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# Components of safe nursing care in the intensive care units: a qualitative study

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## Abstract

**Background** Patient safety is a global health issue that affects patients worldwide. Providing safe care in the intensive care units (ICUs) is one of the most crucial tasks for nurses. Numerous factors can impact the capacity of nurses to deliver safe care within ICUs. Consequently, this study was undertaken with the aim of identifying the components of safe nursing care in ICUs.

**Methods** The current research constitutes a qualitative conventional content analysis study conducted from January 2022 to June 2022. The study participants comprised nurses, intensivists, nurse responsible for patient safety, paramedic, patients, and patients' family member, totaling 21 individuals selected through purposive sampling. Data collection involved individual, in-depth, and semi-structured interviews. Subsequently, data analysis was performed utilizing the approach outlined by Graneheim and Lundman (Nurse Educ Today 24(2):105–12, 2004), leading to the identification of participants' perspectives.

**Results** Three themes were identified as components of safe nursing care in ICUs. These themes include professional behavior (with categories: Implementation of policies, organizing communication, professional ethics), holistic care (with categories: systematic care, comprehensive care of all systems), and safety-oriented organization (with categories: human resource management and safe environment).

**Conclusions** The findings of this study underscore the significance of advocating for safe nursing practices in ICUs by emphasizing professional conduct, holistic care, and safety-focused organizational structures. These results align with existing research, suggesting that by introducing tailored interventions and tactics informed by these elements, a safer environment for nursing care can be established for ICUs patients.

**Keywords** ICU, Patient safety, Professional behavior, Holistic care, Safety-oriented organization

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## Background

One of the most crucial indicatorsof quality care is safety (Atashzadeh Shoorideh et al. [1]). Safety refers to the prevention of all unintentional or intentional harm, such as injury or death due to adverse medication reactions, patient misidentification, or nosocomial infections by healthcare providers (Butler and Hupp [2]). Recently defined by the World Health Organization in 2021, patient safety is a framework of organized activities that establish cultures, processes, behaviors, technologies, and environments within healthcare organizations. This framework aims to consistently and effectively identify

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risks, preventable harm, and reduce the likelihood of their occurrence (Organization [3]).

Unsafe care has significantly contributed to serious medical accidents worldwide (AL-Mugheed et al. [4]), and the social cost of patient injuries has been reported to be in the trillions of dollars annually (Organization [3]). Hospital-acquired serious injuries account for 6% of occupied hospital beds and about 7 million hospital admissions per year (Butler and Hupp [2]). Evidence shows that patient safety is a global health concern that affects patients worldwide, including both developed and developing countries (Austin et al. [5]).

Patient safety is even more crucial in intensive care units (ICUs) because they are among the most critical hospital units where nurses play a vital role (Mahmoudi [6]). In these units, the risk of adverse events is heightened due to factors such as the complexity of the patient's condition and treatment, the presence of numerous electronic devices and equipment, patients' lack of awareness, and their reliance on nurses and life-support equipment (Marzban et al. [7]). Apart from patients, nurses also face unique challenges like high job stress, extended working hours, burnout, dissatisfaction, moral dilemmas, conflicts with patients' families, and decisions regarding end-of-life care (LeClaire et al. [8]).

According to a study conducted in Brazil, factors affecting patient safety in relation to nursing staff included the workload of staff, training and professional qualification of staff, teamwork, contractual employment, lack of job security, and destructive behaviors (Oliveira et al. [9]). In the study by Naderi et al. (Naderi [10])in Iran, the factors affecting patient safety include human resources status, management and organization, interaction and teamwork, medications, equipment, medical environment, patient-related factors, improving patient quality and safety, importance of documentation, evaluation and monitoring, medical errors, and barriers and challenges (Naderi [10]). In a study by Lima et al. (D'Lima et al. [11]), concepts obtained in relation to employee risk perception and patient safety included employee individual factors (sub-theme including pragmatism versus perfectionism), team factors (two sub-themes including team dynamics and interdisciplinary tensions), unit factors (sub-theme including achieving dynamic balance), and organizational factors (sub-theme including risk perception) (D'Lima et al. [11]). Another study identified factors such as nurse error awareness, nurse well-being, teamwork, non-punitive environment, work management, hospital leadership, and ICU leadership as effective factors for safe ICU care (Garrouste-Orgeas et al. [12]).

Vaismoradi (Vaismoradi [13])conducted a grounded theory study in Iran, presenting strategies aimed at enhancing safe care. These strategies encompassed altering attitudes and performance, eliminating organizational obstacles, fostering a culture of teamwork, enhancing the influence of nursing leadership, and cultivating a culture centered on safe nursing care. Furthermore, Vaismoradi emphasized the importance of redefining safe care and conducting guiding research in this domain as highly impactful strategies (Vaismoradi [13]).

Despite the existing researches in the realm of factors and elements associated with patient safety, a noticeable gap in within high-risk and critical units like ICUs is evident. Through the implementation of more targeted studies, it is possible to pinpoint the components of safe nursing care in ICUs that align with the cultural contexts and healthcare systems of different countries. The outcomes of this research at a micro level of management can serve as valuable resources for the education and training of nursing students and professionals, while at a macro level, they can inform the development and implementation of healthcare policies. Hence, this study was initiated with the aim of identifying the components of safe nursing care in ICUs.

## Materials and methods
### Study design and setting
The present study is a conventional content analysis approach, carried out from January 2022 to June 2022. The research was conducted in 8 hospitals affiliated with three medical sciences universities in Tehran, the capital of Iran.

### Participants
Through purposive sampling, a total of 21 participants were selected for interviews. The participants included 7 nurses, 2 head nurses, 1 clinical supervisor, 1 nurse responsible for patient safety, 5 intensivists, 2 patients, 1 patient family member (patient's son), 1 patient safety officer from the Ministry of Health, Treatment, and Medical Education, and 1 paramedic. The initial participant selected for the study was a nurse who met the inclusion criteria, possessed extensive experience, and demonstrated effective communication skills. Subsequent participants were chosen based on the data collected from each participant.

### Data collection
In this research, data was gathered through individual, in-depth and semi-structured interviews with individuals who met the specified inclusion criteria. interviews were conducted by the first author and recorded using a mobile device with the participants' consent.

The inclusion criteria for the healthcare personnel involved having a minimum of two years of professional experience in the ICU or in units associated with patient

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safety. The selection of the two-year threshold was based on the completion of the mandatory manpower plan course and the acquisition of sufficient experience and knowledge. Patients were included if they had a Glasgow Coma Score (GCS) of 15, demonstrated clear speech abilities, and received approval from the ICU intensivist to participate in the interview.

The researcher took into account the diversity of participants in terms of gender, educational background, job position, and work experience, particularly in relation to the nurses. Data collection persisted until data saturation was achieved, and no new codes emerged. A concluding interview was carried out to confirm data saturation. Field notes were utilized for selecting subsequent samples and extracting the codes. During the initial meeting or telephone conversation, the study's aims were elucidated to the 21 participants. In a subsequent communication, participants conveyed their decision to either agree or decline participation. Upon agreement, interview schedules were arranged. Notably, only one intensivist declined to participate. All interviews were conducted either at the hospital or the workplace. Prior to interviewing patients, consent was obtained from the intensivist, and schedules were coordinated with the head nurse of ICU to ensure minimal disruption to patient care and treatment processes.

The interviews comprised four parts: initial open questions, main questions, follow-up questions, and closed questions. The formulation of the questions was guided by the interview guide and involved consultation with members of the research team. Subsequently, a pilot interview was carried out to identify any weaknesses, leading to a redesign of the questions (Kallio et al. [14]) (Table 1).

### Data analysis

Data analysis was conducted by the research team, which comprised a nursing doctoral student (first author) and two nursing professors (second and third authors). The first author performed the data analysis, whereas the remaining authors reviewed and made revisions to the codes, subcategories, and categories. The analysis procedures were conducted utilizing the conventional content analysis approach, following the guidelines proposed by Graniheim and Lundman (Graneheim and Lundman [15]).

### Preparation phase

During this phase, decontextualization was conducted in the following manner. Initially, the interviews, and field notes were transcribed using Word software and thoroughly reviewed to capture the main idea. Subsequently, the semantic units were identified and coded. It is important to highlight that the participants were assigned names based on the sequence of the interviews to uphold anonymity. For instance, the first participant was designated as number 1, while the final participant was denoted as number 21.

### Organizing phase

Through ongoing comparisons of codes and categories and iterative recategorization during the study meetings with the research team members, a total of 1997 codes were initially identified. Subsequently, through a process of reviewing the extracted codes multiple times, eliminating duplicates, and consolidating similar items, the number of codes was ultimately reduced to 1770. Initially, the codes were organized into subcategories, followed by the extraction of categories from the integration of these subcategories. Finally, themes were derived from the integration of categories. Ultimately, a comprehensive definition of the concept under investigation along with its associated structures was provided.

### Reporting phase

During this phase, the processes of sampling, data collection, data analysis, and the subsequent results were documented and reported.

**Table 1** List of the initial open questions, main questions, follow-up questions, and closing questions

| Initial open Question | Main Questions | Follow-up Questions | Closing Questions |
| --- | --- | --- | --- |
| Please provide information regarding your demographics | What procedures do you perform with your patients during each shift? | What precautions are implemented with the patient to guarantee their safety? | Is there a question that has not been posed? |
| Please provide a detailed explanation of your work history | What is the priority of your nursing interventions? | What instances of unsafe care have you observed in relation to the patient? | Is there any additional information you would like to include? |
| Please provide a description of the ICU in which you are employed | | How is safe nursing care typically delivered? | |

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### Data integrity and robustness

In this study, the trustworthiness of the results was enhanced by considering strategies in line with Lincoln and Guba's four criteria for qualitative studies (Lincoln and Guba [16]).

1- Credibility: The credibility of this study is supported by the extensive experience of the first author in the research topic. She conducted her Master's thesis on medication errors in critical care units and has accumulated numerous years of experience working in ICU as a nurse and head nurse. The data collection period was appropriately extended to ensure the researcher's continued involvement in the study process. Participant selection aimed for maximum diversity in age, gender, work experience, and educational level. Data collection methods included in-depth interviews and field notes. The research process was overseen by a doctoral student in nursing with expertise in qualitative research. The interviews and initial coding were reviewed and approved by the participants, with any ambiguities promptly addressed. The complete transcripts of the interviews, along with the coding, were initially forwarded to the primary author. Following the incorporation of the feedback, the revised text was then shared with the secondary author for further input. The process of assigning codes to subcategories, identifying categories, and developing themes was carried out consistently throughout.

2- Transferability: This criterion pertains to the richness of descriptive data. In an effort to maximize transferability, participants were purposefully selected from various positions and across different ICUs, such as internal medicine, neurology, surgery, and trauma.

3- Dependability: It was ensured through the utilization of various data collection methods such as interviews and field notes, along with continuous analysis and precise documentation of all analysis stages. As the current research formed part of a doctoral thesis, all research phases, data analyses, and findings were documented in 6-month reports and reviewed by four referees.

4- Confirmability: To ensure confirmability, the researcher documented their preconceptions about the study subject to separate them and prevent bias. Additionally, during data collection, the researcher refrained from reviewing the findings of related or similar studies.

### Ethics

The Ethical Committee of Tehran Islamic Azad University of Medical Sciences, approved the study protocol (IR. IAU.TMU.REC.1399.481). Written informed consent was obtained from all the participant, and data confidentiality was guaranteed in accordance with rules and regulations, and consistent with the requirements of the Ethical Committee that approved the study. The participants were informed about the possible duration of the interviews, the freedom and authority to stop the interview whenever they felt necessary, how to maintain confidentiality of the information, and how the results of the study would be used.

## Results

The mean age of the participants in this study was 41.80 years, while the mean work experience of the health care members was 17. 16 years. The demographic characteristics of the participants are delineated in Table 2.

The average duration of the interviews was 36.42 min, with a maximum duration of 80 min and a minimum duration of 20 min. A total of 1770 codes were extracted and categorized into 43 subcategories. These subcategories were further integrated to form 7 categories, and from these categories, 3 themes were identified (Table 3).

### Professional behavior

Participants in this study viewed Implementation of policies, organizing communication with team members, patients, and their families, and adherence to professional ethics as key components of professional behavior.

### *Implementation of policies*

Implementation of policies was identified by all participants as a critical component of ensuring safe care and was frequently emphasized during the interviews. This encompassed various aspects such as appropriate execution of nursing procedure, Safe mechanical ventilation, Safe Medication Administration, Safe blood transfusion, Safe restraint, Proper care of patient connections, pain control, preventing falls, delirium, and deep vein thrombosis, adhering to infection control protocols, ensuring safe patient transfers, and obtaining informed consent. Given the extensive range of subcategories and the constraints on presenting all the details, we will highlight select quotes from a few of these subcategories.

For instance, with regard to the proper execution of protocols, one of the nurses stated:

> *"Less experienced nurses use the wrong routines of more experienced nurses and this becomes a habit. It is essential to assess the patient, review the doctor's orders. In certain circumstances, the patient may have specific requirements, such as altering the dressing or removing a drain." (Participant No. 8).*

**Table 2** Demographic characteristics of the participants

| No | Participant | Age (yrs) | Gender | Educational level | Work experience |
|---|---|---|---|---|---|
| 1 | Nurse | 27 | Male | Bachelor | 5 |
| 2 | Head nurse | 34 | Male | Master | 11 |
| 3 | Nurse | 32 | Female | Bachelor | 11 |
| 4 | Intensivist | 50 | Male | Doctoral | 24 |
| 5 | Nurse responsible for patient safety | 34 | Female | Bachelor | 12 |
| 6 | patient safety officer | 55 | Female | Bachelor | 24 |
| 7 | Nurse | 36 | Male | Master | 12 |
| 8 | Supervisor | 55 | Female | Bachelor | 25 |
| 9 | Nurse | 36 | Female | Bachelor | 13 |
| 10 | Nurse | 33 | Female | Master | 7 |
| 11 | Nurse | 36 | Female | Bachelor | 13 |
| 12 | Patient | 32 | Female | Bachelor | - |
| 13 | Nurse | 30 | Male | Bachelor | 8 |
| 14 | Head nurse | 36 | Female | Bachelor | 14 |
| 15 | Patient'family | 53 | Male | Doctoral | - |
| 16 | Intensivist | 65 | Male | Doctoral | 35 |
| 17 | Intensivist | 55 | Male | Doctoral | 25 |
| 18 | Intensivist | 60 | Male | Doctoral | 30 |
| 19 | Intensivist | 50 | Male | Doctoral | 24 |
| 20 | Patient | 41 | Female | Master | - |
| 21 | Paramedic | 28 | Female | Diploma | 2 |

The nurse responsible for patient safety commented on the importance of safe blood transfusions.

*"For blood transfusion, it is ensured that the nurse carefully matches the specifications of the blood bag with the patient's wristband. Additionally, two nurses verify the blood bag. Patients are monitored regularly during transfusions to detect any side effects. They are also educated about potential side effects of blood transfusions and instructed on appropriate actions to take if such side effects manifest." (Participant No. 5).*

One of the intensivists commented on the inadequate management of the patient's pain.

*"Some nurses administer only muscle relaxants to patients before invasive procedures, which can be distressing. When patients are unable to move but still feel pain, it is crucial for healthcare providers to understand that muscle relaxants should be administered alongside painkillers. Prioritizing pain management for patients should be the primary concern for healthcare professionals." (Participant No. 4).*

One of the patients admitted to the ICU articulated his perception of infection control compliance in the following manner:

*"Some nurses frequently disinfected their hands, although we did not observe this practice. It is possible that I overlooked it as well. Even the doctors engage in this behavior. was a doctor who visited the bed adjacent to mine. He touched various surfaces and then proceeded to examine me." (Participant No 12).*

### Organizing communication

Participants highlighted various ways in which communication impacts safe nursing care in the ICU. This resulted in the identification of categories stemming from the integration of subcategories such as shift delivery using the ISBAR technique, proper utilization of identification wristbands, accurate documentation, communication with patients, and Inadequate team communication.

For instance, one of the head nurses described her encounter with the ISBAR technique as follows.

*"Sometimes in the evening and night shifts, nurses may not follow protocols and not use the ISBAR technique for shift delivery and the next day we find many errors and failures." (Participant No. 2).*

The nurse responsible for patient safety emphasized the importance of proper utilization of identification wristbands.

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**Table 3** Themes derived from the integration of subcategories and categories related to safe nursing care in the ICU

| Theme | Category | Subcategory |
|---|---|---|
| Professional Behavior | Implementation of policies | Appropriate execution of nursing procedure<br>Safe mechanical ventilation<br>Safe medication ddministration<br>Safe blood transfusion<br>Safe restraint<br>Proper care of patient connections<br>Pain control<br>Fall prevention<br>Prevention of delirium<br>Prevention of deep vein thrombosis<br>Implementation of infection prevention and control rules<br>Safe transfer of patients<br>Obtaining informed consent |
| | Organizing communication | shift delivery using the ISBAR technique[a]<br>Proper utilization of Identification Wristbands<br>Accurate documentation<br>Communication with the patients<br>Inadequate team communication |
| | Professional ethics | Respecting patient privacy<br>Human dignity<br>Conscience and work commitment |
| Holistic care | Systematic care | Initial assessment of the patient<br>Nursing diagnoses<br>Nursing planning<br>Evaluation of nursing care<br>Continuous care<br>No damage and acquired complications |
| | Comprehensive care of all systems | Respiratory care<br>Digestive and nutritional care<br>Nervous system care<br>Genitourinary care<br>Cardiovascular and haemodynamic care<br>Skin and mucous membrane<br>Attention to the mental, psychological and emotional state of the patient |
| Safety oriented organization | Human resource management | Employing qualified human resources<br>Monitoring the performance of human resources<br>Error reporting and control<br>Arrangement of human resources<br>Sufficient human resources supply<br>Providing general and specific training to human resources |
| | Safe environment | Safe equipment<br>Safe structure |

[a] ISBAR technique: ISBAR (Identify, Situation, Background, Assessment and Recommendation) is a mnemonic created to improve safety in the transfer of critical information

*"The identification wristband plays a crucial role in healthcare settings. Regrettably, there are instances where individuals overlook its significance. One of the key purposes of the wristband is to accurately identify the patient. An incident occurred where a mismatch between the blood bag and the patient's bracelet led to an incorrect transfusion being administered." (Participant No. 5).*

In relation to inadequate team communication, an intensivist expressed the following viewpoint:

*"When the patient had a fever in the middle of the night, the nurse did not report it. Later I found out that she was afraid of waking me up." (Participant No. 4).*

### Professional ethics

Participants identified adherence to the principles of professional ethics as a prerequisite and integral part of safe nursing care. This category was formed from the subcategories of respecting patient privacy, human dignity, conscience and professional commitment.

Regarding respecting patient privacy, one of the ICU patients described her experience as follows:

*"The first night, the nurses were gentlemen and they were very careful not to make me feel uncomfortable. The blanket was taken off me and I felt that my body was visible. They came to cover my body without me telling them. Or when he wanted to see the operation site, he would just push the blanket aside so that I wouldn't be tortured. I don't think anything made me happier at that moment. That's what security means. It means that I feel." (Participant No. 12).*

One of the nurses said the following about human dignity:

*"When we are safe in the working environment, we are trained and respected by our superiors, we are guided, we do our work correctly and we also provide safe care. But if you are not respected as a person and your health is not protected, you don't care about that department and that hospital. You just want to finish your shift and leave". (Participant No. 11).*

One of the intensivists commented on Conscience and work commitment as follows:

*"A conscientious patient may express his wishes by sighing and moaning and making noise. Or, for example, report to our manager that we are neglecting him, but patients with a low level of consciousness may be neglected. It is up to us and our conscience to provide complete, accurate and correct care. Sometimes doctors and nurses can show inattention and immorality towards these patients". (Participant No. 18).*

### Holistic care

In addition to professional behavior, the participants mentioned other things to ensure the safe nursing care of ICU patients, which led to the formation of this theme with categories of systematic care and comprehensive care of all systems.

### Systematic care

The participants were of the opinion that the implementation of the steps of the nursing process is one of the main conditions for the provision of safe care to patients. This category was formed from the subcategories of initial patient assessment, nursing diagnoses, planning, evaluation of care, continuous care and protection from harm and acquired complications.

The patient safety officer in the Ministry of Health, Treatment and Medical Education commented on the importance of the initial assessment of the patient:

*"The initial assessment can lead to the safety of the patient. Whether they have an allergy or not. Whether they are at risk of falling or not. If it is assessed correctly, it can prevent future incidents. and determine the conditions of care. We need to see at what level the patient entered hospital and at what level they should be discharged. The side effects of the medication given to the patient should be reviewed. The nurse should deal with these issues". (Participant No. 6).*

One of the nurses pointed out the importance of care evaluation:

*"At the beginning of my career, if the patient was in pain, I would give painkillers and I didn't care whether the pain was controlled or not. Care evaluation brings reassurance to the patient. It means I go back and see if my care was useful or not". (Participant No. 1).*

One of the nurses with years of experience working in the ICU pointed out the importance of continuity of care:

*"In my opinion, less attention is paid to the discussion of continuing care for terminal patients. Most ICU patients, because they are unlikely to return to their lives, often do not receive the necessary care, or it is not provided in a very accurate and safe way. For example, infection control is not followed. Medication administration protocols are not followed, or they may not administer many of the patient's medications. They do not do the gavage on time and say that it has no effect on the treatment. Somehow they let the patient die". (Participant No. 13).*

### Comprehensive care of all systems

The participants believed that taking care of all body systems and paying attention to the patient's body and mind is a guarantee of safe nursing care. This category was formed from the subcategories of respiratory care, digestive and nutritional care, nervous system care, genitourinary care, cardiovascular and haemodynamic care, skin and mucous membrane care, and attention to the mental, psychological and emotional state of the patient.

In terms of respiratory care, one of the expert nurses describes his performance as follows*:*

*"I listen to the patient's breathing at the very beginning of the shift. I look for the presence of distress in the patient. Whether he has rales or not. The chest is bilateral. And it goes up and down symmetrically. I look at the results of the ABG and even the colour and type of secretions. Because the change in the colour of the secretions can be due to pneumonia". (Participant No. 7).*

One of the head nurses also said about genitourinary care:

*"Sometimes when a patient has oliguria, the nurse does not analyse to understand the cause of the oliguria. She quickly gives the patient furosemide. I have seen a lot of inexperienced staff. I tell them about the catheter route first and check the condition of the bladder. Then I check the amount of fluids given and the patient's CVP. Then check the status of medications and tests. Finally, I report it to the intensivist doctor for a tell order or a I request to visit the patient. Don't go to the last treatment first". (Participant No. 2).*

One of the patients also mentioned that paying attention to the mental, psychological and emotional state of the patient and their family is an important part of safe care:

*"In those first moments I was scared and anxious because the nurse's words and explanations were very good and calmed me down. After two days of feeling better, I really wanted to see my partner. Seeing my wife was more important to me than anything else. My heart was broken. Everything made me cry. But seeing my wife gave me peace. Even though it was short. I don't know. Why did some allow it and others didn't? I don't know if it's legal or not, but it seems to be a matter of taste". (Participant No. 12).*

### Safety oriented organization

Participants believe that nurses' efforts to provide safe care to patients depend on a safety focused organization. This content consists of human resource management and safe environment categories.

#### Human resource management

Employing qualified human resources, monitoring the performance of human resources, error reporting and control, arrangement of human resources, sufficient human resources supply, Providing general and specific training to human resources.

This category was formed from the subcategories of employing qualified human resources, monitoring the performance of human resources, error reporting and control, arrangement of human resources, sufficient human resources supply, Providing general and specific training to human resources..

Regarding the employing qualified human resources, the nurse responsible for patient safety said:

*"We have a selection committee that asks questions of the nurses. Once they are accepted, the train-*

*ing starts. Ten hours of important safety and infection control instructions and report writing. We train them and then they go through 70 h of training under the supervision of the ICU supervisor. The supervisor fills in three checklists for each nurse, covering behavioral, general and specialist skills, and sends them to us. If he gets the required number of points, he starts work, otherwise the training has to be repeated". (Participant No. 5).*

The statement of one of the nurses regarding the arrangement of human resources was as follows:

*"If I am in charge of the shift, I will divide the work carefully and I will try to arrange it in such a way that it is fair and each nurse has both patient with lots of work and with little work. Not that a nurse should have "two busy patients or two patients with little work". I try not to give complicated patients to new and inexperienced nurses who cannot manage the patient". (Participant No. 10).*

One of the nurses, related to the sufficient human resources supply, said:

*"Nurses' salaries are paid late, their salaries are not commensurate with their work. There is no justice in the workplace, there is discrimination. There is job dissatisfaction. There is little encouragement and a lot of punishment. All of this prevents safe patient care. Besides, the nurse loses her motivation. That's why I want to leave." (Participant No. 13).*

#### Safe environment

This category was formed from the subcategories of safe equipment and safe structure.

With regard to safe equipment, the patient safety officer in the Ministry of Health, Treatment and Medical Education said:

*"To provide safe care, the equipment must be safe. And then we expect safe care from the nurse. If our bed is not safe, how can we expect the nurse to prevent falls? If we have a lack of wavy mattress, how can we expect nurses to prevent pressure sores?" (Participant No. 6).*

Also, the statement of the nurse responsible for patient safety regarding the safe structure was as follows:

*"The patient's safety must be ensured from the moment they arrive at the hospital. From the elevators and the stairs to the door and the wall, etc. In the ICU, the conditions are more specific. In our hospital's intensive care unit, one of the beds is placed in a corner where the nurse cannot see it. They always*

*put an extra bed in front of this unit. Every time a patient has a CPR code in that unit, it takes a few minutes to remove the extra bed and bring the crash cart into the unit. Exactly, the golden time of CPR is lost". (Participant No. 5).*

The participants in this study have delineated the components of safe nursing care in the ICUs through the aforementioned scenarios. Consequently, drawing from the outcomes of this investigation, safe nursing care can be delineated as follows: Safe nursing care in the ICU is characterized by a holistic care that encompasses systematic and comprehensive care. In delivering such care, nurses exhibit professional behavior by implementation of policies, organizing communication with patients and peers, and upholding professional ethics. In a safety-oriented organization, safe nursing care is evidenced by the establishment of a safe environment and the effective management of human resources.

## Discussion

The present study was conducted with the aim of identifying the components of safe nursing care in the ICUs. Three themes were identified: professional behavior, systematic care, and safety-oriented organization. In this section, the results are compared and discussed with other studies.

The theme of professional behavior emerged by combining the categories implementation of policies, organizing communication, and professional ethics. The participants believe that safe care depends not only on following policies but also on adhering to the principles of professional ethics and organizing communication with all team members and patients.

In term of implementation of policies, Williams et al. concluded that adherence to guidelines can lead to faster diagnosis of sepsis (Williams [17]), and improves patient safety in medication prescribing (Nouhi et al. [18]). The results of the study by Santos et al. (Santos [19]) in Brazil showed that adherence to clinical guidelines leads to better outcomes in patient restraint, positive effect on pain and delirium (Carrothers et al. [20]; , Thomas et al. [21]), prevention of falls (Tuma et al. [22]), and prevention of deep vein thrombosis (Malhotra et al. [23]). However, it has been argued that adherence to guidelines may jeopardize the autonomy of the nurse, and the nurse may not be able to manage the situation effectively at times not foreseen in the guidelines (Barnard [24]). For this reason, it seems that, in addition to following the established guidelines, the nurse should have creativity and decision-making power, and be able to identify and prepare for possible out-of-procedure cases for the implementation of each procedure. In the present study,

pain control was identified as one of the factors of safe care in the ICU, and most of the participants repeatedly mentioned the pain experience of patients hospitalized in the ICU; in the study conducted in the United States, more than 50% of patients on mechanical ventilation had experienced pain (Fink et al. [25]). However, in a Norwegian study, only 10% of ICU patients reported pain at rest and 27% reported pain during repositioning (Olsen et al. [26]). This discrepancy may be due to differences in facilities, equipment, quality of drugs, pain control protocols and nursing methods. It appears that many of the subcategories identified in the professional behavior theme as components of safe care have been introduced and confirmed in other studies. And the results of this study support the previous findings. However, it should be noted that the identification of these components does not necessarily guarantee their implementation, and their implementation requires multilateral planning. For example, despite the importance of safe drug therapy, Ateshzadeh et al. (Atashzadeh Shoorideh et al. [1])) showed that the level of compliance with drug administration standards was only 2.6% in hospitals under the University of Medical Sciences A in Tehran and 9.4% in hospitals under the University of Medical Sciences B (Atashzadeh Shoorideh et al. [1]). Regarding infection control, Randa et al. showed that nurses' performance in hand washing, wearing gowns, gloves and masks was far from the standards (Randa et al. [27]). Another study found that only 10.83% of nurses avoided incorrect connections (Bayatmanesh et al. [28]).

The results of this study showed that organizing communication between nurses and other members of the care team is as effective as implementing policies. Haddeland et al. (Haddeland et al. [29])in Norway demonstrated the importance and need to improve the use of the ISBAR tool to improve patient safety. They concluded that it is essential that healthcare professionals work together to ensure that everyone has the same situational awareness and that good clinical practice is developed and maintained. Correct use of identification wristbands (Barbosa et al. [30]), accurate recording of all information related to investigations, interventions and their evaluation (Aldawood et al. [31]), and communication with the patient (Danis [32])are effective in improving patient safety. The results of the present study are supported by previous studies. In Iran, Abdi et al. (Abdi et al. [33])concluded that poor communication and lack of team spirit had a negative impact on patient safety (Abdi et al. [33]). In Saudi Arabia, Al-Dawood et al. (Aldawood et al. [31]) showed that poor team communication was one of the barriers to reducing patient safety in the ICU. Ensuring effective communication is critical to maintaining patient safety and can be achieved by implementing standard

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communication protocols, providing regular training and education on effective communication, and promoting a culture of collaboration and teamwork (Muller et al. [34]). Despite the importance of communication to patient safety, the results of evaluations in Iran are disappointing. A review study by Moghadam et al. (Moghadam et al. [35]), which surveyed Iranian hospitals on the implementation of mandatory patient safety standards, found that the implementation of mandatory standards in the area of 'interaction with patients and society' received the lowest score.

According to the results of this research, the principles of professional ethics are necessary to ensure patient safety. The results of studies have shown that things such as respect for privacy (Timmins et al. [36]), respect for human dignity and worth (Sugarman [37]; , Smith and Cole [38]), conscience (Herzer and Pronovost [39])and professional commitment (Teng et al. [40]; , Al-Hamdan et al. [41])are the principles of safe care. The results of the study by Mohammadi et al. (Mohammadi [42]) in Iran on safe care in ICUs and its relationship with moral courage showed that there is a significant relationship between moral courage and the principles of safe care. In line with previous studies, the present study showed that professional ethics is an important component of safe care in ICUs.

The present study identified holistic care as another effective factor in providing safe care. Holistic care is the systematic and comprehensive care of all systems of the patient's body. These findings support previous research highlighting the importance of systems thinking and safe care in improving patient safety and overall quality of care (Moazez et al. [43]). Based on the findings of the study by Wick et al. (Wick et al. [44]), comprehensive care that addresses the physical, emotional, social and spiritual needs of patients was introduced as a solution to improve outcomes and patient satisfaction. In the study on the design of safe nursing care tools by Rashvand et al. (Rashvand et al. [45]), attention to the physical needs and attention to the psychological needs of patients were introduced as the main factors of safe nursing care. In addition to the aforementioned studies, the findings of this study are consistent with the holistic and widely used theories in nursing. These include Martha Rogers' theory, Margaret Newman's theory and Watson's theory. A comprehensive review of holistic theories shows that holistic nursing is a two-way human relationship process in which the nurse is attentive, purposeful and alert in the process of caring for the patient as a whole. The result is an improvement in the nurse's and patient's sense of wellbeing, quality of care and ultimately patient safety (Yazdi and Talebi [46]).

In addition to the cases mentioned, the results of this study show the importance of promoting safe care in ICUs through a safety-oriented organizational approach. The creation of a safe environment is also directly related to the safety of the structure and the provision of safe equipment. In line with the present study, Naderi et al. (Naderi [10])also introduced in their study the state of human resources, management and organization, interaction and teamwork, equipment, environment, and evaluation and monitoring as the main factors affecting patient safety in the hospital (Naderi [10]). In the study by Lima et al. (D'Lima et al. [11]), organizational factors were identified as a threat to patient safety. This means that when employees perceive a risk from the organization, they stop providing safe care to patients. In Oliveira et al.'s study (Oliveira et al. [9]), employee workload, training and professional qualifications, teamwork, contractual employment, lack of job security and disruptive behavior were introduced as factors that interfere with patient safety. In the theoretical model of safe care presented by Vaismoradi (Vaismoradi [13]) the removal of organizational barriers was identified as one of the strategies to improve patient safety . Thus, based on the results of the present study and other studies, it can be said that healthcare organizations play an important role in patient safety.

## Research limitations
One of the limitations of the current study was the absence of theories related to patient safety, which compelled the researchers to resort to the conventional content analysis method.

Another limitation was the lack of specific studies in ICU departments, which made it difficult to compare the present study with similar studies.

In the present study, despite the use of observations and field notes, the primary method of data collection was interviewing the participants. In future studies, incorporating other data collection methods can enhance the depth of the study.

The researcher's extensive background in working in the intensive care unit as a nurse and head nurse, along with their familiarity with non-safe care practices, posed a risk of introducing bias. To mitigate this bias during the interviews, the researcher endeavored to adopt a listening role and formulate questions in accordance with the interview guide.

A significant portion of the patients admitted to the ICU did not qualify for inclusion in the study as a result of their diminished level of consciousness, reliance on mechanical ventilation, and administration of sedative and hypnotic medications. Identifying suitable participants proved challenging, necessitating extensive consultations and diligent follow-up by the researcher.

Patients exhibited caution in sharing their negative experiences due to concerns about potential repercussions from staff. Building trust to encourage open communication without self-censorship proved to be a lengthy endeavor. In addition, in one particular case, the patient expressed concern about the proximity of her bed to the nursing station, fearing that her conversations would be overheard by the nursing staff. Consequently, in adherence to the patient's comfort and in consultation with the anesthesiologist, the interview was relocated to a different room to ensure confidentiality and optimal clinical conditions.

Due to the COVID-19 pandemic and the associated restrictions on patient visits, access to the patient's family was difficult. The researcher had to make several attempts to make appointments for interviews.

## Conclusion

The provision of safe care in the ICU is influenced by various components. According to the findings of this study, nurses exhibit professional behavior, such as implementation of policies, organizing communication with team members, patients, and their families, and adherence to professional ethics. They also demonstrate holistic care by following the nursing process and considering the entire system. Conversely, healthcare organizations play a crucial role in ensuring safe care by providing appropriate equipment and maintaining environmental safety. A safety-focused organization can enhance the delivery of safe care to patients in the ICU by offering a secure environment and reliable equipment. This not only ensures patient safety but also boosts staff efficiency, reduces error risks, and ultimately enhances patient outcomes and overall care quality. Healthcare organizations can establish conditions for safe patient care by recruiting suitable staff, monitoring their performance, and addressing their training requirements. Competent nurses, through the provision of comprehensive and systematic care, can deliver safe and high-quality services to patients. It is imperative to emphasize that achieving the desired outcomes necessitates collaborative efforts among healthcare organizations, nurses, and other healthcare professionals.

## Abbreviations
ICU       Intensive Care Unit
GCS      Glasgow Coma Score
ISBAR   Identify, Situation, Background, Assessment, Recommendation

## Authors' contributions
M.T, T.A and A.E contributed in study design. M.T contributed in data collection and wrote the manuscript. T.A, and A.E analyzed the data and revised the manuscript. All of the authors proved the final version of manuscript.

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