

Nurses' Perception Regarding Their Role for Maintaining Patients' Safety inside the Operating Room

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Abstract Securing patient safety and preventing mistakes are described as key elements in the operating room that should be maintained by surgical team specially nurses, who are the most available with the patients inside the operating room, all the time, that play an important role to maintain patient safety. The operating room is a high-tech and stressful work environment in which the patients are exposed to invasive procedures, which lead to many hazards. **Aim the study:** To explore nurses' perception regarding their role for maintaining patients' safety inside the operating room. **Methods:** A phenomenological qualitative research design approach was used, 20 nurses were recruited from different operating rooms in one of the governmental hospitals in Cairo. The required data were collected during in-depth and semi-structured interviews through using an audio recording; in this study a purposive sampling technique was utilized. **Results:** 18 nurses out of 20 nurses realized the importance of their role regarding maintaining patients' safety inside the operating room, as well the precautions that should be done to maintain patients' safety. Concerning preservations that should be done to maintain patients' safety, 17 nurses out of 20 nurses recognized the importance of implementing aseptic technique inside operating room. Additionally, all the 20 nurses were aware by their responsibilities regarding counting all items that are used during surgical operations accurately is crucial, and prevention of infection at the site or surgical operation. However, 50% of them mentioned that over workload has negative effect on the quality of work in relation to maintaining patients' safety. **Conclusion:** The qualitative findings of this study showed that information about some issues related to awareness about safety measures among operating room nurses are clearly stated; as well the importance of conducting educational training for the nurses will have positive effect on the patients' safety. **Recommendations:** This study recommended that, more supportive and effective strategies should be provided to enhance and maintain patients' safety. Additionally, this study is recommended using mixed study approach quantitative and qualitative to gain more focus understanding about nurses' perception as well as patients' safety inside the operating room. Finally, conducting similar studies, in the future, is recommended using individual interview not group interview and including all the surgical team not only the nurses.

Keywords: nurses' role, perception, patient safety, operating room

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1. Introduction

The operating room (OR) is the unit of the hospital environment where anesthetic-surgical, diagnostic and therapeutic procedures are performed for both elective and emergency surgical operations. Work in the OR is marked by the development of complex and interdisciplinary practices, with a strong dependence on performance of each member in the surgical team inside the OR, and also the need for teamwork all the time. The OR is often marked by pressure and stress. Because of these issues, OR is considered to be a high risk area, extremely

susceptible to errors. Hazards in OR account for a large proportion of the deaths and damages (temporary or permanent) caused by the care process, however, all these hazards are considered avoidable under one condition through awareness of all surgical team inside the OR by its hazards as well their role to maintain patients safety inside OR [1,2,3,4].

With multidisciplinary professionals, diverse and complex surgical equipment, vulnerable patients, time pressures, and extremely high tension, the OR environment is susceptible to many errors. As well as some other major safety problems that include addressing incorrect surgical site/patient/procedure, retained surgical items, medication errors, bedsores, hypothermia, burns,

inadequate emergency responses, and improperly reprocessing surgical devices [2,5].

Maintaining patients' safety inside the OR is an important factor in determining hospitals' ability to address and reduce the occurrence of errors or hazards to the patients. These hazards have become one of the most serious threats for patients' safety and quality of care in hospitals. The World Health Organization defines OR hazards as errors that occur during provision of care, which cause measurable injury or damage to patients, not related to the underlying disease, such hazards may involve errors of process of medication administration or equipment, delays in taking therapeutic choices, misdiagnosis, infection, malfunction or loss of device, and others which could have a negative impact on patients' safety and quality of care. Error or hazard the patients might be exposed to it may interfere into their safety in the OR, and it can cause catastrophic loss to patients [5,6,7,8,9].

Nurses' work in the OR is in demanding environments and plays a vital role in maintaining and promoting patients safety due to the nature of their work. It is essential to understand how principles and interventional plan are implemented in the OR with a view for assessing patient safety from the perspective of health policies. Exploring this issue from the nurses' perspective will provide information about the largest workforce in hospital organizations and contribute to increasing these professionals' level of understanding, reflection, and commitment to safety policies [10,11].

Nurses are considered the backbone of the health care system and important members of the health care team inside the hospital in general and inside the OR in particular. A growing body of evidence indicated that the rate of medical errors and adverse events are associated with the perception of healthcare professionals by their role towards maintaining patients' safety. Nurses are the frontlines who are providing caring for patients 24 hours a day, exploring and analyzing their patients' safety matters. Therefore, awareness by safety measures and nurses' perception regarding their role to maintain patients' safety are necessary to prevent hazards and improve outcome of patients undergoing surgical operations. Consequently, the assessment of nurses' perception about patients' safety is a crucial matter [12].

1.1. Significance of the Study

Patient safety is one of the greatest challenges. In the OR, errors are frequent and often consequential. Therefore, it is ideal for the OR nurses to be oriented to the environmental hazards and aware of their role to carry out preventive measures to maintain patients' safety [13]. The World Health Organization 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 report states that unexpected, major complications arise in 3–22% of surgical procedures, the death rate is estimated as 0.4–0.8% and a large proportion of these complications may be prevented [14]. So, this study was done to explore nurses' perception toward their role for maintaining patients' safety inside the OR.

1.2. Aim of the Study

To explore nurses' perception regarding their role for maintaining patients' safety inside the operating room.

1.3. Research Question

What is the nurses' perception regarding their role for maintaining patients' safety inside the operating room?

2. Method

2.1. Research Design

This study used a descriptive phenomenological qualitative research approach design to explore and describe nurses' perception regarding their role for maintaining patients' safety inside the operating room.

2.2. Participants Recruitment

The study utilized purposive sampling technique, inclusion criteria included the nurses who participated in the study and working in different operating rooms at least one year, with different surgical operations, with different age groups, and different educational levels, from both gender and their number was 20 nurses.

2.3. Setting

The study was conducted in 8 operating rooms in one of the governmental hospitals in Cairo, there were different operating rooms for different specialties as gastrointestinal, urological, neurological surgeries, and this setting had been selected because of its high rate of patients' flow, and the nurses worked in different operating rooms in different surgical operations as the hazards and related matters to patients' safety might differ from one surgical operation to another. This study started from the beginning of November 2021 to the end of February 2022.

2.4. Data Collection Process

Data collection was done through two phases: **First phase: Preparatory phase:** In this phase, the investigators obtained approval from the hospital administration to conduct the study after explaining the aim of the study, the process of data collection, method of data collection, and explaining the questions that would be asked during semi-structured interviews for the OR nurses. To collect qualitative data, the investigators designed an interview topic guide based on previous similar research studies, and the investigators arranged the questions from general to specific and this interview guide is represented in [Table 2](#) and it includes 11 questions that focused on nurses perception about their role for maintaining patient's safety inside OR. After explaining the interview questions, it was piloted for clarity and comprehensibility by giving it to 5 nurses in the OR, who all approved its content; those nurses were excluded from the qualitative data collection. To maintain the results' credibility, a test interview was performed where the questions were tested.

Second phase: Implementation phase: In this phase the investigators had first contacted with the nurses for establishing relationship, explaining to them the objective of this study, and why it was important to conduct it, then obtained their demographic data about themselves as; age, years of experience, educational level, and their allocation in the surgical OR. Afterward, the investigators divided the studied subjects into 4 groups each group 5 nurses, and then the scheduled face to face interviews were done, as each investigator took 2 groups. Then, the investigators asked the nurses about their availability and time preferences to conduct the interview, and all the interviews were conducted in a special room, allocated by the OR head nurse, without the presence of any other person except the investigators and the interviewees. Four interviews were conducted, 2 each week, and this arrangement was running based on all participants' tolerance and willingness in order to let them freely express their perceptions. All the interviews were carried out in the Arabic. As for their duration, each interview lasted between 25 and 50 minutes. The interviews were done by the investigators only, both investigators were females, the first one is associate professor in Adult Health Nursing, and the second investigator has Doctorate degree in Nursing.

During the selected group interviews, each investigator asked the open-ended questions and made sure every participant was given chance to answer the questions. Before each interview, the participants were asked if they minded their interviews being audio-recorded and permission to record the interview was granted by all. The interview began with greeting from the investigators to the participants and thanking them for attendance, and they started to ask the nurses in the group the following questions; 1) How would you define patient safety inside the OR? 2) What do you think about importance of maintaining patient safety inside the OR? 3) How you perceived your role as a nurse of maintaining patients' safety inside the OR? 4) How is patient safety maintained and secured by the nurse inside the OR? 5) Are there any factors inside the OR could enhance or hinder patient safety? 6) What do you consider as the most important intervention for maintaining patient safety inside the OR? 7) Do you think being overloaded by working has negative influence on patients' safety inside the OR? 8) Do you receive training related to patient safety? Can you explain the training topics? 9) Do you think you have work overload inside the OR? Why? Does it influence patient safety? 10) How is the relationship with the multidisciplinary team? 11) Do you think an appropriate communication is important for maintaining patient safety?.

Concerning notes that had been taken by the investigators, they were done as follows; the investigators wrote keywords during the interview, which were completed immediately after each interview, and they included the following items; when, who, and what occurred during the interview, and this was done in addition to audio recording, and observing the participants, and after that, the investigators were completing the interview and refined all the notes that had been taken accordingly. As regards data saturation, this was obtained after interviewing the nurse number 20, as it was

confirmed when no additional data were being found by the investigators from the participants. As they saw similar instances over and over again from the participants, the investigators became confident that each theme is saturated.

After the interviews were audio-recorded, the investigators asked the participants to review the transcripts to make sure that their thoughts were accurately written. Afterward, the final transcripts were translated into English by the corresponded investigator. Later, each transcript went through several precise readings. Codes derived from the data were systematically applied to words and passages in the text. The investigators independently coded the first 2 transcripts. Then, independent coding results were compared and a coding structure was created and applied to all transcripts. Similarities in the codes were arranged into categories, then, the underlying meaning of the categories was then formulated into different themes, and each theme was compared and reviewed with themes recorded in the interview before final themes were agreed. After that, the investigators had another look on themes to make sure that saturation is based on the widest possible range of data on the themes.

2.5. Credibility of the Study

To verify credibility and integrity of data collection process, [15] used Members Check technique, which was applied as follows; after analyzing the data, participants were asked to check the accuracy of the results. To ensure more accuracy of the codes, the interviews were presented to two professors from Medical-Surgical Nursing specialty, from two different settings for taking their opinions (external check). In case of uncertainty or need for further assessment, the interview was repeated.

2.6. Ethical Considerations

Permission to carry out this study was obtained from the hospital administration and verbal consents were obtained from all participants. The investigators assured the participants about the confidentiality of the interviews and presentation of their interview data would be anonymously. As well, they were assured that their withdrawal from the study, at any step, without giving any reason, is voluntary and would not have any negative effect on them. They were also reassured that the collected data were kept and treated anonymously, and all identifications were removed.

2.7. Data Analysis

The studied sample data were analyzed by using the Statistical Package for Social Sciences (SPSS), version 20, and also, data analysis was done through classifying key findings into categories, themes and subthemes. The answers were read by the investigators to identify the themes that indicated how the nurses perceived their role regarding maintaining patients' safety. Categories and themes were formulated. The investigators conducted a thematic analysis of the English transcripts to draw out the significant text from each interview. Then, expressions

with similar meanings were further studied and subdivided into multiple themes. The findings of the qualitative data were presented to the participants to obtain their feedback and to ensure that their meanings and perspectives were precisely represented. To minimize the risk of biasing the qualitative assessment by the study findings, the analysis and coding were carried out by the investigators.

3. Results

Data saturation was reached after interviewing 20 nurses (7 males & 13 females). Hence, nurses' demographic data were presented into table (1), interview guide questions in Table 2, and the six themes in Table 3.

Table 1. Frequency and Percentage and Distribution of the Demographic Characteristics among the Studied Sample (n=20)

Items	No.	%
Gender		
Male	7	35
Female	13	65
Age (in years)		
20 - <25	4	20
25 - < 30	8	40
30 - 35	8	40
$\bar{x} \pm SD$	28.35 ± 4.34	
Years of experience in OR		
1 - <5	12	60
5 - < 10	4	20
10 - 15	4	20
$\bar{x} \pm SD$	5.7 ± 4.11	
Level of education		
Technical Institute of Nursing	9	45
Bachelor	11	55
Types of surgical operations		
General surgery	9	45
GIT surgery	5	25
Orthopedic surgery	1	5
Urology surgery	5	25

Table 2. Interview Guide

1. How would you define patient safety inside OR?
2. What do you think about importance of maintaining patient safety inside OR?
3. How you perceived your role as a nurse of maintaining patient safety inside OR?
4. How is patient safety maintained and secured by the nurse inside OR?
5. Are there any factors inside the OR could enhance or hinder patient safety?
6. What do you consider as the most important intervention for maintaining patient safety inside the OR?
7. Do you think being overloaded by working has negative influence on patient safety?
8. Do you receive training related to patient safety inside the OR? Can you explain which topics that could be delivered?
9. Do you think you have work overload inside the OR? Why? Does it influence patient safety?
10. How is the relationship with the multidisciplinary team?
11. Do you think an appropriate communication is important for maintaining patient safety?

Table 1 shows that, 65% of the studied subjects were female, while, 20% of them their age ranged between 20 and less than 25 years, and an equal percentage of 40% of them their age ranged between either 25 and less than 30 years or between 30 to 35 years, with a mean age of

28.35 ± 4.34. Regarding their years of experience in the OR, 60%, 20%, and 20% of them, their years of experience ranged between 1 to less 5, 5 to less 10, and 10 to less than 15 respectively. Concerning their educational level, 55%, and 45% of them had bachelor degree and technical institute of nursing respectively. As regards types of surgical operations, 45%, 25%, 5%, and 25% of the participants worked in general surgery, gastrointestinal, orthopedic, and urological surgical operations respectively.

Table 3. The Four Themes Related to Nurses' Perception about Patients' Safety Inside the Operating Room

#	Themes
Theme 1	Nurses' perception about importance of their role in maintaining patients' safety inside operating room Precautions and preservations that should be done to maintain patients' safety inside operating room Subtheme (1): Aseptic technique observance
Theme 2	Subtheme (2): Accurate counting of all items used during surgical operation Subtheme (3): Prevention of infection at the site of surgical operation Factors that might have effect on nurses' performance inside operating room and have negative consequences on patients' safety.
Theme 3	Subtheme (1): Availability of supplies and function status of machines. Subtheme (2): Workload and its relation to quality of work and patients' safety Subtheme (3): Proper communication among the surgical team and its effect on patients' safety
Theme 4	Nurses' needs to enhance their performance for maintaining patients' safety inside operating room

In the current study, four themes have been discussed with the participants, these are as follows: First theme was nurses' perception about importance of their role for maintaining patients' safety. Second theme: precautions and preservations that should be done to maintain patients' safety inside the OR, that have 3 subthemes as follows; aseptic technique observance, accurate counting of all items used during surgical operation, and prevention of infection at the site of surgical operation. Third theme: factors might have effect on nurses' performance inside the OR, and have negative consequences on patients' safety which has 3 subthemes as follows; availability of supplies and function status of machines, workload and its relation to quality of work and patients' safety, and proper communication between the surgical team and its effect on patients safety. Forth theme was about nurses needs to enhance their performance for maintaining patients' safety inside OR, and these four themes are mentioned in Table 3.

Theme (1): Nurses' perception about importance of their role in maintaining patients' safety inside the operating room.

The investigators asked the nurses about how much they realize and perceive the importance of their role in maintaining patients' safety inside OR, (18 out of 20 nurses) 90% of them responded to the question as mentioned below:

"We believe in that, all the surgical team, especially us, have the greatest responsibility related to maintaining patients' safety and well-being inside the OR, but all nurses provide full care and support with the surgeon to protect the patients from any harm, we can offer care after surgeons finish their works."

While 10% of the nurses responded as follows; *“It is not too much serious for us as nurses as it is the surgeon who did the surgical operation”*

Theme (2): Precautions and preservations should be done to maintain patients’ safety inside the operating room.

Based on the investigators discussion with the nurses, this theme included 3 subthemes which were as follows; aseptic technique observance, accurate counting of all items used during the surgical operation, and prevention of infection at the site of surgical operation.

The investigators discussed with the nurses about what they know about the precautions that should be done to maintain patients safety inside the OR, and according to the participants’ experience (18 out of 20 nurses) 90% of them responded to this question as mentioned below;

“We are fully aware by several precautions in order to maintain patients’ safety inside the OR, as all of us should implement all infection control policies and procedures strictly, and maintain sterilization field during the whole surgical operation. Meanwhile, 10% of them stated that, even they applied the recorded precautions infection can still occur.”

Concerning the 3 subthemes, the investigators discussed them with the participants, and their responses were as follows:

Subtheme (1): Aseptic technique observance

The majority of the participants (17 out of 20 nurses) 85% of them responded as follows:

“We know very well that, aseptic technique is a fundamental principle in providing care for the patient undergoing surgical operation, also, we should make sure those sterile surgical packages are completely sterile before opening them. However, 15% of them indicated that, following aseptic technique does not guarantee to prevent infection completely.”

Subtheme (2): Accurate counting of all items used during surgical operation

In this regard, all the participants discussed this subtheme and they responded as follows:

“It is our responsibility as nurses to make sure that all items that are used by the surgical team are present on the surgical operation table, so we are keeping check and count all the items that were used in any surgical operation. Also, we never rely on the surgeon or anyone else in the surgical team during any surgical operation regarding counting surgical equipment; therefore, we are counting all by ourselves”

Subtheme (3): Prevention of infection at the site of surgical operation

Based on the discussion between the investigators and the nurses all the participants (100%) responded to this theme as follows:

“We, as nurses, know that the surgical operation site could create the possibility of infection therefore, during surgical operation we are very careful while working with the patients, as we wear gloves, gown, face mask all the time in order to make sure that a sterile field around the patient is strictly maintained, additionally, we observed the rest of surgical team to make sure that all of them adhere to preventive measures inside the OR. Furthermore, we are fully responsible for proper draping and disinfecting the site

of the surgical operation to minimize the possibility of having infection among the patients undergoing surgical operations.”

Theme (3): Factors that might have effect on nurses’ performance inside the operating room and have negative consequences on patients’ safety.

The investigators discussed this theme with the nurses as they asked them about the factors that might have negative effect on their performance to maintain patients’ safety and might make the patients exposed to many hazards, and this theme stated 3 subthemes as follows:

Subtheme (1): Availability of supplies and function status of machines.

The investigators discussed this subtheme and (9 out of 20 nurses) 45% of the participants responded to this theme as indicated below:

“We, as operating room nurses, may find some threats and hazards that hinder our role regarding applying precautions and principles related to patients’ safety inside the OR, examples of these factors; lack of supplies, malfunction of the equipment that we use inside the operating room, and this would have a negative consequence on the patients’ safety. Meanwhile, 55% of them stated that, we can do our work effectively even if we do not have adequate supplies.”

As regards the remaining participants 65% stated the following about availability of supplies and function status of the machines:

“We, as nurses, can work under any circumstances, although, there are adequate supplies or not and the machines are functioning appropriately or not.”

Subthemes (2) Workload and its relation to quality of work and patients’ safety

The investigators discussed with the participants the effect of shortage of the nursing staff, over workload, and lack of coordination among the OR team, such issues have negative effect on maintaining patients’ safety or not, and based on the participants’ responses, the current study reported the following (10 nurses out of 20 nurses) 50% of them indicated the following:

“When we have too much workload this will sure affect our performance as we have the feeling that we are not able to focus on the appropriate care that might cause many harm to the patient. However, the other 50% of other reported that, “We are working under any conditions as we know this might be out of control, and we know that we will not be blamed due to shortage of the nursing staff.”

Subthemes (3) Proper communication between the surgical team and its effect on patients’ safety

The investigators discussed the proper and effective communication among the surgical team with the participants and how this might have effect on patients’ safety inside the OR, and (18 nurses out of 20 nurses) 90% of them stated the following:

“We are inside the OR with different disciplines, so we think one of the most important issues to maintain patient safety is to have clear and concise communication regarding surgical team interventions and all prescribed interventions, and this of course will prohibit any hazards that threat the patients’ safety.”

As well, (19 out of 20 nurses) 95% of the participants stated other factors that could have effect on their

performance related to patients' safety as mentioned below;

"Inside the OR if we do not find adequate support from the whole surgical team this might lead us to feel disappointed because we believe in that we are one team and lack of support among surgical team could lead to frustration and disappointment that might have negative effect on our performance, and if anyone in the team is not aware of the responsibilities and the importance of being supportive, this will lead to a lot of disturbance in the work environment which might affect negatively on patient safety, and we are fully aware and know very well that lack of communication or lack of support, will affect on the patients' safety inside the OR."

Themes (4) Nurses need to enhance their performance for maintaining patients' safety inside the operating room

In this theme, all the participants discussed their needs for training that would have positive effect on their performance and they reported to the investigators as follows:

"We all believe and know the importance of attending training from time to time to be fully aware by all up-to-date new interventions, devices, new principles, new surgical techniques as all these topics would help us to be aware by actions that could be done in order to protect the patients in the OR from any hazards."

4. Discussion

The OR setting has been described as a complex, high-risk environment in terms of patients' safety. Operating rooms, on the other hand, require special caution and contain various hazards for the patients. Operating rooms contain various hazards related to applications, infrastructure and humans. It is one of the areas that need high quality nursing care since patients are dependent on their nurses to meet their personal needs [16,17].

In the current study, more than two thirds of the participants were females. As for age, it ranged between 20 and 35 years, with a mean age of 28.35 ± 4.34 years. Regarding their years of experience in the OR, for three-fifths of the participants they ranged between 1 to less than 5 years, and an equal percentage of two-tens of the participants, their years of experience ranged either between 5 to less than 10 years, or between 10 to 15 years. The same table revealed that, more than half of them had bachelor degree, and less than half had technical institute certificate. Concerning the participants' specialty in the OR, less than half of them worked in general surgery, while an equal percentage of one-quarter of them worked in gastrointestinal surgery and urological operations, and a minority was working in orthopedic surgery.

The findings of this study reported an overview about how nurses perceived their role to maintain patients' safety inside the OR, which are presented in the form of four main themes. Regarding the theme related to nurses' perception about importance of their role in maintaining patients' safety inside the OR, the current study results indicated that, the majority of the participants were fully

aware of their responsibilities in relation to maintaining safety and well-being of the patients inside the OR. This could be attributed to that, the nurses inside the OR are staying with the patient from the first moment she/he enters the operating room till going outside, and also they are aware by the set-up of the OR and the possible hazards that might happen in such setting. This finding is supported with those of [18], who in a very recent study pointed out that since, nurses are the largest group of direct health care providers, and vital members of health team at everywhere inside the hospital, therefore, they carry out the full responsibility of patients' safety in hospitals in general and the OR in particular, and assessing the perceptions of nurses toward safety enables the identification of strengths, areas for improvement, and possible interventions.

As regards the theme of precautions and preservations that should be taken to maintain patients safety inside the OR, it included 3 subthemes as; aseptic technique observance, accurate counting of all items used during surgical operation, and prevention of infection at the site of surgical operation. The present study findings proved that, the majority of the participants mentioned that they are fully aware and oriented by the safety measures, and precautions, examples of these precautions; infection control policies, maintaining strict aseptic technique by all the surgical team. Additionally, the present study results revealed that majority of the participants are aware about the importance of following; aseptic technique principles, and significance of counting all the surgical instruments at the beginning of opening the sterile kit, before suturing the wound, and after finishing suturing it, also, nurses clarified how preparation of surgical site and patient draping are very important to maintain patient safety inside the OR.

This may be due to that, all the nurses inside the OR see different surgical cases therefore; they gained cumulative experience that led them to be aware of the needed safety measures and precautions. As well, the studied nurses may have a good awareness about the principles of maintaining patients' safety as all these principles are posted on the wall of OR in front of them all the time.

This study results are in the same line with those of [19], who indicated that, infection control measures are essential for surgical operations and the OR nurses are always exposed to different cases and they should be aware by the developed policies for infection control. The efficacy of those policies depends on how well the surgical team is aware by it. Thus nurses must have great knowledge and strict adherence to the prevention of infections. As well, these findings are in agreement with those of [3], who reported that, the nursing team has enormous responsibilities for the prevention of complications inside the OR, also, it proved that by increasing the number of nurses in the OR, they could remain for long time under supervision while performing different tasks in the OR, and concerning communication among the surgical team, whereas interpersonal communication of the surgical team is important to provide information, exchange experiences, in order to have patient better outcomes.

Concerning the theme of factors that may have effect on nurses' performance inside operating room and have

negative consequences on patients' safety, the current study results stated that slightly more than two thirds of the participants indicated that there are some common factors that can affect on patients' safety such as lack of supplies, and malfunction of the machines. Additionally, they mentioned that lack of support among the surgical team will have negative effect on their performance; this may happen due to that, all the working environment has lack of human and non-human support that might lead to bad consequences. This study result is supported by those of a very recent study carried out by [20], which mentioned that, a nurse's performance is affected by some factors as relationships with colleagues, working conditions, technical devices and equipment used inside the OR, support of the hospital and the OR administrative staff. As well, in a previous similar study conducted by, [21], they reported that, lack of continuous training and education, gaps in communication, lack of regulations and rules could have effect on patients' safety.

In the present study, half of the participants mentioned that, one of the most important subthemes in relation to factors that affect patients' safety inside the OR was; over workload which have negative consequences of their ability to perform all their assigned tasks effectively and this might have negative effect on patients' safety. This might happen due to that over workload among nurses will make them very exhausted and not able to perform all their assigned tasks effectively. This finding is supported by that of [22], who stated that OR environment is different from other work environments with respect to its construction and working conditions. The system, long work hours, and stressful environment can negatively affect the OR staff performance, which will have negative impact on the patients' safety. As well, the previous finding is in agreement with that of [23], who reported that, the association between compromised patient safety and nurse exhaustion and fatigue, is partly related to excess working hours, which has been rigorously demonstrated over many years, in a multitude of scientific studies, as when nurse's shifts are longer than 12 hours the expectations of adverse events are three times higher. Additionally, [24], clarified that, threats in the operating room include work environment problems, work overload that cause fatigue and concentration difficulties, and lack of adequate staffing.

Concerning communication among the surgical team which added to other factors that affect patients safety inside the OR, in the current study, results stated that, the majority of the participants mentioned that proper and effective communication among the surgical team with the participants have positive effect on them that would make them keen to maintain patient safety inside the OR, also they indicated that, an appropriate and clear communication have significant impact on maintaining patients safety. This could be attributed to that improper communication might lead to misinterpretation of the prescriptions and surgical team requests that may cause some errors that threat patients' safety. These results are supported by those of [25], who reported that, medical errors such as leaving sponges in the operative field, wrong-organ transplantation, incorrect blood transfusion

or wrong site operations caused by inter-professional communication and cooperation problems frequently encountered in OR.

In addition, [26], who recently stated that, among the factors affecting the incidence of errors in the OR were communication skills and the quality of the personnel teamwork of the department, so improving the communication skills of employees and enhancing teamwork, are important to reduce the incidence of medical errors in the OR and, consequently, improve the patients' safety status. As well, [27] stated that, effective communication is one of the goals of patients' safety that must be implemented.

As regards the theme that discussed the nurses' needs to enhance their performance related to maintaining patients' safety, the current study results indicated that, all the participants mentioned that, frequent training is very important to keep all of us up-to-date with all new machine devices, procedures, and many other things that will reflect positively on patients' safety. This finding is supported by those of [28], who highlighted that, the nurses in the OR believed that the nature of patient care in the OR is complex and occurs in a unique environment. Thus, OR nurses should be fully aware and constantly improve their scientific and practical knowledge and skills to provide principles of health care ethics for those patients. As well, [13], stated that, it is ideal that OR nurses are acquiring updated knowledge of patients safety and risk factors. Similarly, [29], and [30], reported that, the level of knowledge and acquired skills nurses developed from training had a great impact on provision of safe patients' care, as well nurses' knowledge, and perceptions influenced their observance to patients' safety principles.

5. Conclusion

This study offered rich and comprehensive data about the main items related to nurses' perceptions for maintaining patients' safety. This study indicated that, majority of the participants realized their role toward maintaining patients' safety inside the operating room, precautions and preservations that should be done to maintain patients' safety, and importance of proper communication among surgical team.

6. Recommendations

This study recommended that, more supportive and effective strategies for confronting all mentioned factors affecting nurses' performance should be implemented to enhance and maintain patients' safety inside the OR. Moreover, this study is recommended using mixed study approach quantitative and qualitative to gain more focus understanding about nurses' perceptions about patients' safety inside the OR. Finally, conducting similar studies in the future via individual interview not group interview, and including all the surgical team not only the nurses are recommended.

7. Limitations of the Study

The qualitative findings of the current study were interpreted in light of some limitations, first, the fact that this is a single hospital study. Second, this study should assess perceptions across different settings. Additionally, the assessment of perceptions about patients' safety was done only for nurses and not for the remaining surgical team. Moreover, the qualitative nature of this research regarding the perceptions of the participants cannot be generalized.

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References

- [1] Bastami, M., Imani, B., & Koosha, M. (2022). Operating room nurses' experience about patient cares for laparotomy surgeries: A phenomenological study. *Journal of Family Medical Primary Care*; 11(4): 1282-1287.
- [2] Blomberg, A.C., Bisholt, B., & Lindwall, L. (2018). Responsibility for patient care in perioperative practice. *Nursing Open*; 5(3): 414-421.
- [3] Gutierrez, L.S., Santos, J.L.G., Peiter, C.C., Menegon, F.H.A., Sebold, L.F., & Erdmann, A.L. (2018). Good practices for patient safety in the operating room: Nurses' recommendations. *Rev Bras Enferm Journal*; 71(6):2775-82.
- [4] Hanfy, E.M.A., Taha, N.M., Mohamed, F.A., & Ahmed, Z.M. (2021). Factors affecting nurses performance regarding patient safety in emergency operating rooms. *Annals of the Romanian Society for Cell Biology*; 25(6): 18986-18995.
- [5] Kwon, E., Kim, Y., Kim, S., Jeon, S., Lee, E., Kang, H., Nam, S., & Kim, M. (2019). A comparative study on patient safety attitude between nurses and doctors in operating rooms. *Journal of International Medical Research*; 48: 4.
- [6] Hee-Eun, J., Yeoungsuk, S., & Hee-Young, K. (2017). Nurses' perception of patient safety culture and safety control in patient safety management activities. *Journal of Korean Academy of Nursing Administration*; 23: 450.
- [7] Kakemam, E., Gharaee, H., & Rajabi, M.R. (2021). Nurses' perception of patient safety culture and its relationship with adverse events: A national questionnaire survey in Iran. *BMC Nursing Journal*; 20: 60.
- [8] Kim, N.Y., & Jeong, S.Y. (2021). Perioperative patient safety management activities: A modified theory of planned behavior. *PLoS ONE Journal*; 16: 6.
- [9] Nyberg, A., Olofsson, B., Otten, V., Haney, M., & Fagerdah, AM. (2021). Patient safety during joint replacement surgery: Experiences of operating room nurses. *BMJ Open Quality*; 10: 4.
- [10] Bahar, S., & Önler, E. (2020). Turkish surgical nurses' attitudes related to patient safety: A questionnaire study. *Niger J Clin Pract*; 4:470-475.
- [11] Mota, A.S., Castilho, A.F., & Martins, M.M. (2021). Assessment of patient safety in the operating room: Nurses' perceptions. *Revista de Enfermagem Referência*; 5:6.
- [12] Hadad, E., Abd Elrhmaan, S., Ahmad, F., & Ali, H. (2021). Perceptions of staff nurses about patient safety culture at Minia General Hospital. *Minia Scientific Nursing Journal*; 010(1): 68-77.
- [13] Cho, O.H., Lee, D., & Hwang, K.H. (2022). Patient safety awareness, knowledge and attitude about fire risk assessment during time-out among perioperative nurses in Korea. *Nursing Open*; 9(2): 1353-1361.
- [14] Ingvarsdotir, E., & Halldorsdotir, S. (2018). Enhancing patient safety in the operating theatre: From the perspective of experienced operating theatre nurses. *Scand J Caring Sci*; 32(2): 951-960.
- [15] Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic Inquiry*. Newbury Park, CA: Sage Publications.
- [16] Gül, H. (2021). Occupational health and safety in operating rooms: In A. Agrawal, & S. Kosgi (Eds.), *Healthcare access*. Intech Open.
- [17] Önler, E., & Akyolcu, N. (2019). Evaluation of operating room staff's attitudes related to patient safety: A questionnaire study. *Journal of Interprofessional Education & Practice*; 17: 100287.
- [18] Alrashedi, B.A., Alamri, M.S., Aljohani, K.A., AL-Dossary, R., Albaqawi, H., Alharbi, J., Hosis, K.A., Aljohani, M.S., Almadani, N., & Falatah, R. (2022). Nurses' perception of safety culture in medical-surgical units in hospitals in Saudi Arabia. *Medicina Journal*; 58:897.
- [19] Elgazzar, S., & Ahmed, Sh. (2020). Nurse's awareness of infection control measures in operating room. Available at: https://www.researchgate.net/publication/342872511_Nurse's_awareness_of_infection_control_measures_in_operating_room.
- [20] Alshyyab, M.A., Rania Albsoul, R., & Gerard Fitzgerald, G. (2022). Factors influencing patient safety culture in operating room in a teaching hospital in Jordan: A qualitative descriptive study. *TQM Journal*; Available on Emerald Insight at: <https://www.emerald.com/insight/1754-2731.htm>.
- [21] Kim, F.J., da Silva, R.D., Gustafson, D. Nogueira, L., Harlin, T., & Paul, D.L. (2015). Current issues in patient safety in surgery: A review. *Patient Saf Surg*; 9: 26.
- [22] Uğurlu, Z., Karahan, A., Ünlü, H., Abbasoğlu, A., Elbaş, N.Ö., Işık, S.A., & Tepe, A. (2015). The Effects of workload and working conditions on operating room nurses and technicians. *Workplace Health & Safety Journal*; 63(9): 399-407.
- [23] Faltas, M.S., & Abd-Allah, F.K. (2018). Relation between nurses' workload and patients' safety in surgical and neurological intensive care units. *IOSR Journal of Dental and Medical Sciences*; 7(6): 21-33.
- [24] Seyman, C.C., & Ayaz, S. (2016). Opinions of operating room nurses regarding patient and staff safety in operating room. *Dicle Medical Journal / Dicle Tip Dergisi*; 43:1.
- [25] Ongun, P., & Intepeler, S.S. (2017). Operating room professionals' attitudes towards patient safety and the influencing factors. *Pakistan Journal of Medical Sciences*; 33(5): 1210-1214.
- [26] Imani, B. & Jalal, Sh.B. (2021). Explaining the impact of surgical team communication skills on patient safety in the operating room: A qualitative study.
- [27] Zulfendri, Y., & Nasution, S.S. (2020). Nurse's perception of patient safety culture in an effort to improve service quality in the operating room of Riau Province Hospital. *Britain International of Exact Sciences (BIOEx) Journal*; 2(1): 84-94.
- [28] Aghamohammadi, F., Imani, B., & Moghadari, K.M. (2021). Operating room nurses' lived experiences of ethical codes: A phenomenological study in Iran. *International Journal of Nursing Sciences*; 8(3):332-338.
- [29] Biresaw, H., Asfaw, N., & Zewdu, F. (2020). Knowledge and attitude of nurses towards patient safety and its associated factors. *International Journal of Africa Nursing Sciences*; 13.
- [30] Vaismoradi, M., Tella, S.A., Logan, P., Khakurel, J., & Vizcaya-Moreno, F. (2020). Nurses' adherence to patient safety principles: A systematic review. *International Journal Environ Res Public Health*; 17(6): 2028.

