capacitación del equipo y desarrollo de competencias. En cuanto a las posibilidades, se observó una nueva área de actuación en desarrollo, 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.

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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<sup>1</sup>.

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<sup>2</sup>.

When technology is properly used and administered, it benefits the practice of care in several areas<sup>3</sup>. 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<sup>4</sup>. 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<sup>5-7</sup>.

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<sup>6</sup>. 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<sup>8</sup>. 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<sup>9</sup>.

## 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<sup>10</sup>. The results found were analyzed as the objectives traced.

This study follows ethical aspects, in accordance with copyrights, as Law No. 9.610/98<sup>11</sup>.

## 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 <sup>12</sup> 2009	Technological advances in the operating room	Schmock BA	Pennsylvania Nurse Journal	Qualitative	5
A2 <sup>13</sup> 2010	Robotics in nursing	Booth BE	Journal of Nursing Practice	Qualitative	5
A3 <sup>14</sup> 2010	Best practices for minimally invasive procedures	Ulmer BC	AORN Journal	Qualitative	5
A4 <sup>15</sup> 2010	The effects of information technology on perioperative nursing	Sweeney P	AORN Journal	Qualitative	5
A5 <sup>16</sup> 2010	Developing a successful robotic surgery program in a rural hospital	Zender J, Thell C	AORN Journal	Case study	5
A6 <sup>17</sup> 2011	Keeping up with technology	Stanton C	AORN Journal	Qualitative	5
A7 <sup>18</sup> 2011	Role of the perioperative nurse in robotic surgery	Thomas CC	Perioperative Nursing Clinics	Qualitative	5
A8 <sup>19</sup> 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 <sup>20</sup> 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 <sup>21</sup> 2013	Modifiable factors to decrease the cost of robotic-assisted procedures	Nayeemuddi NM, Daley SC, Ellsworth P	AORN Journal	Qualitative	5
A11 <sup>22</sup> 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<sup>10</sup>.

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<sup>19</sup>). 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<sup>14</sup>). 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<sup>13</sup>, A3<sup>14</sup>, A4<sup>15</sup>).

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<sup>13</sup>). The constant presence of the nurse in procedures also provides the accurate assessment of the educational and human resources needs (A1<sup>12</sup>, A3<sup>14</sup>).

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<sup>16</sup>).

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<sup>13</sup>, A3<sup>14</sup>, A5<sup>16</sup>, A10<sup>21</sup>).

### 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<sup>16</sup>).

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<sup>16</sup>, A8<sup>19</sup>). 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<sup>14</sup>, A6<sup>17</sup>, A10<sup>21</sup>).

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<sup>1</sup>.

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

### 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<sup>19</sup>).

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

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

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<sup>20</sup>).

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<sup>17</sup>, A9<sup>20</sup>). 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<sup>20</sup>).

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<sup>20</sup>). 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<sup>17</sup>).

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<sup>16</sup>).

In 1999, the Food and Drug Administration (FDA) approved the Da Vinci Surgical System<sup>®</sup> 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<sup>16</sup>, A8<sup>19</sup>).

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<sup>19</sup>, A10<sup>21</sup>).

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<sup>18</sup>, A10<sup>21</sup>). 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<sup>21</sup>).

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<sup>®</sup> is currently the only surgical robot in the market (A10<sup>21</sup>).

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<sup>16</sup>, A11<sup>22</sup>).

**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<sup>14</sup>, A7<sup>18</sup>, A8<sup>19</sup>). 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<sup>15</sup>, A10<sup>21</sup>).

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<sup>14</sup>, A7<sup>18</sup>, A10<sup>21</sup>).

### 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<sup>19</sup>). 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<sup>19</sup>). The implementation of a clinical path or evidence-based practice guidelines involves changes. Patients are, currently, more aware of the new surgical technology (A7<sup>18</sup>, A8<sup>19</sup>).

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<sup>19</sup>).

Technology is increasingly used to improve the quality of health care and it should benefit patients in various aspects (A4<sup>15</sup>). 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<sup>23</sup>.

### Permanent education

Nurses are health care professionals selected to take on the role of coordinator and educator (A1<sup>12</sup>). 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<sup>15</sup>), 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<sup>15</sup>, A11<sup>22</sup>).

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

**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.

reconciled with the needs of the institution and the society<sup>24</sup>. 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<sup>24,25</sup>.

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<sup>19</sup>). 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<sup>12</sup>, A8<sup>19</sup>).

## FINAL CONSIDERATIONS

The robotic surgery is a growing technology in hospitals, triggering the need to prepare, train and update health

**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

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.

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