Effect of Designed Nursing Guidelines Regarding Patients' Safety in Emergency Operating Room on Nurses' Performance

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Abstract

Background: Patients' safety in emergency operating room is an essential part of nursing practice so that, nurses must be equipped with appropriate knowledge and skills to meet the needs of such group of patients safely and competently. **Aim:** This study aims to evaluate the effect of designed nursing guidelines regarding patients' safety in emergency operating room on nurses' performance. **Design:** One-group quasi-experimental (pre-post) research design was utilized. **Setting:** the study was conducted at emergency operating unit which affiliated to Ain Shams University Hospital at Cairo - Egypt. **Sample:** A convenience sample of 40 nurses from the previously mentioned setting were recruited in the current study. **Tools:** Four tools were be used to collected data to achieve the aim of the present study as following I-Nurses' structured self-administered questionnaire, II-Nurses' practice observational checklist, III- Nurses' attitude scale regrading patients' safety and IV- Nurses' opinion sheet regarding the effectiveness of nursing guidelines. **Results:** There was statistically significant improvement in the studied nurses' knowledge and practices regarding patients' safety in emergency operating room post the designed nursing guidelines implementation as 92.50% & 95 % respectively. In addition to, the total satisfactory level of the studied nurses' attitude regrading patients' safety was 90 % post the designed nursing guidelines implementation. **Conclusion:** the results of current study concluded that, majority of the studied nurses had a significant improvement in their performance (knowledge, practices & attitude) regarding patients' safety in emergency operating room post nursing guidelines implementation compared to pre. **Recommendations:** Emergency operating room should be supplied by evidence -based protocols regrading safe surgery in order to reduce the risk of unnecessary harm associated with emergency surgical procedures.

Key words: ***Key words:*** *Designed nursing guidelines, Patients' safety in emergency operating room, Nurses' Performance*

Introduction

In today's health care environment and patient safety are considering as a top priority of the current health issues. Patient safety is a key component of nurses' performance in emergency Operating Room (OR) as they work in a challenging and dynamic environment with high workload. Improving nursing knowledge, practice and attitudes regarding patient safety in emergency operating room is very essential and can be achieved through developing standards of patients' safety in emergency operating room, clear identification of deficiencies in provision of care, and increasing nurses' awareness regarding their vital role in saving patient life through safe practice **(Singh & Arulappan, 2023).**

Patient safety is defined as "the absence of preventable harm to a patient during the process of health care **(FitzGerald , 2023).** According to **Association of perioperative Registered Nurses (AORN). (2023),** that provide updated insights into the practices and guidelines relevant to nursing performance in the emergency operating room, focusing on patient safety. It includes the twelve following guidelines (rapid patients' assessment,

effective team communication, preoperative verification, preparation of the OR, infection control practices, medication administration safety, continuous monitoring, emergency preparedness, patient positioning and safety, postoperative hand-off, documentation in real time, patient and family support).

Emergency operating room defined as hot area that is required to deal with an immediate acute threat to life, organ, limb or tissue caused by severe trauma, acute disease process, or complication of a surgical or other interventional procedure. The skills needed for emergency surgery include the ability to undertake those abdominal (including; urological, thoracic, vascular and soft tissue) procedures that need to be performed within 24 hours **(Zhang et al, 2022).**

Emergency surgery is carried out when immediate, unplanned action needs to be taken after a patient has become seriously ill, badly injured or not breathing. It's done in order to save a patient's life or to deal with severe threat to organs, limbs or tissue **(Ross et al., 2022)**. It can apply to various conditions, these include: severe trauma to the head, chest and abdomen, serious burns, acute respiratory failure ,cardiac emergencies like heart attacks , cardiac shock and cardiac arrhythmia ,aneurysms, acute neurological conditions and abdominal conditions like perforated ulcers, appendicitis and cholecy stitis or blockage in the bowel **(Joshi ,2023).**

Emergency surgery procedures represent a large and unplanned workload for hospitals worldwide. It is estimated that 28% of the global burden in the emergency setting is surgical **(De Simone et al., 2023).** Patients who undergo surgical procedures in the emergency setting are 8 times more likely to die than those undergoing the same procedure electively with added high health systems costs. Early diagnosis and management are the key to improving outcomes and decreasing morbidity, length of hospital stay and mortality in all patients. Performing emergency surgical operations timely and effectively according to the clinical scenario and disease severity is crucial to reduce postoperative complications **(McLeod, 2023).**

Nursing care in emergency operating rooms 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 safety and reporting any adverse events that occur. From this vantage point, nurse safety procedures are a critical aspect of emergency operating room patient care **(Mamdouh et al, 2020)**

The three phases of any surgical procedure are preoperative, intraoperative, and postoperative. These phases begins when the patient arrives in the anesthetic room or operating theater and ends when the patient transferred to the post anesthesia care unit, where post-surgical care is delivered to the patient. Nurses have a critical role in ensuring the safety of patients during these stages **(Ali, et al., 2022).**

Significance of the study:

The **World Health Organization, 2021,** addresses the issue of patient safety in the OR in the report "Safe Surgery Saves Lives", in which complications related to surgical procedures are identified as a major cause of death and disability worldwide. The surgical volume worldwide has been estimated at 312·9 million operations in 2020. According to careful estimations, approximately seven million injuries and one million deaths result from surgeries. Therefore, a designed nursing guidelines is chosen for emergency operating room nurses to improve their performance regarding patients' safety in emergency OR.

Aim of the study

This study aims to evaluate the effect of designed nursing guidelines regarding patients' safety in emergency operating room on nurses' performance through the following:

1. Assessing nurses' level of performance regarding patients' safety in emergency operating room
2. Designing and implementing nursing guidelines regarding patients' safety in emergency operating room.

3. Evaluating the effect of designed nursing guidelines regarding patients' safety in emergency operating room on nurses' performance.

Research Hypothesis:

The implementation of designed nursing guidelines will have a significant improvement on the performance of the studied nurses regrading patients' safety in emergency operating room.

Operational definitions:

Nurses' performance: It means the studied nurses' level of knowledge, practice and attitudes regrading patients' safety in emergency operating room.

Patients' safety: It refers to risk reduction of unnecessary harm associated with patients' safety in emergency operating room to an acceptable minimum.

Subjects and Methods

A-Research design:

One-group quasi-experimental (pre-post) research design was utilized to accomplish the aim of the current study. Quasi-experimental design is an empirical interventional study used to estimate the causal impact of an intervention on target population without random assignment **(Handley et al., 2018).**

B- Research Setting:

The study was carried out at emergency operating unit, which included six emergency operating rooms at emergency hospital that affiliated at Ain Shams University Hospitals.

C- Subjects:

The number of 40 Nurses were recruited using a convenience sampling technique at previously mentioned setting, who accepted to participate in the study.

Tools for data collection:

The researchers used four tools to evaluate the effect of designed nursing guidelines regarding patients' safety in emergency operating room on nurses' performance.

Tool I: Nurses' Structured Self-Administrated Questionnaire: It was developed by the researchers in Arabic language, and it consisted of two parts.

Part 1: It involved five closed ended questions concerned with characteristics of the studied nurses such as age, gender, qualification, work experiences and training courses regarding patients' safety in emergency operating room.

Part 2: This part used to assess nurses' knowledge regrading patients' safety in emergency operating room through preoperative, operative & postoperative stages; it was developed by the researchers after reviewing the related literatures (**Association of perioperative Registered Nurses (AORN) (2023).,** it included 72 questions in the form of multiple-choice questions & true and false questions distributed into the twelve items as follow: ***preoperative stage*** include 27 questions (rapid patients' assessment seven MCQ, effective team communication four true& false questions , preoperative verification ten MCQ , preparation of the OR six MCQ. ***Operative stage*** includes 31 questions (infection control practices eight MCQ, medication administration safety seven true & false questions, continuous monitoring five MCQ, emergency preparedness five true & false questions, patient positioning and safety six MCQ). ***Post operative stage*** include 14 questions (postoperative hand-off five MCQ, documentation in real time four true& false questions, patient and family support five true& false questions)

Scoring system: The total score of knowledge was 72 grades. Each correct answer was given one mark and the incorrect answer was given zero. Based on the critical care approach. It was considered that:

- More than or equal to 90 % was satisfactory level of knowledge (≥65 grades of correct answers).

- Less than 90% was unsatisfactory level of knowledge (< 65 grades of correct answers).

Tool (II): Nurses' practice observational checklist: It was used to assess nurses' level of practice in emergency operating rooms, focusing on patient safety. Additions and modifications to fit local practices are encouraged so that, it was modified and designed by the researchers after reviewing the recent related literatures and studies **Haynes et al. (2020)** and, **GuL., et al. (2022).** It included 240 steps of practical skills distributed into twelve checklists as following: preoperative stage involves rapid patients' assessment (21steps), effective team communication (16 steps), preoperative verification (18 steps), preparation of the OR (16 step). Operative stage includes (infection control practices (17 steps), medication administration safety (23 steps), continuous monitoring (15 steps), emergency preparedness (25 steps), patient positioning and safety (24 steps). postoperative stage concerned with postoperative hand-off (28 steps), documentation in real time (23 steps), patient and family support (14 steps)

Scoring system: The total score of nurses' practices was 240 marks, each step done correctly was given one mark and zero for the step which was not done or done incorrectly. Based on the critical care approach it was considered that:

-More than or equal to 95% was considered competent level of practice (≥228 correct actions).

-Less than 95% was considered incompetent level of practice (228< correct actions).

Tool III: Nurses' attitudes scale regrading Patient Safety; it was developed by **Sexton et al. , (2006)** and adapted by **Baykal et al., (2010).** The translation approach for testing the language validity of the original scale was done. The final version of this scale has six subdimensions involving 46 items as following: job satisfaction (11 items), teamwork climate (12 items), safety climate (5 items), perception of management (7 items), stress recognition (5 items) and working conditions (6 items).

Scoring system: this 5-point Likert-type scale has the following response categories: 5 = I totally agree, 4 = I agree, 3 = I partially agree, 2 = I disagree, 1 = I totally disagree. Ten items (21, 36, 37, 38, 39, 40, 41, 42, 43, 45) are negatively scored. Total scores range between 46 and 230. Higher scores indicate positive attitudes to patient safety while lower scores indicate negative attitudes. It was considered that:

- More than or equal to 90 %, ≥ 207 score, it was considered positive attitude).

- Less than 90% < 207 score, it was considered negative attitude).

Tool IV: Nurses' opinion sheet regarding the effectiveness of nursing guidelines: This tool was be designed by the researchers to evaluate the effectiveness of deigned nursing guidelines regarding patients' safety on emergency operating room. It was adapted from **Taylor& Clarke, (2021) and Brown & Morgan ,(2021).** It includes five parts with total 16 questions in the form of Yes or No questions distributed as following:

Part 1: Evaluation of provided guidelines, it concerned with the guidelines clearly explained during training or orientation sessions specific to the emergency OR environment and also cover all critical procedures needed during an emergency surgical, it includes four questions.

Part 2: Evaluation of the application of guidelines in practice, it means applying the safety guidelines effectively during emergency surgeries or procedures help reduce risks, errors, or complications for patients during emergency surgical operations, it includes four questions.

Part 3: Effect of guidelines on patient safety in the emergency operating room, it

refers to guidelines enhance the communication and coordination between team members during emergency procedures, it includes three questions.

Part 4: Challenges and suggestions for improvement guidelines this part appreciate additional training or more detailed guidance on patient safety in emergency operating room settings, it includes three questions.

Part 5: Overall satisfaction with guidelines, this part includes two questions about nurses' satisfaction with guidelines regarding delivering safe and effective care to patients during emergency surgical procedures.

Scoring system: The total score of was 16 grades. If the nurse' response with Yes was given one mark and NO was given zero. Based on the critical care approach. It was considered that:

- More than or equal to 90 % ≥14 grades were satisfactory level regarding the effectiveness of nursing guidelines

- Less than 90% < 14 grades were unsatisfactory level regarding the effectiveness of nursing guidelines

The ethical research considerations in the study included the following:

-The study began only after consent had been received from the ethics committee of the faculty of nursing - Ain shams university with study number 24.01.197 at 11/12/2023. Explain the aim of the study to the hospital director to apply this study for nurses included in the study.

-The researchers approached the nurses individually at the emergency operating unit at the Ain Shams University Hospital, explaining the purpose of the study, and take their approval regarding participation of the current study, also clarify the importance of the designed nursing guidelines to improve the studied nurses' performance regarding patients' safety in operating room.

-Nurses were informed that they allowed choosing to participate or not in the study and they had the right to withdraw from the study at any time without giving any reasons. Assured that the obtained information was confidential and used only for the purpose of the study.

-The study tools could not cause any harmful effects on the studied nurses. Professional help was provided to all participants whenever needed.

Content validity and reliability:

Testing validity of the tools was reviewed by a panel of five experts in the critical care nursing faculty staff to ascertain their clarity, relevance, comprehensiveness, simplicity, and applicability; minor modification was done. Testing reliability of the proposed tools was done statistically by alpha Cronbach test for nurses' knowledge was 0.891, for nurses' practice was 0.716, regrading nurses' attitude was 0.881 and. In addition to Cronbach's alpha reliability coefficient for the nurses' opinion regarding the effectiveness of nursing guidelines was 0.931 that indicate high reliability of the used tools.

Pilot study:

A pilot study was carried out for 10% of the total number of the studied nurses included in the current study about four nurses before data collection to evaluate the feasibility, time, cost, adverse events, and improve upon the study design before the performance of a full-scale research study. Minor modifications on tools were done, so that the nurses who included in the pilot study were included in the main study group.

Field work:

It was carried out through three phases (assessment &planning, implementation and evaluation).

Assessment & planning phase:

The tools were developed by the researchers based on reviewing the recent and

related literature. Data collections took about 6 months which started from January until June 2024. Four tools were used to assess nurses' level of performance regarding patients' safety in operating room.

At the beginning, once the approval was taken to carry out the study, the researchers started to collect data through assessing of nurses' knowledge, practice and attitude regrading patients' safety in emergency operating room before the implementation of the designed nursing guidelines to determine basic nurses' needs.

The nurses' practice observational checklist and patients' safety attitude scale were used prior to administration of the questionnaire to ensure maximal realistic observations of the nurses' performance and minimize the possibility of bias. The nurses' practice and attitude were assessed by the researchers during the nurses are working in emergency operating room, the time allowed for filling the checklist took about 30 minutes and the time of patients' safety attitude scale took about 20 minutes.

Nurses' structured self-administered questionnaire was filled by the nurses themselves during their free time before an educational guideline implementation to assess their demographic characteristics and their level of knowledge regarding patients' safety in operating room, it took about 20–30 minutes to be fulfilled. The study tools were filled two times before the implementation of designed nursing guidelines and after its implementation.

Implementation phase:

Based on the findings of the assessment phase; goals, priorities, and expected outcomes were formulated to meet nurses' needs regrading patients' safety in emergency operating room. Then, the studied nurses receive a booklet about designed nursing guidelines regarding patients' safety in emergency operating room at Ain Shams University Hospital, which is illustrated and applicable by two researchers using handout in power point.

Designed nursing guidelines that refers to designing and implementing an Arabic booklet by the researchers based on recent relevant literatures, which covered the nurses' performance regarding patients' safety in emergency operating room through preoperative, operative & postoperative stages. According to **Association of perioperative Registered Nurses (AORN). (2023) that** provide updated insights into the practices and guidelines relevant to nursing performance in the emergency operating room, focusing on patient safety. It included twelve guidelines as effective team communication, preoperative verification, preparation of the OR, infection control practices, medication administration safety, continuous monitoring, emergency preparedness, patient positioning and safety, postoperative hand-off, documentation in real time, patient and family support).

The sessions were conducted in the morning and afternoon shifts. The total number of the studied nurses was about 40 nurses; it was difficult to gather all the nurses at one time, so the nurses were divided into eight groups, each group of about five nurses and the designed nursing guidelines were implemented on 2 days for each group separately in the same suitable time for each one of them.

Implementation of the designed nursing guidelines was carried out at the previously mentioned settings. The number of sessions of designed nursing guidelines were four sessions, the first & second session directed toward theoretical knowledge and the third and fourth session directed toward practical skills, as in the following:

The first session: in which nurses' structured self- administrated questionnaire was filled by the nurses themselves and gives an overview about patients' safety in operating room through ***preoperative stage*** includes four guidelines as following; *rapid patient assessment* refers to perform primary assessment to determine urgency and necessary interventions according to the patient's condition. *Effective team communication* through it the nurse should be to utilize standardized communication tools

(e.g., SBAR—Situation, Background, Assessment, Recommendation) and work closely with surgical team (anesthesiologists &surgeons) and other healthcare professionals to coordinate care.

Preparation of the OR in which the nurse must be to ensure the operating room is fully prepared for emergency surgery, including verifying the availability of necessary instruments, supplies, and equipment. *Preoperative verification;* that reflect to the nurse should follow a preoperative checklist to confirm the patient's identity, procedure, and surgical site and verify informed consent, if possible, in emergency situations. It took about 45 minutes.

The second session as regards to theoretical knowledge of ***operative stage*** that includes five guidelines as following; *infection Control Practices* are concerned with maintenance and adherence to strict hand hygiene and sterile techniques, particularly during trauma cases where speed is critical as well as, ensuring that all instruments and supplies are properly sterilized and available.

Medication administration safety is involve verifying and administering emergency medications promptly, double-checking dosages and indications even in urgent situations. *Continuous Monitoring* refers to continuously monitor vital signs and other critical parameters during the procedure and reporting any significant changes promptly.

Emergency Preparedness is required to ensure that resuscitation equipment and the use of crash carts are readily available. *Patient Positioning and Safety* is involved the use appropriate techniques for patient positioning to prevent injuries and secure the patient properly to avoid any falls or complications.

In addition to ***postoperative stage*** that includes three guidelines as following: *postoperative Hand-off* provide thorough, accurate hand-offs to post-anesthesia care unit (PACU) staff, including details on interventions performed, patient status, and potential complications. *Documentation in Real Time* through it the nurse must maintain accurate and timely documentation of all actions, interventions, and observations and ensure that records reflect the rapid pace and unique circumstances of emergency care. *Patient and family support* refers to communication with the patient's family regarding the surgery's outcome, answering questions or concerns they may have regarding care and providing emotional support during a stressful time. It took about 45 min.

The third & fourth session: concerned with nurses' practices in emergency operating rooms focusing on patient safety as following: *preoperative stage* involves (rapid patients' assessment, effective team communication, preoperative verification, preparation of the OR. *Operative stage* includes infection control practices, medication administration safety, continuous monitoring, emergency preparedness, patient positioning and safety. *postoperative stage* concerned with postoperative hand-off, documentation in real time, patient and family support). Each session took about 45 min.

Two methods of teaching (presentation and group discussion) were be used by the researchers to build learner self-esteem and enhance the studied nurses' performance. Regrading to media of teaching used for demonstration designed nursing guidelines for the studied nurses were illustrated booklet, computer and board.

Evaluation phase: Nurses were handled the designed nursing guidelines booklet, with some explanations from the researchers regarding its importance. At the end of the designed nursing guidelines, its effectiveness was evaluated through assessing of nurses' knowledge, practice and attitude regarding patients' safety in operating room post implementation of the nursing guidelines for all the studied nurses and the results was compared with pretest levels.

However, the researchers assess nurses' opinion regarding the effectiveness of nursing guidelines once post the implementation of the designed nursing guidelines.

Statistical analysis: All data were collected, coded, tabulated, and subjected to statistical analysis. Statistical analysis is performed by the statistical package SPSS version 22 for Windows Data Editor (International Business Machines Corporation IBM, Armonk, New York). Microsoft Office Excel is used for data handling and graphical presentation. Qualitative categorical variables are described by percentage and proportions. Descriptive statistics are used to analyze the response to individual items and the respondents' characteristics. chi-square test and P value test were used to test the correlation.

Results:

Table 1 shows that 45 % of the studied nurses were 30-<40 years old with mean age 33.28±8.252, and 72.5 % of them were female. Concerning the qualification 37.5 % of the studied nurses were nursing diploma. As regards their years of experience, 42.5 % of the studied nurses had experience from 5-<10 years with mean experience 11.75±8.77. Moreover 100% of the studied nurses did not attend training courses about patient safety in emergency operating rooms.

Figure 1 illustrates that the total satisfactory level of nurses' knowledge regarding patients' safety in emergency operating room significantly improved post the nursing guidelines implementation 92.5% compared to pre 57.5 % with statistically significant difference (P-value 0.0003).

Figure 2 represents that the total satisfactory level of nurses' practice regarding patients' safety in emergency operating room significantly improved post the nursing guidelines implementation 95% compared to pre 62.5 % with statistically significant difference (P-value 0.0004).

Figure 3 reveals that the total satisfactory level of nurses' attitude regarding patients' safety in emergency operating room significantly improved post the nursing guidelines implementation 90% compared to pre 70 % with statistically significant difference (P-value 0.0253).

Figure 4 shows that 95% of the studied nurses revealed that nursing guidelines regarding patient safety in emergency operating rooms was effective.

Table 2 reveals that there was a statistically significant relation between total nurses' knowledge and their qualification pre the nursing guidelines implementation (P-value .002).

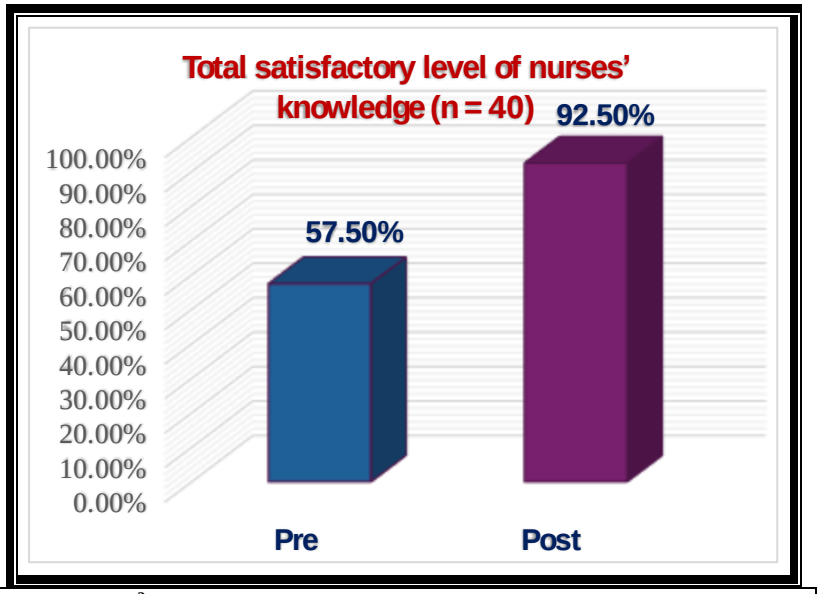
Table 3 reveals that there was a statistically significant relation between total nurses' practice and their demographic data including qualification and years of experience pre the nursing guidelines implementation (P-value 0.235).

Table 4 reveals that there was a statistically significant relation between total nurses' attitude and their qualification and pre the nursing guidelines implementation (P-value 0.235).

Table 5 reports that there was a positive correlation between the total level of nurses' knowledge and their total level of practice and attitude regarding patient safety in emergency operating room pre and post the nursing guideline implementation. In addition to there was a positive correlation between total level of nurses' practice and their total level of attitude regarding patient safety in emergency operating room pre and post the nursing guideline implementation.

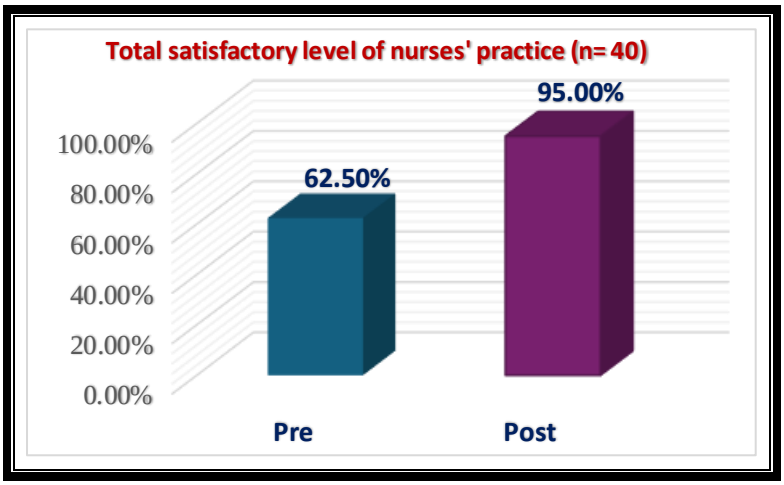
Table (1): Frequency and percentage distribution of the studied nurses' characteristics (n=40)

Nurses' characteristics	Studied nurses	
	N	**%**
Age		
18<30 years	16	40 %
30-<40 years	18	45 %
40-<50 years	6	15 %
Mean ± SD	**33.28±8.252**	
Gender		
Male	11	27.5 %
Female	29	72.5 %
Qualification		
Nursing school diploma	14	35 %
Nursing institute diploma	15	37.5 %
Nursing bachelor	11	27.5 %
Experience years		
1<5 years	7	17.5 %
5-<10 years	17	42.5 %
10-<15 years	9	22.5 %
≥ 15	7	17.5 %
Mean ± SD	**11.75±8.77**	
Training courses about patient safety in emergency operating rooms		
Yes	0	0 %
No	40	100 %



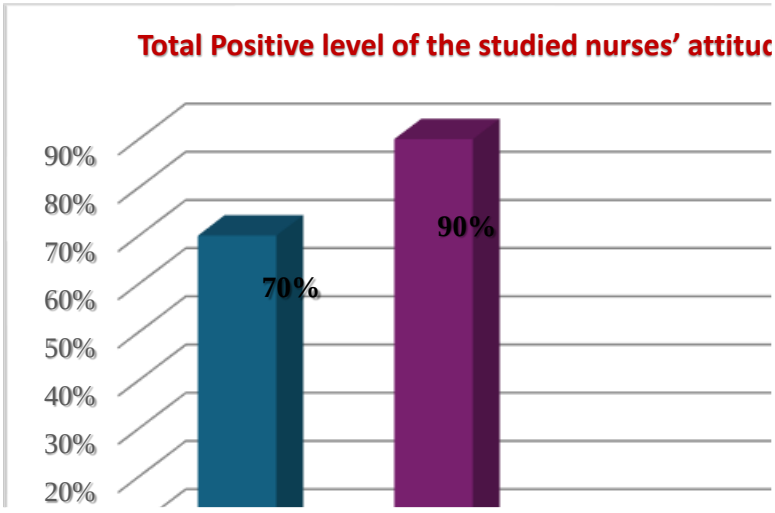
Knowledge X^2 test 13.067 at **P-value** 0.0003*

Figure (1): Total satisfactory level of the studied nurses' knowledge regarding patient safety in emergency operating rooms pre and post the nursing guidelines implementation (n= 40).



practice X^2 test 12.624 at **P-value** 0.0004*

Figure (2): Total satisfactory level of the studied nurses' practice regarding patient safety in emergency operating rooms pre and post the nursing guidelines implementation (n= 40).



attitude X^2 test 5.000 at **P-value** 0.0253*

Figure (3): Total positive level of the studied nurses' attitude regarding patient safety in emergency operating rooms pre and post the nursing guidelines implementation (n= 40).

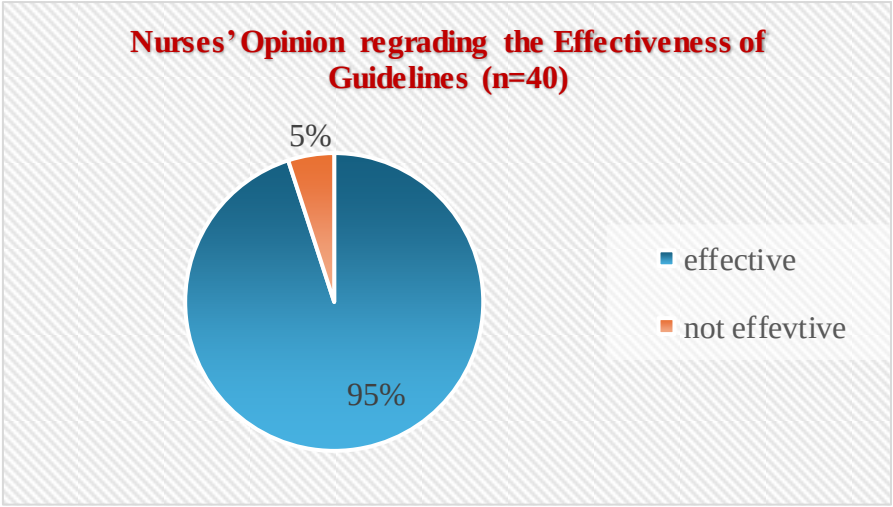


Figure (4): percentage distribution of the studied nurses' opinion regarding the effectiveness of nursing guidelines regarding patient safety in emergency operating rooms (n= 40).

Table (2): Relation between total level of nurses' knowledge and their characteristics pre and post the nursing guidelines implementation.

Items	Total nurses' knowledge							
	Pre				Post			
	Satisfactory (n=23)	Unsatisfactory (n=17)	X^2	P-value	Satisfactory (n=37)	Unsatisfactory (n=3)	X^2	P-value
Age								
18<30	9	7	2.063	.356	15	1	1.299	.522
30<40	12	6			18	0		
40<50	2	4			4	2		
Qualification								
Nursing diploma	3	11	11.654	.002*	12	2	0.027	.986
Nursing institute	11	4			14	1		
Nursing bachelor	9	2			11	0		
Years of experience								
1<5	4	3	0.714	.869	6	1	0.618	.892
5<10	9	8			16	1		
10<15	5	4			8	1		
≥ 15	5	2			7	0		

*Non-significant P>0.05 * Statistical significant P≤0.05*

Table (3): Relation between total level of nurses' practice and their characteristics pre and post the nursing guidelines implementation.

Items	Total nurses' practice							
	Pre				Post			
	Satisfactory (n=25)	Unsatisfactory (n=15)	X^2	P-value	Satisfactory (n=38)	Unsatisfactory (n=2)	X^2	P-value
Age								
18<30	10	6	2.903	.234	15	1	0.918	.631
30<40	13	5			18	0		
40<50	2	4			5	1		
Qualification								
Nursing diploma	3	11	15.824	.0003*	13	1	0.028	.985
Nursing institute	12	3			14	1		
Nursing bachelor	10	1			11	0		
Years of experience								
1<5	1	6	9.484	.0235*	6	1	0.530	.912
5<10	11	6			16	1		
10<15	7	2			9	0		
≥ 15	6	1			7	0		

*Non-significant P>0.05 * Statistically significant P≤0.0*

Table (4): Relation between total level of the studied nurses' attitude and their characteristics pre and post the nursing guidelines implementation.

Items	Total nurses' attitude							
	Pre				Post			
	positive attitude (n=25)	negative attitude (n=15)	X^2	P-value	positive attitude (n=38)	negative attitude (n=2)	X^2	P-value
Age								
18<30	11	5	1.6733	.43316	14	2	0.802	.66949
30<40	14	4			17	1		
40<50	3	3			5	1		
Level of education								
Nursing diploma	5	9	12.1109	.00234	12	2	0.481	.78623
Nursing institute	13	2			14	1		
Nursing bachelor	10	1			10	1		
Years of experience								
1<5	1	5	10.8256.	.01270	6	1	0.618	.89222
5<10	12	5			16	1		
10<15	8	1			8	1		
≥ 15	7	1			6	1		

Table (5) Correlations between total satisfactory level of nurses' knowledge, practice and attitude regarding patient safety in emergency operating rooms pre and post the nursing guidelines implementation.

	Total level of nurses' knowledge				**Total level of nurses' practice**			
	Pre		**Post**		**pre**		**post**	
Items	**r**	**P-value**	**r**	**P-value**	**r**	**P-value**	**r**	**P-value**
Total level of nurses' practice	0.398	0.030*	.503	0.0001*	--	--	--	--
Total level of nurses' Attitude	0.67	.000*	0.389	0.013*	0.327	0.039*	0.347	0.028*

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Discussion:

The emergency operating room is one of the most critical and high-stakes environments in healthcare, where even small lapses in patient safety can lead to severe consequences. Nurses working in this setting must constantly navigate complex procedures under pressure and follow safety guidelines for optimal patient outcomes. The guidelines serve as a structured framework that provides nurses with clear, actionable steps to enhance their performance and ensure patient safety **(Zhou & Zhang, 2023).**

Therefore, the current study was carried out to evaluate the effect of designed nursing guidelines regarding patients' safety in emergency operating rooms on nurses' performance (knowledge and practice and attitude).

Regarding characteristics of the studied nurses, most of the studied nurses were less than forty years old with mean age 33.28±8.252 from the researcher point of view that higher proportion of those nurses were young and tolerate the work nature of emergency operating room and the load of work required.

Concerning nurses gender the finding of the present study revealed that less three quarters of the studied nurses were female, this may be because the greater fraction of the nurses in Egypt are female.

This finding was agreed with **Hanfy, et al., (2021),** who found in the study entitled "Factors affecting Nurses Performance Regarding Patient Safety in Emergency Operating Rooms", that more than half of studied nurses' age was less than 30 years old, and more than three quarters were female**.**

Concerning qualifications, more than one third of the studied nurses were nursing diploma. This might elaborate the current condition of nursing qualification. As regards studied nurses' years of experience, less than half of the studied nurses had experience from 5-<10 years with mean experience 11.75±8.77.

This result could be attributed to the emergency operating room need experience in how to deal with cases.

This finding was consistent with **Ali, et al., (2022)** who reported in the study entitled "Nurses' Performance Regarding Patient Safety in Emergency Operating Rooms" that 57.1 % of the nurses evaluated had worked in operating rooms for at least five years.

Owing to training courses the finding of the present study revealed that almost all the studied nurses did not attend training courses about patient safety in emergency operating room. This may be due to lack of in-service training programs/ workshops/ scientific conferences regarding patient safety in emergency operating room.

This finding was supported by **Nabil, et al., (2019),** who showed in the study entitled "Nurses' Performance Regarding Patient Safety in Operating Room at Zagazig University Hospitals" that majority of the studied nurses did not attend training courses regarding operating safety.

Regarding total nurses' knowledge regarding patients' safety in emergency operating room, the results of the current study indicated that more than half of the studied nurses had satisfactory level of knowledge pre the nursing guidelines implementation, while most of them had satisfactory level of knowledge post the nursing guidelines implementation.

The significant improvement in the level of the studied nurses' level of knowledge post the designed nursing guidelines implementation could be attributed to the effectiveness of conducting nursing guidelines.

This result is in the same line with **Mohamed, et al., (2022).** who reported in their study about "Effect of Nurses' Implementation of Surgical Safety Guidelines on Their Performance and Post-Operative Complications", and clarified that there were high statistically significant differences between the nurses' total scores of knowledges regarding surgical safety pre and post implementation of surgical safety guidelines.

Furthermore, this result is similar to the result of **Zhang**, **et al., (2022)** who found in their study about "Effect of patient safety training program of nurses in operating room", that after the training, the scores of safety knowledge toward operating reporting of nurses showed a significant increase relative to the scores before the training.

Regarding total nurses practice, the results of the current study represented that less than two third of the studied nurses had satisfactory level of practice pre the nursing guidelines implementation, while most of them had satisfactory level of practice post the nursing guidelines implementation.

The improvement is due to the present nursing guidelines using information, adequate sessions and practical content of nursing guidelines which were given to the nurses, different teaching strategies such as discussion, lecture, demonstration and re-demonstration, using media as handout including pictures and knowledge as well as availability of sufficient materials and supplies needed for achievement of the work.

This result is similar to the result of **Nabil et al., (2019).** who found in their study about "Nurses' Performance Regarding Patient Safety in Operating Room at Zagazig University Hospitals", that most of nurses had a satisfactory level of practice regarding patient safety in operating room.

Regarding total nurses' attitude, the results of the current study revealed that, more than two third of the studied nurses had positive attitude pre the nursing guidelines implementation, while most of them had positive attitude post the nursing guidelines implementation. This might be related to a visible effective action of this attitude in improving their performance and quality of care delivered and reduction of hazard that may occur. It can also be stated that nurses who work in an emergency operating room get, the higher the level of sense of belonging and loyalty they feel for the emergency operating room becomes.

These findings was supported by **Ünver & Yeniğün (2020**) who stated in their study about "Patient safety attitude of nurses working in surgical units: A cross-sectional study in Turkey" that, Nurses who received training on patient safety had statistically higher attitude scores than those who did not.

This finding was consistent with **Biresaw, et al., (2022)** who reported in their study "Operating room professionals' attitudes towards patient safety and the influencing factors" that, operating room professionals' attitudes towards patient safety were found to be at the moderate level.

Regarding nurses' opinion on the effectiveness of nursing guidelines regarding patient safety in emergency operating rooms, the present study showed that most of the studied nurses revealed that nursing guidelines was effective.

This suggests that the guidelines are well received and likely meet the expectations and needs of most nursing staff in emergency situations in operating rooms. Also, implementation of these guidelines enhanced nurses' confidence and helped the nurses to be more prepared to handle emergency situations in operating rooms, leading to fewer adverse events.

This result was consistent with **Smith & Doe, (2020),** who reported in the study entitled "A study on the impact of clinical guidelines on patient safety in emergency rooms" that the implementation of clear, evidence-based guidelines significantly reduced errors, improved patient outcomes, and enhanced nurses' confidence. Also, this result was in the same line with **Seo, & Lee, (2023),** Who found in their study about "Effects of Nurses' Perceptions of Patient Safety Rules and Procedures on Their Patient Safety Performance" that Nurses' perceptions regarding the usefulness and effectiveness of rules and procedures about patient safety were positively related to their patient safety performance.

The present study revealed that there was a statistically significant relation between total nurses' knowledge level and their qualification pre the nursing guidelines implementation. This may explain that education had a vital role in improving the knowledge of nurses and consequently improve the quality of the care.

The present study revealed that there was a statistically significant relation between total nurses' practice level and their characteristics including level of education and years of experience pre the nursing guidelines implementation.

These results finding was in the same line with **Al-Hamdan & Othman, (2021)** who reported in their study about "The influence of education and experience on nursing practice in Jordanian hospitals "that, nurses' education levels and years of experience influenced their clinical practices.

From the researchers' point of view the results may be interpreted as more time of experience and educational level may assist the nurses to improve their practice. These variables also suggest that the older practitioner nurses in the emergency operating room increased their level of experience and perception of the importance of patient safety measures in operating rooms.

The finding of the current study revealed that, there was a statistically significant relation between total nurses' attitude and their qualification and pre the nursing guidelines implementation. This suggests that nurses with higher levels of education tend to have more positive attitudes toward patient safety, which may be due to a greater understanding of the importance of patient safety and the theoretical foundations of clinical care.

This result was inconsistent with **Aydemir & Ko, (2023),** Who stated in the study entitles "Patient safety culture and attitudes among emergency care unit nurses in Türkiye" that the characteristics of the nurses including educational status had no effect on their culture and attitudes regarding the safety of patients.

Regarding the correlations between the studied variables**,** the current study results represented that there was a positive correlation between the total level of nurses' knowledge and their total level of practice regarding patient safety in emergency operating rooms pre and post the nursing guideline implementation.

This means that knowledge is necessary for nurses to improve their practice. This is based on the recognition that nursing knowledge production must also be viewed in conjunction with practice as practice invades not only the use of knowledge but also gaining of knowledge. Nursing competencies depend largely on intuitive knowledge and skills. Therefore, usually the reasons for nurses' improper performance are usually the lack of nurses' knowledge and skills.

This study result is congruent with **Zhang, et al., (2022).** Who mentioned in their conducted study which was entitled "Effect of patient safety training program of nurses in operating room" that practice of operating room nursing improved thorough theoretical knowledge that increase nurses' ability to prioritize interventions, and all kinds of knowledge must be used in order to ensure professionally safe practice of the discipline.

Also, this result was comparable to **Mohamed, et al., (2022)** who shoed in their study about "Effect of Nurses' Implementation of Surgical Safety Guidelines on Their Performance and Post-Operative Complications" that, there was positive statistically significant correlation with satisfactory level of knowledge and practice and practice immediately post program implementation observed.

Also, the current study results clarify that there was a positive correlation between the total level of nurses' knowledge and their total level of attitude regarding patient safety in emergency operating room pre and post the nursing guideline implementation.

It implies that when nurses are more knowledgeable about safety guidelines, they are likely to have more favorable attitudes toward implementing those practices. Als, it suggests that the nursing guidelines not only enhance knowledge but also foster the right attitudes to ensure that safety guidelines are followed rigorously in the high-pressure environment of the emergency operating rooms.

This result finding supported by **Ahmed et al., (2022)** who found in their study about "Nurses' Performance Regarding the Patients' Safety Measures in Operating Theater" that, there was positive statistically significant correlation between level of knowledge for nurses and their attitude level.

On the same scope, the current study findings reported that there was a positive correlation between the total level of nurses' practice and their total level of attitude regarding patient safety in emergency operating room pre and post the nursing guideline implementation.

It means that nurses with positive attitudes toward safety are more likely to implement the best practices and follow nursing guidelines that ensure safe outcomes. Also, the implementation of the nursing guidelines appears to be an effective way to enhance both attitudes and practices, potentially leading to better patient outcomes. This result was in the same line with **Bureau, & Loranger, (2022)** who found in their study which was entitled "The role of nurse education in improving safety attitudes and practices in the operating room" that the structured nursing education programs influenced both attitudes toward safety and the implementation of best practices in high-risk areas like the operating room.

Conclusion

After the implementation of designed nursing guidelines regarding patients' safety in emergency operating room, the studied nurses' performance had a significant improvement compared to pre of the nursing guidelines implementation. This is supported the current research hypothesis.

Recommendations

- A standardized set of indicators is applied to emergency surgery to facilitate service monitoring and continuous quality improvement, such as triage systems for emergency surgical patients were nationally implemented in hospitals.

- Emergency operating room should be supplied by Evidence-based protocols regrading safe surgery in order to reduce the risk of unnecessary harm associated with emergency surgical procedures.

- Ongoing education about best practices, new technologies, and safety protocols is essential for nurses working in emergency surgery to stay updated on the latest advancements in patient care.

- Conducting periodic in-service training advanced care programs for nurses help in improving their performance regrading patients' safety in emergency operating room.

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