

Nurses' Adherence to Surgical Safety Guidelines for Patients Undergoing Abdominal Surgery

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ABSTRACT

Background: Patient's safety events at the operating room can be completely avoidable by adhering to surgical safety practices that aims to improve adherence to evidence-based safety practices, communication and team work during critical time points as during surgical procedure, before induction of anesthesia, before incision and before the patient leaves the room. **Objective:** This study aimed to assess nurses' adherence to surgical safety guidelines for patients undergoing abdominal surgery.

Subjects and methods: Design: A descriptive exploratory research design was used to achieve the aim of this study. Setting: This study was conducted at the Operating Departments affiliated to El-Saff General Hospital and Atfeh Central Hospital. Study subjects: A convenient sample of all available nurses (75) from the previously mentioned departments was included in the study. Tools of data collection: Structured interview questionnaire included two parts: demographic characteristics of the studied nurses and surgical safety guidelines checklist.

Result: This study presented that less than half of the studied scrub nurses and only minority of the circulating nurses and anesthesia nurses had competent practices at the operating room respectively.

Conclusion: The study concluded there were statistically significant relations between competent practices of scrub nurses and their attendance of training courses related to surgical safety and between competent practices of circulating nurses, their age and years of experience, while, there were no statistically significant relations between competent practices of anesthesia nurses, their gender and attendance of training course.

Recommendation: Ongoing staff development programs and continuing education are important for improving staff performance and maintaining patients' safety.

Keywords: Abdominal surgery, Adherence, Surgical safety.

INTRODUCTION

Surgery is one of the fundamental health care services given in the health care system. Over 234 million surgical operations are performed annually worldwide, complications occur in 3–16 % of surgical procedures. Surgical complications are major causes of morbidity and mortality and also pose a major financial burden to patients and providers, but it has been estimated that at least half of these complications are avoidable. The importance of safety culture that enhances patients' safety initiatives has been reiterated for years in the health care system and the safety of surgical care therefore is a global concern ⁽¹⁾.

Patients undergoing surgical intervention are at increased risk for complications and death. Even routine surgery requires the complex coordination of surgeons, anesthesia providers, nurses and support staff to provide timely and effective care. Heightened patient's acuity and time pressure increases the potential for critical errors and omissions in established standards of care. Implementation of the World Health Organization's surgical safety checklist improved the process of care and was associated with one third decreases in complications across all types of noncardiac adult surgery ⁽²⁾.

There's evidence that a lack of safety protocols in surgery could lead to a range of surgical adverse events contributing to preventable deaths. Avoidable complications during surgery commonly arise because of factors such as: operating on the wrong patient, using the wrong procedure or at the wrong site, inadequate

anesthesia, surgical skills and equipment, lack of readiness to manage unanticipated blood loss and non-sterile equipment and surgical items and sponges left inside body cavities of patients resulting in sepsis and failure in non-technical skills such as communication and teamwork. Patients' safety and measures to ensure optimal outcomes of surgery are particularly important in Africa, where patients are twice as likely to die after surgery compared to the global average, and the risk of death following perioperative complications is significantly greater than in other regions ⁽³⁾.

In 2008 the World Health Organization developed the Surgical Safety Checklist (SSC) to improve surgical patient safety. The SSC reinforces safety practices in surgery and fosters better communication and teamwork between clinical disciplines. It is designed to allow the surgical team, anesthesia providers, nurses and others to discuss, agree and check important details about each surgical case at three key time-points in the normal flow of a surgical procedure, namely, briefing phase before induction of anesthesia, time out period after induction and before surgical incision and debriefing phase after wound closure and before leaving the operating room ⁽⁴⁾.

It's essential that basic nursing care places an emphasis on the safety of the patients. Nurses should be responsible for educating patients about potential dangers and strategies to minimize them, as well as, advocating for patient's safety and reporting any adverse events that occur. From this vantage point, nurse safety procedures are a critical aspect of operating room

patient care during the three phases of intraoperative treatment which are preoperative, intraoperative, and postoperative ⁽⁵⁾.

Significance of the study:

The operating room is a fast-paced and high-pressure dynamic work environment where a wide variety of patients' conditions are managed by multidisciplinary health care providers and complex procedures and there are approximately 234 million surgical procedures performed each year worldwide ⁽⁶⁾. It has been estimated that 66% of inpatient adverse events occur in surgical patients with half of these adverse events are preventable ⁽⁷⁾. In developing countries, a total of 4.2 million post-operative deaths have been estimated annually, mortality rates are projected to be between 5–10% for major surgeries which is ten times the surgical mortality in developed countries⁽⁸⁾. The standards of patients' safety have been published in all Egyptian hospitals but the level of competencies in patients' safety isn't satisfactory ⁽⁹⁾.

Early diagnosis and management of surgical and anesthetic problems, clinical treatment of complications and pain management are the nurse's responsibilities in the postoperative period. For patients' safety, it's critical to monitor and improve operating room nurses' safety attitudes. A well-trained nursing staff is essential to ensure high-quality patient's care, while, also reducing the risk of serious harm or death to patients ⁽¹⁰⁾.

AIM OF THE STUDY

This study aimed to assess nurses' adherence regarding surgical safety guidelines for patients undergoing abdominal surgery through assessing nurses' level of practices regarding surgical safety guidelines.

Research question: What is the level of nurses' practices regarding surgical safety guidelines?

Operational Definitions:

Minor abdominal surgery can include different techniques depending on the organ that need an operation either incision or laparoscopic surgeries with the times needed about 30 to 60 minutes.

Adherence: include operating nurses' practices regarding surgical safety at the operating room.

SUBJECT AND METHODS

The subject and methods for this study were portrayed under the four main items as follows:

I- Technical item:

The technical design includes research design, setting, subjects and tools for data collection.

Research design:

A descriptive exploratory research design was utilized to achieve the aim of this study.

Descriptive design involves direct exploration, analysis and description of a particular phenomenon. Exploratory design doesn't aim to provide the final and

conclusive answers to the research questions, but merely explores the research topic with varying levels of depth ⁽¹¹⁾. An exploratory descriptive design helps the researcher to describe and document aspects of a situation as it naturally occurs, as well; it helps to establish a database for future research ⁽¹²⁾.

Setting:

This study was conducted at Operating Departments affiliated with El-Saff General Hospital and Atfeh Central Hospital.

The Operating Departments at El Saff Central Hospitals are located on the third floor and include two sections, the first nonsterile section consists of 2 dressing rooms for doctors and nurses, 2 rooms for stocks of medication and supplies and one room for preparing patient before operation. Sterile section consists of 3 operating rooms (room N1 obstetrics and gynecology, room N2 general surgeries and room N3 orthopedic surgeries). Each operating room is connected to one handling room to handle clean and unclean instruments for sending to Sterilization Department by back emergency lane. One recovery room "PACU" that receive patient post-operatively until transferring to surgical ward. About 20 cases of minor abdominal surgery are admitted on 3 days weekly.

The Operating Departments at Atfeh Central Hospitals are located on the second floor and include two sections, the first nonsterile section consists of 2 dressing rooms for doctors and nurses, 1 room for stocks of medication and supplies. One recovery room "PACU" that receive patient post-operatively, sterile section consists of 4 operating rooms (room N1 obstetrics and gynecology, room N2 and N3 general surgeries and room N4 orthopedic surgeries), two handling rooms that are located bedside the sterilization basin to handle sterilized instrument and sends instruments to Sterilization Department located bedside the sterilization basin. About 15 cases of minor abdominal surgery are admitted on 2 days weekly.

Subjects:

A convenient sample of all available nurses (75) from the previously mentioned departments was included in the study. They were (20) anesthesia nurses and (55) scrub and circulating nurses.

Tools of data collection:

Tool I: Structured interview questionnaire:

This tool was developed by investigator in English language and was divided into two parts.

Part I: Demographic characteristics of the studied nurses:

This part was developed by the investigator based on literature review ⁽¹³⁾. It included the demographic characteristics of the studied nurses as age, gender, qualification, years of experience, attendance of pervious training courses related to surgical safety and duration after training.

Part II: Surgical safety guidelines checklist:

This checklist was adapted from WHO⁽¹⁴⁾, Hassan *et al.*⁽¹⁵⁾ and McMillan⁽¹⁶⁾, to assess scrub, circulating and anesthesia nurses practices regarding surgical safety guidelines and it included:

- **Scrub nurses' practices at the operating room:** it contained 30 items.
- **Circulating nurses' practices at the operating room:** it contained 45 items.
- **Anesthesia nurses' practices at the operating room:** it contained 19 items.

Scoring system of surgical safety guidelines checklist:

For each item of checklist score "one" for done step and score "zero" for the not done, the scores of the items were summed up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. Total scores of practices were calculated for each section of nurses' practices and were categorized as:

- Competent if total score \geq to 90%.
- Incompetent if total score $<$ 90%.

Validity:

The study tools were tested for validity (face and content validity). Face validity aimed to determine whether the tools measure what was supposed to measure. Content validity was conducted to determine whether the content of the tool cover the aim of the study. It was measured by a jury of 5 experts, three assistant professors and two lecturers of medical surgical nursing at Faculty of Nursing, Helwan University. The experts reviewed the tool for clarity, relevance, accuracy, comprehensiveness, simplicity and applicability, and minor modifications were done.

Reliability:

The tool showed good reliability for surgical safety, Cronbach's Alpha was used to determine the internal reliability of the developed tool. Reliability of the tool was tested to determine the extent to which the questionnaire items are related to each other. Reliability score for surgical safety guidelines checklist was 0.747.

Ethical considerations:

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee, Helwan University. Participation in the study was voluntary and subjects were given complete full information about the study and their role before signing the informed consent. The ethical considerations were included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where they weren't be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

II- Operational item:

The operational design included preparatory phase, pilot study and field work.

Preparatory phase:

It included reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop the tool for data collection.

Pilot study:

The pilot study was done on 10% of the sample (8 nurses) to examine the clarity of questions and time needed to complete the study tools. Subjects included in the pilot study weren't excluded from the study sample as minor modifications were done.

Field work:

- Data collection was completed within six months period starting from beginning of November 2021 to the end of April 2022.
- The investigator visited the Operating Department two days per week from (8: am to 2: pm) during morning shift at El Saff Central Hospital (on Tuesday and Wednesday) and Atfeh Central Hospital (on Sunday and Monday).
- An informed consent was obtained from each nurse prior to data collection.
- Each day the investigator observed 1-2 nurses' practices at the operating room and every nurse was observed on 3 times and the average was calculated to each step.
- The study tool was completed by the investigator within an average time (60 minutes to 90 minutes) as following: structured interview questionnaire for collecting demographic characteristics of operating room (OR) nurses, it took 10- 15 minutes and filled surgical safety guidelines checklist by observing of scrub, circulating and anesthesia nurses' practices before, during and after operation it took 50-75 minutes (the average time for abdominal surgeries).

Limitation: Adding another setting for data collection at "Atfeh Central Hospital" was due to small sample size at El Saff central hospital secondary to nurses' vacations /during time of data collection (maternity leave, child care leave, or sick leave).

III- Administrative Item:

After explaining study aim and objective, an official permission was obtained from responsible authorities from the directors of at El Saff Central Hospital and Atfeh Central Hospital asking for cooperation and permission for data collection.

Statistical analysis

Upon completion of data collection, data were computed and analyzed using Statistical Package for the Social Sciences (SPSS), version 24 for analysis. For quantitative mean and standard deviation (SD) were used to describe the results. For qualitative data, frequency and percentage distribution of each category

were calculated.

RESULTS

Table (1): Reveals that 47.2% of the studied scrub and circulating nurses were within age group from 30 to less than 40 years. 100.0% of them were female and 78.2% were diploma nurses. Also 61.8% had experience of 10 years or more. 87.2% and 70.8% of them attended training courses related to surgical safety with a duration after training of 1 to less than 5 years respectively.

Table (1): Frequency and percentage distribution of the studied scrub and circulating nurses according to their demographic characteristics (N=55)

Nurses' Characteristics		No	%
Age (in years)	20 < 30	10	18.1
	30 < 40	26	47.2
	40 years or more	19	34.5
Mean ± SD	35.32 ± 7.47		
Gender	Male	0	0.0
	Female	55	100.0
Qualification	Nursing Diploma	43	78.2
	Technical nursing institute	12	21.8
	Bachelor	0	0.0
Years of experience at operating room	Less than 1 year	4	7.3
	1 < 5 years	9	16.3
	5 < 10 years	8	14.6
	10 years or more	34	61.8
Mean ± SD	12.14 ± 2.78		
Attended training courses related to surgical safety	Yes	48	87.2
	No	7	12.8
Duration after training (N=48)	Less than 1 year	0	0.0
	1 < 5 years	34	70.8
	5 < 10 years	14	29.2

Table (2): Illustrates that, 100.0% of the studied anesthesia nurses were within age group of 20 to less than 30 years. 60.0% of them were female. 100.0% of them had technical nursing institute qualification and years of experience of less than 1 year. 55% of them attended courses related to surgical safety since 6 to less than 12 months of 63.7% of them.

Table (2): Frequency and percentage distribution of the studied anesthesia nurses according to their demographic characteristics (N=20)

Nurses' Characteristics		No	%
Age (in years)	20 < 30	20	100.0
	30 < 40	0	0.0
	40 years or more	0	0.0
Mean ± SD	21.85 ± 1.18		
Gender	Male	8	40.0
	Female	12	60.0
Qualification	Nursing Diploma	0	0.0
	Technical nursing institute	20	100.0
	Bachelor	0	0.0
Years of experience at operating room	≤1 year	20	100.0
	1 < 5 years	0	0.0
	5 < 10 years	0	0.0
	10 years or more	0	0.0
Mean ± SD	7.9 months ± 1.81		
Attended training courses related to surgical safety	Yes	11	55.0
	No	9	45.0
Duration after training	1-6 months	4	36.3
	6 < 12 months	7	63.7
	1 < 5 years	0	0.0
	5 < 10 years	0	0.0

Figure (1): indicates that 40% of the studied scrub nurses had total competent level of practices at the operating room.

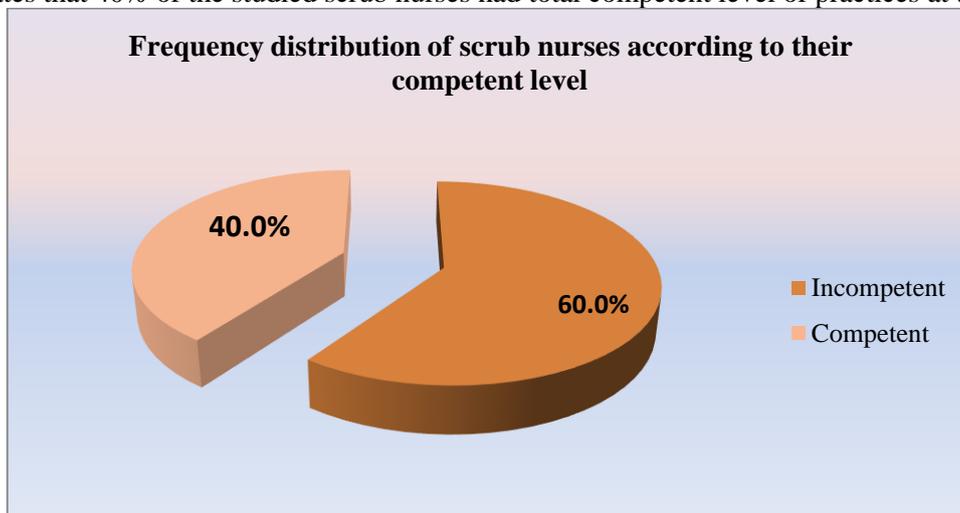


Figure (1): Frequency distribution of the scrub nurses according to their total competent level of performance

(N=55)

Figure (2): indicates that 14.5 % of the studied circulating nurses had total competent level of practices at the operating room.

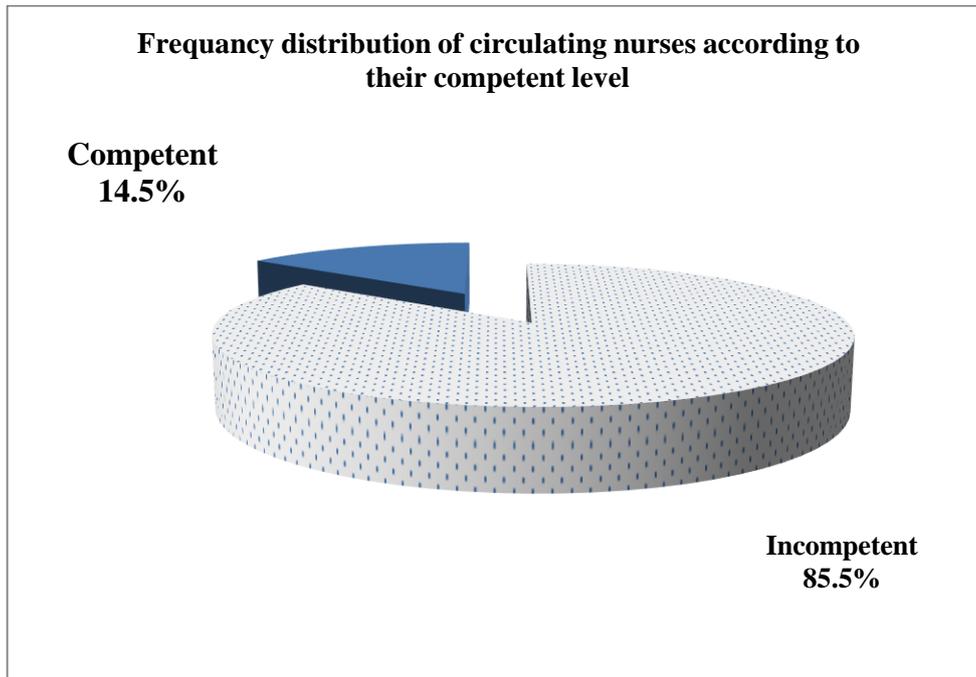


Figure (2): Frequency distribution of the circulating nurses according to their total competent level of performance: (N=55).

Figure (3): presents that only 5 % of the studied anesthesia nurses had total competent level of practices at the operating room.

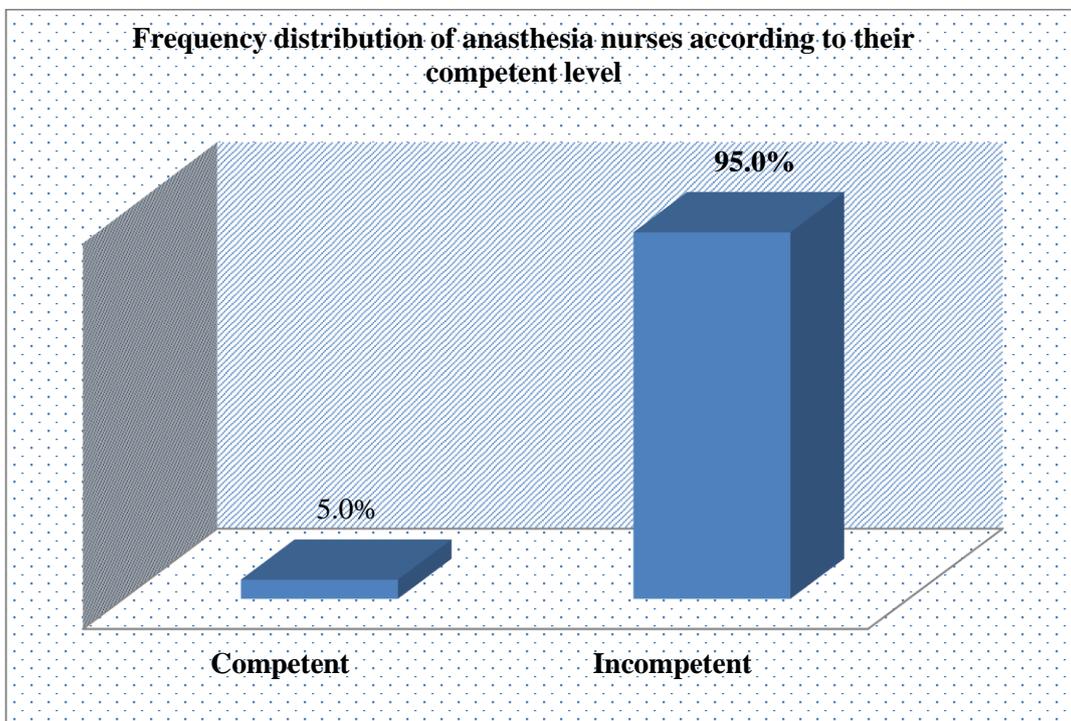


Figure (3): Frequency distribution of the anesthesia nurses according to their total competent level of performance (N=20)

DISCUSSION

Regarding age of the studied nurses, this study results revealed that about half of the studied scrub and circulating nurses were in the age group from 30 to less than 40 years. This result agrees with the study conducted by **El-Shafei *et al.***⁽¹⁷⁾, which showed that the mean age of the studied operating room (OR) nurses was 31 ± 9 years.

Concerning gender, the present study revealed that all of the scrub and circulating nurses were female. From the investigator point of view, this might be due to the overall ratio of male nurses is lesser than female nurses in the nursing profession. These findings agree with a study about quality of nursing care provided to patients in the operating room, based on Ministry of Health standard of care, which was conducted by **Hassan *et al.***⁽¹⁵⁾ and showed that scrub and circulating nurses were mostly females.

Concerning the nurses' qualification, the current study indicated that the majority of the studied scrub and circulating nurses were diploma nurses. In the same line, **Gouda *et al.***⁽¹⁸⁾ in their study illustrated that half of the studied nurses were secondary diploma nurses. Also in the same line **Hassan *et al.***⁽¹⁵⁾ revealed that more than half of them had diploma.

According to nurses' years of experience, about two thirds of the studied scrub and circulating nurses had experience of more than ten years at OR. This can be related to the majority of them were diploma nurses. This result is dissimilar to the study conducted by **Mohammad and Hadi**⁽¹⁹⁾, which reported that two thirds of the studied nurses had experience ranging from one to five years.

Relating to attendance of training courses, the current study reported that the majority of the studied scrub and circulating nurses had attended training courses related to surgical safety and more than two thirds of them attended training since one to five years. From the investigator's point of view, the hospital provides training courses for nurses about surgical safety to improve their performance that will affect positively on quality of care for patients undergoing surgery. These results are consistent with study done by **Hosny and Almasry**⁽²⁰⁾ in their study, which showed that all of the nurses had in service training courses related to infection control measures at OR.

Regarding age of the studied anesthesia nurses, this study revealed that all of the studied anesthesia nurses were in the age group 20 to less than 30 years. This finding is in same line with result of **Khademian, *et al.***⁽²¹⁾ who found that the mean age of the nurses was 22.26

± 0.88 years.

Considering gender of the studied anesthesia nurses, the current result presented that about two thirds of the anesthesia nurses were female. This finding was in harmony with **Rahmani *et al.***⁽²²⁾ who found that more than two thirds of the nurses were female.

Related to qualification of anesthesia nurses, the present study demonstrated that all of the studied anesthesia nurses had technical nursing institute qualification and years of experience of them were less than one year. This finding is in the same line with result of **Zhu *et al.***⁽²³⁾ who found that more than half of nurses had nursing institute qualification and years of experience from one to five year.

Regarding attending courses related to surgical safety, the present study revealed that more than half of the studied anesthesia nurses attended courses related to surgical safety with duration after training of one to less than 3 years. This finding is in harmony with **Balodimou *et al.***⁽²⁴⁾ in their study, which found that more than two thirds had received training programs education.

Regarding the total competent level of practices of the studied scrub and circulating nurses according to their scrub duties, the current study indicated that more than two thirds of the studied nurses had total competent level of practices at the operating room. This can be interpreted as nearly two thirds of them had experience of 10 years or more and the majority of them attended training courses related to surgical safety. This finding is in same line with **Bahar and Önlér**⁽²⁵⁾, which conducted a study and found the operating room nurses had higher level of practices.

Related to total competent level of practices of the scrub and circulating nurses according to their circulating duties, the present study revealed that less than half of the studied nurses had total competent level of practices at the operating room. This result is inconsistent with study done by **Shin and Kim**⁽²⁶⁾ and found that the OR nurses' perioperative competencies were the highest.

From investigator point of view, although the majority of circulating nurses performed many safety practices, the most critical surgical safety issues according to WHO surgical safety checklist are performed by less than two thirds of them as (assessing the risk for blood loss, checking presence of essential imaging, introducing of all team members by name and role, as well, recording of name of surgical procedure).

According to the anesthesia nurses' total competent level of practices, the current result presented that the majority of the studied nurse's anesthesia had total incompetent level of practices at operating room. This result is congruent with **Jeon *et al.*** ⁽²⁷⁾ who reported that both patient's care and knowledge of anesthesia patient's care were reported as a low assessment. This may be due to lack of training courses, lack of job description of anesthesia nurses and lack of experience in anesthesia nursing, as well as, having less than one year of experience.

This finding is contraindicated with **Ahmed and Awad** ⁽²⁸⁾ in their study and presented that there was a satisfactory level of performance regarding the implementation of surgical safety checklist (sign-in) before induction of anesthesia, before skin incision and debriefing and before wound closure.

CONCLUSION

On the light on the finding of the current study, it can be concluded that:

Less than half of the studied scrub nurses and only minority of the circulating nurses and anesthesia nurses had competent practices regarding surgical safety at the operating room. There were statistically significant relations between competent practices of scrub nurses and their attendance of training courses related to surgical safety and between competent practices of circulating nurses, their age and years of experience, while, there were no statistically significant relations between competent practices of anesthesia nurses, their gender and attendance of training course.

RECOMMENDATIONS

Based on the results of the present study the following recommendations are suggested:

At organizational level:

- Operating room nurses should participate in training programs to increase their knowledge and practices, as well as, to reinforce a constructive attitude towards patient safety.
- Strict observation of nurses during work and continuous evaluation of their performance and correction of malpractice is essential.
- Assess obstacles that affect nursing practices regarding patients' safety and surgical safety guidelines.
- Close collaboration between nursing managers and operating room nurses to develop a safety culture at the organization.

At research level:

- Replication of the study on large sample size to be able to generalize the result study.
- Future research to assess the effect of nursing training program regarding nurses' adherence to surgical safety guidelines on patients' outcomes.
- Further study is needed to evaluate the impact

of surgical safety training programs on the performance of nurses.

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