



The process of nurse adaptation to robotic surgery: A qualitative study

Yasemin Uslu¹  | Yasemin Altınbaş² | Tuğba Özercan³ | Meryem Yavuz van Giersbergen⁴

¹ Faculty of Health Sciences, Nursing Department, Acibadem Mehmet Ali Aydınlar University, Istanbul, Turkey

² School of Nursing, Adiyaman University, Adiyaman, Turkey

³ Acibadem Healthcare Group, Maslak Hospital, Istanbul, Turkey

⁴ Nursing Faculty, Department of Surgical Nursing, Ege University, Izmir, Turkey

Correspondence

Yasemin Uslu, Acibadem Mehmet Ali Aydınlar University, Faculty of Health Sciences, Nursing Department, Istanbul, Turkey.
Email: yaseminuslu86@gmail.com

Abstract

Background: This study aimed to reveal the experiences of nurses in robotic surgery and their adaptation to this method.

Methods: This research was planned within the framework of qualitative research methods. The study population consisted of robotic surgery nurses in Turkey. Focus group interviews were conducted after the flow process was developed, and the interviews were supported using a semistructured interview form. Two focus interviews were conducted with 15 participants.

Results: As a result of the content analysis, 11 themes were created in four categories. The categories of the study were designed as follows: (1) Training in Robotic Surgery Nursing, (2) Adaptation to Technology in Robotic Surgery Nursing, (3) Changing Roles and Adaptation Process in Robotic Surgery Nursing, and (4) Future of Robotic Surgery.

Conclusions: The lack of clarity regarding the roles and responsibilities of robotic surgery nurses and the lack of arrangements for working conditions are thought to cause professional dissatisfaction and disengagement from work.

KEYWORDS

focus group, operating rooms, preoperative nurses, qualitative studies, robotic surgery, robotic surgery nurses

1 | INTRODUCTION

Robotic surgery refers to surgical procedures that are performed with the assistance of a robot.¹ Each day, new ideas and more advanced models for robotic surgery are designed.² As technology for robotic surgery has developed, dimensions have been reduced, functionality has been increased and, finally, the use of the technology has been facilitated with the help of three-dimensional images.¹

Worldwide, more than five million operations have been performed in 66 countries using robotic surgery systems.³ In Turkey, robotic surgery systems were used in laparoscopic surgery at only a limited number of clinics until 10 years ago; today, robotic surgery is routinely conducted in many clinics.⁴ In Turkey, robotic surgical systems are used in a total of 32 centers in eight cities, and approximately

132 surgeons currently use this method.³ It is estimated that there are approximately 90 to 100 robotic surgical nurses in Turkey.

Because robotic surgical interventions require complex medical instruments, a re-education process is required for nurses to achieve the desired qualification. The first step in training is learning the hardware and the terminology related to robotic surgery, and the second step is establishing the system.⁵

The role of a robotic surgery nurse in the preoperative period is the preparation and control of the system, patient placement, patient positioning, and ensuring the safety of the team. The responsibilities of the nurse during surgery involve helping the surgeon, paying attention to the rules of asepsis by distinguishing the sterile and nonsterile parts of the robot, placing the robot in the body, reading the data received from the videoscopic screen correctly and quickly, reporting to the



surgeon and taking immediate measures in case of possible power failure.^{6,7}

In robotic surgery, a field in which teamwork has a significant impact on success, it is the nurse's responsibility to establish the system and to ensure continuity throughout the procedure. It is becoming important to examine the experiences of health professionals in facilitating the adaptation of the use of robots in surgery. Research on the human behavior associated with these events is possible with a flexible and holistic approach. Thus, the opinions and experiences of individuals participating in qualitative studies are very important.⁸

This study aims to reveal the experiences of nurses in robotic surgery and their adaptation to this method.

2 | MATERIALS AND METHODS

The use of a qualitative method was planned; therefore, focus group interviews were used to gather the data.

2.1 | Population and sampling

Participants were selected using a purposive sampling method.⁹ Individuals who worked as robotic surgery nurses in the operating rooms of any of four hospitals belonging to a private health group in Istanbul, Turkey, for at least 6 months participated in the study.

2.2 | Focus group interviews

In this research, which was conducted using a qualitative approach, two focus group interviews were performed. The first focus group interview involved eight participants, and the second focus group interview involved seven participants. Each interview lasted for approximately 80 to 120 minutes. Focus group interviews were conducted using a semistructured interview form. The semistructured questions were designed to evaluate the experiences of robotic surgery nurses in the adaptation process from the moment they began working in this field. The flowchart of the focus group interviews is given in Table 1.

2.3 | Analysis of the focus group interviews

In the evaluation of the data obtained from the interviews, the phenomenological interpretation method of Colaizzi was used. The interviews were transcribed on the day they were conducted, and the categories were composed of themes. In the study findings, the studied phenomena were extensively explained, the basic structure of each phenomenon was explained, and, finally, the validity and reliability of the findings were investigated by sharing with the experts in the field.¹⁰ The responses obtained during the interviews were coded by the researchers according to a coding list; common categories were developed, and the findings were reviewed and finalized by 2 experts. In this way, the validity of interpretation was strengthened.⁸

TABLE 1 Flowchart of focus group interviews

Planning phase

Introduction and introducing the subject, mentioning the purpose of the research and the method, obtaining consent for voice recording, reminding the participants of the rules, ensuring that the environment is safe and comfortable, and assessing the demographic structure of the participants

Application phase

Obtaining permission to share the experiences of the participants in accordance with the semistructured interview form
Semistructured interview guide

1. What training have you received in robotic surgery nursing? What did you feel during this training?
2. Are you interested in technology? How did this affect your role as a robotic surgery nurse? Please explain.
3. How does working with the robot make you feel during the operation? What are the conveniences and challenges you are experiencing? Please explain.
4. In your opinion, has there been any change in the roles of robotic surgery nursing? Please explain.

Final evaluation phase

The expectation of the participants

5. What do you think about the future of robotic surgery nursing? Please explain.
6. Do you have any suggestions for the development of robotic surgery nursing? Please explain.

Closing and thanks

Analysis: Reviewing the purpose and scope of the research; recording the findings of the research

2.4 | Ethical considerations

Ethical approval and permission to conduct the study were obtained from the Ethics Committee (2016-9/20). Audio recordings of the interviews with the participants were made after obtaining the consent of the interviewees, and consent was obtained for voluntary involvement in the study. Due to concerns related to privacy protection, the real names of the interviewees and other personal information were not used in this study. Each participant was identified using a nickname of his or her choice.

3 | RESULTS

In this study, "Nurse" is defined as "Participant," and the participant's nickname (Participant 1 etc.) is used at the beginning of each sentence. Four participants were male nurses, and 11 were female nurses (mean age, 27.4 years; range, 20-37 years); all had 2 to 14 years of working experience in their profession. The duration of the participants' experience as robotic surgery nurses ranged from 1 year to 10 years. Of the participants, four were college graduates, and 10 were graduates of vocational health high schools. Four categories and 11 themes in total were created based on the scope of the interviews. The categories and themes described by the participants are shown in Figure 1.

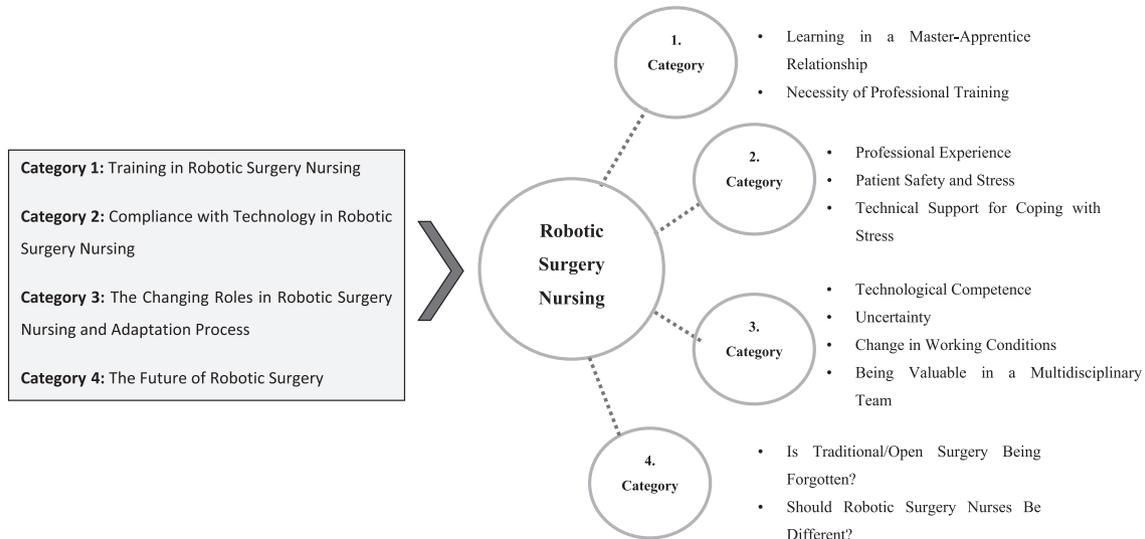


FIGURE 1 Categories and themes of the study

First Category: Training in robotic surgery nursing

Within the scope of this category, the participants were questioned regarding the training obtained by the participants in robotic surgery nursing and their experiences during the training.

3.1 | Learning through a master-apprentice relationship

Most of the participants ($n = 13$) emphasized that they learned robotic surgery nursing through a master-apprentice relationship and considered themselves insufficiently educated.

I learned by the master-apprentice relationship, learned from an experienced nurse. Scrub nurses were experienced, and we were circulating. We got used to it while watching, then gradually we became involved. I do not think many people entering the robotic surgery know much about the robotic surgery, because we did not get any training. We do not actually know many things. (*Participant 12*).

3.2 | The necessity of professional training

Most of the participants ($n = 14$) expressed a need for professional training in robotic surgery nursing.

The training of the robotic surgery nurse is not considered important in my environment. I still do not know about the robot exactly. (*Participant 12*).

One participant noted that the physician is more competent in robotic surgery and therefore emphasized the priority of training of physicians.

Since surgeons are the main authorized persons who use the robot, it is very normal that their training has priority. (*Participant 2*).

Second Category: Compliance with technology in robotic surgery nursing

Within the scope of the second category, the participants were questioned about their interest in technology and their experience in using technology.

3.3 | Professional experience

Some of the participants ($n = 5$) stated that being interested in technology is not decisive in robotic surgery nursing.

The experience of the operating room nurse manages and facilitates the robotic surgery process. The experience of the operating room nurse facilitates the process rather than the technology. (*Participant 2*).

3.4 | Patient safety and stress

Most of the participants ($n = 10$) stated that any technical problem with the robot and the lack of technical knowledge caused fear during the operation and that they experienced anxiety about harming the patient.

I do not enter into any cases without fear, fear of harming the patient and a new device you do not know. I do not speak English. I fear some problems will possibly arise. I am afraid of hurting a patient



with a device that I am not familiar with, and I feel this fear each and every time. (Participant 15).

3.5 | Technical support for coping with stress

Some of the participants (n = 5) stated that the availability of technical support during surgery reduced their stress.

The presence of our company representatives gives us confidence and makes us feel more comfortable. I have experienced technical problems several times, and they immediately intervened. I feel safer. (Participant 4).

Third Category: The changing roles in robotic surgery nursing and the adaptation process

Within the scope of the third category, the participants were asked about the changing roles of the robotic surgery nurse and about the process of adaptation to these roles, the importance of these roles, the advantages and disadvantages of working with a multidisciplinary team, the process of adaptation to the team, and the difficulties they had experienced.

3.6 | Technological competence

Some of the participants (n = 6) stated that the responsibility of the nurse increased during robotic surgery and that surgeons expect nurses to have technical knowledge.

More rules are added in addition to the rules of traditional surgery. You have to do things in the same manner, but the surgeon at the console expects you to use the technical features of the robot well. Unlike traditional surgery, they also place the responsibility of organization on you, expecting you to be aware of the errors. You have more coordination and technical responsibility. (Participant 2).

The two participants stressed the importance of anticipating the next step in the adaptation process, ensuring control of the environment and maintaining asepsis.

In open surgery, patients are under your control, while the surgeon and the entire team are responsible for patient safety. When a device is added to robotic surgery, we need to be more careful about the environmental control and protection of asepsis. (Participant 5).

3.7 | Uncertainty

Most of the participants (n = 11) stated that their role in robotic surgery was not clear.

The physician determines the competence of the nurse. In open surgery, the nurse becomes more active, while in the robotic surgery, everything is under the control of the physician. (Participant 6).

All of the participants stated that the competency levels of robotic surgery nurses should be determined within the institution, as follows:

The legal responsibilities of robotic surgery nurses should be determined in our institution. In robotic surgery cases, we need to know whether or not the instrument is sent by the doctor or the nurse. (Participant 7).

3.8 | Change in working conditions

All of the participants emphasized the change in their working conditions that had occurred due to working in robotic surgery.

Robotic surgery has a long duration of operation and does not end in a few hours. We are on the case all day long, sometimes till late night, and we come back in the morning, which does not fit the schedule. When we have urgency, we cannot get permission to leave; the robot is more important than me. (Participant 7).

3.9 | Being valuable in a multidisciplinary team

Some of the participants (n = 5) stated that there were positive differences in intrateam communication in robotic surgery.

In robotic surgery, the attitude of the team is changing; communication is softening. Communication is turning into dialogue rather than shouting at each other. (Participant 12).

Fourth Category: The future of robotic surgery

In this category, the participants were asked about their perceptions of the future of robotic surgery nursing and the general characteristics that should be present in the robotic surgery nurse.

3.10 | Is traditional/open surgery being forgotten?

Most of the participants (n = 10) stated that robotic surgery will be used extensively in the future. Four participants stated that with the expansion of robotic surgery, it will become ordinary.



Great surgeons open small incisions; the robots will become widespread, and we will become common. (Participant 9).

3.11 | Should robotic surgery nurses be different?

Most of the participants (n = 12) emphasized that the characteristics of the robotic surgery nurse should be different.

When choosing a nurse, he/she should be organized very quickly in emergency situations and be able to open the patient. It is important to choose a prompt and experienced person. The process of robotic surgery is outrageous and painful, so nurses must be willing. (Participant 2).

Some of the participants (n = 6) stated that people who have the characteristics required in a surgical nurse will be good robotic surgery nurses.

4 | DISCUSSION

In robotic surgery, the nurse is responsible for establishing the system and for ensuring continuity throughout the procedure. To provide effective patient care, the operating room team should be trained in the patient's surgical process.^{6,11,12}

Because robotic surgery is a state-of-the-art and newly emerging area, it is important to improve the standard of care in this area and to share information as a means of generating resources that help eliminate both the lack of technical knowledge and role uncertainty. It has been stated that nurses play a key role in the generation of this information.^{11,13,14} It is important that nurses taking part in robotic surgery receive good training in this area. The procedures to be established regarding the responsibilities of the nurse should include installation of the robotic system, use of the user manual, calibration of the system, patient covering, patient safety, and preoperative and postoperative patient evaluation and care.^{2,14} At the same time, algorithms should be created for use in emergency situations, and nurses should learn all emergency procedures needed to open the robotic instrument manually; these areas should be included in the training.¹¹ It is expected that nurses will achieve the required qualifications in this area through orientation and training programs during the learning and adaptation process.¹¹ In this study, it was stated that physician training is given more importance than nurse education and that training is designed to cover physicians. Therefore, it can be concluded that the lack of organized training sessions that include nurses may have a role in the emergence of failures in robotic surgery. In this study, it is found that most of the participants learned in a master-apprentice relationship by observing experienced nurses because they did not receive any orientation or practical training in robotic surgery after graduation. During training, beginners can be matched with experienced people who help them find answers to their questions and contribute to learning by demonstrating the correct technique.¹¹

It is important that nurses have sufficient knowledge and experience to support the surgical procedure and ensure patient safety.⁵ In this study, it is determined that, in addition to the necessity of using advanced technological devices in robotic surgery, the professional experience of the nurse is also important. It was stated that the tendency to use technology facilitated the work of the surgeon in robotic surgery and that professional experience facilitated the work of the nurse. The participation of younger nurses with little experience in the practice can create difficulties in the implementation process. Therefore, it can be said that acquiring professional knowledge and experience requires advanced age and work experience and that both of these characteristics facilitate the use of technology and robotic surgery.

When device-related errors occur, the operation may be postponed or delayed, or the type of operation may be changed from laparoscopy to open surgery. The nurse plays a key role in managing this process.^{15,16} Nurses should be prepared for situations that require a transition to open surgery, and they should have competence in this regard. For this reason, a systematic approach can be adopted that allows nurses to be prepared for robotic device errors and avoid consequences that may potentially harm the patient.¹⁷ In one study, it was stated that patient safety can be improved by instituting training programs for thoracic robotic surgery nurses.¹⁸ In the current study, it was found that nurses had insufficient information about their expected roles and that this caused stress in nurses during surgery. It is thought that it is important to choose only individuals who are willing to participate in robotic surgery nursing; otherwise, there may be difficulties in addressing the stress and the difficulties encountered. It is concluded that the involvement of young or inexperienced operating room nurses in robotic surgery before they have acquired experience in traditional surgery causes stress and difficulties in crisis management and that robotic surgery nurses should therefore be nurses with operating room experience. It was also revealed that the presence of company representatives during the surgical procedure and good team communication reduce the stress experienced by nurses and make them feel confident.

The robotic surgery nurse needs to have a written job description that outlines his or her role and to be a care coordinator for patients in robot-assisted operations. The duties and responsibilities of the position must be defined in terms of clinical practice, education, management, research, and professionalism.¹¹ Creation of nurse registration forms specific to robotic surgery helps provide legal protection as well as solve problems related to the uncertainty of the nurse's role and technical knowledge deficiencies.¹⁹ In Turkey, the duties and regulations of the nursing profession were revised in 2011, and the revision serves as a basis for the determination of liability. In this regulation, the competencies of the operating room nurse (scrub and circulating) are determined, but the tasks, authorities and responsibilities for task distribution, and the processes to be followed during robotic surgical procedures are not explained.²⁰ In this study, nurses stated that role uncertainties were experienced due to insufficient legal policies and that their technical responsibility was increased in robotic surgery. All of the participants stated that the level of competence of the



robotic surgery nurse should be determined within the institution, that the duties, authorities, and responsibilities of robotic surgery nurses are not clear, and that the nurses are not aware of their own competencies.

It is stated that communication between nurse and surgeon is important during robotic surgery. It is known that most preventable errors that compromise patient safety are due to lack of team communication.²¹ The best results for the patient and for the patient's safety can be ensured by the establishment of an effective robotic surgery team.¹² In this study, some of the participants stated that the communication and attitude of the team in robotic surgery were softer, that the importance of the nurse was understood, and that the use of a multidisciplinary approach facilitated the work.

It has been stated that the knowledge, skills, and abilities of the individual should be compatible with the requirements of the profession.²² Some of the participants in this study expressed a belief that the robotic surgery nurse should possess certain characteristics such as being prompt and practical, anticipating the next step in the procedure, having no panic, being knowledgeable, and possessing dexterity and foresight.

It has been stated that in the future surgical robots will become smaller and less expensive and that disposable and special-purpose robots will contribute to the health economy.²³ Similarly, the participants stated that in the future the maintenance costs of robotic surgery will decrease and that health care system policies will improve in such a way that robotic surgery will continue to increase in prevalence and will become ordinary. Catenacci et al (2011) state that the single cut has gained popularity among both patients and physicians.²⁴ In this study, the participants made similar statements.

5 | CONCLUSION AND RECOMMENDATIONS

It has been determined that robotic surgery nurses are primarily concerned about causing harm to the patient due to technical problems and lack of knowledge. In robotic surgery, a field that is at the peak of technological applications, proper formal training of operating room nurses will play a key role in preventing problems related to employee and patient safety. It is thought that organization of training and orientation programs for the education of nurses who plan to assist in robotic surgery will be effective in facilitating the compliance of the nurses and improving employee and patient safety.

In the study, it was stated that nurses should be experienced in the robotic surgery field. All of the participants stated that the competence level of robotic surgery nurses should be determined within the institution and that the duties, authorities, and responsibilities of robotic surgery nurses are not clear and they are not aware of their competencies. In this context, it is recommended that process management protocols related to robotic surgery nursing be prepared to establish legal bases institutionally or nationally through which the duties, authorities, and responsibilities of the robotic surgery nurse

are determined and that internal arrangements be made to improve the working conditions of robotic surgery nurses.

6 | LIMITATIONS

Because robotic surgery is a newly developing area in our country, the number of qualified and experienced nurses is limited. For this reason, one of the most important limitations of this study is that the study participants are young and inexperienced. Because the study was conducted in private hospitals in Istanbul, the results are not applicable to other regions. Therefore, the study has limitations with respect to generalizability.

CONFLICT OF INTEREST

NONE.

ORCID

Yasemin Uslu  <https://orcid.org/0000-0001-5727-3753>

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