

Factors affecting Nurses Performance Regarding Patient Safety in Emergency Operating Rooms

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Abstract

Background: Nurse's performance remains long standing determinates of quality of care for patients, many factors affecting the performance of nurse in emergency operating rooms. Patient safety is a key component of nurses' performance. Nurses have an important role for maintaining patient safety. **The aim of the study** was to assess factors affecting nurses' performance regarding patient safety in emergency operating rooms. **Research design:** A descriptive design was carried. **Setting:** This study was conducted at the operating rooms in emergency and new surgery hospitals at Zagazig University, Egypt, **a convenience sample** of all available nurses (70). **The tools of data collection:** An Interview questionnaire about personal characteristics of studied nurses, nurses' knowledge and factors affecting nurses' performance, an observational checklist to assess nurses' practices. **The results** revealed that, 52.9% of studied nurses had unsatisfactory total knowledge. 38.6% of studied nurses had unsatisfactory total practice. In relation to factors, 91.4% of studied nurses had affected by planning and coordination, 88.6% by equipment, 84.3% by communication and 80% by procedures. The majority of studied nurses' performance regarding patient safety (80%) had affected by total factors. The study finding **concluded** that, there was a positive significant correlation between total knowledge, total practice and factors affecting nurses' performance. **Recommendation:** Training programs for all operating room nurses's to improve their knowledge and practice regarding patient safety. Factors affecting nurses' performance should be evaluated by the nursing management and hospital administration to avoid or correct such factors.

Keywords: Factors, Nurses' Performance, Patient Safety, Emergency Operating Room.

Introduction

Operating rooms (ORs) are different from other work environments with respect to their construction and working conditions. The systems, long work hours, and stressful environment can negatively affect the health of OR personnel and affect negatively patient safety and surgical outcomes (Uğurlu, Karahan, Ünlü, et al., 2015). The World Health Organization (WHO) defines patient safety as "the absence of preventable harm to a patient during the process of health care", while others have similarly defined patient safety as being the freedom from accidental injury caused by medical care, which translates to medical error (Brasaitė, Kaunonen, & Suominen, 2015). Nurses have an important role in ensuring and maintaining patient safety because they provide direct care to patients. They are responsible for protecting the patients from the possible dangers and preventing the unwanted results of initiatives in each environment in which they work (Rizalar S., & Topcu, 2017). The operating room nurse must demonstrate the knowledge and skills required to secure patient safety. This includes taking responsibility for asepsis and the instruments and measures to

prevent infection and complications in connection with surgical interventions as well as the ability to manage biological specimens, identify surgical team needs and develop care programs autonomously and in collaboration with patients and their significant others, able to analyze, assess and deal with complex issues and situations and participate in or undertake examinations and treatments (Von Vogelsang, Swenne, Gustafsson, et al., 2020). A nurse's job performance is affected by some factors as organizational commitment, career development, relationships with colleagues, working conditions, and years of experience, nurse manager's support to the nurses, leadership skills, and the nurse's involvement in decision making had a significant impact on nurses' job satisfaction, Hospital management and organizational support includes factors such as providing adequate salary, opportunities for personal development, recognition for a job well done, listening and responding to employee concerns, supporting new ideas, visible leadership, and the provision of adequate support services to allow the nurses to spend time with their patients and do their jobs (Arakelian, Rudolfsson, Rask-Andersen, 2019).

Significance of the study

The situation in low- and/or middle-income countries is more critical, as about 2.6 million deaths happen as a result of 134 million adverse events occur in hospitals annually. In Egypt, the nurse/patient ratio is half the international figure, which led to a significant shortage in qualified staff that may not have a clear view of safety framework. The potentiality for safety hazards can increase if they work in a challenging and dynamic environment with high workload as operating room (El-Sherbiny et al., 2020). Therefore this study will be carried out in an attempt to assess factors affecting nurses' performance regarding patient safety in emergency operating room.

Aim of the study: was evaluated the factors affecting nurses ' performance regarding patient safety in emergency operating rooms.

Research Question

- What is the level of nurses' knowledge and practice regarding patient safety in emergency operating rooms?
- What are the factors affecting nurses' performance regarding patient safety in emergency operating rooms?

Research design: A descriptive research design was carried out in this study.

Setting: The study was conducted at the operating rooms in emergency and new surgery hospitals at Zagazig University.

Subjects: A convenience sample of all available nurses (70) working in operating rooms in emergency and new surgery hospitals at Zagazig University

Tools of data collection

Tool I: Nurses' Structured Questionnaire: It consisted of three parts:

Part 1: Assess personal characteristics as: age, gender, educational qualification, marital status, and years of experience in operating rooms, family income, and residence, attendance of training courses in patient safety, having periodic checkup and HB vaccination at work. 10 close ended questions.

Part 2: Assess nurses knowledge regarding patient safety in emergency operating rooms and consist of 28 questions in the form of Multiple Choice and True/false forms covering five different sections as (nurse's knowledge about environmental safety 6 questions, patient

safety before surgery 5 questions, patient safety during surgery 5 questions, patient safety after surgery 3 questions, precautions in operating room 9 questions. It was adapted from Alaa-Eldeen, Saad & Elrefaee, (2012) and modified by the researcher.

Scoring system: The total score of the knowledge was 28 grades (100%). Each complete correct answer scored one grade, zero for incorrect answer or don't know. For each area of knowledge, the score of the items was 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. Knowledge was considered satisfactory if the percent score was equal or above 75% and unsatisfactory if less than 75% based on statistical analysis.

Part 3: Assess factors affecting nurses' performance regarding patient safety in emergency operating rooms which adapted from Van Beuzekom, Boer, Akerboom, et al., (2013), and modified by researcher to suite aim of the study such as (training 5 items, communication 4 items, planning and coordination 2 items, environmental design 4 items, equipment 6 items, maintenance 2 items, teamwork 4 items, team instructions 3 items, situation awareness 3 items, housekeeping of equipment 3 items, hierarchical decision making 5 items, procedures 3 items). This part is consisted of 44 statements. The responds to these statements were on two scales as follows: one point for affected, zero point for not affected.

Scoring system for factor items: Total score for whole factors assessment tool was calculated for every nurse and the mean of total score was calculated. These scores were converted into percent scores. The nurses' performance was affected with this factor when the total score equal or above 70% and not affected when the total score below 70% based on statistical analysis.

Tool II: Observational checklists for nurses: was developed to assess nurses' practices regarding patient safety in emergency operating rooms. It was adapted from Alaa-Eldeen, Saad & Elrefaee, (2012) and modified by the researcher. It was consisted from 123 items in three phases: Phase I: Sign-in (before induction of anesthesia) as environmental safety (14 items covering mechanical, thermal, electrical, bacteriological, and chemical safety), Preparing the operating room with necessary equipment: two items with 24 sub-items covering all equipment needed in operation and Patient preparation for anesthesia and surgery: 14 items and 30 sub-items covering (patient support, reassurance, explanations, history, confirmation of identification data, vital signs). Phase II: Time-out (period from anesthesia induction until before skin closure): This includes 7 items with 12 sub-items covering induction of anesthesia, proper identification, counting equipment, skin preparation, handling surgical instruments, communicating critical events immediately, and assisting in management of complications. Phase III: Sign-out: includes 5 items and 30 sub-items covering oral review of operation, handling specimens, repeating counts, immediate post-operative care, and environmental hygiene. **Scoring system:** For observational checklist consisted of given 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. The nurses had satisfactory level of practice when the total score more or equal than 75% and unsatisfactory if it less than 75% based on statistical analysis.

Administrative and ethical considerations

An official permission for data collection in Zagazig University was obtained from the hospital administrative personnel by the submission of a formal letter from the Dean of the faculty of Nursing Zagazig University explaining the aim of the study in order to obtain permission and help. At the interview, each subject was informed about the purpose, benefits

of the study, and studied nurses were informed that participation is voluntary and they have right to withdraw from the study at any time without given any reason. In addition, confidentiality, and anonymity of the subjects were assured through coding of all data. The researcher assured that the data collected will be confidential and would be used only to improve nurses' knowledge and practice for the purpose of the study.

Pilot study

Was carried out in order to check and ensure the clarity, applicability, relevance and feasibility of the tools. For this study, the researcher selected seven (10%) nurses random to participate in the pilot testing of the questionnaire and checklist from operating rooms. It helped to estimate the time needed to fill in the sheets. Since no modifications were done.

Field work

Once the approval was granted to progress in the study, the researcher started to organize a schedule for collecting the data. The researcher visited study setting to be familiar with work process, time of work and observe nurses attending the study settings to a set schedule for data collection. The researcher used to go to the study setting for interviewing the nurses who fulfill the criteria. The purpose of the study was explained to each nurse individually, and then the nurses were asked to participate in the study. Each nurse observed for 2 shifts at morning and afternoon for three times then she will ask to fulfill the questionnaire sheet, as the researcher was observing nurses practical skills about studied procedure. The time needed to complete the checklist varies between 1-3 hours or according to type of surgery. The fieldwork was executed over the period from September, 2020 to March, 2021. The researcher was available one day (Sunday) at Emergency Hospital and one day (Tuesday) at New Surgery Hospital at Zagazig University weekly.

Content validity and Reliability

The tools were revised by a panel of seven experts from medical and nursing staff which included one professor of medical surgical nursing, one professor of general surgery and five assistant professors of medical surgical nursing that revised the tool's content for clarity, relevance, comprehensiveness, understanding, and ease for implementation. All recommended modifications were done. Reliability was measured by Cronbach's Alpha for knowledge questionnaire was 0.82. Reliability of practice checklist was 0.979. Reliability of factors was 0.769.

Statistical analysis

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA 2011). Quantitative data were expressed as the mean $\pm$ SD & (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. Spearman's rank correlation coefficient was calculated to assess relationship between various study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation, also values near to 1 indicate strong correlation & values near 0 indicate weak correlation. All tests were two sided. P-value < 0.05 was considered statistically significant (S), and p-value $\geq$ 0.05 was considered statistically insignificant (NS).

Results

As regard age, 52.9% of the studied nurses age less than or equal 30 years ranged between 19-49 years old with mean 30.5 ± 6.05 and 75.7% of nurses were female, while 54.3% of the studied nurses were married. As regard qualification 42.9% of nurses had technical institute

in nursing. Furthermore 57.1% of the studied nurses had total years of experience regarding operating rooms. In addition 38.6 % of the studied nurses had previously attended training courses related patient safety in emergency operating rooms, table (1). According to level of nurse's Knowledge regarding patient safety in emergency operating rooms: It was found that 47.1% of studied nurses had satisfactory level of total knowledge score, while 52.9% of nurses had unsatisfactory level of total knowledge score with mean $\pm$ SD, 20.51 ± 2.83 , table (2). The current finding revealed that the studied nurses their performance regarding patient safety in emergency operating rooms was affected by training 58.6%, communication 84.3%, planning and coordination 91.4%, environmental design 1.4%, equipment 88.6%, maintenance 40.0%, teamwork 35.7%, team instructions 64.3% , situation awareness 57.1%, housekeeping of equipment 74.3%, hierarchical decision making 52.9% and procedures 80% related factors. Finally, 80% of studied nurses had factors affecting their performance regarding patient safety in emergency operating rooms with Mean $\pm$ SD 27.63 ± 5.19 , table (3). As regard to level of nurse's practice, the study finding revealed that 38.6% of studied nurses had unsatisfactory level of total practice score, while 61.4% of nurses had satisfactory level of total practices score regarding patient safety in emergency operating rooms with mean $\pm$ SD, 93.1 ± 12.57 , table (4). The study finding revealed that there was significant positive correlation between total knowledge and total practice ($r = 608^{**}$ at $p = 0.0001$) among studied nurses and there was statistically significant positive correlation between total knowledge and total factors ($r = .447^{**}$ at $p = 0.0001$) among studied nurses. In addition to, there was statistically significant positive correlation between total factors and total practice ($r = .382^{**}$ at $p = 0.001$), table (5).

Discussion

The results of the current study revealed that more than half of studied nurses' age was less than 30 years old and more than three quarters were female. A female gender was higher than male due to the most of nurses in the past were female. More than half of studied nurses were married and had years of experience in operating room above five years with mean 7.8 ± 6.2 . In addition more than one third of the studied nurses had technical institute in nursing. This may be because according to the hospital policy, technical institute nurses are responsible for patient care but nurses graduated from faculty only doing supervisor role in spite of availability of them. These findings in the same line with Asghari et al., (2019) who reported that, more than one third of studied nurses 40.1% were had technical institute in nursing. Finding of this study clarified that more than half of studied nurses hadn't previously attended training course about patient safety. This may be due to decrease accessibility of training courses provided by hospital management. This result is contradicted with Sillero et al., (2018) who stated that more than half of studied nurses attended training courses regarding patient safety in operating rooms. But more than one third of studied nurses had previously attended training course about patient safety in operating rooms. According to total nurses' knowledge regarding patient safety in emergency operating rooms, The current study clarified that more than half of the studied nurses had unsatisfactory level of knowledge. It may be related to one of the following factors: absence of scientific continuous teaching activities in clinical field, nurses' ignorance, lack of hospital administration to supervision and attention to supply nurses with such knowledge, majority of nurses working in operating rooms had diploma or technical institution so they hadn't enough knowledge regarding patient safety and lack of training, in the same consequence with Nakhaee et al., (2015) who found that more than half of studied nurses had unsatisfactory knowledge regarding patient safety. This is contraindicated with Fajemilehin et al., (2016) who revealed that the majority of nurses had good knowledge about patient safety. According to factors affecting nurses' performance, the current finding revealed that the majority of the studied

nurses their performance regarding patient safety in emergency operating rooms was affected by training, communication, planning and coordination, environmental design, equipment, maintenance, teamwork, team instructions, situation awareness, housekeeping of equipment, hierarchical decision making and procedures related factors. This result is on the same line with Gouda et al., (2019) who stated that the most of the studied nurses their performance were affected by these factors. Concerning total nurses' practice in operating room, this study revealed that more than third of studied nurses had unsatisfactory total practice regarding patient safety along three phases of surgery (sign in, time out, sign out). This may be due to lack of bachelor graduate among studied nurses, poor training and work overload. In addition, knowledge deficit and lack of attention about patient safety, lack of standardized nursing care procedure or no availability of manual book which contain all nursing procedure in patient safety in emergency operating room, increased number of patients documented in operation list compared with staff number make the nurse experience burn out. All these contributed to the unsatisfactory practice level of nurses regarding patient safety in operating rooms. These results are matched with Ali et al., (2020) who clarified that more than one third of studied nurses had unsatisfactory total practice regarding patient safety in operating room. But this is contraindicated with Gutierrez et al., (2018) who reported that the nurses participating in the study presented satisfactory practice for patient safety in the operating room. The present study results identify a statistically positive correlation between studied nurses' total knowledge regarding patient safety in emergency operating room with factors affecting nurses' performance, and total nurses' practice. These results are not correspondent with Kang et al., (2015), who reported that, there are no significant correlations between total knowledge regarding patient safety with factors affecting nurses' performance and nurses' practice. Finally, analysis of data in the current study showed that, the main factors affecting nurses' performance regarding patient safety were (planning and coordination, equipment, communication and procedures) in emergency operating rooms. Regarding nurses' performance, more than half of the studied nurses had unsatisfactory level of total knowledge and more than third had unsatisfactory total practice regarding patient safety in emergency operating rooms.

Conclusion

Based on the results of the present study, it could be concluded that, more than half of the studied nurses had unsatisfactory level of total knowledge score and more than one third had unsatisfactory level of total practice score. The majority of the studied nurses their performance regarding patient safety in emergency operating rooms had affected by total factors. In addition, there was positive significant correlation between studied nurses' total knowledge with total nurses' practice and factors affecting nurses' practice regarding patient safety in emergency operating room.

Recommendations

The study recommended that, training programs for all operating room nurses's to improve their knowledge and practice regarding patient safety. The factors affecting nurses' performance should be evaluated by the nursing management and hospital administration to avoid or correct such factors. Further research is proposed to assess the value of specialized training program or interventions on nurses' performance regarding patient safety in emergency operating room.

Table 1 Personal Characteristics Data of Studied Nurses (n=70)

Items	No	%
Age		

<30 years	37	52.9
≥30 years	33	47.1
Mean ±SD 30.5±6.05 Median(range) (19-49)		
29		
Gender		
Males	17	24.3
Females	53	75.7
Education		
Diploma	21	30.0
technical institute	30	42.9
Bachelors'	19	27.1
Marital status		
Single	20	28.6
Married	38	54.3
Others	12	17.1
Residence		
Rural	62	88.6
Urban	8	11.4
Years of experience		
≤5 years	30	42.9
>5 years	40	57.1
Mean ±SD 7.8±6.2 Median(range) 30)		
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Training		
Yes	27	38.6
No	43	61.4
Income		
Sufficient	46	65.7
Insufficient	24	34.3
Medical check up		
Yes	35	0.50
No	35	0.50
HB Vaccine		
Yes	38	54.3
No	32	45.7

Table 2 Number and Percentage Distribution of Total Nurse's Knowledge Regarding Patient Safety in Emergency Operating Rooms (n=70)

Items	No	%
Total Knowledge Level(28)*		
Satisfactory	33	47.1
Unsatisfactory	37	52.9
Mean ±SD Range	20.51±2.83 (13-27)	

Table 3 Number and Percentage Distribution of Total Nurses' Practices Regarding Patient Safety in Emergency Operating Rooms (n=70)

Items	No	%
Total Practice Level(123)*		
Satisfactory	43	61.4
Un Satisfactory	27	38.6
Mean $\pm$ SD	93.1 $\pm$ 12.57	
Range	(33-111)	

Table 4 Frequency and Percentage Distribution of Factors Affecting Nurses Performance Regarding Patient Safety in Emergency Operating Rooms (n=70)

Items	Affected		Not affected	
	No.	%	No.	%
Training (5)*	41	58.6%	29	41.4
Mean $\pm$ SD	3.24 $\pm$ 1.43			
Range	00-5			
Communication(4)*	59	84.3	11	15.7
Mean $\pm$ SD	1.91 $\pm$ 0.74			
Range	00-4			
Planning and coordination (2)*	64	91.4	6	8.6
Mean $\pm$ SD	0.36 $\pm$ 0.64			
Range	00-2			
Environmental Design (4)*	1	1.4	69	98.6
Mean $\pm$ SD	3.87 $\pm$ 0.45			
Range	1-4			
Equipment within Operating Room(6)*	62	88.6	8	11.4
Mean $\pm$ SD	3.39 $\pm$ 1.15			
Range	1-6			
Maintenance (2)*	28	40.0	42	60.0
Mean $\pm$ SD	1.4 $\pm$ 0.81			
Range	00-2			
Team work (4)*	25	35.7	45	64.3
Mean $\pm$ SD	2.84 $\pm$ 1.37			
Range	00-4			
Team instructions (3)*	45	64.3	25	35.7
Mean $\pm$ SD	1.81 $\pm$ 1.12			
Range	00-3			
Situation awareness (3)*	40	57.1	30	42.9
Mean $\pm$ SD	2.26 $\pm$ 1.37			
Range	00-4			
Housekeeping of Equipment(3)*	52	74.3	18	25.7
Mean $\pm$ SD	1.79 $\pm$ 0.92			
Range	00-3			
Hierarchical decision making (5)*	37	52.9	33	47.1
Mean $\pm$ SD	3.39 $\pm$ 0.87			
Range	1-5			
Procedures (3)*	56	80.0	14	20.0
Mean $\pm$ SD	1.34 $\pm$ 1.1			

Range	00-3			
Total Factors Affecting Nursing Role (44)*	56	80.0	14	20.0
Mean $\pm$ SD	27.63 $\pm$ 5.19			
Range	17-40			

()* maximum score

Table 5 Correlation Matrix between Total Knowledge Score, Total Practice Score and Factors Affecting Nurses Performance Regarding Patient Safety in Emergency Operating Rooms (n=70).

		Knowledge	Practice	Factors
Knowledge	R	-	608**	0.447**
	P	-	0.0001*	0.0001*
Factor	R	-	.382**	-
	P	-	0.001	-

(r) Correlation coefficient significant $p < 0.05$.

* Insignificant $p > 0.05$

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