

**Report
on
THE SCRUB NURSE: SILENT COMMUNICATION AND ROLE DURING
THE SURGERY**

submitted to

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ENG 1133

Specialized Communication for Technology Students

TU: 6:00PM-8:30PM

December 19th, 2017

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This report contains information about scrub nurses and the important role they play in the surgical theater and in the medical field overall. It briefly introduced the definition and technical and non-technical skills of a scrub nurse. Plus, a brief background of technology that is approaching towards that scrub nurse field.

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ABSTRACT

Nursing is a very largely growing field of medicine. The main focus of a nurse is to care for their patients. There are many different fields of nursing some that are most common include: certified registered nurse anesthetists (CRNA), certified nurse-midwife (CNM), nurse practitioner (NP) and scrub nurse (SN). All of them play an important role in the medical field, as they help save lives and sometimes are the right hand of the doctor. Due to the constant contact with their patients they simple know their patients better. This report will focus on the scrub nurse. Their role and responsibilities in the medical environment. The portion will also discuss what are technical and non-technical skills that all scrub nurses should acquire in their field to become better and more efficient nurses. There will be a short comparison of new scrub nurses entering the field and nurses that have been in the field for a while, and the focus will be on how are both performance of these nurses differs. Moreover, brief explanation of the crucial presence of the scrub nurse before during and after the surgery is explained in this essay as well.

Lastly, an upcoming and new trend of a robot scrub nurse will be mentioned and explained. Analyzing the robot scrub nurse to see whether it might be a threat for all scrub nurses and their field of work or, whether it will be more of a help to easy their job tasks. Finally, further investigation of scrub nurse robot and its efficiency during the surgery. To bring better understating of this specific topic images and visuals will be applied to better understand it all.

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I. INTRODUCTION

Working in the medical field is not easy, being able to really see whether one is meant to work in this kind of environment is important. Medicine is very broad and constantly changing field of work. There is not only one kind of a doctor or one kind of a nurse to treat all of our problems. There are many different doctors and nurses instead, as there are many different problems associated with health. In today's society, we have many different doctors and in addition many different fields of nursing as well. Although the variety of specialists and nurses is changing and very different there is only one purpose, to help and care for the one seeking help or need caring for. Although this is an important aspect of medical field, becoming a doctor or a nurse requires lots of work, it is not easy. Nursing in specific takes around 6 years in order to become a specialized nurse like SN, CRNA or CNM. At the end those that want to study this type of field are setting themselves up for a successful future not only because of helping people in need but becoming someone quite important to the society.

The purpose of this report is to explain and educate potential students that are trying to choose what they would like to do with their registered nurse licensure and to possibly help them choose the scrub nurse as their field of study. In addition, this report is also designed to inform potential patients or healthy people of importance of a scrub nurse and to why is it good to know what are their tasks in the medical field, if one will be in need of surgery. By explaining further, the duties and tasks that scrub nurses have to perform before, during and after the surgery. Plus,

scrub nurses' involvement in the surgery and the silent communication with the doctor. Lastly, the analysis of potential threat or maybe help to the scrub nurse field as a new technology emerges: the scrub nurse robot. Brief analysis of robots' efficiency and development is also explained.

This report is divided into three main areas but they are all connected together as it will refer to the scrub nurse. The first section contains brief definition of nursing and later it analyses what is the scrub nurse. The second section of this report includes information related to the non-technical skills that all scrub nurses should learn and be aware of. Plus, an overview of scrub nurses' performance and duties in the operating theater. Further, technical skills are explained and talked about how they are different from the non-technical skills. At the end, the third part of the report focuses on new emerging technology such a scrub nurse robots. It explains how this technology will work, or perhaps how it is already working. To clarify some studies are found to see how efficient this type of technology actually is in the surgical theater environment. Finally, blunt analysis of the scrub nursing field, as it might be in danger of being replaced by this robot or not.

II. SCRUB NURSE

The Definition of the Scrub Nurse

Mosby's Medical Dictionary defines the scrub nurse as

“a registered nurse who assists surgeons during operations” (Mosby’s Medical Dictionary, 2009).

This is a very simple explanation to a very large field of study and profession, as the scrub nurse is a lot more than just registered nurse who attends the surgery. Scrub nurses require lots of knowledge that is gained during the school time but most importantly the practical knowledge and being able to apply it in the field is also very important. This nurse could be qualified to be called “the right hand” of the surgeon during the surgery, literally. Without the scrub nurse the operation would not take place, scrub nurse is as important during the surgery as is the doctor. This is also why this kind of nurse is very special and important.

Technical Skills of the Scrub Nurse

The scrub nurse similarly like all of the other nurses take care of the patients, but they do it in the surgical theater during the surgery, and a little bit after the surgery when the patient is put in the recovery room. The main role of the scrub nurse before the surgery is to prepare the surgical theater for the surgery and make sure that everything is sterile and ready for the surgery. This type of preparing is technical skill that scrub nurse will apply. The role of the scrub nurse during the surgery is mainly to focus on the surgeon and deliver the right surgical instruments to the surgeon operating the right way, without delays or confusions. According to the *Journal of Perioperative Nursing in Australia*, “The scrub nurse assumed responsibility for all items used within the surgical field, ensuring that all instruments, sterile supplies and equipment required for the procedures are available and functional. Clearly, technical skills such as performing the

surgical scrub, gowning, swab and instruments count are essential for effective scrub practice. Nonetheless non-technical skills are also important as they enable scrub nurses to maintain a high level of performance and ensure patient safety and high-quality care.” (Kang et al., 2014, p.16) Moreover, scrub nurse’s role in preparing the surgical theater is very important, but he or she must “scrub-in” as it is crucial to maintain the sterile technique. By scrub-in they must wash their hands with special anti-bacterial soaps, once this is done they will then put on their surgical attire such as: the mask, gown and gloves. Once they are fully dressed then the scrub nurses’ role is to help the surgical doctor the dress in the surgical attire. The reason why the scrub nurse has to put the surgical attire on the surgeon is because they will be the ones in contact with the body of the patient. This part of scrub nurses’ role is the technical skill that is gained during their time in school. The non-technical skill is mostly acquired during their practice in the surgical field.

Expert Vs. Novice Scrub Nurse

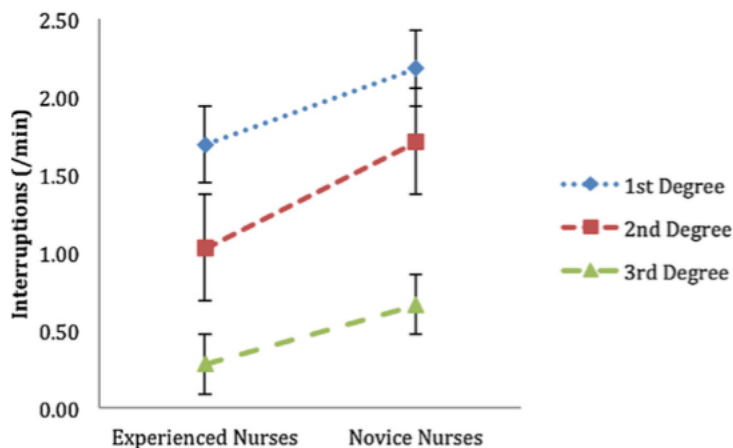
Studies show that more experience scrub nurses are better performers during the surgery unlike the newly graduated nurses. There has been a study held to see whether the more experienced nurse performs better and is more efficient or the novice nurse, and according to the International Journal of Nursing Studies, “Experienced nurses showed better task prioritization in the display of greater resistance to interruptions during their tasks, especially to non-surgeon triggered interruptions during their surgical counts. The experienced nurses also displayed better anticipation in aiding the surgeon, taking shorter times to handover the instruments and making lesser mistakes. Most importantly, in a separate evaluation session, the experienced nurses were rated significantly higher in their cognitive non-technical skills than the novice nurses, confirming better performance.” (Koh et al., 2014, p.1238) Everyone has the right to learn and knowledge doesn’t come quick, it has to be studied and practiced. Scrub nurses have to be

efficient and quick in order to maintain a good flow of the surgery, without any delays. In Figure 1 it can be seen that the new scrub nurses had more interruptions during the surgery rather than the more experienced scrub nurses. In addition, Figure 2 shows another visual of interruptions that took place during the instrument handling, and once again more experience nurses performed better.

Figure 1. Nature and frequency of interruptions during each count type and between experience levels. Koh et al., An investigation of differing levels of experience and indices of task management in relation to scrub nurses' performance in the operating theatre: Analysis of video-taped caesarean section surgeries. (p.1235)

Type of interruption	Gauze counts		Closure counts		Final counts		Mop counts		Sub total		Total
	Exp. nurses	Novice nurses	Exp. nurses	Novice nurses	Exp. nurses	Novice nurses	Exp. nurses	Novice nurses	Exp. nurses	Novice nurses	
Help surgeon	4	2	1	6	0	1	2	0	7	9	16 (35.6%)
Others	0	0	2	6	1	0	0	0	3	6	9 (20.0%)
Incorrect counts	0	0	2	6	1	0	0	0	3	6	9 (20.0%)
Unable to find instruments	0	0	1	6	2	0	0	0	3	6	9 (20.0%)
Interruption by circulating nurse	0	3	0	1	1	0	0	0	1	4	5 (11.1%)
Housekeeping duties	0	0	2	1	0	0	0	0	2	1	3 (6.7%)
Others	0	0	0	2	1	0	0	0	1	2	3 (6.7%)
Total	4	5	6	22	5	1	2	0	17	28	45

Figure 2. Frequencies of higher order interruptions across level of experience. Koh et al., An investigation of differing levels of experience and indices of task management in relation to scrub nurses' performance in the operating theatre: Analysis of video-taped caesarean section surgeries. (p.1236)



III. SILENT COMMUNICATION

Non-technical Skills of the Scrub Nurse

In addition to the technical skills that scrub nurses is required to maintain they also have to learn the non-technical skills, which are as important. As reported by the International Journal of Nursing Studies in reference to non-technical skills it is said that, “Non-technical skills are the cognitive, social and personal resource skills that complement technical skills. And contribute to safe and efficient task performance.” (Mitchell et al., 2011, p.819) Those non-technical skills include silent communication. What this means is being able to react to something without needing another person to say what they need. It sounds like “reading someone’s mind” but in reality, it’s just trying to learn the different gestures of another person. In this case the scrub nurse by gaining experience and working with surgeons should be able to learn the visual and silent knowledge. By looking at hand and body gestures, and face of the surgeon nurse is able to hand him the surgical instruments that are needed at a certain moment. Without having the surgeon telling the scrub nurse what they need, this non-technical skill requires allows the nurse and the surgeon to work together for a while to understand each other. According to the International Journal of Nursing, “Body movement can make a colleague aware of what one is about to do next...This means that talk is not always needed, but rather attentiveness to non-vocal conduct is equally important. Through their hand and other body movements a surgeon can secure the availability of the scrub nurse for the upcoming request and thereby maximize the occurrence of a swift object passing.” (Korkiakangas et al. 2014, p. 1204)

Performance Before and After the Surgery

Besides making sure that the surgery theater is well prepared for the surgery before beginning the surgery the scrub nurse must count all surgical instruments and swabs. According

to the British Journal of Nursing, “Swab and instrument count policy and practice in the operating department cannot be overstated.” (Smith et al. 2014, p.593) This statement is true because, if swab and instruments aren’t counted correctly it might cause the surgery to take longer and it might cause chaos in the operating room by delaying it. To avoid this type of situation the policy of counting all of the tools that will be needed is crucial.

Furthermore, besides the non-technical and technical skills that must be learned by the scrub nurse, they will also need to adjust to different hospital environments. Scrub nurses are needed in hospitals, especially where there are many shortages. Sometimes they will be forced to change their team, usually causing the flow of regular surgery to change a little. The scrub nurse in a new environment will need to learn and get to know a new surgeon they will be working with. Which sometime might cause some delays during the procedure and discomfort as well due to not being able to perform their best right away. Some surgeons don’t like to be asked to repeat themselves and some don’t mind. According to the Journal of Advanced Nursing, “High staff turnover, resulting from reduced stability of employment and increasing internationalization of the labor market for health professional will continue to unsettle previously relatively stable team work.” (Bezemer et al., 2016, p.370) This also makes things harder for those nurses that have been previously able to perform at their best with the same team and then it all changes as they will have to go to another team. It is almost like starting all over again and being a novice scrub nurse all over.

IV. INVENTION OF ROBOTIC SCRUB NURSE

Development of Scrub Nurse Robot

We live in a world of new technology. Constantly something new shows up on TV, new phones, new dishwashers, new cars, and then we got something new in the medical field too, of course, the scrub nurse robot. The scrub nurse robot that is supposed to help and ease the job of the scrub nurse. Figure 3 shows a visual of the surgical theater with the surgeon and the scrub nurse and a robot next to the scrub nurse helping with the surgical instruments. According to the book on surgical robotics systems, “A robot is not a machine – it is an information system. Perhaps it has arms, legs, image capture devices (eyes) or various chemical and biological sensors.” (Rosen et al., 2011, p.3) What the author means by this, is simply that a robot could be almost like human, depends how one creates it. Robotic Surgery has been evolving and making many doctors and nurses life’s easier by helping during many surgical procedures and not only. Figure 4 displays different type of robotic technologies that are now used in the surgery today.

Figure 3. Configuration of the proposed OR with surgeon, an anaesthetize, a scrub nurse (SN) and robotic scrub nurse (RSN). Perez-Vidal et al., (2012). *Steps in the development of a robotic scrub nurse. Robotics and Autonomous Systems*, 60(6), 902.

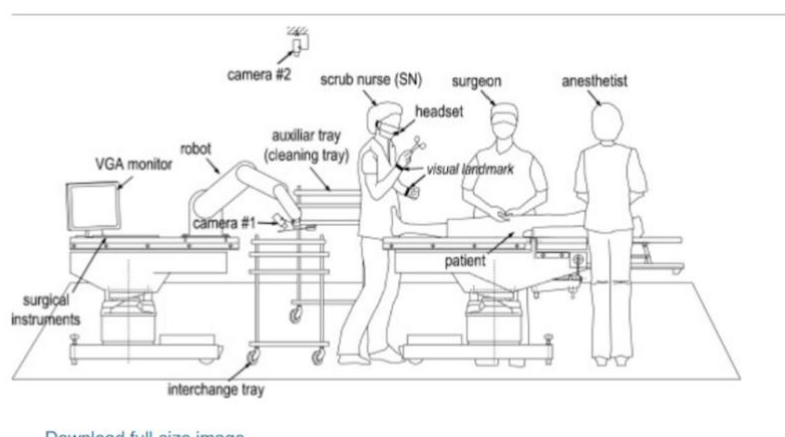
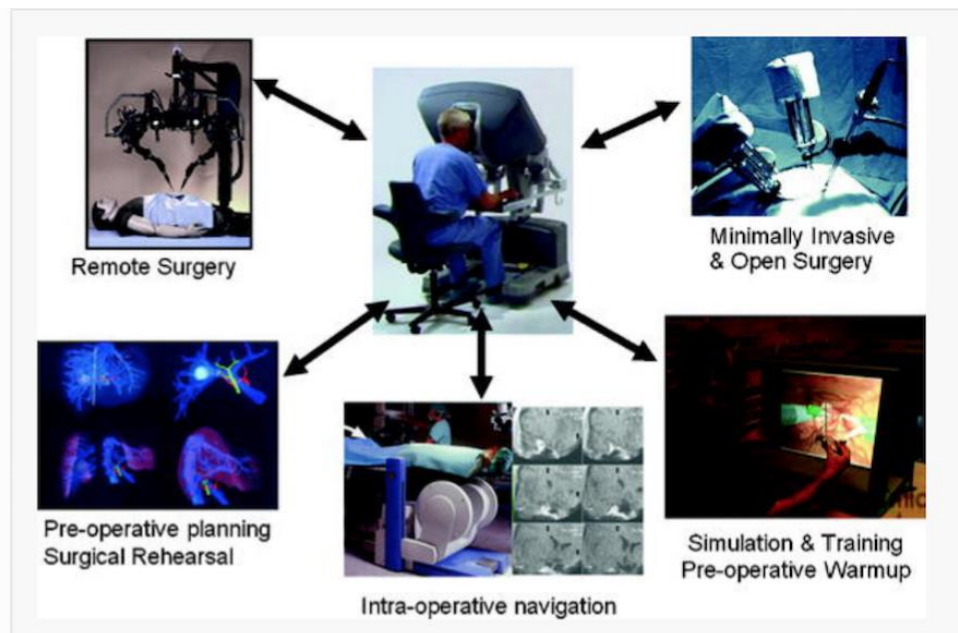


Figure 4. Integration of operative procedure using the surgical work station. Rosen et al., (2011). *Surgical Robotics Systems Applications and Visions*. Boston, MA: Springer US.



Efficiency of Scrub Nurse Robot

Another reason why scientist had been developing more of robot version of scrub nurses was due to shortage on staff in certain hospitals. The robots were meant to help those hospitals that were short on staff and ensure that the surgery is held. The scrub nurse robots would need to be trained by the scrub nurses according to the source from *Robotics and Autonomous Systems Journal*, “Robot Scrub Nurse is previously trained for a specific surgery by experienced Scrub Nurse.” (Perez-Vidal et al., 2012, p. 910) The scrub nurse robot would be set up next to the surgical instruments table to ensure all instruments are being passed to the surgeon in the right timely manner. Figure 5 shows the visual of this kind of scrub nurse robot. According to the *International Congress Series*, “Scrub nurse robot choose and pass the appropriate instrument, and prepare other instruments for the next action...we confirm that they were able to pass the instruments faster than human scrub nurse.” (Yoshimitsu et al., 2005, p.845) Not only scientist

have designed and developed a scrub nurse robot but they also proved that it could be more efficient while passing the surgical instruments during the laparoscopic surgery.

The ability of scrub nurse robot could improve the problem of shortage on scrub nurses in certain hospitals. In addition to scrub nurse robot being efficient another source explains that, “...robotic system has also been extensively described in the literature showing that it improves surgical outcomes owing to its inherent advantages.” (Santok et al., 2016, p.107) Once again scrub nurse robot will have the ability to better boost the surgical environment by helping the scrub nurse during the surgical procedure.

Figure 5. Scrub nurse robot which treats an electrical knife and long-handled blood aspirator. Yoshimitsu et al., (2005) Prototype development of scrub nurse robot for laparoscopic surgery.p.847



V. CONCLUSION

Scrub nurse is an important part of the surgery. The presence of a scrub nurse before during and after the surgery is crucial. Scrub nurse must prepare the surgical theater and “scrub-in” before the surgery. In addition, the surgeon needs the help from scrub nurse to put on the surgical attire. During the surgery, the scrub nurse must use her technical skills as well as non-technical skills in order to keep the procedure going smoothly. Passing the surgical tools and swabs to the surgeon in the right time is crucial to maintain the right surgical environment, and it requires both technical and non-technical skills. Knowledge of gestures and movements that surgeon does have to be read by the scrub nurse as well. In addition, developing a scrub nurse robot could possibly enhance the performance of the human scrub nurse. Passing some of the work load that scrub nurse has onto the robot scrub nurse could help the scrub nurse focus on other tasks during the surgery. Lastly, according to sources scrub nurse robot can be very efficient and fast during the surgery, faster than scrub nurse. By passing the surgical instruments to the surgeon, keeps the flow of the operation in place.

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