

Overcoming Barriers to Early Mobilization in ICU: The Effect of Teaching Guidelines on Nurses' Knowledge, Practices and Anxiety

1 Mona MohamedElhady, 2 Manal Mohamed Ahmed Ayed, 3Nagla Hamdi Kamal Khalil,4Amany Gamal Elgharieb Mohamed el-berdan, 5 Safaa Mohamed Adam Tozer, 6 Sahar Abd El Mohsen Mosa, 7Asmaa Daifallah Mehany Mohamed

1 a Assistant Professor of Emergency and Critical Care Nursing, Faculty of Nursing, Mansoura University

1 b Assistant Professor of Emergency and Critical Care Nursing, Faculty of Nursing, King Abdulaziz University

2 Pediatric Nursing, Faculty of Nursing, Sohag University, Egypt

3Professor of Medical Surgical Nursing, Al Rayan National Colleges, College of Health Sciences and Nursing, Madinah, KSA

4Assistant professor of Medical-Surgical Nursing, Faculty of Nursing, Port-Said University

5Lecturer at Critical Care and Emergency Nursing, Faculty of Nursing, Sohag University, Egypt

6Assistant Professor in Psychiatric Nursing, Faculty of Nursing, Modern University for Technology and Information

7Lecturer of Medical Surgical Nursing / Faculty of Nursing / Beni- Suef University, drasmaa.a333@gmail.com

Abstract:

Background: Early mobilization is a safe and effective approach, with a potential of influencing functional outcomes and avoiding immobility complications. Even the ideal of early onset of mobilization of critically ill patients as part of standard of care can be difficult to implement. The clinical practice of early mobilization is though less adopted in the intensive care unit. **Aim :** This study aimed to evaluate the effect of teaching guidelines on nurses' knowledge, practices, and anxiety to overcome barriers of early mobilization among patients in intensive care unit. **Design:** To fulfill the aim of the study a quasi-experimental design was used in this study. **Setting:** The study was applied in the intensive care unit affiliated to Sohag University Hospital. **Subjects:** A convenience sample of 50 nurses working at the previously mentioned setting who were recruited in this study. **Tools:** Tool (I): Nurses' knowledge about early mobilization, Tool (II): Nurses' practice Observation Checklist about early mobilization, and Tool III: Zung's self-rating anxiety questionnaire. **Results:** The study findings revealed that nurses' had a higher knowledge score and practice post-teaching guidelines implementation than pre-teaching guidelines implementation regarding early mobilization. There was a reduction in the studied nurses' anxiety levels post-the teaching guidelines implementation. There was a positive correlation between nurses' total knowledge, practice, and anxiety post-teaching guidelines implementation. **Conclusion :** Teaching guidelines has a positive effects on improving nurses' knowledge, practice, and anxiety reduction to overcome barriers of early mobilization among patients in intensive care unit. **Recommendations :**Regular efforts to alter intensive care unit culture toward early mobilization with a multidisciplinary approach and several interventions are also essential to early mobility success in clinical practice. It is recommended that nurses receive regular up-to-date refresher training with continuous follow up to the uptake early mobilization into daily nursing practice in the intensive care unit. The barriers to implementation of early mobilisation need to be addressed by the organisation.

Keywords:Barriers of early mobilization, Intensive care unit, Nurses' knowledge, practice, and anxiety, Teaching guidelines

Introduction:

Critically sick patients are susceptible to complications like delirium, deep vein thrombosis, ventilator-associated pneumonia, urinary tract infections, constipation, and weakness developed in the intensive care unit (ICU), among others. These issues may worsen over time, lowering patients' quality of life and raising death rates (Fraser et al., 2022). Researchers are realizing more and more that early mobility is both practical and beneficial for critically sick patients as critical care medicine develops on a worldwide scale (Clarissa et al., 2023).

Although there isn't a single, agreed-upon definition of ICU early mobilization, it's commonly understood to mean allowing ICU patients to begin therapeutic exercises as soon as possible. By taking this strategy, the risk of ventilator-associated pneumonia can be reduced, the length of ICU delirium can be shortened, deep vein thrombosis can be avoided, neuromuscular function

can be restored more quickly, and ICU-acquired weakness can be prevented and treated. Moreover, it can promote intestinal peristalsis, avoid constipation and intestinal adhesions, increase patients' capacity for self-care, and reduce the duration of intensive care unit admissions (Tipping, 2024).

In intensive care units (ICUs), patients often experience bed rest and prolonged immobility, which heightens the risk of ICU-acquired weakness and other complications. The early mobilization of ICU patients has been linked to enhanced muscle strength and functional independence, as well as a reduced duration of delirium, mechanical ventilation, and ICU stay (3–7). Despite the established safety and feasibility of early mobilization (Abrams et al., 2024), a significant number of ICU patients remain immobilized for extended periods. Numerous previous studies have identified both modifiable and nonmodifiable barriers to early mobilization. Gaining insight into these barriers, along with strategies to address

them, is beneficial for clinicians aiming to incorporate early mobility into standard clinical practice (**Engel et al., 2023**).

The studies included were examined for descriptions of obstacles and the corresponding strategies to address those obstacles. Two authors independently classified each obstacle and strategy. In cases of uncertainty regarding categorization, a consensus among all authors was reached. To aid future quality improvement initiatives, the identified obstacles were organized into one of four categories: (1) patient-related obstacles, which encompass patient symptoms and conditions (e.g., hemodynamic instability); (2) structural obstacles, which include human and technical resources (e.g., staffing, equipment, or protocols); (3) obstacles related to ICU culture, which involve habits, attitudes, and the context within ICUs and institutions (e.g., staff morale); and (4) process-related obstacles, which pertain to the delivery of services and clinician functioning (e.g., unclear roles and responsibilities) (**Abrams et al., 2024**).

Significant disruptions in physiological functioning are frequently seen by patients in the intensive care unit (ICU). A lot of attention is paid to aggressive life support, which is linked to ongoing organ failure monitoring and care. Critically ill patients in the intensive care unit have historically been managed with supine or semi-recumbent positioning, bed rest, mechanical ventilation, analgesia, and sedation. Long-term outcomes, especially with regard to neuromuscular function, have not received much attention during this care. In the intensive care unit, bed rest has drawbacks.

The interconnected pathophysiological alterations associated with immobility and acute disease affect many body systems in less than 24 hours. The most common problems are respiratory in nature (e.g., delayed weaning from mechanical ventilation and atelectasis). All bodily systems, including the musculoskeletal, cardiovascular, respiratory, integumentary, and cognitive systems, are greatly impacted by prolonged bed rest and immobility. It is often recognized that hospitalized patients are frequently elderly and may also be fat; these factors may make movement more difficult (**Leditschke et al., 2022**).

Routine procedures, such as deep sedation for bed rest, are employed to assist critically ill patients in numerous intensive care units (ICUs). These patients, particularly those on mechanical ventilation, endure extended periods of immobilization and diminished physical performance. This prolonged immobility can lead to various adverse effects, including decreased muscle strength, an extended duration of mechanical ventilation, and consequently, a longer hospital stay. As a result, the quality of life following ICU discharge may be adversely affected. Early mobilization can be implemented in ICUs after addressing potential barriers faced by nurses, as well as preparing the ICU environment with the necessary equipment and trained personnel (**Roberts et al., 2024**).

Early mobilization is a crucial measure to prevent complications for patients admitted to the ICU. However, its implementation is not always feasible due to the continuous emergence of problems and barriers. Early mobilization in the ICU should commence as soon as patients exhibit physiological stability. This process entails the initiation of physical activity exercises that start in bed, progress to sitting at the edge of the bed, and ultimately lead to ambulation, aimed at restoring musculoskeletal strength and function. Despite the advantages of early mobilization, not all patients receive these interventions routinely during their ICU admission. This is corroborated by a study conducted in the United States, which found that only 45% of ICUs reported the implementation of early mobilization (**Bakhru et al., 2022**).

Studies have consistently shown that ICU patient mobilization is suboptimal, with a German study by **Sibilla et al. (2020)** reporting that less than one-third of ICU patients are mobilized during their stay. Identified barriers to mobility include insufficient staffing, safety concerns, limited staff time, inadequate equipment, and knowledge gaps among nurses regarding early mobilization. A recent study by **Gilson (2023)** reinforced these findings, highlighting that nurses' knowledge and practice gaps are significant barriers to implementing early mobilization in ICU settings.

Insufficient knowledge and negative perceptions among ICU medical personnel are significant barriers to early mobilization. As key players in implementing early mobilization, ICU nurses' knowledge and attitudes are crucial. Despite global efforts to promote early mobilization, research on ICU nurses' perspectives remains limited, highlighting the need for evaluation and assessment (**Dafoe et al., 2020**). Barriers to early mobilization are categorized into patient-related, culturally-related, and structurally-related factors. However, most research focuses on physician-reported barriers or patient-specific issues, leaving a gap in understanding nurse-perceived barriers in the ICU (**Needham, 2020**).

Nurses, with their intimate knowledge of patients' conditions, play a vital role in quality care. According to **Gilson (2023)**, they identify early mobilization issues and inadequate training as major barriers, highlighting unique challenges that nurses face in implementing early mobilization.

Significance of the Study

Our clinical experience and medical record review revealed a lack of documented data on early mobilization in the ICU, highlighting significant challenges such as patient sedation, inadequate teamwork, safety concerns, and limited resources. Moreover, many nurses underestimated the importance of early mobilization. This gap underscores the need for a cultural shift in care and emphasizes the importance of educating and training nurses to improve their knowledge, practices, and proficiency in using mobility protocols, ultimately enhancing patient outcomes (**Bakhru et al., 2022, Roberts**

et al., 2024). Consequently, the present study was conducted to assess the impact of teaching guidelines on nurses' knowledge, practices, and anxiety to address barriers to early mobilization among patients in the intensive care unit.

Aim of the Study

The current study aimed to evaluate the effect of teaching guidelines on nurses' knowledge, practices, and anxiety to overcome barriers of early mobilization among patients in intensive care unit.

Research Hypothesis

H1: It is anticipated that the mean scores of nurses' knowledge and practice will improve following the implementation of early mobilization teaching guidelines for patients in the intensive care unit, compared to their mean scores prior to these guidelines.

H2: It is expected that the mean scores of nurses' anxiety will decrease after the introduction of early mobilization teaching guidelines for patients in the intensive care unit, in contrast to their mean scores before the guidelines were implemented.

Subjects and Method:

Research Design

A quasi-experimental one-group pre-test-post-test design was used to examine the impact of an independent variable on a dependent variable without randomization (Nestor & Schutt, 2018).

Setting

The research was conducted in the intensive care unit associated with Sohag University Hospital.

Subjects

A convenience sample consisting of 50 nurses from the aforementioned setting was recruited for this study.

Tools of Data Collection

Data were gathered using three instruments:

Tool I: Nurses' Knowledge about Early Mobilization:

This instrument was created by the researchers after reviewing current relevant literature (Uustal, 2013; Brissie, 2015; Koo et al., 2016; Parry et al., 2017). Its purpose was to evaluate the level of knowledge that nurses possess regarding early mobilization for patients in the intensive care unit. This tool was translated into Arabic, the language spoken by the participating nurses. It consisted of two primary sections as follows:

Part 1: 'Nurses' Demographic Data:

In order to collect data on the nurses' age, gender, educational level, years of ICU experience, and any training they may have attended regarding early mobilization for patients in the intensive care unit, this section was created.

Part 2: 'Nurses' Knowledge about Early Mobilization:

The definition of mobility, the timing of early mobilization, exercise types, immobility complications, the significance of early mobilization, safety considerations for early mobilization, and barriers for early mobilization were all covered in this section, which had 48 questions (21 multiple-choice questions and 27 true/false questions).

Scoring system: Every right response was worth one mark. Answers that were unidentified, missing, or incorrect received a score of 0. Two categories were created from the total score: good and unsatisfactory. A knowledge level of 75% or more was considered satisfactory, while a score of less than 75% was considered unsatisfactory. Other similar research (Mohammed & Ibrahim, 2016; Tabash et al., 2016) served as the basis for this grading system.

Tool (II): Nurses' Practice Observation Checklist regarding early mobilization:

This tool was created by the researchers following a review of recent pertinent literature (Jolley et al., 2024; Koo et al., 2016; Taito et al., 2019). Its purpose was to assess the level of nurses' practices concerning early mobilization among patients in the intensive care unit. This tool comprised two primary sections: assessment and implementation, encompassing 28 observational statements as detailed below:

Part I: Assessment: This section included five statements regarding the assessment of patients in the intensive care unit prior to the implementation of early mobilization.

Part II: Implementation: This section contained twenty-three observational statements related to the execution of early mobilization for patients in the intensive care unit.

Scoring system: Each 'adequately performed practice' was awarded 1 mark. 'The incorrect or missed practice' received a score of 0. The overall scoring was categorized into two groups: competent or incompetent. Scores of 75% or higher were regarded as competent practice levels, while scores below 75% were seen as incompetent practice levels.

Tool III: Zung's self-rating anxiety questionnaire:

Anxiety levels were assessed utilizing Zung's self-rating anxiety scale (Zung, 1971). This scale comprises a total of 20 validated self-report questions. A four-point Likert scale serves as the measurement instrument, where 1

signifies "never" or "very rare," 2 indicates "sometimes," 3 represents "often," and 4 denotes "very often or always." Questions 1 to 5 pertain to the emotional dimensions of anxiety, while questions 6 to 20 address the physical dimensions of anxiety. The scores for all 20 items combine to yield a total score ranging from 20 to 80. Subsequently, these total scores were converted into an "Anxiety Index" with values spanning from 25 to 100. This index was interpreted as follows: moderate anxiety levels (45–59), marked to severe anxiety levels (60–74), normal range (20–44), and extreme anxiety levels (75 and above). The Cronbach's alpha for internal consistency was .82 (Tanaka-Matsumi & Kameoka, 1986). In this study, the Cronbach's alpha for the Statistical Analysis System (SAS) was 0.84.

Content Validity of Tools

Five experts with expertise in Psychiatric Nursing & Intensive Care Medicine, Critical Care and Emergency Nursing, and Medical-Surgical Nursing tested the tools for content-related validity. The tools were examined by the experts for application, simplicity, clarity, and relevance. Thus, no modifications were made.

The Reliability of Data Collection Tools

To ascertain how well the items in each tool conceptually align, the Cronbach's Alpha test was used to assess the tools' reliability. Tool II's Cronbach's Alpha test score was 0.898, whereas Tool I's was 0.945. This proves that the instruments used to acquire the data are reliable.

Pilot Study

To assess the tools' feasibility, objectivity, and application as well as to gauge the amount of time needed to complete the questionnaire and observation checklist, a pilot research was carried out with five nurses, or 10% of the sample. The appropriate adjustments were made. Included in the primary study were the nurses who took part in the pilot.

Ethical Considerations

The Research Ethical Committee at the nearby university provided ethical permission. The hospital's administrative authorities granted a formal letter of authorization for the study after receiving thorough information about its purpose. For the nurses who agreed to take part in the study, informed consent was obtained. Their participation in this study was voluntary, and they were informed that they could leave at any time without facing any consequences. On the data collection sheets, codes were used in place of the participants' names to maintain confidentiality and anonymity. Participants were reminded that the practice they witnessed would not affect their performance review.

Data Collection:

Data collecting took place from June to October 2023 after receiving formal consent from the body in charge of the

data collection environment. Three stages of data collection were used:

1: Preparatory Stage

The researchers invited the nursing staff to participate in this experiment, spoke with them about herself, and explained the specifics of the study. Using part I of tool I, the researchers conducted individual interviews with each participating nurse to collect background information. Using part 2 of tool I, the nurses' understanding of early mobilization for patients in the intensive care unit was evaluated. Tool III was used to measure anxiety levels, and Tool II was used to evaluate the nurses' practices. A booklet on early mobilization for patients in the intensive care unit was created by the researchers using the nurses' pre-test knowledge, practice, and anxiety scores as well as current evidence-based practices.

Ten sessions that covered both the theoretical and practical aspects of early mobilization for patients in the intensive care unit made up the teaching booklet. It was written in simple Arabic and included a variety of colored illustrations to improve the educational process and help nurses understand the information. Faculty members from the Faculty of Nursing's Medical Surgical and Critical Care & Emergency Nursing Department reviewed the pamphlet, and changes were made in response to their suggestions.

2: Implementation Stage:

In this phase, the researchers organized and executed the early mobilization teaching guidelines within the intensive care unit. Three sessions were conducted each week during the morning shift in the intensive care unit. The participating nurses were grouped, with each group consisting of 3-5 nurses based on their availability. During the first session, each participant nurse received a copy of the colored educational booklet for guidance, motivation, and review. Various teaching media were utilized, including PowerPoint presentations, diagrams, paper and pens, and illustrated videos. At the conclusion of the final session, the researchers conveyed their appreciation and gratitude to the nurses for dedicating their time and effort to participate in the study.

Strategies for overcoming barriers.

Barriers

Strategies

Patient-related barriers

- | | |
|--|--|
| (i) Hemodynamic instability | (i) Stepwise approach |
| (ii) Pain | (ii) Pain management before mobilization |
| (iii) Deep sedation | (iii) Regular assessment, lighter sedation |
| (iv) Agitation and delirium | (iv) Assessment, antipsychotic medications |
| (v) Patient denial, lacking motivation | (v) Patient education and encouragement |

- | | |
|--------------------------------|---|
| (vi) ICU equipment and devices | (vi) Portable devices, secure lines, drains, and interdisciplinary teamwork |
|--------------------------------|---|

Structural barriers

- | | |
|---------------|---|
| Limited staff | (i) Additional staff, independent mobility team |
|---------------|---|

Lack of protocols and limited guidelines

- (ii) Develop protocols, safety criteria

- | | |
|---|---|
| (iii) Limited equipment analysis model of | (iii) Training for appropriate use of equipment, financial, and the cost economic |
|---|---|

Cultural barriers

- | | |
|----------------------------------|------------------------------------|
| (i) Lack of mobilization culture | (i) Promotion of mobility programs |
|----------------------------------|------------------------------------|

- | | |
|---|----------------------------------|
| (ii) Early mobilization, not a priority | (ii) Interprofessional education |
|---|----------------------------------|

Process-related barriers

- (i) A dearth of coordination and planning

- (i) Regular screening of patients, interprofessional coordination, and planning

- | | |
|-----------------------------------|---|
| (ii) Risks for mobility providers | (ii) Training, appropriate equipment, and mobility team |
|-----------------------------------|---|

The following procedures were followed to implement the teaching guidelines for the research participants:

a. Outlining the objectives and intentions of the program

Objective: To assess the impact of teaching guidelines on nurses' knowledge, practices, and anxiety in order to address the challenges of early mobilization for patients in the intensive care unit.

Specific objectives

Upon completion of the sessions, the nurses who received training will be capable of performing the following tasks:

1. Define the concept of early mobilization.
2. Discuss the timing associated with early mobilization.

3. List various types of exercises.
4. Identify the complications arising from mobilization.
5. Explain the significance of early mobilization.
6. Recognize safety considerations pertinent to early mobilization.
7. Describe the barriers to early mobilization.
8. Outline strategies to alleviate nurses' anxiety.

The hospital lecture hall was utilized to deliver the teaching guidelines. Various instructional methods, including lectures, group discussions, and brainstorming sessions, were employed. To enhance clarity and support the instructions, data was presented through graphics and videos on laptops during the sessions. Each session commenced with a review of the content from the previous session, followed by a discussion of the session's objectives to ensure that participants grasped the material. The program consisted of four sessions, each lasting between 30 to 45 minutes, with intervals for discussion. A post-test was administered immediately following the sessions.

The initial session commenced with the nurses receiving a warm welcome and an introduction from the researchers. The objectives of the session were articulated, highlighting the importance of the topic, defining mobility, discussing the timing of early mobilization, outlining various types of exercises, and addressing the complications associated with immobility. In subsequent sessions, the researchers concentrated on the significance of early mobilization, safety considerations related to it, and the obstacles that may hinder early mobilization.

Instructions regarding anxiety were provided, including its definition, signs, and symptoms. Some strategies for managing anxiety encompassed maintaining healthy daily routines, effective communication with others, managing negative thoughts, and seeking support from friends, family, and others to enhance one's sense of security. The session also included anxiety-reduction techniques such as an explanation of meditation (definition, steps), the benefits of deep breathing, muscle relaxation, and yoga.

Following each session, participants revisited the objectives of the new topics and provided feedback on the previous discussions. This was supplemented by a PowerPoint presentation, and the material was deliberated in a group environment. Through their comments, the researchers aided nurses in acquiring knowledge and practical skills. Additionally, pamphlets containing images and clear, simple text were provided in a booklet format for reference after the intervention.

3: Evaluation Stage

At this stage, the knowledge, practices, and anxiety levels of nurses were assessed one month following the implementation of the teaching guidelines. Knowledge was assessed using part 2 of tool I, while the practices related to early mobilization among patients in the intensive care unit were evaluated using tool II, and anxiety was measured using tool III. A comparison of nurses' scores before and after the introduction of the teaching guidelines was conducted.

Statistical Analysis:

Data were processed by using the Statistical Package for the Social Sciences Version 22 (SPSS, Inc., Chicago, IL, USA). A p value < 0.05 is considered to be statistically significant result. Quantitative data were described and summarized using numbers and percentages. On the other hand, the average values and their standard deviations (SDs) were used for mean and dispersion of normally distributed quantitative data, respectively. Statistical significant relationships among the study variables were computed using Chi-square (χ^2), Pearson Correlation Co-efficient (r), Point correlation coefficient (rpb), and Paired sample t-test (t).

Results:

Table 1 demonstrated that 70% of the nurses surveyed were female, and 88% were aged between 20 and under 30 years, with an average age of 28.8 ± 7.43 . Fewer than half of these individuals possessed a bachelor's degree in nursing. Additionally, 80% had between 1 and less than 5 years of professional experience.

Figure 1 demonstrates that a significant majority (90%) of nurses lacked previous training in early mobilization for patients in the intensive care unit.

Figure 2 demonstrates that the main source of information concerning early mobilization for patients in the intensive care unit, as reported by the nurses surveyed, was the doctors (80%), followed by media (16%) and books (4%).

Table 2 illustrates a statistically significant difference and improvement in the mean knowledge scores of nurses regarding early mobilization for patients in the intensive care unit, both before and after the implementation of the teaching guidelines ($p = <0.001$).

Figure 3 It was demonstrated that following the introduction of the teaching guidelines, 80% of the nurses exhibited a satisfactory level of knowledge concerning early mobilization of patients in the intensive care unit. This table illustrates that the knowledge of the nurses studied significantly improved after the implementation of the teaching guidelines, with a p-value of less than 0.001.

Table 3 illustrates a statistically significant difference and improvement in the mean scores of total nursing practices regarding early mobilization among patients in the intensive care unit, both before and after the implementation of the teaching guidelines ($p = <0.001$).

Figure 4 demonstrates that following the introduction of the teaching guidelines, 96% of the nurses exhibited a competent level of practice concerning early mobilization of patients in the intensive care unit. This table indicates that the practice of the nurses studied significantly improved after the implementation of the teaching guidelines, with a p-value of less than 0.001.

The barriers were categorized into patient-related barriers, structural barriers, cultural barriers, and process barriers. In **Table (4)**, the responses from nurses regarding perceived barriers related to patient conditions included physical barriers. Nurses reported a high severity of illness, with 8% indicating patients were 'too sick,' 6% citing hemodynamic instability, and 12% noting arrhythmias and obesity (e.g., BMI >30). Additionally, 16% reported respiratory instability manifested as distress or ventilator desynchronization in ventilated patients, while 24% identified patient pain as a barrier. Poor nutritional status was acknowledged by 18% of respondents.

The same table also presented results concerning patient-related neurophysiological barriers, such as deep sedation and/or paralysis, with nurses indicating a response rate of 26%. Delirium and patient agitation were reported by 16%, while patient refusal to move was noted. Responses regarding patients' sense of motivation due to anxiety were at 20%, and 28% of nurses reported patients complaining of fatigue, needing rest, or experiencing sleepiness. Furthermore, 10% of participants indicated that barriers existed for patients admitted to the ICU for palliative care.

Regarding patient-related barriers associated with ICU devices and equipment, hemodynamic monitoring equipment was identified as a barrier by 26% of nurses, while other ICU-related devices were reported as barriers by the majority, with 74% of participants indicating this response.

Considering the feedback from our participants regarding structural barriers, we observe that 20% of responses indicate a lack of an early mobility program or protocol (for instance, the absence of routine physiotherapy delivery), along with limited guidelines and no established eligibility criteria, which are significant structural barriers. Additionally, inadequate staff training accounts for 28% of the responses.

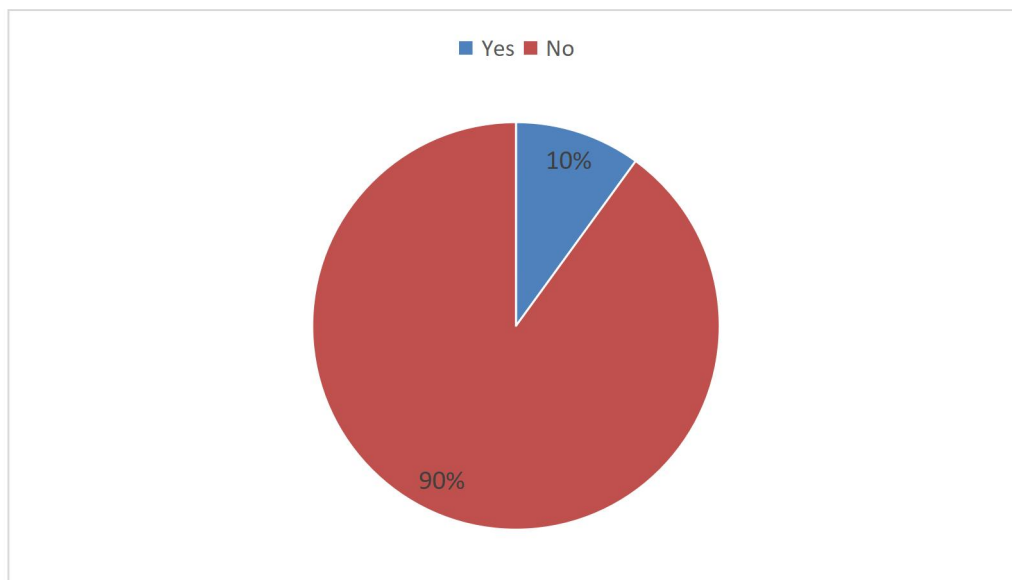
In relation to cultural barriers, the same table reveals that a lack of a mobility culture (such as insufficient staff buy-in and the absence of a multidisciplinary approach) is noted by 30% of respondents. Furthermore, 28% of participants highlight a deficiency in staff knowledge and expertise concerning the risks or benefits of mobility. Other notable responses include early mobility not being prioritized during ICU stays at 20%, a lack of support or educational buy-in from staff at 16%, and a lack of patient and family awareness regarding the benefits of early mobilization at 6%.

In **table (6)**, our participants identified process-related barriers, indicating that 28% perceive a lack of planning and coordination, while 24% cite missing or delayed daily eligibility screenings and standing bed rest orders as issues. Additionally, 22% reported concerns regarding risks to mobility providers, such as stress and injuries.

The total scores of nurses' knowledge and practices before and after the educational sessions showed a substantial positive statistical association ($P = 0.001$ & 0.001 , respectively), as shown in **Table 7**.

Table 1: Nurses' Demographic Data

Variables	No (50)	%
Gender		
Male	15	30
Female	35	70
Age nurses (years)		
20- < 30	44	88
30- < 40	6	12
Mean \pm SD = 28.8 \pm 7.43		
Educational level		
Secondary Nursing School	8	16
Technical Nursing Institute	19	38
BSc Nurse	21	42
Postgraduates study	2	4
Years of work experience in ICU		
1<5	40	80
5<10	5	10
> 10	4	8

**Figure 1: Previous training among the studied nurses regarding early mobilization among patients in intensive care unit**

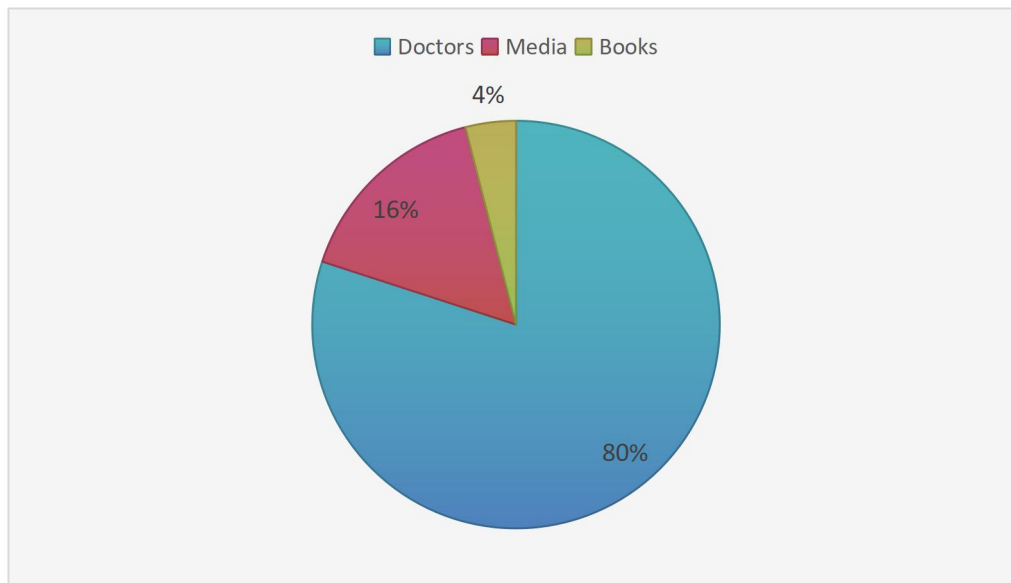


Figure (2): Nurses' sources of knowledge regarding early mobilization among patients in intensive care unit

Table 2: Total Nurses' Knowledge Mean Scores Differences Pre and Post the teaching guidelines

Items	Pre-teaching guidelines	Post-teaching guidelines	<i>T</i>	<i>P</i> -value
	Mean \pm SD	Mean \pm SD		
Nurses' knowledge mean scores	26.15 \pm 9.33	38.78 \pm 2.87	11.08	0.001

t: Paired t-test

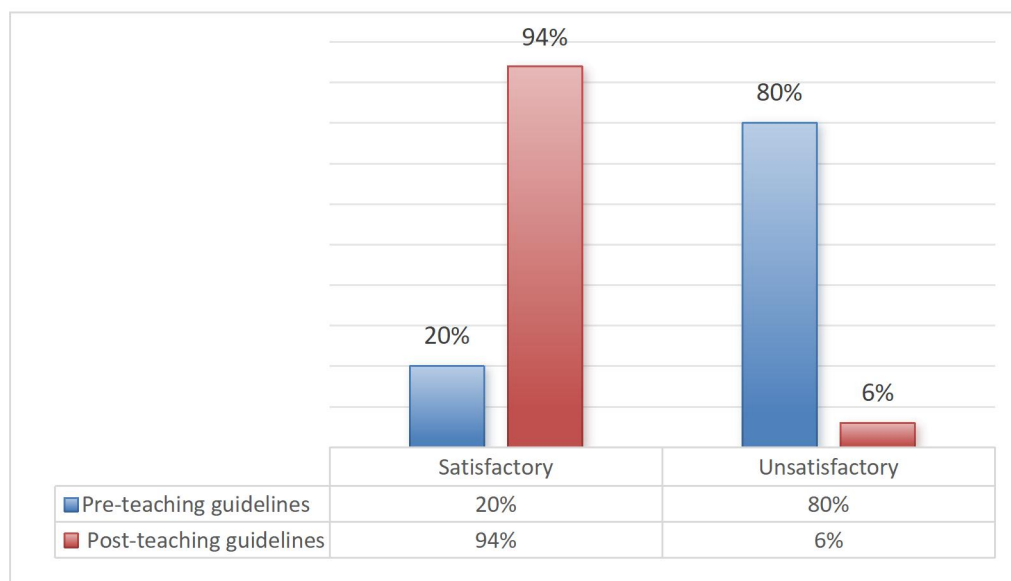


Figure 3: Total Nurses' Knowledge level Pre and Post teaching guidelines

Table 3: Total Nurses' Practices Mean Scores Differences Pre and Post the teaching guidelines

Items	Pre-teaching guidelines	Post-teaching guidelines	<i>T</i>	<i>P</i> -value
	Mean \pm SD	Mean \pm SD		
Nurses' practices mean scores	2.08 \pm 0.89	19.76 \pm 3.33	39.22	0.001

t: Paired t-test

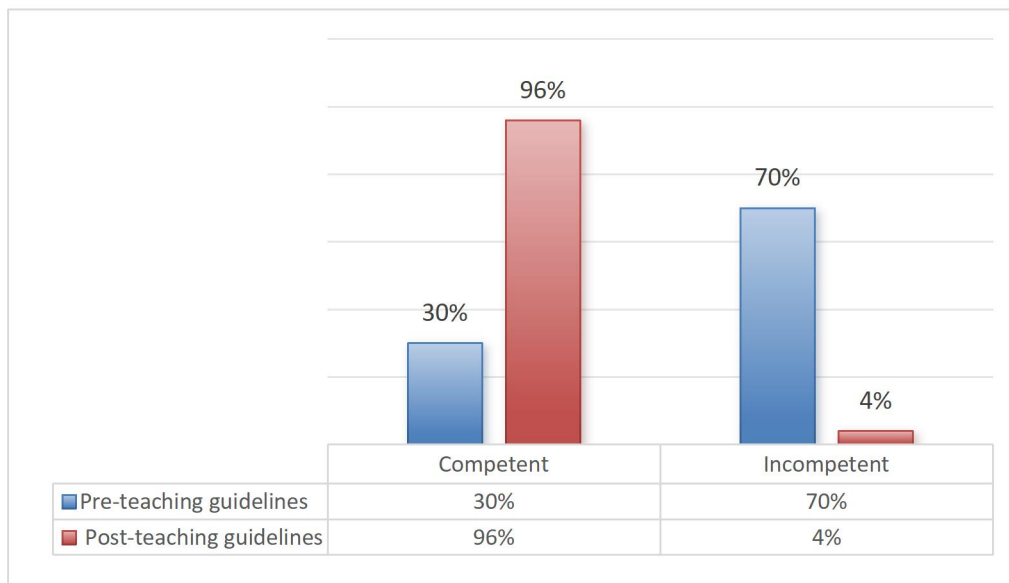
**Figure 4: Total Nurses' practices level Pre and Post the teaching guidelines**

Table (4): Patients related barriers(no:50)

Items	Frequency	%
Physical barriers		
High severity of illness, patients “too sick”	4	8
Hemodynamic instability	3	6
Arrhythmias	6	12
Respiratory instability/distress, ventilator asynchrony	8	16
pain	12	24
Poor nutritional status	9	18
Obesity (e.g., BMI >30)	6	12
Baseline or new immobility/weakness	2	4
Neuropsychological barriers		
Deep sedation and/or paralysis	13	26
Delirium, agitation	8	16
Patient refusal, lack of motivation, anxiety	10	20
Fatigue, need for rest, sleepiness	14	28
Palliative care	5	10
ICU devices and equipment		
Hemodynamic monitoring equipment	13	26
ICU related devices	37	74

Table (5) Response of Nurses towards structural related barriers and cultural related barriers no (50)

Item	Frequency	%
Structural related barriers		
Limited staff, time constraints	10	20
Lack of early mobility program/protocol (e.g., no routine delivery of Physiotherapy), limited guidelines, no eligibility criteria	15	30
Inadequate staff training	14	28
Limited equipment	6	12
Early discharge (before mobilization)	5	10
Cultural related barriers		
Lack of mobility culture (e.g., inadequate staff buy-in, lack of multidisciplinary culture)	15	30
Lack of staff knowledge and expertise about risks/benefits of mobility	14	28
Early mobility is not a priority	10	20
Lack of support or staff buy-in Education	8	16
Lack of patient/family knowledge	3	6

Table (6): Response of nurses towards Process related barriers no (50)

Item	Frequency	%
Lack of planning and coordination	14	28
Unclear expectations, roles, and responsibility	18	26
Missing/delayed daily screening for eligibility, and standing bedrest order	12	24
Risks for mobility providers (stress, injuries)	11	22

Table 7: Correlation between Total Scores of Knowledge and Practices among the Studied Nurses' Pre and Post the Educational Sessions

Items	Knowledge	Practices	R	P-value
	Mean ± SD	Mean ± SD		
Total scores pre-sessions	26.15±9.33	2.08± 0.89	0.906	0.001
Total scores post-sessions	38.78±2.87	19.76± 3.33	0.846	0.001

Discussion:

According to others, early mobilization is a crucial component of care that improves results Sundseth. Variations in intracranial pressure and cerebral perfusion, cognitive impairment, hemiparesis or hemiplegia, and the dislodgement of cerebral monitoring or other indwelling equipment can all jeopardize safety during mobilization Klein. The usefulness of early mobilization has been tested in a number of research on various neurological diseases (Klein et al., 2021; Bartolo et al., 2021). Early mobilization has not yet been incorporated into the routine patient care practices of intensive care unit staff, despite mounting evidence to the contrary. According to the literature, early mobilization is a secure and successful strategy that can significantly affect functional outcomes (Denehy et al., 2017; Hodgson et al., 2013). hence, the study done to evaluate the effect of the early mobilization among patients in intensive care unit educational sessions on nurses' knowledge, practices, and anxiety.

According to a review by Tipping et al. (2021), physical mobilization in the intensive care unit improved involvement and bodily function as assessed by walking ability and muscle strength. Early rehabilitation in patients admitted to the intensive care unit or high dependency unit for more than 48 hours improved the patients' walking ability at hospital discharge, but had no effect on muscle strength or functional status, according to a systematic review and meta-analysis by Castro-Avila et al. , (2020). So, the study aimed to evaluate the effect of teaching guidelines on nurses' knowledge, practices, and anxiety to overcome barriers of early mobilization among patients in intensive care unit.

In terms of personal information and training background, the current study found that fewer than three-quarters of the nurses who participated in the survey were female, and the majority were between 20 and 30 years old, with a mean age of 28.8 ± 7.43 years. This finding aligns with the national trend in Egypt, where females predominantly pursue nursing careers. Similar results were reported by Kim et al. (2019), who investigated the educational needs of nurses regarding early mobilization (EM) in the intensive care unit (ICU) and found that most participants were female. Likewise, Mary et al. (2018) found that all participating nurses in their study on early mobilization of post-operative patients were female, with a mean age of 31.36 ± 30.00 years.

Less than half of the nurses in this study had a bachelor's degree in nursing, according to the findings

of the study. This may be attributed to a national strategy to assign newly graduated bachelor-level nurses to ICUs to enhance the quality of care delivered. It is essential that ICU nurses be highly trained and qualified to provide optimal patient care. These findings are consistent with Mahran et al., (2019), who reported that over half of their study participants had a bachelor's degree in nursing.

Training and Knowledge in Early Mobilization

The study found that a significant majority of nurses had not received prior training in early mobilization for ICU patients. This result concurs with Kim et al. (2019) and Mahran et al. (2019), who also reported a lack of education and training among ICU nurses in this area. This deficit may stem from organizational challenges, including lack of funding for training programs and staff shortages, which limit nurses' opportunities to attend external educational sessions. As emphasized by Messer et al., (2020), and Middleton (2019), in-service training is essential to improve nurses' knowledge and competency, ultimately enhancing patient care outcomes.

Moreover, the main source of information on early mobilization, as reported by the majority of nurses in this study, was physicians. From the researchers' perspective, this finding suggests that nurses rely on medical staff as their primary and trusted source of knowledge. While this may reflect interprofessional collaboration, it also highlights the need for structured nursing-led educational initiatives to empower nurses with evidence-based knowledge.

Impact of Teaching Guidelines on Nurses' Knowledge

Following the implementation of teaching guidelines, the study observed a statistically significant improvement in nurses' mean knowledge scores regarding early mobilization in the ICU. This suggests a positive impact of the educational intervention, especially among younger nurses who may be more receptive and enthusiastic about learning new concepts. These findings highlight the importance of continuous professional development and the need for nursing leadership to foster a culture of learning and evidence-based practice.

Additionally, the study demonstrated that post-intervention, most nurses achieved satisfactory knowledge levels concerning early mobilization. This underscores the importance of structured educational efforts in bridging knowledge gaps among ICU nurses. Similar findings have been observed in previous

studies involving physicians and physiotherapists, indicating that insufficient knowledge can hinder the proper implementation of early mobilization protocols. When nurses lack clarity on EM procedures, implementation is likely to be inconsistent or abandoned altogether. Therefore, educational programs are crucial to eliminate misunderstandings and promote standardized practice in ICU settings.

Nurses' Knowledge and Practice Regarding Early Mobilization

Nurses' knowledge serves as the foundation for their technical skills, and it significantly influences their ability to think critically and provide safe, evidence-based care (Yue et al., 2019). This knowledge is primarily acquired through formal education and clinical training. A persistent issue in nursing practice is the disconnect between theoretical knowledge and practical application, particularly regarding early mobilization (EM) in the intensive care unit (ICU). This gap is often attributed to barriers such as insufficient education, limited training opportunities, and lack of awareness among nurses (Gilson, 2019).

According to the current study's findings, before the educational sessions, all participating nurses had inadequate knowledge of early mobilization. This might be because people aren't aware of how important EM is and how it affects ICU outcomes and patient recovery. These findings highlight how urgently nurses' knowledge and preparedness for EM implementation need to be improved through focused teaching guidelines and continuous in-service training.

Following the educational sessions, a statistically significant improvement in nurses' knowledge was observed. This outcome was expected, as education is known to enhance knowledge, skills, and attitudes. Similar findings were reported by Chatterley, (2021), Mary et al., (2020), and Messer et al., (2020), who all noted improvements in nurses' knowledge after implementing EM-focused educational interventions.

Interestingly, while ICU nurses generally acknowledged the benefits of early mobilization—an encouraging sign for future implementation—their understanding of EM often remained intuitive rather than evidence-based. A Canadian survey supported this, showing that more than half of respondents believed EM was feasible, yet many nurses still expressed reluctance to adopt it as routine practice. This hesitation may stem from the perception of EM as a complex and risky process. Additionally, insufficient training, limited resources, and conservative ICU cultures may contribute to nurses' resistance.

These findings highlight the need for **clear, standardized EM protocols** that can guide nursing practice, reduce ambiguity, and ensure patient safety. Moreover, over half of the ICU nurses in previous studies cited inadequate equipment and devices as barriers to effective EM implementation. Nurses frequently face the dilemma of understanding the need for patient mobilization but lacking the tools and institutional support to act accordingly.

In light of this, ICU managers should actively promote the benefits of EM, provide necessary equipment, and support nurses in educating patients and their families about its importance. Creating a culture that supports EM requires both administrative backing and continuous staff development.

The current study also demonstrated a statistically significant improvement in nurses' practice scores post-intervention. The teaching guidelines played a crucial role in enhancing both knowledge and practice, reflecting the success of the intervention. Before the educational sessions, many nurses exhibited suboptimal practices, likely due to a lack of structured protocols, absence of in-service training, and heavy ICU workloads. After the sessions, most nurses achieved competent levels of practice, which can be attributed to the well-structured content and individualized approach of the educational program.

These improvements are supported by studies such as Jones et al. (2020) and Chong (2019), who similarly reported enhanced nursing practices following EM-focused educational interventions. Moreover, a statistically significant correlation between knowledge and practice scores was observed, with both significantly higher post-intervention than pre-intervention. This reinforces the positive impact of the educational guidelines and the willingness of nurses to improve their skills and knowledge when given proper support and training. The findings are consistent with those of Messer et al. (2020), who also highlighted the effectiveness of education in transforming ICU nursing practice related to early mobilization.

Barriers to Early Mobilization in ICU Patients

Although numerous studies have demonstrated that early mobilization (EM) is both **safe and effective** for intensive care unit (ICU) patients, particularly those on mechanical ventilation (MV), its implementation remains limited in daily practice (Dubb et al., 2021). Despite the growing body of evidence supporting EM, surveys consistently show low adoption rates across many critical care settings.

Patient-Related Barriers

In the current study, participating nurses identified several patient-related barriers to EM implementation. The most commonly cited was coma or deep sedation, which significantly limits patient participation in mobilization activities. This finding aligns with a study conducted at Beni Suef Hospital, which reported similar results (**Mostafa et al., 2022**). Other reported patient-related barriers included **fatigue**, sleepiness, and a general need for rest, which nurses perceived as hindrances to EM. These perceptions, however, contrast with the work of **Truong et al. (2019)**, who emphasized that prolonged bed rest, even within 24 hours, can lead to harmful physiological changes in critically ill patients, suggesting that rest should not preclude mobilization.

Furthermore, ICU devices—including mechanical ventilators, endotracheal tubes, and various catheters—were seen by nurses as major physical barriers to mobilization. These findings are consistent with other studies highlighting the presence of medical equipment as a primary limiting factor in patient mobilization efforts (**Grimm et al., 2019**).

Structural Barriers

A key structural barrier identified in this study was the **lack of adequately trained staff** for EM implementation. This finding supports previous research by **Hoyer (2019)**, which emphasized training deficits as a critical challenge. According to **Schweickert et al. (2019)**, **comprehensive staff training** is a vital prerequisite for successful EM protocol adoption. Without a workforce that is both knowledgeable and confident in performing EM, even well-designed protocols are unlikely to be effective.

Process-Related Barriers

The current study also found that lack of planning, poor coordination, and unclear role expectations among ICU teams hinder EM implementation. This aligns with findings by **Jolley et al. (2024)**, who reported that fragmented communication and undefined responsibilities negatively impact patient outcomes and care efficiency.

Additional process-related barriers noted by the nurses included staff shortages, inadequate equipment, absence of standardized protocols, and the high workload typical of ICU environments. These challenges are echoed globally and have been cited in numerous studies (**Dubb et al., 2021**). Nurses often

shoulder the primary responsibility for EM, which, when combined with high patient acuity and staff shortages, diminishes their ability and motivation to engage in mobilization activities. Research suggests that **without additional staffing or support from a multidisciplinary team**, it is difficult to achieve a significant increase in EM practices (**Leditschke et al., 2022; Sibilla et al., 2020**).

Overcoming Barriers: Role of Education and Protocols

Our findings demonstrated a significant positive correlation between nurses' knowledge and practice scores before and after educational sessions, consistent with the theoretical knowledge-attitude-belief-practice (KABP) model. This model posits that a strong knowledge base leads to positive attitudes, which in turn influence professional behavior. Previous studies have also supported this link (**Ahmed et al., 2020; Ali & Ali, 2019**), showing that increased knowledge improves both nurse performance and patient outcomes.

Thus, continuous training, leadership support, and availability of written EM protocols are essential to bridge the knowledge-practice gap. Supporting initiatives such as just-in-time training, e-learning modules, and recognition of high-performing nurses may further foster a positive EM culture in ICUs.

Moreover, the study participants pointed out important barriers that prevent adequate implementation of early mobilization in intensive care unit, especially the contradiction between very heavy workload and limited staffing, insufficient equipment, and lack of written protocols or guidelines. The problem of shortages of nursing professional staff has affected hospitals around the world (**Hickmann et al., 2020; Chawla et al., 2024**), and further studies should address how to deal with this problem or focus on creating novel inventions to increase the efficiency of implementation of early mobilization. intensive care unit nurses under- take the main responsibility for patients' mobilization, and intensive care unit nurses are required to make an extra effort for early mobilization. The heavy workload of nurses impairs their motivation to implement early mobilization (**Liu et al., 2020**). Without additional staff in participating intensive care unit, a significant increase in intensive care unit mobilizations could not to be anticipated (**Nydahl et al., 2020**). Furthermore, it has been advised that deployment of a multidisciplinary team can improve the implementation of early mobilization (**Hickmann et al., 2021**).

The practice of early mobilization is still not common in the clinical setting due to different perceived

barriers. Some of these barriers include hemodynamic instability, presence of vascular attachments, altered sleep patterns, safety of the patients, lack of communication and teamwork between various professionals, lack of professionals, inadequate time, delirium, extreme sedation, risk of musculoskeletal injury, and extreme stress at work (Jolley et al., 2024; Fontela et al., 2020; Harris & Shahid, 2024; Leditschke et al., 2022).

There are both adjustable and non-modifiable obstacles to early mobilization, according to Leditschke et al. (2022). Modifiable barriers included low Glasgow Coma Score, agitation, sedation management, vascular access catheters in a femoral position, and procedure timing. Medical orders, neurologic instability (difficulty in controlling intracranial hypertension), hemodynamic instability, and respiratory instability were among the nonmodifiable factors. In contrast to patients who were mobilized actively, Sibilla et al., (2020) reported that fewer barriers were observed during passive mobilization.

Developing ways to overcome early mobilization barriers and understanding them helps professionals incorporate early mobilization into their regular clinical practice. Dubb et al.'s study (2021) synthesized the existing information on early mobilization obstacles and methods to get beyond them. Their knowledge and those of intensive care unit nurses were positively correlated.

The results of the current study showed a statistically significant positive correlation between the nurses' overall knowledge scores and their total practice scores before and after the training sessions. This outcome aligns with the conclusions of other studies (Ahmed et al., 2020; Ali & Ali, 2019). Typically, nurses apply their knowledge in their clinical practice. Thus, nurses' performance and, in turn, the standard of care they offer and patient outcomes will both increase if they are aware of the best available evidence for patient care. Thus, to guarantee excellent patient care in intensive care units, critical care nurses should prioritize ongoing education, training, and refresher courses.

The present study's overall results demonstrated that nurses' understanding and application of the EM of patients were positively impacted by the EM educational sessions. The study's research premise is supported by these findings. In a systematic review and meta-analysis, Okada et al. (2019) examined the effects of early versus delayed mobilization in critically ill adult patients and found no changes in health-related quality of life or mortality between the two groups.

Since the evaluation encompassed studies with a small sample size and a diverse definition of interventions, additional research was recommended to validate these results. The quality of life was impacted by early mobilization, according to Castro-Avila et al., (2020) No impact on mortality was found by Zhang et al. (2019).

A study by Amunda-dottir et al. (2019) examined the effects of vigorous upright movement twice a day on individuals on mechanical ventilation. When they compared the twice-daily and daily mobilization groups at three, six, and twelve months, they found no difference in the results. A 12-month follow-up of a randomized controlled study by Denchy et al. (2023) revealed no discernible difference in outcomes between the intervention and usual care groups. When compared to no treatment, early mobilization following heart surgery reduced the length of hospital stay, improved functional capacity, and prevented postoperative complications, according to a systematic review by Santos et al. (2021) When comparing various mobilization techniques and durations, the most effective protocol was not found.

In their study of the impact of early mobilization on pulmonary complications following coronary artery bypass graft (CABG), Moradian et al., (2021) found that the intervention group had better oxygenation, a lower incidence of atelectasis, and pleural effusion. More research should be done to determine the best time, frequency, intensity, and duration to start early mobilization, they recommended.

In a comparative analysis to evaluate the impact of early mobilization on clinical outcomes and mobility in the neurological intensive care unit, Klein et al. (2021) discovered that patients' maximum degree of movement increased without resulting in any serious problems. A study by Alamri et al., (2019) examined the effectiveness of an early mobility program for stroke patients in the intensive care unit. Three groups of patients were identified: cooperative and on the ventilator, unstable and on the ventilator, and cooperative and weaning off of the ventilator. Different protocols were used to treat them. Muscle strength and quality of life were positively impacted by early mobility programs. Since there were no negative consequences, they were deemed safe to be practiced.

In their study evaluating the efficacy of early vs delayed mobilization in patients with moderate to severe acute ischemic stroke, Diserens et al., (2021) found that early mobilization appeared to reduce the number of severe medical complications. Neurological scales and transcranial Doppler measurements of cerebral blood flow demonstrated the protocol's safety. However, only 60% of the planned cases could be

completed using Doppler, and the study was conducted on a limited sample size with unequal dropouts. The impact of early mobilization on functional outcomes in patients with severe acquired brain injury was investigated by **Bartolo et al., (2022)** and was found to positively affect the patients' clinical and functional recovery.

Early mobilization is an intervention that has been shown to have positive results, is deemed safe for use, and satisfies safety and termination criteria. Numerous research have created early mobilization strategies in various intensive care units that have been proven to be workable, safe, and efficient (**Adler & Malone, 2022; Li et al., 2023**).

Although some studies report **no significant difference in mortality or long-term outcomes** between early and delayed mobilization (**Okada et al., 2020; Zhang et al., 2020; Tipping et al., 2017**), others have noted improvements in **muscle strength, functional recovery, and reduced complications** such as atelectasis or delirium (**Santos et al., 2021; Moradian et al., 2021; Bartolo et al., 2022**). Importantly, the **safety of EM protocols** has been validated across multiple studies, including those involving ventilated and neurologically compromised patients (**Klein et al., 2020; Diserens et al., 2021**).

Despite its proven benefits, **EM remains underutilized**. Effective implementation requires **protocol-driven, multi-level interventions** that address organizational, clinical, and individual-level barriers. Developing context-specific EM protocols and investing in ICU staff education are essential next steps to enhance adoption and improve patient outcomes.

Conclusion :

Depending on the results of the current study, the study concluded that the study's findings teaching guidelines has a positive effects on improving nurses' knowledge, practice, and anxiety reduction to overcome barriers of early mobilization among patients in intensive care unit.

Recommendations

The findings of this study highlighted the following recommendations:

- Systematic efforts to change intensive care unit culture to prioritize early mobilization using an interprofessional approach and multiple targeted strategies are important components of successfully implementing early mobility in clinical practice.

- It is recommended to provide nurses with continuous refresher courses with continuous follow up to ensure incorporation of the early mobilization into daily nursing practice in the intensive care unit.
- Organizational support is required to overcome barriers to the implementation of early mobilization.

References:

- Abrams, D., Javidfar, J., Farrand, E., Mongero, L., Agerstrand, C., Ryan, P., Zimmel, D., Galuskin, K., Morrone, T., Boerem, P., & Bacchetta, M. (2024). Early mobilization of patients receiving extracorporeal membrane oxygenation: a retrospective cohort study. *Crit Care* 27;18:R38.
- Adler, D. & Malone, A. (2022). "Early mobilization in the intensive care unit: a systematic review," *Cardiopulmonary Physical Therapy Journal*, vol. 23, no. 1, pp. 5–13.
- Ahmed, M. A., Ahmed, F. A., Mohammed, M. A., & Mahgoub, A. A. (2020). Effect of an educational program about acute respiratory distress syndrome on critical care nurses' performance. *Assiut Scientific Nursing Journal*, 8(20), 1-12.
- Alamri, I., Waked, F., Amin, K., Al-quliti, M., & Manzar, A. (2019). "Effectiveness of an early mobility protocol for stroke patients in intensive care unit," *Neurosciences*, vol. 24, no. 2, pp. 81–88.
- Ali, H. A. E., & Ali, M. M. (2019). Effect of designed teaching protocol regarding patients' safety after cardiac catheterization on nurses' performance and patients' incidence of vascular complications. *International Journal of Studies in Nursing*, 4(1), 107.
- Amundadottir, R., J. Jo'nasdo'ttir, K., Sigvaldason, A. (2019). "Effects of intensive upright mobilisation on outcomes of mechanically ventilated patients in the intensive care unit: a randomised controlled trial with 12-months follow-up," *European Journal of Physiotherapy*, pp. 1–11.
- Bakhru, R. N., Wiebe, D. J., McWilliams, D. J., Spuhler, V. J., & Schweickert, W. D. (2022). An environmental scan for early mobilization practices in US ICUs. *Critical Care Medicine*, 43(11), 2360-2369.
- Barber, E., Everard, T., Holland, A., Tipping, C., Bradley, S., & Hodgson, C. (2024). Barriers and facilitators to early mobilisation in intensive care: a qualitative study. *Aust Crit Care* ;28:177–182.

- Bartolo, S. Bargellesi, C. & Castioni A. (2021). "Mobilization in early rehabilitation in intensive care unit patients with severe acquired brain injury: an observational study," *Journal of Rehabilitation Medicine*, vol. 49, no. 9, pp. 715–722.
- Castro-Avila, P. Sero'n, E. Fan, M. Gaete, & Mickan, S. (2020). "Effect of early rehabilitation during intensive care unit stay on functional status: systematic review and meta-analysis," *PLoS One*, vol. 10, no. 7, Article ID e0130722.
- Chatterley, L. (2021). Improving nurse knowledge and attitudes of early mobilization of the postoperative patient. Retrieved from: <https://digitalcommons.ric.edu/etd/188>.
- Chawla, R., Myatra, S., Ramakrishnan, N., Todi, S., Kansal, S., Dash, S. (2024). Current practices of mobilization, analgesia, relaxants and sedation in Indian ICUs: a survey conducted by the Indian Society of Critical Care Medicine. *Indian J Crit Care Med*;18(9):575-584.
- Chong, M. (2019). Patient early mobilization: a Malaysia's study of nursing practices. *Journal of Intensive and Critical Care*, 3(3), 29. DOI: 10.21767/2471-8505.100088.
- Clarissa, C., Salisbury, L., & Rodgers, S. (2023). Early mobilization in mechanically ventilated patients: a systematic integrative review of definitions and activities. *J Intensive Care*;7:3.
- Dafoe, J., Chapman, S., Edwards, K., & Stiller, A. (2020) "Overcoming barriers to the mobilisation of patients in an intensive care unit.," *Anaesth. Intensive Care*, vol. 43, no. 6, pp. 719–727, Nov., doi: 10.1177/0310057X1504300609.
- Denehy, E., Skinner, L., Edbrooke, A. (2023). "Exercise rehabilitation for patients with critical illness: a randomized controlled trial with 12 months of follow-up," *Critical Care*, vol. 17, no. 4, p. R156.
- Diserens, T., Moreira, L., & Hirt, A. (2021). "Early mobilization out of bed after ischaemic stroke reduces severe complications but not cerebral blood flow: a randomized controlled pilot trial," *Clinical Rehabilitation*, vol. 26, no. 5, pp. 451–459.
- Dubb, R., Nydahl, P., Hermes, C. (2021). Barriers and strategies for early mobilization of patients in intensive care units. *Ann Am Thorac Soc*;13(5):724-730.
- Engel, H., Tatebe, S., Alonzo, P., Mustille, R., & Rivera, M. (2023). Physical therapist-established intensive care unit early mobilization program: quality improvement project for critical care at the University of California San Francisco Medical Center. *Phys Ther* ;93:975–985.
- Fontela, L. Forgiarini Ju'nior, G., & Friedman, A. (2020). "Clinical attitudes and perceived barriers to early mobilization of critically ill patients in adult intensive care units," *Revista Brasileira de Terapia Intensiva*, vol. 30, no. 2, pp. 187–194, ..
- Fraser, D., Spiva, L., Forman, W., & Hallen, C. (2022). Original research: implementation of an early mobility program in an ICU. *Am J Nurs.* ;115(12):49-58.
- Gilson, S. L. (2023). Promoting early mobility of patients in the intensive care unit. (Doctorate dissertation, Walden University).
- Grimm, A., Silvestri-Elmore, E., Grimm, K., Klinger, S., Nye, J., & Bhullar, A. (2019). "Perceived barriers to early progressive mobilization in the ICU: Multidisciplinary perspectives in an underserved population," *J. Nurs. Educ. Pract.*, vol. 9, no. 5, p. 102.
- Harris, A., & Shahid, A. (2024). "Physical therapy-driven quality improvement to promote early mobility in the intensive care unit," *Baylor University Medical Center Proceedings*, vol. 27, no. 3, pp. 203–207.
- Hickmann, C., Castanares-Zapatero, D., & Bialais, E. (2020). Teamwork enables high level of early mobilization in critically ill patients. *Ann Intensive Care*;6(1):80-90.
- Hodgson, C. L., Berney, S., Harrold, M., Saxena, M., & Bellomo, R. (2013). Clinical review: early patient mobilization in the ICU. *Critical Care*, 17(1), 207.
- Hoyer, E., Brotman, D., Chan, K., Needham, D. (2021). Barriers to early mobility of hospitalized general medicine patients: Survey development and results. *Am J Phys Med Rehabil*;94:304-312.
- Jolley, S. E., Regan-Baggs, J., Dickson, R. P., & Hough, C. L. (2024). Medical intensive care unit clinician attitudes and perceived barriers towards early mobilization of critically ill patients: a cross-sectional survey study. *BMC Anesthesiology*, 14(1), 84.
- Jones, R. A., Merkle, S., Ruvalcaba, L., Ashton, P., Bailey, C., & Lopez, M. (2020). Nurse-led mobility program: driving a culture of early mobilization in medical-surgical nursing. *Journal of Nursing Care Quality*, 35(1), 20-26.
- Kim, C., Kim, S., Yang, J., & Choi, M. (2019). Nurses' perceived barriers and educational

- needs for early mobilization of critical ill patients. *Australian Critical Care*, 32(6), 451-457. Retrieved from: www.elsevier.com/locate/aucc
- Klein, M., Mulkey, J., Bena, N., & Albert, A. (2021). "Clinical and psychological effects of early mobilization in patients treated in a neurologic ICU," *Critical Care Medicine*, vol. 43, no. 4, pp. 865–873.
 - Koo, K. K., Choong, K., Cook, D. J., Herridge, M., Newman, A., Lo, V., ... & Lamontagne, F. (2016). Early mobilization of critically ill adults: a survey of knowledge, perceptions and practices of canadian physicians and physiotherapists. *CMAJ Open*, 4(3), E448.
 - Leditschke, M., Green, J., Irvine, B., Bissett, & Mitchell, A. (2022). "What are the barriers to mobilizing intensive care patients?" *Cardiopulmonary Physical Therapy Journal*, vol. 23, no. 1, pp. 26–29.
 - Li, X., Peng, B., Zhu, Y., & Zhang, X. (2023). "Active mobilization for mechanically ventilated patients: a systematic review," *Archives of Physical Medicine and Rehabilitation*, vol. 94, no. 3, pp. 551–561.
 - Liu, H., Jing, X., Fang, X., & Fan, X. (2020). Pathway analysis of job stressors and psychological capital on career development of ICU specialist nurses. *Chin J Nurs*;51(8):1012-1015.
 - Bartolo, S., Bargellesi, C., & Castioni, A. (2022). "Mobilization in early rehabilitation in intensive care unit patients with severe acquired brain injury: an observational study," *Journal of Rehabilitation Medicine*, vol. 49, no. 9, pp. 715–722.
 - Mahran, G. S. K., Abdelrahman, H. A., & Abo-Elmagd, N. S. (2019). Current practice types of early mobilization in the intensive care units and challenges faced by nurses attempting to translate it into practice. *American Journal of Nursing*, 7(1), 31-36.
 - Mary, Z., Afzal, M., Sehar, S., & Gilani, S. A. (2020). Improving nurses' knowledge and attitude regarding early mobilization of post-operative patients. *Journal of Health, Medicine and Nursing*, 51. Retrieved from: www.iiste.org
 - Messer, A., Comer, L., & Forst, S. (2020). Implementation of a progressive mobilization program in a medical-surgical intensive care unit. *Critical Care Nurse*, 35(5), 28-42.
 - Middleton, A. C. (2019). Improving early mobilization in acute stroke patients through best practice education. (Doctorate dissertation, Faculty of the School of Nursing Widener University).
 - Mohmmmed, S. S., & Ibrahim, K. Y. (2016). Effect of health educational program on nurses knowledge and practice regarding infection control in neonatal intensive care unit at pediatric hospitals in khartoum state. *Pyrex Journal of Nursing and Midwifery*, 2(3), 20-27 Available at <http://www.pyrexjournals.org/pjnm>
 - Moradian, M., Najafloo, H., Mahmoudi, M., Ghiasi A. (2021). "Early mobilization reduces the atelectasis and pleural effusion in patients undergoing coronary artery bypass graft surgery: a randomized clinical trial," *Journal of Vascular Nursing*, vol. 35, no. 3, pp. 141–145.
 - Mostafa, B., Salem, S., & Abdelhameed, S. (2022). Perceived barriers for early mobilization of patients admitted to the intensive care unit (ICU). *The Egyptian Journal of Intensive Care and Emergency Medicine*, 2(1), 8-19. doi: 10.21608/jicem.2022.136081.1002.
 - Needham, A. (2020). "Early physical medicine and rehabilitation for patients with acute respiratory failure: a quality improvement project.," *Arch. Phys. Med. Rehabil.*, vol. 91, no. 4, pp. 536–542, Apr., doi: 10.1016/j.apmr.01.002
 - Nestor, P. G., & Schutt, R. K. (2018). *Research methods in psychology: Investigating human behavior(3rd ed.)*. Los angeles: Sage Publications.
 - Nydahl, P., Günther, U., & Diers, A. (2020). PROtocol-based MOBilizaTION on intensive care units: stepped-wedge, cluster-randomized pilot study (Pro-Motion). *Nurs Crit Care*. ;25(6):368-375.
 - Okada, T., Unoki, Y., Matsuishi, Y., & Egawa, K. (2019). "Early versus delayed mobilization for in-hospital mortality and health-related quality of life among critically ill patients: a systematic review and meta-analysis," *Journal of Intensive Care*, vol. 7, no. 1, pp. 1–9.
 - Parry, S. M., Remedios, L., Denehy, L., Knight, L. D., Beach, L., Rollinson, T. C., ... & Granger, C. L. (2017). What factors affect implementation of early rehabilitation into intensive care unit practice? A Qualitative Study with Clinicians. *Journal of Critical Care*, 38, 137-143.

- Roberts, L. A. Johnson, T., & Lalonde, T. (2024). Early mobility in the intensive care unit: Standard equipment vs a mobility platform.” *Am. J. Crit. care an Off. Publ. Am. Assoc. Crit. Nurses*, vol. 23, no. 6, pp. 451–457, Nov., doi: 10.4037/ajcc2024878.4.
- Santos, N. A., Ricci, É. A., Suster, D. M., & Paisani, L. D. (2021). Chiavegato, “Effects of early mobilisation in patients after cardiac surgery: a systematic review,” *Physiotherapy*, vol. 103, no. 1, pp. 1–12.
- Schweickert, W., Pohlman, M., Pohlman, A., Nigos, C., Pawlik, A., Esbrook, C. (2019). Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. *Lancet* 30; 373:1874–1882.
- Sibilla, A., Nydahl, P., Greco, N., Mungo, G., Ott, N., Unger, I., ... & Kudchadkar, S. R. (2020). Mobilization of mechanically ventilated patients in Switzerland. *Journal of Intensive Care Medicine*, 35(1), 55-62. doi.org/10.1177/0885066617728486
- Sundseth, B., Thommessen, O., & Rønning, M. (2024). “Early mobilization after acute stroke,” *Journal of Stroke and Ce- rebrovascular Diseases*, vol. 23, no. 3, pp. 496–499.
- Tabash, M. I., Hussein, R. A., Mahmoud, A. H., El-Borgy, M. D., & Abu-Hamad, B. A. (2016). Impact of an educational program on knowledge and practice of health care staff toward pharmaceutical waste management in Gaza, Palestine. *Journal of the Air & Waste Management Association*, 66(4), 429-438.
- Taito, S., Sanui, M., Yasuda, H., Shime, N., & Lefor, A. K. (2016). Current rehabilitation practices in intensive care units: a preliminary survey by the Japanese Society of Education for Physicians and Trainees in Intensive Care (JSEPTIC) Clinical Trial Group. *Journal of Intensive Care*, 4(1), 66.
- Tanaka-Matsumi, J., & Kameoka, V. A. (1986). Reliabilities and concurrent validities of popular self-report measures of depression, anxiety, and social desirability. *J Consult Clin Psychol.*, 54, 328. <https://psycnet.apa.org/doi/10.1037/0022-006X.54.3.328>.
- Tipping, M., Harrold, A., Holland, L., Romero, T., Nisbet, C., & Hodgson, L.(2024). “The effects of active mobilisation and rehabilitation in ICU on mortality and function: a systematic review,” *Intensive Care Medicine*, vol. 43, no. 2, pp. 171–183.
- Truong, A., Fan, E., & Brower, R. (2019). Bench to bedside review: Mobilizing patients in the intensive care unit – from pathophysiology to clinical trials. *Critical Care*; 13:216 (doi:10.1186/cc7885)
- Ustul, K. M. (2013). Implementation of a nurse-driven mobility protocol in critical care (Master dissertation, Rhode Island College), 60-68.
- Wang, J., Ren, D., Liu, Y., Wang, Y., Zhang, B., & Xiao, Q. (2020). Effects of early mobilization on the prognosis of critically ill patients: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 110, 103708. Retrieved from: <https://doi.org/10.1016/j.ijnurstu.2020.103708>
- Winkelman, C., & Peereboom, K.. (2020). Staff-perceived barriers and facilitators. *Crit Care Nurse*;30:S13–S16.
- Yue, M., Zhang, M., Zhang, C., & Jin, C. (2017). The effectiveness of concept mapping on development of critical thinking in nursing education: A systematic review and meta-analysis. *Nurse Education Today*, 52, 87-94.
- Zhang, W., Hu, Z., & Cai, A. (2019). “Early mobilization of critically ill patients in the intensive care unit: a systematic review and meta-analysis,” *PLoS One*, vol. 14, no. 10, Article ID e0223185,.
- Zung, W. (1971). A Rating Instrument for Anxiety Disorders. *Psychosomatics*, 12(6), 371–379.