Comprehensive Journal of Science
Volume (11), Issue (41), (JUNE, 2026)
ISSN: 3014-6266

مجلة العلوم الشاملة
المجلد (11) العدد 41 يونيو 2026
ردمد: 3014-6266

Physiological Criteria for Clinical Decision-Making Regarding the Initiation of Early Mobilization in Intensive Care Units among Physiotherapists in Tripoli

Summer Sasi Ali ELulo A.M. /Faculty of Physical Education and Sports Sciences
Department of Rehabilitation and Physical Therapy / University of Tripoli
Email: S. elalo@uot.edu.ly
Sami Khalifa Hamdi, Faculty of Physical Education and Sports Sciences / Department of Rehabilitation and
Physical Therapy / University of Tripoli
S.HAMDI@uot.edu.Iy

تاريخ الاستلام:2026/05/06 –تاريخ المراجعة:2026/05/28– تاريخ القبول: 2026/06/08– تاريخ للنشر: 2026 /06/30

Abstract

Early mobilization is a fundamental rehabilitation strategy in intensive care units (ICUs), aimed at minimizing the adverse effects of prolonged immobilization and improving functional recovery. However, its safe implementation depends on accurate clinical decision-making based on patients' physiological stability. This study aimed to identify the physiological variables used by physiotherapists in Tripoli as criteria for initiating and terminating early mobilization in ICU patients and to explore the factors influencing these clinical decisions. A descriptive cross-sectional survey was conducted among 25 physiotherapists working in public and private ICUs in Tripoli using a structured questionnaire developed from current international guidelines and evidence-based literature. Descriptive statistical analysis was used to summarize participants' responses. The findings revealed that 44% of physiotherapists initiated early mobilization between the second and fifth day of ICU admission, while only 28% began within the first two days. Heart rate (76%), blood pressure (68%), and oxygen saturation (68%) were the most frequently used physiological criteria for initiating mobilization, whereas important parameters such as FiO_2, PEEP, respiratory rate, and level of consciousness were considered less frequently. For terminating mobilization, the most common criteria included new cardiac arrhythmias (72%), abnormal respiratory rate (72%), systolic blood pressure >180 mmHg (64%), and severe patient agitation (60%). Most participants (64%) reported mobilizing mechanically ventilated patients when physiological stability was maintained. Patient medical stability (64%), the availability of clinical protocols (56%), safety concerns (56%), and clinical experience (52%) were identified as the primary factors influencing decision-making. The study concludes that considerable variability exists in early mobilization practices among physiotherapists in Tripoli, highlighting the need for standardized evidence-based protocols and targeted educational programs to improve clinical consistency, patient safety, and rehabilitation outcomes in intensive care settings.

Keywords: Early mobilization; Intensive Care Unit (ICU); Physiotherapy; Clinical decision-making; Physiological parameters; Mechanical ventilation; Critical care rehabilitation; Patient safety.

Introduction:

Intensive Care Units (ICUs) represent some of the most specialized and complex therapeutic environments, admitting critically ill patients who require close monitoring and continuous support for vital organ functions. While advancements in critical care methods and respiratory and circulatory support technologies have improved survival rates, they have also led to an increase in the number of patients spending extended periods in the ICU. This improvement in survival has heightened interest in the functional complications associated with prolonged stays—complications that now pose a major challenge for healthcare teams due to their direct

impact on treatment outcomes and the patient's recovery of functional abilities (Parada-Gereda et al., 2025; Sing am et al., 2024).

Prolonged ICU stays are associated with reduced physical activity and a range of complications, most notably ICU-acquired muscle weakness, loss of muscle mass, balance disorders, and diminished cardiorespiratory fitness, as well as reduced functional independence following hospital discharge. Recent systematic reviews have shown that these complications are linked to prolonged mechanical ventilation, extended hospital stays, and delayed return to daily activities; consequently, preserving motor function has become a primary goal alongside treating the underlying illness (Daum et al., 2024; Rawal et al., 2024). Early mobilization has become a key component of rehabilitation programs in intensive care units (ICUs). It entails the gradual and structured initiation of patient movement during the acute phase of illness—once safety and clinical stability criteria are met—without waiting for full recovery. Early mobilization encompasses a range of therapeutic interventions, starting with range-of-motion exercises and progressing to sitting, standing, and walking, depending on the patient's capacity and tolerance. Recent evidence indicates that its deliberate implementation contributes to reducing the duration of mechanical ventilation and ICU stays, as well as improving muscle strength and functional ability, all while maintaining a high level of safety when established protocols are followed (Xu et al., 2025; Khan et al., 2025).

Despite the benefits demonstrated by studies, the successful implementation of early mobilization depends not merely on the timing of initiation, but largely on the soundness of the clinical decision regarding the patient's readiness for movement. Making this decision is one of the most significant challenges facing physical therapists in the ICU, as it requires balancing the anticipated benefits of early mobilization against the risk of complications arising from clinical instability. Consequently, modern guidelines emphasize that the decision to initiate mobilization must be based on a systematic assessment of the patient's physiological status, rather than solely on the length of the hospital stay or personal experience. (Rawal et al., 2024; Alanazi et al., 2024)

Physiotherapists are key members of the multidisciplinary care team in intensive care units, participating in assessing patient readiness, selecting appropriate activity levels, and monitoring physiological responses before, during, and after early mobilization sessions. Their role extends beyond merely administering therapeutic exercises to making evidence-based clinical decisions aimed at maximizing therapeutic benefit while minimizing the risk of complications. Consequently, the quality of clinical decision-making is a fundamental factor in the success of early mobilization programs and the achievement of their functional goals. (Singam et al., 2024; Schaller et al., 2024).

Physiological parameters serve as the cornerstone for physiotherapists when making clinical decisions regarding the initiation of early mobilization; these indicators reflect the stability of vital organ functions and the patient's ability to safely tolerate physical activity. These parameters include assessments of blood pressure, mean arterial pressure, heart rate, oxygen saturation, fraction of inspired oxygen (FiO2), positive end-expiratory pressure (PEEP), and respiratory rate, as well as level of consciousness, cardiac rhythm stability, and a review of hemodynamic support medications. Recent evidence confirms that relying on a single indicator is insufficient for making mobilization decisions; instead, all indicators must be evaluated comprehensively to ensure patient safety. (MD Anderson Cancer Centre, 2025; Rawal et al., 2024). Despite the existence of international guidelines defining safety criteria for early mobilization, their application in clinical practice varies across healthcare institutions and among practitioners themselves. Studies have shown that adherence to physiological criteria is influenced by multiple factors, including the availability of protocols, training levels, professional experience, the size of the treatment team, and the resources available within the intensive care unit. This variability leads to differences in the timing of mobilization initiation

and the permitted level of activity, which can impact patient safety and functional treatment outcomes (Papadimitriou et al., 2025; du Plessis et al., 2025).

Surveys conducted among physiotherapists in various countries have also revealed disparities in knowledge regarding the physiological criteria used for clinical decision-making. Some therapists demonstrated a greater reliance on traditional indicators—such as blood pressure, heart rate, and oxygen saturation—while placing less emphasis on other parameters like positive end-expiratory pressure (PEEP), fraction of inspired oxygen (FiO2), and level of consciousness; these are no less critical when assessing a patient's readiness for early mobilization. These findings highlight an ongoing need to update clinical knowledge and align daily practice with evidence-based guidelines (Wshah et al., 2025; Papadimitriou et al., 2025).

Research Problem

Although early mobilization has become a crucial rehabilitative intervention in intensive care units (ICUs), its safe implementation does not rely on a generic decision or fixed timing; rather, it requires a precise understanding of the physiological parameters that determine a patient's readiness for movement. These parameters include indicators such as blood pressure, pulse rate, oxygen saturation, fraction of inspired oxygen (FiO2), positive end-expiratory pressure (PEEP), respiratory rate, level of consciousness, and other factors related to patient safety during mobilization.

Recent literature indicates a lack of consistency among physical therapists regarding the use of these parameters in clinical decision-making—a variation linked to factors such as experience, training, the availability of protocols, and safety concerns. Such inconsistency can lead to delays in initiating early mobilization or result in non-uniform implementation across healthcare institutions.

Scientific information on this topic remains limited, particularly regarding the city of Tripoli. Consequently, the research problem centres on the lack of clarity regarding the physiological parameters physical therapists rely on when making clinical decisions to initiate early mobilization in ICUs, as well as the extent to which these parameters align with current scientific recommendations.

General Study Objective:

The study aims to identify the physiological variables used as criteria for clinical decision-making regarding the implementation of early mobilization in ICUs by physical therapists in Tripoli.

Specific Objectives:

1. To determine the timing of early mobilization initiation in ICUs based on the patient's day of admission.
2. To identify the key physiological variables relied upon by physiotherapists when initiating early mobilization sessions in intensive care units.
3. To determine the key physiological variables relied upon by physiotherapists when terminating early mobilization sessions in intensive care units.
4. To assess the extent to which physiotherapists mobilize patients while they are on mechanical ventilation.
5. To identify the factors influencing the clinical decision-making of physiotherapists regarding the implementation of early mobilization in intensive care units.

General Research Question:

What physiological variables serve as criteria for clinical decision-making regarding the implementation of early mobilization in intensive care units among physiotherapists in Tripoli?

Sub-questions:

1. When do physiotherapists begin implementing early mobilization in intensive care units relative to the patient's day of admission?

2. What are the key physiological variables relied upon by physiotherapists when initiating early mobilization sessions in intensive care units?
3. What are the key physiological variables relied upon by physiotherapists when terminating early mobilization sessions in intensive care units?
4. To what extent do physiotherapists mobilize patients while they are on mechanical ventilation in intensive care units?
5. What factors influence the clinical decision-making of physiotherapists regarding the implementation of early mobilization in intensive care units? Previous Studies and Their Application

Study 1: Wshah et al. (2025)

Title: "Exploring Early Mobilization Practices in Adult Intensive Care Units in Jordan: A Cross-Sectional Survey Study"

This study aimed to explore early mobilization practices within adult intensive care units (ICUs) in Jordan and to identify the common strategies employed by healthcare professionals when implementing them. A descriptive cross-sectional design was used, and data were collected via a structured electronic questionnaire distributed to healthcare professionals working in ICUs across various health sectors in Jordan. A total of 200 completed responses were received; the participants included physiotherapists (34.5%) and nurses (21%). The results indicated that the most frequently used early mobilization strategies in the ICUs were patient repositioning (19.3%), followed by active mobilization (14.4%) and passive mobilization (13.1%). The findings also showed that the majority of participants integrated early mobilization with respiratory secretion clearance procedures, suggesting a link between early mobilization practices and respiratory care in the ICU setting. Furthermore, the study revealed that respiratory stability was the primary criterion used to determine a patient's eligibility for early mobilization. Finally, the study found that 36% of participants reported the absence of standardized protocols for early mobilization in their respective ICUs. The study concluded that early mobilization is a recognized and important practice among healthcare workers in Jordan; however, its implementation varies significantly due to the absence of standardized protocols and a need for training and clear clinical guidelines. The study recommended developing standardized practical guidelines and organizing training programs to support the safer and more consistent implementation of early mobilization within intensive care units.

Second Study: Papadimitriou et al. (2025)

Titled: "Early Mobilization of Critically Ill Patients: A Survey Study on the Knowledge, Practices, and Perceptions of Physiotherapists in Greece"

This study aimed to assess physiotherapists' knowledge regarding the early mobilization of critically ill patients, their clinical practices, and their perceptions of the barriers limiting its implementation in intensive care units. Employing a descriptive survey design via an online questionnaire, the study focused on the therapists' knowledge of early mobilization, the nature of the practices employed, and the factors influencing implementation. The results indicated that early mobilization is a safe and beneficial intervention for reducing complications associated with bed rest and improving respiratory function; however, its implementation remains limited due to a gap between scientific evidence and...

Study Procedures:

1. Study Methodology:

Based on the nature, objectives, and research questions of the study, the researchers employed the descriptive survey method, as it was deemed appropriate for the study's aims.

2. Study Population:

The study population consisted of physical therapists working in physical therapy centers and departments within intensive care units in the city of Tripoli.

3. Study Sample:

The sample comprised 25 physical therapists working in intensive care units—within physical therapy centers and departments at public and private hospitals in Tripoli—who were selected via random sampling from among those who responded to the study instrument.

Table (1) Description of the research sample by age variable

Percentage	Number	Age
16%	4	Less than 30 years
60%	15	30–39 years
24%	6	40 years and above

Figure (1)Description of the research sample by age variable

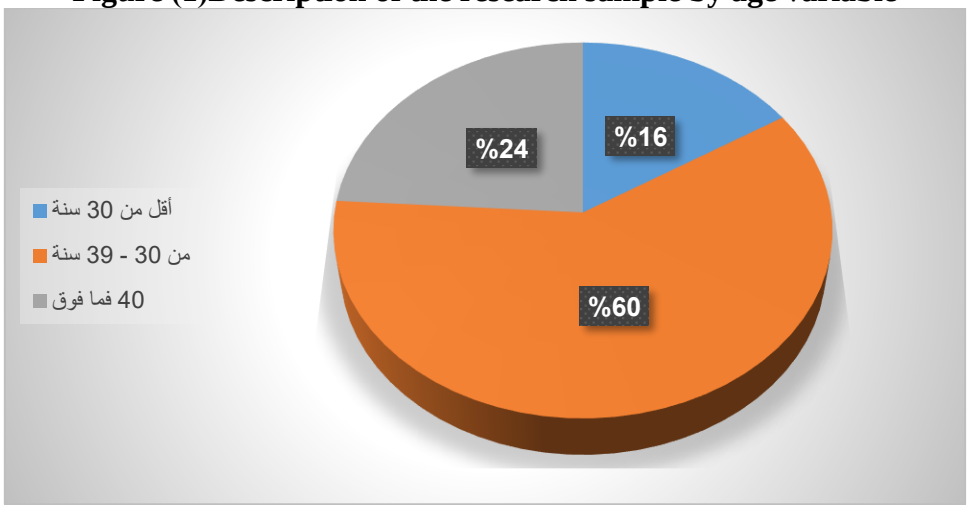


Table (2) Description of the research sample by gender

Percentage	Number	Gender
64%	16	Male
36%	9	Female

Figure (2) Distribution of the research sample by gender

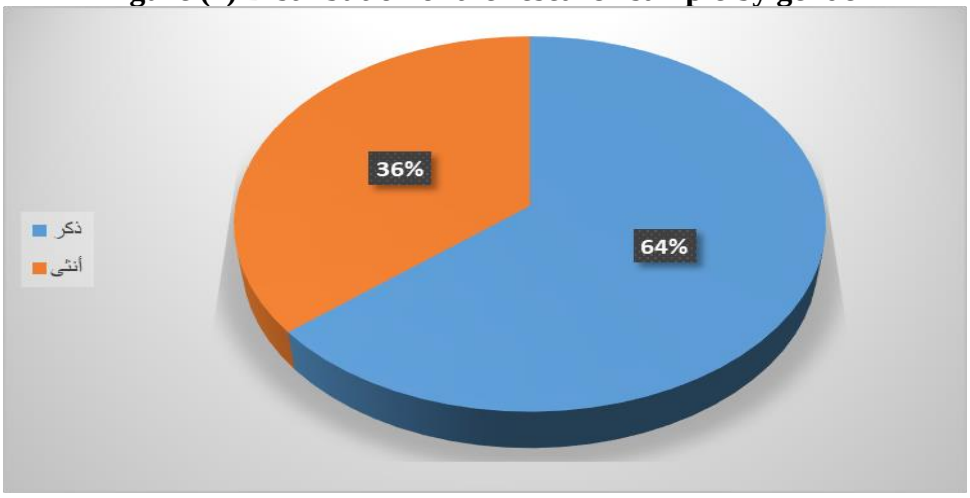


Table (3) Description of the research sample by educational qualification

Percentage	Number	Educational Qualification
16%	4	Intermediate Diploma
20%	5	Higher Diploma
40%	10	Bachelor's Degree
24%	6	Higher Degree (Postgraduate)

Figure (3) Distribution of the research sample according to the academic qualification variable.

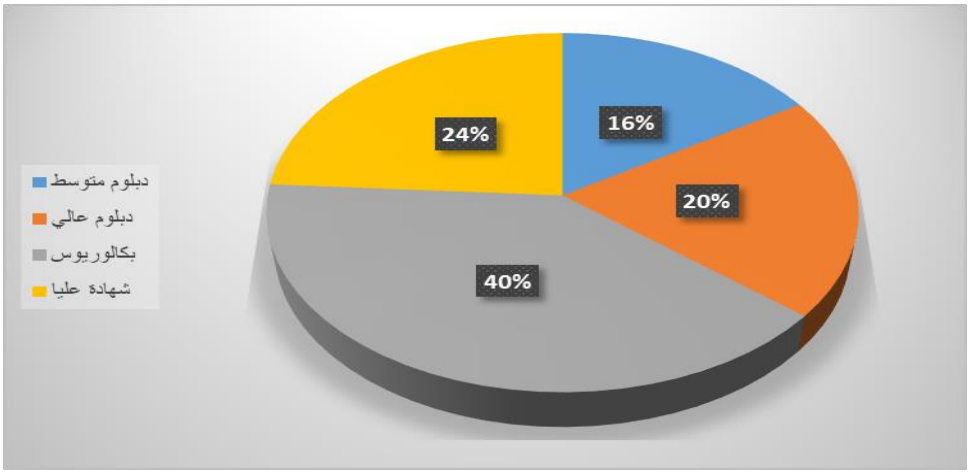
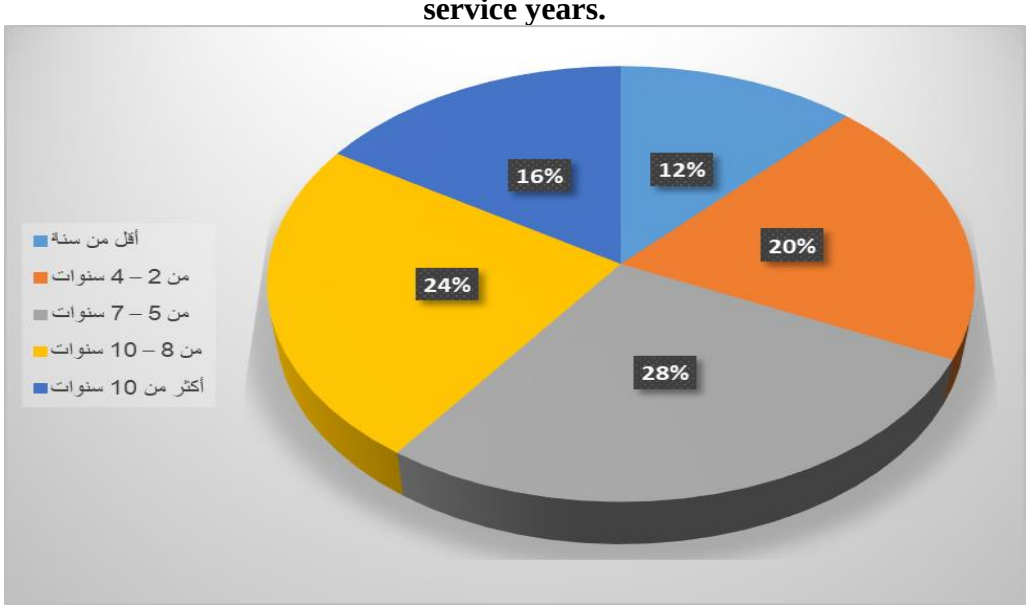


Table (4) Description of the research sample by experience in intensive care

Percentage	Number	Experience in intensive care
12%	3	Less than one year
20%	5	2–4 years
28%	7	5–7 years
24%	6	8–10 years
%16	4	More than 10 years

Figure (4): Distribution of the research sample according to the variable of practical service years.



Study Instrument

The study utilized a structured questionnaire developed by the researchers following a review of scientific literature and international guidelines regarding early mobilization in intensive care units (ICUs). The aim was to identify the physiological variables physiotherapists rely on for clinical decision-making—specifically regarding the initiation and termination of early mobilization—as well as the factors influencing these decisions.

The questionnaire was designed based on scientific literature and international guidelines concerning early mobilization in ICUs. Items regarding practice patterns and the role of the physiotherapist were based on recommendations by Gosselink et al. (2008) and the study by Yean et al. (2020). Items concerning the timing of mobilization initiation and physiological safety criteria were based on recommendations by Hodgson et al. (2014) and guidelines by Schaller et al. (2024). Items regarding criteria for starting and ending mobilization sessions relied on the review by da Conceição et al. (2017) and the MD Anderson Cancer Center algorithm (2025). Items related to mobilizing patients on mechanical ventilation were based on the study by Hodgson et al. (2022) and recent Australian guidelines by Hodgson et al. (2025). Finally, items concerning factors influencing clinical decisions were formulated based on studies by Yean et al. (2020), Papadimitriou et al. (2025), and Shahs et al. (2025), ensuring alignment with the study's objectives and research questions. The questionnaire consisted of two main sections:

Section One: Demographic data, covering the participants' personal and professional characteristics, such as age, gender, educational qualifications, and years of experience in intensive care.

Section Two: Data regarding clinical practice in early mobilization, comprising six key areas:

1. Early mobilization practice patterns within intensive care units.
2. Timing of early mobilization initiation based on the patient's day of admission.
3. Physiological variables considered when deciding to initiate early mobilization sessions.
4. Physiological variables considered when deciding to terminate early mobilization sessions.
5. Early mobilization practices for patients on mechanical ventilation.
6. Factors influencing the physiotherapist's clinical decision-making regarding early mobilization.

The questionnaire items were formulated as closed-ended, multiple-choice questions tailored to the nature of each section; some items required a single answer, while others allowed for multiple selections, reflecting the fact that clinical decision-making in intensive care units often relies on a combination of physiological indicators rather than a single one.

- Validity of the Instrument

To ensure the validity of the study instrument, the questionnaire was submitted in its preliminary form to a panel of ten experts specializing in physiotherapy and intensive care. They were asked to evaluate the items based on their relevance to the study objectives, the clarity of the wording, and the comprehensiveness of the questionnaire regarding the physiological variables involved in clinical decisions to initiate or terminate early mobilization. In light of the reviewers' comments, certain phrases were modified, unsuitable items were removed, and specific paragraphs were reworded, resulting in a final version of the questionnaire suitable for administration.

- Pilot Study

A pilot study was conducted with a small sample of physical therapists—distinct from the main study sample—to verify the clarity and comprehensibility of the questionnaire items and their suitability for the nature of the specialists' work in intensive care units. Additionally, the study aimed to determine the time required for completion and to identify any difficulties participants might encounter while filling out the questionnaire. The pilot study results indicated that the

questionnaire items were clear and appropriate, with no significant difficulties reported during completion.

- Instrument Reliability

Given that most questionnaire items consisted of closed-ended and multiple-choice questions—with some allowing for multiple responses—instrument reliability was assessed using a test-retest method. The questionnaire was re-administered to the pilot study sample after an appropriate interval, and participants' responses from both administrations were compared to ensure consistency and stability. The similarity of responses between the two administrations demonstrated that the instrument possessed an adequate level of reliability, justifying its use in the main study. Main Study

The main study was conducted from Sunday, December 13, 2025, to Wednesday, February 11, 2026, involving the research sample members under identical conditions and circumstances for all participants.

Presentation and Discussion of Results

Presentation and discussion of results regarding:

General Question: What physiological variables are adopted as criteria for clinical decision-making regarding the implementation of early mobilization within intensive care units by physiotherapists in the city of Tripoli?

First Question: When do physiotherapists initiate early mobilization within intensive care units, based on the patient's day of admission?

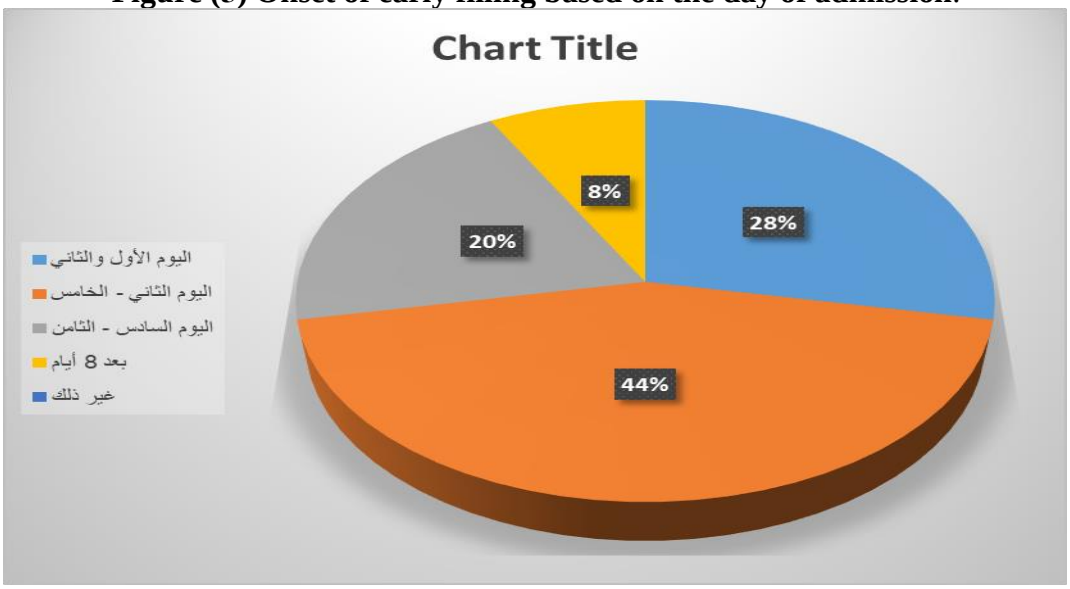
Table (5): Onset of early mobilization based on day of admission

Onset of early mobilization based on day of admission

(100%)	Percentage	Number of respondents (n=25)
28%	7	Days 1 and 2
44%	11	Days 2–5
20%	5	Days 6–8
8%	2	After 8 days
0%	0	Other

Note: (One option only)

Figure (5) Onset of early filling based on the day of admission.



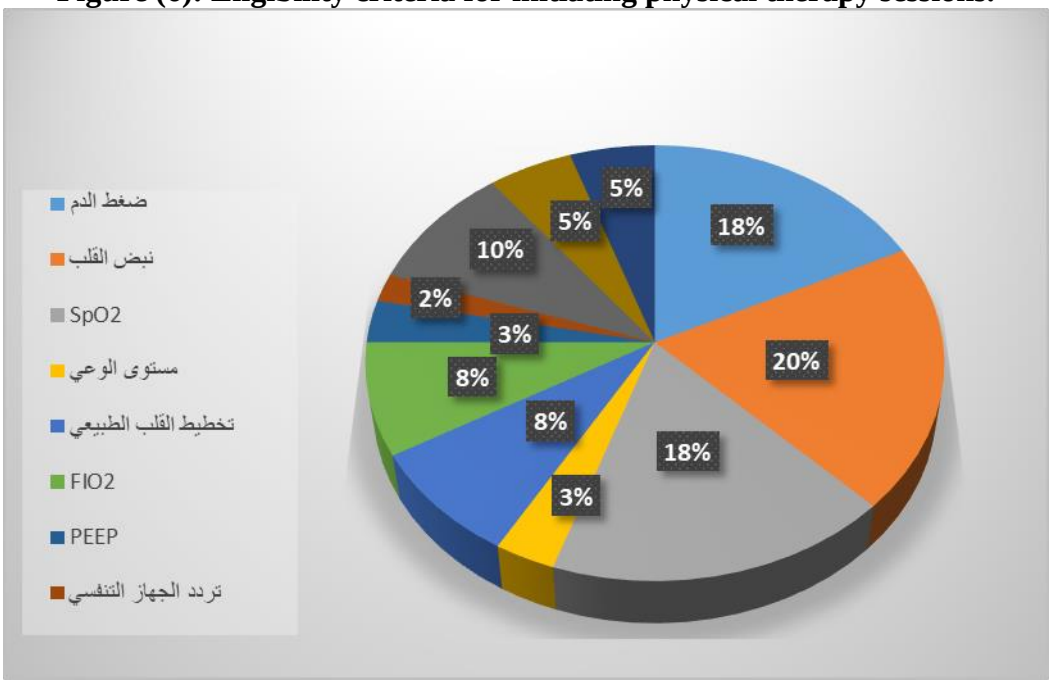
Second Question: What are the key physiological variables relied upon by physical therapists when initiating early mobilization sessions in intensive care units?

Table (6) Eligibility criteria for initiating physical therapy sessions

Percentage (100%)	Number of Respondents (n=25)	(Physiological Variables)
68%	17	Blood pressure
76%	19	Heart rate
68%	17	SpO2
12%	3	Level of consciousness
32%	8	Normal ECG
32%	8	FiO2
12%	3	PEEP
8%	2	Respiratory rate
36%	9	Temperature
20%	5	Medical history review
20%	5	Intracranial pressure
0%	0	Other

Note: Multiple options could be selected.

Figure (6): Eligibility criteria for initiating physical therapy sessions.



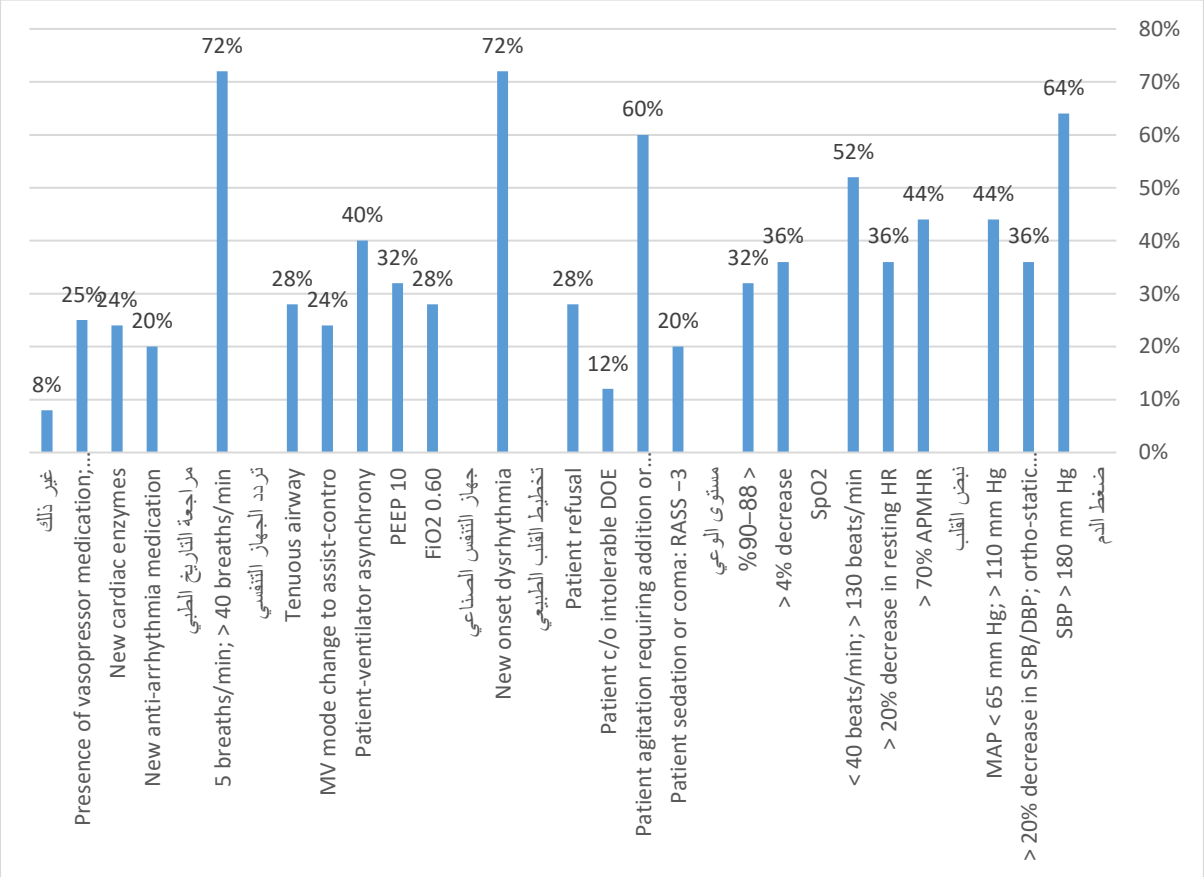
Research Question 3: What are the key physiological variables relied upon by physical therapists when terminating early mobilization sessions in intensive care units?

Table (7): Criteria for terminating physical therapy sessions

Percentage (100%)	Number of Respondents (n=25)	(Physiological Variables)
		Blood Pressure
64%	16	SBP > 180 mm Hg
36%	9	> 20% decrease in SBP/DBP; orthostatic hypotension
44%	11	MAP < 65 mm Hg; > 110 mm Hg
		Heart Rate
44%	11	> 70% APMHR
36%	9	> 20% decrease in resting HR
52%	13	< 40 beats/min; > 130 beats/min
		SpO2
36%	9	> 4% decrease
32%	8	< 88–90%
		Level of Consciousness
20%	5	Patient sedation or coma: RASS −3
60%	15	Patient agitation requiring addition or escalation of sedative medication: RASS > 2
12%	3	Patient complains of intolerable DOE (Dyspnea on Exertion)
28%	7	Patient refusal
		ECG Findings
72%	18	New onset dysrhythmia
		Mechanical Ventilation
28%	7	FiO2 0.60
32%	8	PEEP 10
40%	10	Patient-ventilator asynchrony
24%	6	MV mode change to assist-control
28%	7	Tenuous airway
		Respiratory Rate
72%	18	5 breaths/min; > 40 breaths/min

		Medical history review
20%	5	New anti-arrhythmia medication
24%	6	New cardiac enzymes
25%	5	Presence of vasopressor medication; new vasopressor or escalating dose of vasopressor medication
8%	2	Other

Note / (Multiple options may be selected)

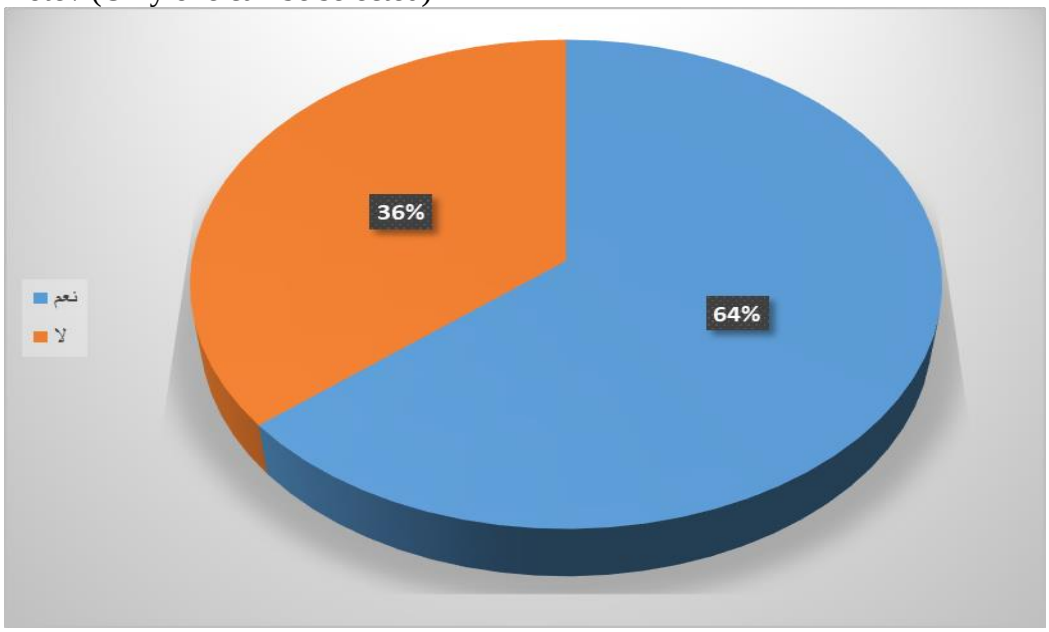


1. Fourth Question: To what extent do physical therapists mobilize patients while they are on mechanical ventilation in intensive care units?

Table (8): Mobilization of patients on mechanical ventilation by the physical therapist

(100%)	Percentage	Do you mobilize patients while they are on mechanical ventilation? Number of respondents (n=25)
64%	16	Yes
36%	9	No

Note / (Only one can be selected)

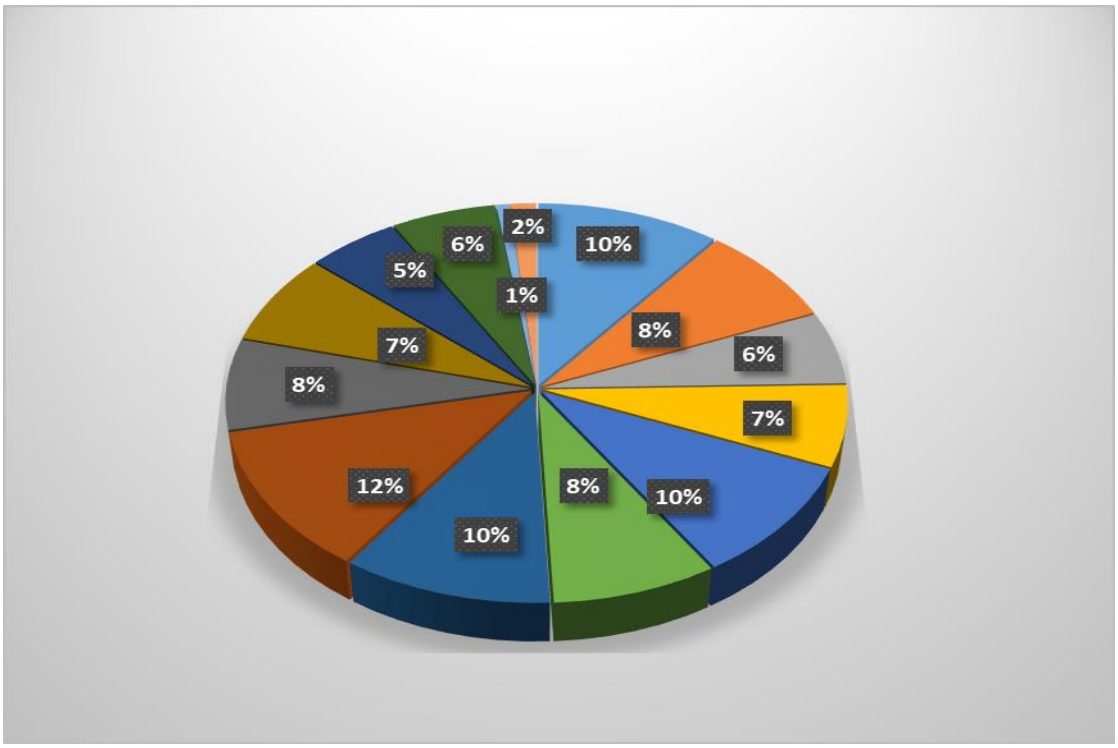


Question 5: What factors influence the clinical decision-making of physical therapists regarding early mobilization in intensive care units?

Table (9): Factors influencing your clinical decision to perform early mobilization

Percentage (100%)	Number of respondents (n=25)	Factors influencing your clinical decision to perform early mobilization
56%	14	Provided protocols or guidelines
44%	11	Equipment provided for early mobilization
32%	8	Physical space / Physical environment
36%	9	Assistance from other staff
52%	13	Clinical experience with early mobilization
44%	11	Knowledge or training regarding early mobilization
56%	14	Safety concerns regarding early mobilization
64%	16	Patient's medical stability
40%	10	Level of sedation used
40%	10	Catheter location
28%	7	Patient's body weight
32%	8	Cognitive level
4%	1	Endotracheal intubation (presence of a tracheal tube)
8%	2	Other

Note: Multiple options could be selected.



Discussion of Results

The results in Table (5) indicate that the majority of specialists (44%) initiate early mobilization between the second and fifth days of admission, while 28% begin within the first or second day. This finding suggests that the decision to initiate mobilization remains linked—at least in part—to the duration of the hospital stay rather than the patient's physiological readiness. This contrasts with modern guidelines, which emphasize that early mobilization should commence as soon as physiological stability criteria are met—often within the first 48–72 hours of ICU admission, provided the clinical condition permits. The researchers suggest that this delay may stem from clinical caution, a lack of clear protocols, or a reliance on the length of stay rather than a direct assessment of physiological indicators (Schaller et al., 2024).

Regarding the physiological criteria for initiating physical therapy sessions, the results in Table (6) show that heart rate was the most frequently used criterion (76%), followed by blood pressure and oxygen saturation (SpO_2), each at 68%. This finding aligns with the recent clinical practice guidelines from the Agency for Clinical Innovation, which state that the decision to initiate early mobilization in the ICU must be preceded by an assessment of hemodynamic and respiratory stability—including blood pressure, heart rate, oxygen saturation, and respiratory support requirements. It also concurs with the review by Alanazi et al., which identified basic vital signs as key determinants of safety for early mobilization, both prior to and during the session. The researcher believes that the specialists' reliance on these indicators reflects a sound understanding of the importance of basic vital signs as a primary step in assessing a patient's readiness for mobilization (Agency for Clinical Innovation, 2025; Alanazi et al., 2024). The results showed lower selection rates for certain important criteria, such as PEEP (12%), level of consciousness (12%), respiratory rate (8%), and FiO_2 (32%). This finding contrasts with modern protocols that emphasize the importance of assessing ventilator parameters and neurological status prior to mobilization—particularly for patients on mechanical ventilation—given that FiO_2 values, PEEP, respiratory rate, and level of consciousness are critical indicators for determining the safety of mobilization. Furthermore, a study by du Plessis et al. indicated that knowledge gaps and cautious practices among intensive care staff might limit the safe and systematic implementation of early mobilization. The researcher suggests that the low selection rate for these indicators highlights a clear need for specialized training on interpreting ventilator

parameters and using consciousness scales, such as RASS, before deciding to mobilize a patient (MD Anderson Cancer Center, 2026; du Plessis et al., 2025). Regarding the criteria for terminating physical therapy sessions, the results in Table 7 showed that the most frequently selected criteria were the onset of a new cardiac arrhythmia (72%), a respiratory rate below 5 or above 40 breaths/minute (72%), systolic blood pressure (SBP) >180 mmHg (64%), and severe agitation (RASS >2) (60%). These findings align with the recent MD Anderson Cancer Center guidelines on early mobilization in the ICU, which indicate that mobilization sessions must be halted or modified if signs of intolerance—such as cardiac instability, decreased oxygen saturation, elevated respiratory rate, or acute neurological changes—occur. They also concur with the review by Rawal et al. (2024), which emphasized that criteria for stopping mobilization should include clear cardiac, respiratory, and neurological indicators to ensure patient safety during physical activity. The researcher suggests that the specialists' knowledge of these cessation criteria was superior to their knowledge of certain initiation criteria; this may be because warning signs during a session are more distinct and easier to recognize in clinical practice (MD Anderson Cancer Center, 2025; Rawal et al., 2024).

The results in Table 8 indicate that 64% of specialists mobilize patients while they are on mechanical ventilation. This is a relatively positive finding, as it suggests that the majority of participants do not view mechanical ventilation as an absolute contraindication to early mobilization; instead, they base their decision on the patient's physiological stability and the presence of safety measures. This result aligns with recent Australian guidelines emphasizing the need to weigh the benefits and risks of mobilization for every patient receiving mechanical ventilation in the ICU. It also accords with the TEAM study, which examined early active mobilization in mechanically ventilated patients and underscored the importance of implementing it based on careful individual assessment and continuous monitoring. The researcher believes this result reflects an evolution in the awareness of specialists; however, she simultaneously emphasizes the need for clear protocols defining initiation and cessation criteria to ensure patient safety during mechanical ventilation (Hodgson et al., 2025; Hodgson et al., 2022).

Regarding factors influencing clinical decision-making, the results in Table 9 indicate that the most significant factor was patient medical stability (64%), followed by protocols or guidelines and safety concerns (56% each), and then clinical experience (52%). These findings align with recent studies showing that the implementation of early mobilization in intensive care units is influenced by several factors, most notably patient medical stability, the existence of clear protocols, levels of training and experience, safety concerns, and multidisciplinary team support. The researcher posits that this result confirms that clinical decision-making relies not only on the specialist's knowledge of physiological indicators but is also influenced by the organizational environment within the ICU, as well as the availability of local guidelines, institutional support, and continuous training (Albarrati et al., 2024; Papadimitriou et al., 2025; Wshah et al., 2025).

Conclusions

- The study results showed that the application of early mobilization within intensive care units (ICUs) among physiotherapists in Tripoli remains inconsistent, indicating a disparity in clinical practice and a lack of uniformity among all physiotherapists.
- The majority of physiotherapists were found to initiate early mobilization between the second and fifth day of patient admission, suggesting that the decision to initiate mobilization is often more closely linked to the length of stay than to a comprehensive physiological assessment of the patient.
- The results showed that the most frequently used physiological indicators when deciding to initiate early mobilization are heart rate, blood pressure, and oxygen saturation, reflecting a good understanding of the importance of basic vital signs in assessing patient readiness.

- The study revealed a lack of attention to some important physiological indicators such as FiO_2, PEEP, respiratory rate, and level of consciousness, indicating a need to enhance knowledge of the advanced indicators used in assessing ICU patients.
- The results showed that physiotherapists have a better understanding of the criteria for stopping mobilization sessions compared to the criteria for starting them, reflecting greater attention to danger signs during the procedure. - The study showed that the majority of physiotherapists do not consider the presence of a ventilator a contraindication to early mobilization, but rather base their decision on the patient's physiological stability.
- The results showed that the patient's medical stability is the most influential factor in clinical decision-making, followed by the availability of guidelines, safety concerns, and clinical experience.
- The study confirmed that the clinical decision to initiate early mobilization depends on the integration of a range of physiological indicators and regulatory factors, not on a single indicator or personal experience alone.
- The results indicate the need to standardize clinical practice within intensive care units in Tripoli through evidence-based protocols.

- The study's findings demonstrate a clear need to enhance the competence of physiotherapists in applying early mobilization criteria, thereby ensuring improved quality of care and patient safety.
- Recommendations: Based on the study's findings, the researcher recommends the following

Recommendations:

- Developing a unified Libyan protocol, based on the latest scientific evidence, to define the physiological criteria for initiating and discontinuing early mobilization within intensive care units. - Organize training programs and continuing education courses for physiotherapists on assessing physiological indicators related to early mobilization, particularly FiO_2, PEEP, level of consciousness, and respiratory rate.
- Promote the application of evidence-based practice in clinical decision-making within intensive care units.
- Encourage multidisciplinary teamwork in early mobilization decisions to ensure patient safety.
- Integrate early mobilization protocols into the policies and procedures adopted in Libyan hospitals.
- Provide the necessary equipment and devices that contribute to the safe implementation of early mobilization.
- Encourage hospitals to implement regular training programs on safe early mobilization and risk management during implementation.
- Conduct prospective studies with larger samples from various Libyan cities to compare clinical practices among healthcare institutions.
- Conduct analytical studies to examine the relationship between years of experience, academic qualifications, knowledge of physiological parameters, and clinical decision-making.
- Conduct pilot studies to evaluate the impact of implementing evidence-based early mobilization protocols on improving patient outcomes within intensive care units.

reviewer

1- Adler, J., & Malone, D. (2012). Early mobilization in the intensive care unit: A systematic review. Cardiopulmonary Physical Therapy Journal, 23(1), 5–13.
2- Agency for Clinical Innovation. (2025). Physical activity and mobilisation for critically ill adults: Clinical practice guide. NSW Agency for Clinical Innovation.
3- Alanazi, R. A. H., et al. (2024). Best practices for early mobilization of intensive care unit patients: A narrative review. Saudi Journal of Medicine & Public Health.

4- Albarrati, A., et al. (2024). A culture of early mobilization in adult intensive care units. Healthcare, 12(13), 1300. https://doi.org/10.3390/healthcare12131300
5- Arias-Fernández, P., Romero-Martin, M., Gómez-Salgado, J., & Fernández-García, D. (2018). Rehabilitation and early mobilization in the critical patient: Systematic review. Journal of Physical Therapy Science, 30(9), 1193–1201. https://doi.org/10.1589/jpts.30.1193
6- Daum, N., Drewniok, N., Bald, A., Ulm, B., Buyukli, A., Grunow, J. J., & Schaller, S. J. (2024). Early mobilisation within 72 hours after admission of critically ill patients in the intensive care unit: A systematic review with network meta-analysis. Intensive and Critical Care Nursing, 80, 103573. https://doi.org/10.1016/j.iccn.2023.103573
7- da Conceição, T. M. A., Gonzáles, A. I., Figueiredo, F. C. X. S., Vieira, D. S. R., & Bündchen, D. C. (2017). Safety criteria to start early mobilization in intensive care units: Systematic review. Revista Brasileira de Terapia Intensiva, 29(4), 509–519.
8- du Plessis, I., Francis, S., & Morrow, B. (2025). Early mobilisation in Windhoek intensive care units: Practices, attitudes and barriers. South African Journal of Physiotherapy, 81(1), Article a2118. https://doi.org/10.4102/sajp.v81i1.2118
9- Gosselink, R., Bott, J., Johnson, M., Dean, E., Nava, S., Norrenberg, M., Schönhofer, B., Stiller, K., van de Leur, H., & Vincent, J. L. (2008). Physiotherapy for adult patients with critical illness: Recommendations of the European Respiratory Society and European Society of Intensive Care Medicine Task Force on Physiotherapy for Critically Ill Patients. Intensive Care Medicine, 34(7), 1188–1199. https://doi.org/10.1007/s00134-008-1026-7
10- Hodgson, C. L., Capell, E., & Tipping, C. J. (2018). Early mobilization of patients in intensive care: Organization, communication and safety factors that influence translation into clinical practice. Critical Care, 22, 77. https://doi.org/10.1186/s13054-018-1998-9
11- Hodgson, C. L., et al. (2022). Early active mobilization during mechanical ventilation in the ICU. The New England Journal of Medicine, 387(19), 1747–1758. https://doi.org/10.1056/NEJMoa2209083
12- Hodgson, C. L., et al. (2025). Australian clinical practice guideline for physical rehabilitation and mobilisation in adult intensive care units. Australian Critical Care.
13- Hodgson, C. L., Stiller, K., Needham, D. M., Tipping, C. J., Harrold, M., Baldwin, C. E., Bradley, S., Berney, S., Caruana, L. R., Elliott, D., Green, M., Haines, K., Higgins, A. M., Kaukonen, K. M., Leditschke, I. A., Nickels, M. R., Paratz, J., Patman, S., Skinner, E. H., … Webb, S. A. R. (2014). Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults. Critical Care, 18, 658. https://doi.org/10.1186/s13054-014-0658-y
14- Ji, H. M., et al. (2023). Early mobilization and rehabilitation of critically ill patients. Journal of Clinical Medicine, 12(7).
15- Jolley, S. E., Moss, M., Needham, D. M., Caldwell, E., Morris, P. E., Miller, R. R., Ringwood, N., Anders, M., Koo, K. K. Y., Gundel, S. E., Parry, S. M., Hough, C. L., & Acute Respiratory Distress Syndrome Network Investigators. (2017). Point prevalence study of mobilization practices for acute respiratory failure patients in the United States. Critical Care Medicine, 45(2), 205–215. https://doi.org/10.1097/CCM.0000000000002058
16- Khan, S. A., Moeed, A., Mari, T., Yousuf, Z., Hanson, A., Dong, Y., Cornelius, P., Anjum, H., Ratnani, I., & Surani, S. (2025). Safety and early mobilization in intensive care unit patients: An updated systematic review and meta-analysis of randomized controlled trials. World Journal of Critical Care Medicine, 14(4), 107396.

17- Kayambu, G., Boots, R., & Paratz, J. (2013). Physical therapy for the critically ill in the ICU: A systematic review and meta-analysis. Critical Care Medicine, 41(6), 1543–1554. https://doi.org/10.1097/CCM.0b013e31827ca637
18- MD Anderson Cancer Center. (2025). ICU adult early mobilization algorithm. The University of Texas MD Anderson Cancer Center.
19- Morris, P. E., & Herridge, M. S. (2007). Early intensive care unit mobility: Future directions. Critical Care Clinics, 23(1), 97–110.
20- Nydahl, P., Ruhl, A. P., Bartoszek, G., Dubb, R., Filipovic, S., Flohr, H.-J., Kaltwasser, A., Mende, H., Rothaug, O., Schuchhardt, D., Schwabbauer, N., & Needham, D. M. (2014). Early mobilization of mechanically ventilated patients: A 1-day point-prevalence study in Germany. Critical Care Medicine, 42(5), 1178–1186. https://doi.org/10.1097/CCM.0000000000000149
21- Papadimitriou, E., Petras, S., Mitsiou, G., Vasileiadis, I., Grammatopoulou, E., & Patsaki, I. (2025). Early mobilization of critically ill patients: A survey of knowledge, practices and perceptions of Greek physiotherapists. Healthcare, 13(11), 1248. https://doi.org/10.3390/healthcare13111248
22- Parada-Gereda, H. M., et al. (2025). Safety of early mobilisation in the intensive care unit. Critical Care.
23- Parry, S. M., & Puthucheary, Z. A. (2015). The impact of extended bed rest on the musculoskeletal system in the critical care environment. Extreme Physiology & Medicine, 4, 16. https://doi.org/10.1186/s13728-015-0036-7
24- Rawal, H., et al. (2024). Early mobilization in the ICU. CHEST Critical Care, 2(1), 100038. https://doi.org/10.1016/j.chstcc.2023.100038
25- Schaller, S. J., Scheffenbichler, F. T., Bein, T., Blobner, M., Grunow, J. J., Hermes, C., Kaltwasser, A., Lewald, H., Nydahl, P., Reisshauer, A., Renzewitz, L., Siemon, K., Staudinger, T., Ullrich, R., Weber-Carstens, S., Wrigge, H., Zergiebel, D., & Coldewey, S. M. (2024). Guideline on positioning and early mobilisation in the critically ill by an expert panel. Intensive Care Medicine, 50(8), 1211–1227. https://doi.org/10.1007/s00134-024-07532-2
26- Singam, A., et al. (2024). Mobilizing progress: A comprehensive review of the efficacy of early mobilization therapy in the intensive care unit. Cureus.
27- Tadyanemhandu, C., van Aswegen, H., & Ntsiea, V. (2018). Early mobilisation practices of patients in intensive care units in Zimbabwean government hospitals: A cross-sectional study. Southern African Journal of Critical Care, 34(1), 16–21. https://doi.org/10.7196/SAJCC.2017.v34i1.343
28- Taito, S., Shime, N., Ota, K., & Yasuda, H. (2016). Early mobilization of mechanically ventilated patients in the intensive care unit. Journal of Intensive Care, 4, 50. https://doi.org/10.1186/s40560-016-0179-7
29- Truong, A. D., Fan, E., Brower, R. G., & Needham, D. M. (2009). Bench-to-bedside review: Mobilizing patients in the intensive care unit—From pathophysiology to clinical trials. Critical Care, 13(4), 216. https://doi.org/10.1186/cc7885
30- Wshah, A., et al. (2025). Exploring early mobilization practices in adult intensive care units in Jordan. Journal of Multidisciplinary Healthcare, 18, 1819–1832.
31- Yean, L. C., et al. (2020). Physiotherapy practice of early mobilization in intensive care units in selected West Malaysia hospitals: A cross-sectional surve
32- ALfordaga, M., & Omer, A. I. (2026). Real-Time Requirements Analysis in Smart Healthcare Monitoring Systems: A Case Study of an ATmega328P-Based Health Monitoring Device. *Al-Farooq Journal of Sciences*, *2*(3), 1216-1236.
33- Wshah, A., Obaidat, S. M., Shallan, A. I., Muhsen, A., Bin Sheeha, B., Alkasassbeh, A., Wshah, S., Al Hadidi, A. R. B., Altaim, T. A., Sawafta, B., & Alqallab, S. (2025).

Exploring early mobilization practices in adult intensive care units in Jordan: A cross-sectional survey. Journal of Multidisciplinary Healthcare, 18, 3749–3761. https://doi.org/10.2147/JMDH.S524236

34- Papadimitriou, E., et al. (2025). Early mobilization of critically ill patients: A survey of Greek physiotherapists' knowledge, practices, and perceived barriers. Healthcare, 13(11), 1248. https://doi.org/10.3390/healthcare13111248

35-