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Safety Measures Applied by Nurses for Surgical Patients Postoperatively and Its Relation to Patients Outcomes

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Abstract: **Keeping patients safe while in the postoperative period is a topic of great concern for patients and nurses. Aim: To determine safety measures applied by nurses for surgical patients postoperatively and its relation to patients' outcomes. Design: descriptive, correlational research designs was utilized. Setting: Surgical "Male & Female 'departments' at king abdulaziz university teaching affiliated hospital in Jeddah, Kingdom of Saudi Arabia. Subjects: a non-probability convenience sample was chosen and it consisted of all available nurses working from the above setting and their surgical postoperative patients. Total numbers included in the study were 31 nurses and 31 post-operative patients. Tools: 1. Sociodemographic questionnaire: to assess nurses Socio-demographic characteristics. 2. Safety Measures Observation Checklists: to investigate safety measures applied by nurses for surgical patients postoperatively. 3. Surgical Patient Clinical outcomes observational Checklist: was adopted from hospital chart to determine surgical patient clinical outcomes within the first 24 hours postoperatively. Results: The highest percentage of studied nurses were providing care for their patients equally without pay attention to religion, color or gender. Also it revealed that nurses were not explains to patients; the importance of knowing the signs of wound inflammation. Conclusions: There is a positive correlation but not significant between safety measures score and surgical patient clinical outcome score. Also the educational level among the studied nurses had a positive effect between safety measures dimension and patient outcomes postoperatively. Recommendations: There is a need to change in the educational system through creating patient safety courses in nursing faculties' curriculums.**

Keywords: **Safety Measures- Surgical Patients- Patient Outcomes.**

1. INTRODUCTION

Nurses are involved in the provision of health care in every area of the health care system, 24 hours a day seven days a week. This presence of nurses and their sound knowledge base enable them to play a critical role in patient safety. Through their vigilance, nurses act to keep patients` safe, identify areas of risk and recognize situations in need of improvement **[1].**

Nurses address patient safety in all aspects of care. This includes informing patients about risk and risk reduction, advocating for patient safety and reporting adverse events **[2].** Safety is a serious component of health care quality, and health care organizations continually attempt to improve the safety of their services, with increasing recognition of the importance of establishing a safety culture. A culture of safety requires an understanding of the values, beliefs and norms about what is important in an organization and what attitudes and behaviors related to safety are supported, rewarded and expected **[3].**

Safety emerges from the interaction of the health systems' component; it does not reside in a person, device or department. Improvement that requires understanding technical work and identifying organizational factors that influence the safe work conduct **[4].**

The enhancement of patient safety involves a wide range of actions in the recruitment, training and retention of health care professionals, performance improvement, environmental safety and risk management, including infection control, safe use of medicines, equipment safety, safe clinical practice, safe environment of care, and accumulating an integrated body of scientific knowledge focused on patient safety **[5].**

Keeping patients safe while in the postoperative period is a topic of great concern for patients and nurses There are many possible causes for patient harm within the surgical department. The process of providing post-operative care includes the use of medications, dressing and physical activity on the part of the patient. When time constraints and staffing difficulties are added to the equation, it is understandable how and why injuries occur **[6].** The most significant barrier to improve patient safety is a lack of awareness of the extent to which errors occur daily in all health care settings **[7].**

Patient safety is a discipline that emphasizes safety in health care through the prevention, reduction, reporting, and analysis of medical error that often leads to adverse effects. The frequency and magnitude of avoidable adverse events experienced by patients was not well known until the 1990s, when multiple countries reported staggering numbers of patients harmed and killed by medical errors. Recognizing that healthcare errors impact 1 in every 10 patients around the world, the world health organization calls patient safety an endemic concern **[8].** Indeed, patient safety has emerged as a distinct healthcare discipline supported by an immature yet developing scientific framework. There is a significant transdisciplinary body of theoretical and research literature that informs the science of patient safety **[9].**

Patient safety is one of the Nations' most health care challenges, there is increasing number of patients who die in hospitals each year as the result of lapses in patient safety practice **[10].** Improving patient safety, remains a health care organizational challenge, compared to other industries with highly reliable processes, health care baseline process reliability is low and patient safety solutions continue to be a high demand, while studies have examined implementation of individual patient safety intervention, little has been studied or published on the theoretical framework of patient safety system implementation in health care institution **[11].** According to its definition by the National Patient Safety Foundation, patient safety consists in "the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the processes of health care **[12].** Surgery involving little risk to the life of the patient; *specifically*: an operation on the superficial structures of the body or a manipulative procedure that does not involve a serious risk **[13].**

Surgical care is an integral part of health care throughout the world, with an estimated 234 million operations performed annually **[14].** This yearly volume now exceeds that of childbirth**.** Surgery is performed in every community; wealthy and poor, rural and urban, and in all regions **[15].** Although surgical care can prevent loss of life or limb, it is also associated with a considerable risk of complications and death. The risk of complications is poorly characterized in many parts of the world, but studies in industrialized countries have shown a perioperative rate of death from inpatient surgery of 0.4 to 0.8% and a rate of major complications of 3 to 17%. Data suggest that at least half of all surgical complications are avoidable **[16].** Previous efforts to implement practices designed to reduce surgical site infections or anesthesia-related mishaps have been shown to reduce complications significantly **[17&18].** A growing body of evidence also links teamwork in surgery to improved outcomes, with high-functioning teams achieving significantly reduced rates of adverse events **[19&20].** Adverse events in patients who have undergone surgery constitute a large proportion of iatrogenic illnesses. Most surgical safety interventions have focused on the operating room. Since more than half of all surgical errors occur outside the operating room, it is likely that a more substantial improvement in outcomes can be achieved by targeting the entire surgical pathway **[21].**

Patient outcomes to be the most meaningful that the interventions, patient behaviors and health determinants would be documented. The interventions include rides to physician visits, health coaching and nurse phone calls in addition to medications, therapies and surgeries. Patient behaviors documented include medication adherence, physical activity, nutrition and sticking to 20 minutes per day of walking in the care plan. The health determinants that drive patient behavior documented would include social, socioeconomic and environmental **[22].**

Hospital-acquired complications, such as nosocomial infection, falls, and venous thromboembolism, are well known to be frequent and morbid. Unfortunately, prevention remains challenging. Two widely touted prevention strategies-checklists and reminders-have inherent barriers that limit their use as general solutions to these endemic problems. Likewise, relying upon additional vigilance and efforts of those already caring for patients may guarantee that hospital acquired complications persist, given the time pressures already constraining bedside clinicians. Consequently, the Patient Safety, be considered to ensure that each patient receives individualized prevention strategies to minimize the hazards of hospitalization **[23].**

Automated risk assessment in the acute and long-term care settings that recent national patient safety efforts highlight the promise of using informatics processes to manage patient. safety issues such as the management of patient falls. However, to date, most automated risk assessment techniques in the acute care setting are electronic versions of existing fall risk assessment instruments, with limited use of computerized decision support **[24&25].**

In Egypt, patient safety culture still has many areas for improvement that need continuous evaluation and monitoring to attain a safe environment both for patients and health-care providers **[26].** Observable behavior that can be directly measured and a description of submission to predetermined goals were very essential **[27].** Moreover, in Egypt, various studies in the patient safety field have been conducted however; less attention has been focused on handling patient safety issues from the front-line healthcare provider's perception **[28].**

There are a number of complications that can result from surgery, some of which are of major concern because of their potential to cause hazards as medications, including drug errors. The introduction of acute pain services has enabled early recognition of these hazards and, in some cases, extremely rare complications so that corrective action can be taken to prevent permanent harm **[29].**

Improved nursing care may prevent many adverse events, and nursing must take a stronger leadership role in this area. Although errors are almost inevitable, safety can be improved, and health care institutions are increasingly making safety a top priority. Information technology provides safety benefits by enhancing communication and delivering decision-support; its use will likely be a cornerstone for improving safety **[30].**

Aim of the study:

To determine safety measures applied by nurses for surgical patients postoperatively and its relation to patients' outcomes

Research questions:

1. What are safety measures applied by nurses for surgical patient postoperatively?

2**.** What are the relationship between safety measures and surgical patient outcomes postoperatively?

Operational definition:

- **Safety Measures** was operationally defined as certain actions taken by the nurse to increase or ensure protection from danger as using universal precautions , pproviding health education and /or revising the prepared medication with the prescribed one before administration.

- **Surgical patient postoperatively** was operationally defined as a patient who is admitted to the hospital for minor surgical treatment that requires at least one overnight stay.

- **Surgical patient outcomes** were operationally defined as interventions must be assessed such as Patient outcomes related to consciousness, vital signs, skin color, wound, ambulation and bowel sounds.

2. SUBJECTS AND METHOD

Design: correlational descriptive research designs have been utilized

Setting: The study was carried out at surgical departments, Male & Female, King Abdulaziz University teaching affiliated hospital, Jeddah, KSA. The hospital has 845 beds with the addition of 157 beds dedicated for the critical care units and general & specialized clinics that exceeds two hundred clinics. With consistent generosity and support, it's now

full capacity of 1002 beds. As regard general surgical in-patient departments; the hospital has two main surgical departments in the fifth floor one for males' and the other for female patients`; each has 30 beds. Each department provides care for different types of surgical operations and procedures. Nurses working in those two departments have been distributed on the three shifts. The available nurses had been involved in the study

Subjects:

Two types of sample were selected.

1. Nurses Sample: Non probability convenience sample of 31 nurses was selected. All available nurses working in the above mentioned setting were selected.

2. Patients Sample: purposive sample was selected. The total numbers included in the study were 31 patients from the same departments. They were selected according to the following:

Inclusion criteria:

- Adult
- Alert/Conscious
- Has no chronic illness
- Has minor surgery
- Within 24 hours Postoperatively

Tools of the study:

1. Sociodemographic questionnaire, to assess nurses Socio-demographic characteristics as gender, age, marital status, and years of clinical experiences, training about surgery.

2. Safety Measures Observation Checklists: It was developed by **[27]** and adapted by the researcher to observe safety measures applied by nurses for surgical patients postoperatively within 24 hours. It was divided into 2 parts:

Part I: Safety measures regarding to nursing practice applied by nurses for surgical patients postoperatively were consisting of 8 items; "give nursing care and not protecting the patient from harm, provide care for their patients equally without pay attention to religion, color or gender, nurses' practice universal precautions for the surgical patients.

Scoring system Tool, II; part1:

- Done = 3
- Not Done =2
- Not applicable=1

The cut point for satisfactory is set at 60% of the total score.

Part II: Safety measures regarding to patient' right applied by nurses for surgical patients postoperatively were consisting of 7 items; consider the patient has the right to express his/her pain, consider the patients have the right to be answered for all their questions related to the health status, consider the patients have the right to make their descion related to his/ her care plan etc….

Scoring system for Tool II; part II:

- Agree=3
- Uncertain=2
- Disagree=1

3. Surgical Patient Clinical outcomes observational Checklist: was adopted from hospital chart to determine surgical patient clinical outcomes within the first 24 hours postoperatively. Surgical outcomes components were 7: as neurological, cardiovascular, respiratory, skin color, ambulation, wound and GIT assessment.

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Scoring system for Tool III

- Normal findings =2
- Abnormal findings =1

Procedure for Data collection:

- The present study was carried out within six months started from the 1st of January to the 30th of Jun 2015.
- **Approval** Before data collection the necessary approval was secured from the director of hospital at king Abdulaziz University Hospital, Jeddah. The purpose of the study was explained to nurses, patients and agreement was taken to the research.
- **Ethical consideration and Informed consent:**

During the initial interview, the purpose of the study and the procedures were explained to the nurses and the postoperative patients. An informed consent was obtained from both subjects. They were assured that all information would be confidential. Subjects were assured that their participation in the study was voluntary and that they could withdraw from the study at any time and their participation would be voluntary.

- **Validity of tools:** A jury of seven experts reviewed the tools; 5 from the medical surgical nursing, faculty of nursing, king Abdulaziz University, and two surgeons from surgery department, king Abdulaziz university hospital were selected to test the clarity, feasibility and relevance of tools. The corrections were done accordingly based on their response.
- **Reliability of the tool**: The reliability co-efficient regarding the safety measures observational checklist, the researcher repeated the reliability co-efficient; the Cronbach's alpha of tool II was showed 0 .798. and for tool III the Cronbach's alpha was 0.87. Hence the study tools indicate good reliability for conducting the research study.
- **Pilot study:** A pilot study was carried out on 10% of the subjects. Tools were tested in the previously mentioned settings in order to be revised for clarity, understanding, comprehensiveness, practicability, applicability, feasibility and ease of implementation, detecting the obstacles and problems that may be encountered during data collection. It also helped to estimate the time needed to fill in the study tools. Data collected from the pilot study were analyzed and minor modification was done. The researcher has excluded the piloted sample.
- Each nurse was observed by the researcher regarding safety measures provided by them for surgical patients postoperatively within 24 hours. Each observation took from 20-25 minutes

Statistical analysis:

The data has been analyzed using SPSS version 16. SPSS is a comprehensive system for analyzing data. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and complex statistical analysis. Data was represented as frequencies, percentages, and mean ± standard deviation.

3. RESULTS

Table (1) This table reveals that more than two third of the studied sample (71%) were female nurses. 64.5 % had bachelor degree, while 35.5 % had nursing school diploma. Moreover, slightly above half of studied nurses (58.1%) their clinical experiences in the current position was ranged from less than three up to six years as well as 9.7 % of them had one year clinical experiences. 90.3 % were registered nurses, 61.3 % of them had children ranged from 1 up to 2 . In addition, slightly above half 54.8 % were married. The mean age was 32.9 at SD 5.12.

Table (2) This table shows that highest percentage of studied nurses 96.8% provide care for their patients equally without paying attention to religion, color or gender, while 48.4% of nurses did not "Give nursing care without protecting the patient from harm". Only 1.1 % of the studied nurses did not apply universal precautions of the surgical patient". While 8.1% notify the doctor about any complications occurred to the patient during his/her stay in the unit.

Table (3) This table reveals that the minority 6.5 % of nurses had agree about "Consider that the patient have the right to make his decision related to his care plan", as well as 45.2% nurses did not agree that Explaining to patient the importance to know the signs of wound inflammation.

Table (4) This table illustrates relationship between nurse's qualifications and safety measures applied to postoperative surgical patients. The only statistically significant predictors of the item "recorded accurate medication information in surgical unit record" as revealed from the p value <0.05. This measure explains the variations in nurses' education regarding accurate recording of medication in surgical ward at mean= 4.045. None of the other items of patient safety measures had a statistically significant effect in relation to nurses qualifications at p= >0.05.

Table (5) This table revealed that no statistically significant relations were observed between nurse's years of clinical experiences, their qualifications and patient safety measures practice at p= >0.05.

Table (6) This table revealed that no statistically significant relationship was observed between gender, marital status, level of education and years of experiences and surgical patient outcomes scores at p= >0.05. Conversely, statistically significant correlations could be detected with surgical patient outcomes scores and nurses occupation at t test -2.23 p=<0.05.

Table (7): This table revealed that there is a negative correlation between total patient safety measures and outcome score with diploma nurses while there is a positive correlation between total patient safety measures and outcome score with bachelor degree nurses their clinical years of experiences >3-6.

Figure (1): This figure reveals Correlation between patient safety practice score and patient outcome score r= 0.1 p value=0.6 not significant

Table (1): Distribution of studied nurses according to their Socio-demographic data

Socio-Demographic Characteristics	n. (31)	100%
Age		
• Mean	32.9	
• SD	5.12	
Gender		
• Male	9	29.0
• Female	22	71.0
Level of Education		
• Diploma	11	35.5
• Bachelor degree	20	64.5
Clinical Experience		
• less than one year	3	9.7
• >1-3	5	16.1
• >3-6	18	58.1
• above six years	5	16.1
Occupation		
• Registered Nurse	28	90.3
• Assistant Nurse	3	9.7
Marital status		
• Single	14	45.2
• Married	17	54.8
Number of children		
• No children	11	35.5
• 1-2	19	61.3
• 3-5	1	3.2
Surgical Departments:		
• Female Department	13	41.9
• Male Department	18	58.1

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Table (2) Safety Nursing Practice applied to surgical patient postoperatively (N=31)

Safety Nursing Practice	Done		Not Done		Not applicable	
	n.	%	n.	%	n.	%
1. Give nursing care without protecting the patient from harm	15	45.2	14	48.4	2	6.5
2. .Provide health education for the patient.	16	51.6	3	9.7	12	38.7
3. Provide care for their patients equally without pay attention to religion, color or gender -----etc	30	96.8	1	3.2	0	0.0
4. Nurses' practice with universal precautions for the surgical patient.	18	58.1	5	16.1	8	25.8
5. Wash their hands between each patient, during and after care with patient and between any procedure and the other.	21	67.7	10	32.3	0	0.0
6. Revise the prepared medication with the prescribed one before administration.	30	96.8	1	3.2	0	0.0
7. Recored accurate medication information in surgical unit record	16	51.6	3	9.7	12	38.7
8. Notify the doctor about any complications occurred to the patient during his/her stay in the unit.	18	58.1	0	0.0	13	41.9

Table (3) Safety Nursing practice applied to patient' right for surgical patients postoperatively (N=31)

Safety Nursing practice applied to patient' right	Agree		uncertain		Disagree	
	n.	%	n.	%	n.	%
1. Consider the patient has the right to express his/her pain.	23	74.2	3	9.7	5	16.1
2. Consider that the patients have the right to be answered for all their questions related to the health status.	14	45.2	14	45.2	3	9.7
3. Consider that the patients have the right to make their decision related to his/her care plan.	21	67.5	2	6.5	8	25.8
4. Consider the patient's right to use his/her own personal utilities in the unit as" food, drink, radio…	24	77.4	1	3.2	6	19.4
5. Explain for the patient about the importance of commitment with safety measures	18	58.1	4	12.9	9	29.0
6. Explains to patient the importance to know the signs of wound inflammation	10	32.3	7	22.6	14	45.2
7. Attend training program for improving safe care in the unit.	14	45.2	6	19.4	11	35.5

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Table (4) Relationship between nurse's qualifications and safety measures applied to post-operative surgical patients (N = 31).

Patient safety measures		Nurses Qualifications				Chi square	P-value
		Diploma N=11		Bachelor degree N=20			
		n.	%	n.	%		
1. Give nursing care without protecting the patient from harm	*No	8	50.0	8	50.0	3.044	>0.05
	Yes	3	20.0	12	80.0		
2. Provide health education for the patient.	*No	7	46.7	8	53.3	1.58	>0.05
	Yes	4	25.0	12	75..0		
3. Provide care for their patients equally without pay attention to religion, color or gender -----etc	*No	0	0.0	1	100.0	0.568	>0.05
	Yes	11	36.7	19	63.3		
4. Consider the patient has the right to express his/her pain.	*No	2	25.0	6	75.0	0.518	>0.05
	Yes	9	39.1	14	60.9		
5. Consider that the patients have the right to be answered for all their questions related to the health status.	*No	7	41.2	10	58.8	0.533	>0.05
	Yes	4	28.6	10	71.4		
6. Consider that the patients have the right to make their decision related to his/her care plan.	*No	4	40.0	6	60.0	0.132	>0.05
	Yes	7	33.3	14	66.7		
7. Consider the patient's right to use his/her own personal utilities in the unit as" food, drink, radio…	*No	3	42.9	4	57.1	0.215	>0.05
	Yes	8	33.3	16	66.7		
8. Explain for the patient about the importance of commitment with safety measures	*No	7	53.8	6	46.2	3.29	>0.05
	Yes	4	22.2	14	77.8		
9.Explains to patient the importance to know the signs of wound inflammation	*No	9	42.9	12	57.1	1.546	>0.05
	Yes	2	20.0	8	80.0		
1. Attend training program for improving safe care in the unit.	*No	6	35.3	11	64.7	0.001	>0.05
	Yes	5	35.7	9	64.3		
11. Nurses' practice with universal precautions for the surgical patient.	*No	5	38.5	8	61.5	0.087	>0.05
	Yes	6	33.3	12	66.7		
12. Wash their hands between each patient, during and after care with patient and between any procedure and the other.	*No	4	40.0	6	60.0	0.132	>0.05
	Yes	7	33.3	14	66.7		
13. Revise the prepared medication with the prescribed one before administration.	*No	1	100.0	0	0.0	1.879	>0.05
	Yes	10	33.3	20	66.7		
14.Recored accurate medication information in surgical unit record	*No	8	53.3	7	46.7	4.045	<0.05* sig
	Yes	3	18.8	13	81.3		
15. Notify the doctor about any complications occurred to the patient during his/her stay in the unit	*No	5	38.5	8	61.5	0.087	>0.05
	Yes	6	33.3	12	66.7		

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Table (5) Relationship between nurses' years of clinical experiences, qualifications and safety measures practice

		safety measures practice		Test of significance	p- value
		Mean	SD		
Qualifications	Diploma	15.91	4.35	t= -0.791	>0.05 N. sig.
	Bachelor degree	17.05	3.55		
Years of clinical experience	less than one year	16.67	2.89	F=1.3	>0.05 N. sig.
	>1-3	16.00	6.04		
	>3-6	16.94	3.35		
	above six years	16.20	4.44		

Table (6) Relationship between nurse's sociodemographic characteristics and postoperative surgical patient clinical outcomes

Nurses Sociodemographic characteristics		Patient outcome score		t-test	p- value
		Mean	Standard Deviation		
Gender	Male	61.44	2.88	-0.008	>0.05 N. sig.
	Female	61.45	3.23		
Occupation	Registered nurse	61.07	3.01	-2.23	<0.05* Sig.
	Assistant nurse	65.00	.00		
Marital status	Single	60.71	4.01	-1.217	>0.05 N. sig.
	Married	62.06	1.98		
Level of Education	Diploma	61.82	2.71	t= 0.484	>0.05 N. sig.
	Bachelor degree	61.25	3.32		
Years of clinical experiences	less than one year	65.00	.00	F= 1.55	>0.05 N. sig.
	>1-3	61.60	3.36		
	>3-6	60.61	3.24		
	above six years	62.20	1.48		

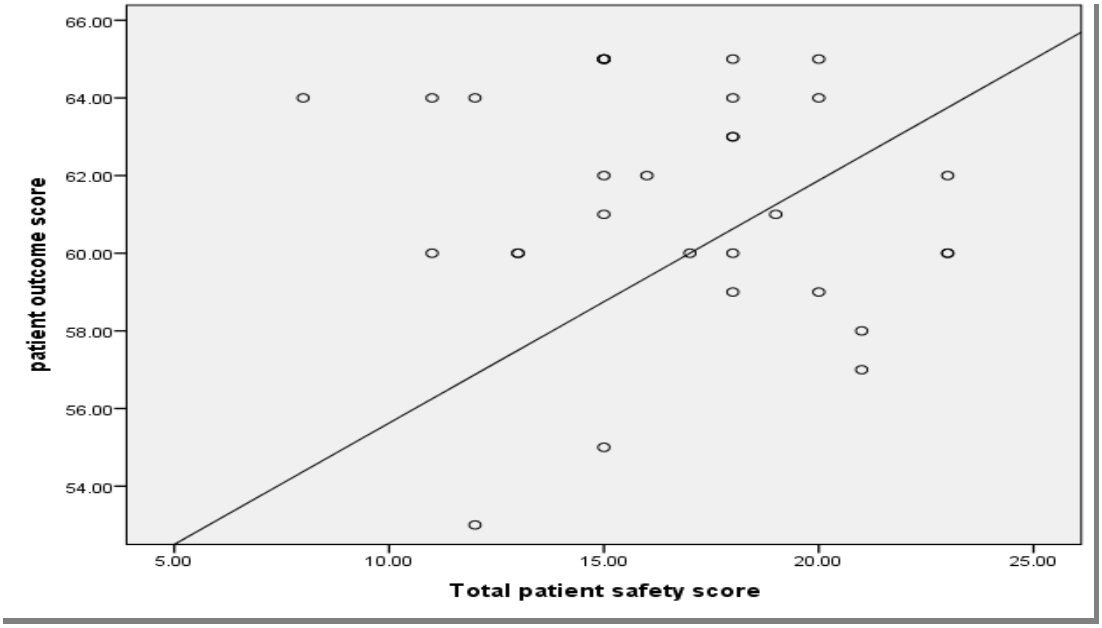

Figure (1): Correlation between patient safety measures practice score and patient outcome score

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Table (7): Correlation between nurses 'qualifications, years of clinical experiences, safety measures practice score and patient outcome score

			Total patient safety measures	Outcome score
Nurses Qualifications				
Diploma	Total patient safety measures	r	1	-.570
		P-value		.067
		N	11	11
	Outcome score	r	-.570	1
		P-value	.067	
		N	11	11
Bachelor degree	Total patient safety measures	r	1	.164
		P-value		.489
		N	20	20
	Outcome score	r	.164	1
		P-value	.489	
		N	20	20
Years of experience				
>1-3	Total patient safety measures	r	1	-.677
		P-value		.209
		N	5	5
	Outcome score	r	-.677	1
		P-value	.209	
		N	5	5
>3-6	Total patient safety measures	r	1	.144
		P-value		.568
		N	18	18
	Outcome score	r	.144	1
		P-value	.568	
		N	18	18
above 6 years	Total patient safety measures	r	1	-.008
		P-value		.990
		N	5	5
	Outcome score	r	-.008	1
		P-value	.990	
		N	5	5

4. DISCUSSION

Safety is a condition or state of being resulting from the modification of human behavior and/or designing of the physical environment to reduce hazards thereby reducing the chance of accidents **[31].** Patient safety is a major concern of the health care system; nurses are knowledgeable worker whose main responsibility is to provide safe and effective care so it is very important for the nurses to believe in and comply with patients' right for having safe care. Nurses address patient safety in all aspects of care. This includes informing patients about risk and risk reduction, advocating for patient safety and reporting adverse events **[2].** Surgery is one major focus of health care improvement. So the present study was conducted to determine safety measures applied by nurses for surgical patients postoperatively and its relation to patients' outcomes at University Hospital.

The present study was carried out on 62 participants; 31 those nurses who are working in surgical wards at King Abdulaziz University hospital and 31 from their surgical patients. In respect to age, gender, level of education and clinical experience years. This study reported that two third of studied nurses were female in gender. Majority of them had bachelor degree, while one third had nursing school diploma, moreover slightly above half of them; their clinical experiences in the current position was ranged from less than three up to six years as well as few of them had one year nursing clinical experience. Highest percentage were registered nurses, 61.3 % of studied nurses had children ranged from 1 up to 2. In addition, slightly above half of the studied nurses were married, the mean age was 32.9 at SD 5.12 **(Table 1).** These findings were consistent with other studies by **[6]** who studied "Measuring Nurses' Compliance with Patients' Safety Measures during Hemodialysis at Minia University and General Hospitals". It was carried out on 48 nurses, which showed that the majority of them are females, approximately all of them are married, having a diploma and about half of them with the age less than 40 years and years of experiences in hemodialysis unit less than 20 years, also more than two-third of the study nurses attending training program about patients' safety and infection control precautions.

Answer Research Question no.1:

What are safety measures applied by nurses for surgical patient postoperatively?

As regards nurses who provide care; the present study findings revealed that the majority of the studied nurses providing care for their patients equally without pay attention to religion, color or gender -----etc. While almost half of nurses were not giving nursing care without protecting the patient from harm **(Table 2).** Also the present study revealed that forty-five present of nurses did not agree about explaining to patient the importance to know the signs of wound inflammation **(Table 3),** followed by more than two thirds of nurses did not practice the safety measure as regard "notify the doctor about any complications occurred to the patient during his stay in the unit **(Table 2)**. These findings were contradicted with **[6]** who studied "Measuring Nurses' Compliance with Patients' Safety Measures during Hemodialysis at Minia University and General Hospitals "and reported that the patients have the right to speak up and engage with providers in discussions concerning health care, be educated, be informed, and understand choices in the management of their health care. This is could be as a result of informing physicians promptly of any problems happened to the patient is very critical point in keeping patients' safety, as reporting systems are a fundamental link in patients' safety initiatives, promptly report events or situations of actual or potential protection of patient against harm.

On the other hand, the present study finding was consistent with **[32]** who conducted a study on "determinants of patient-reported medication errors: a comparison among seven countries". They concluded that the major challenge for all countries for error prevention is better communication among multiple healthcare providers and more structured organization of care across healthcare settings. This could be due to relative's interpreted instructions to a patient wrongly due to the doctor's use of complex technical medical jargon. Also on the social basis there were concerns about the quality of surgical practice of an otherwise excellent consultant surgeon in undertaking a particularly difficult operation, but staff felt intimidated and unable to discuss their concerns.

As regard universal precautions; the present study findings showed that the minority of the studied nurses did not practice universal precautions for the surgical patient **(table 2),** also nurses; was uncertain as regard considering the patient's right to use his own personal utilities in the unit as" food, drink, radio and revise the prepared medication with the prescribed one before administration **(table 3).** These findings were supported by **[33]** who studied" Beginning the journey of hand hygiene compliance monitoring at a 2,100-bed tertiary hospital in Vietnam" and stated that hand hygiene as a simple core measure with immense impact on patient safety with regard to decreasing the incidence of hospital-acquired infections. International estimates show that overall compliance with hand hygiene among health care personnel is as low as 5% to 30%. This is due to hand hygiene is a major component of standard precautions and one of the most effective methods to prevent transmission of pathogens associated with health care. In addition to hand hygiene, the use of personal protective equipment should be guided by risk assessment and the extent of contact anticipated with blood and body fluids, or pathogens.

Regarding the relation between patient safety measures dimension and education level of the studied nurses; the only statistically significant predictors of the item "recorded accurate medication information in surgical unit record". This dimension explains the variations in nurses' educational level regarding accurate recording of medication in surgical ward at mean= 4.045 and p value<0.05. None of the others items of patient safety dimensions had a statistically significant

effect to level of education of nurses at p= >0.05 **(Table4).** These findings respected by **[34].** It is declared that Worldwide escalation of the use of standard precautions would reduce unnecessary risks associated with health care. Promotion of an institutional safety climate helps to improve conformity with recommended measures and thus subsequent risk reduction. Provision of adequate staff and supplies, together with leadership and education of health workers, patients, and visitors, is critical for an enhanced safety climate in health-care settings. Also **[35]** who studied "Awareness of occupational hazards and use of safety measures among welder: a cross sectional study from eastern Nepal" and stated that education and duration of employment were significantly associated with the awareness of hazards and of Personal protective equipment (PPE) and its use.

Concerning relationship between years of clinical experiences, qualifications of the studied nurses and their practice of safety measures; the current study findings revealed that there are no statistically significant relations were observed at t= -0.791 p= >0.05 **(Table 5).** Also there was a study by **[36]** about **"**Nurse Staffing and Quality of Patient Care". It's suggested that greater nurse staffing was associated with better outcomes in intensive care units and in surgical patients. In addition; there was a significant negative correlation between the percentage of nurses with bachelor of science in Nursing (BSN) degrees and the incidence of deaths related to health care. This is because of the educational level of nursing staff has been identified as a moderating factor that influences their practicing on the surgical patient outcomes postoperatively.

Answer Research Question no,2:

What are the relationship between nurses' practice with safety measures and surgical patient Outcomes?

As regard to nurses sociodemographic characteristics with postoperative surgical patient clinical outcomes. The present study findings reported that there were no statistically significant relations were observed between gender, marital status, educational level and years of clinical experiences and surgical patient clinical outcomes scores at p= >0.05. Conversely, statistically significant relation could be detected between surgical patient clinical outcomes scores and occupation at t test -2.23 p=<0.05 **(Table 6).** These findings were parallel with **[37]** who studied "Surgical adverse events: a systematic review". They stated that surgical adverse events occurred in 14.4% of patients. 5.2% of those events were judged as potentially preventable to help target patient safety improvement efforts. Also there was a study by **[38]** who studied **"**Frequency of patient-reported infections among sicker adults in high-income countries: An international perspective". He revealed that Surgery has also been identified as a major predictor of patient reported hospital-acquired infection across 11 countries.

The study findings reported that the majority of the studied nurses confirmed that they are practicing safety measures regarding "revise the prepared medication with the prescribed one before administration" **(Table 2).** Also illustrate that majority of nurses 81.3 % with bachelor degree in nursing were confirming that they were "record accurate medication information in surgical unit record with a statistical significance difference with chi square 4.045 and p <0.05 **(Table4).** This is inconsistent with **[39]** who have a study about "Medication Errors in Critically Ill Adults" and stated that medication errors may occur at any stage of the medication process, most occur at the administration stage**.** Also **[40]** mentioned that drug administration constitutes a high-responsibility, primary nursing task that can consume up to 40% of clinical nurses' work time. However, there was a study by **[41]** who studied "Medication safety and transfusion errors in the ICU and beyond and stated that errors associated with drugs can be particularly common in the ICU. Critically ill patients receive nearly twice as many medications as patients in general care units, and most medications involve calculations for bolus administration or continuous infusion This is might be because medication errors have a considerable economic and societal burden. Thus, a number of error prevention strategies have been proposed to increase the safety of the medication process, including pharmacists' participation in clinical rounds, having independent drug checks by many providers, and using barcode technology, medication reconciliation programs, or computerized order entry by physicians.

As regard Correlation between safety measures score and patient outcome score; the current study concluded that there is a positive correlation but not significant between patient safety score and patient outcome scores score r= 0.1 p value=0.6 **(Figure1).** It is similar with a guideline by World Health Organization (WHO) launched a second Global Patient Safety Challenge, 'Safe Surgery Saves Lives', the goal of the WHO Patient Safety Safe Surgery Saves Lives Challenge is to improve the safety of surgical care around the world by defining a core set of safety standards that can be applied in all

countries and settings to reduce the number of surgical deaths across the world **[42].** The initiative was designed to strengthen the commitment of clinical staff to address safety issues within the surgical setting. This included improving anesthetic safety practices, ensuring correct site surgery, avoiding surgical site infections and improving communication and teamwork within the team **[43].** Because surgical complications are a considerable cause of death and disability around the world; the current findings revealed that there is a positive correlation but not significant between patient safety score and patient outcome scores **(Figure1).** Those findings supported by **[14]** Who studied "A surgical safety checklist to reduce morbidity and mortality in a global population" and reported that death & postoperative complications improved following implementation of SSCs. and improves the safety of surgical patients in diverse clinical and economic environments.

Although it is clear that the delivery of patient-centered care should be a priority, it is not clear that patient satisfaction is directly related to patient safety or effectiveness of care. In fact, previous studies have demonstrated variable associations between patient satisfaction, patient safety, and patient outcomes.

5. CONCLUSIONS

Providing care for the patients equally without pay attention to religion, color or gender and universal precautions are the most safety measures practicing by the studied nurses with the surgical patient postoperatively, also the educational level was variated among studied nurses regarding accurate recording of medication in surgical ward. Although there was no relationship between years of clinical experiences, qualifications of the studied nurses and their practice of safety measures for the surgical patient postoperatively. However, there is a positive correlation but not significant between patient safety measures practice score and surgical patient clinical outcome scores.

6. RECOMMENDATIONS

- Training program for all nurses about safety measures for practice all procedures applied to all surgical patients post operatively.
- Ensure a safe skill-mix which includes experienced nurses working each shift to ensure that graduate and beginner nurses are adequately mentored and supervised.
- In-service education program for safety measures applied to all surgical patients post operatively.
- Apply the World Health Organization's (WHO) surgical checklist as intervention tool to decrease morbidity and mortality in surgical procedures.

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