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Effects of early mobilization in critically ill patients in intensive care units: an integrative review of the literature

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Abstract: Introduction: Mechanical ventilation is a procedure essentially used in intensive care units (ICUs) to provide respiratory support to patients with acute respiratory failure. Although it is a vital intervention, prolonged mechanical ventilation time can lead to significant complications, such as muscle weakness, atrophy, respiratory dysfunction, and increased length of ICU stay. Methodology: Data collection took place through the Coordination for the Improvement of Higher Education Personnel (CAPES), Google Scholar, Scielo, PubMed and BIREME, through bibliographic research of articles published in the period from 2017 to 2022. Findings: The sample consisted of 133 articles, of which 122 were pre-selected, 86 excluded, totaling 05 articles for the final sample. Final Thoughts: Through this study, it was possible to conclude that ICU-acquired muscle weakness is a frequent complication that can happen to several patients admitted to the Intensive Care Unit, which can impair the area of muscle mass and strength, causing various problems related to prolonged hospitalization time, mechanical ventilation and neuromuscular blockers.

Keywords: Physical therapy; Early mobilization; Intensive care.

1. Introduction

Mechanical ventilation is a procedure essentially used in intensive care units (ICUs) to provide respiratory support to patients who have acute respiratory failure. Although it is a vital intervention, prolonged mechanical ventilation time can lead to significant complications, such as muscle weakness, atrophy, respiratory dysfunction, and increased length of ICU stay. These adverse effects underscore the importance of early mobilization of patients on mechanical ventilation. In recent years, there has been a significant increase in evidence corresponding to the functional benefit of the use of early physiotherapy in critically ill patients in the intensive care unit (ICU) from the first 48 hours after the institution of mechanical ventilation (MV), but the performance of early mobilizations in critically ill patients is still infrequent (Pereira, 2017; Santana, 2022).

In Brazil, it has recently been observed that no more than 10% of critically ill patients are mobilized beyond the bedside. The consequences caused by immobility, resulting from prolonged hospitalization and often associated with extreme age, the severity of the disease and the type of admission, can extend up to 5 years after hospital discharge. Thus, a public health problem arises, impacting on the increase in comorbidities and the mortality rate (Ramos, 2021; Feliciano, 2019).

Prolonged immobility and lack of adequate mobilization in critically ill patients are problems that can have significant consequences for public health. This issue is related to several factors, such as limited resources, lack of knowledge and awareness about the importance of early mobilization, and logistical challenges faced by health professionals (Ramos, 2021)

Despite the evident benefits, early mobilization is still underutilized in many intensive care units. Barriers related to lack of knowledge, security concerns, and lack of resources can limit its implementation. However, as more scientific evidence is accumulated and clinical guidelines recommend the practice, early mobilization is expected to become an integral part of the care of patients on mechanical ventilation (Veneziano, 2022).

But for the conclusion to be positive, it is necessary to know the relationship between the benefits, eligibility for the performance of the MP and its adverse occurrences. It is essential that patients are carefully evaluated according to safety standards before PM is initiated, however, there is a discrepancy between the choices of safety standards in the various types of ICU. Early mobilization consists of the practice of adapted exercises and physical activities, started as early as possible during the ICU stay. This strategy aims to reverse the deleterious effects of prolonged immobility, stimulating muscle function, preserving strength, and improving patients' functional capacity. On the other hand, neuromuscular electrostimulation uses low-intensity electrical currents to selectively activate muscles, promoting muscle contraction and preventing atrophy resulting from immobilization (Reis, 2021; Rosa, 2022).

Therefore, because there is no systematization of safety standards, there is no agreement on which standards should be used to initiate the PM, so that the risks are reduced.

In order to conduct clinical practice with scientific references, this study proposed to verify the effects of early mobilization in critically ill patients hospitalized in the ICU, through a systematic review. Therefore, this research aims to analyze the effects of early mobilization in critically ill patients hospitalized in intensive care units (ICU).

2. Methodology

This is an integrative review of the literature, i.e., a survey of theoretical references based on scientific publications, which is nationally and internationally involving the effects of early mobilization in critically ill patients hospitalized in intensive care units.

Data collection took place through the Coordination for the Improvement of Higher Education Personnel (CAPES), Google Scholar, Scielo, PubMed and BIREME, through bibliographic research of articles published in the period from 2017 to 2022. The following health science descriptors (Dess/MeSH) were used: Early mobilization; Physiotherapy; Intensive care. The Boolean operator "AND" is used in the search. The choice of these databases is justified because they are known and present reliable and good quality sources.

The research was based on articles published in the period from 2017 to 2022 by the inclusion criteria: studies in English and Portuguese, published in the last five years, which deal with topics related to the effects of early mobilization in critically ill patients hospitalized in intensive care units. These are available for free online. Exclusion criteria were: studies whose text is not available in full, duplicates, review, meta-analysis, and even works that, after reading, were not related to the objective of the research.

2. Results

The sample consisted of 133 articles, of which 122 were pre-selected, 86 excluded, totaling 05 articles for the final sample, as shown in figure 1 below:

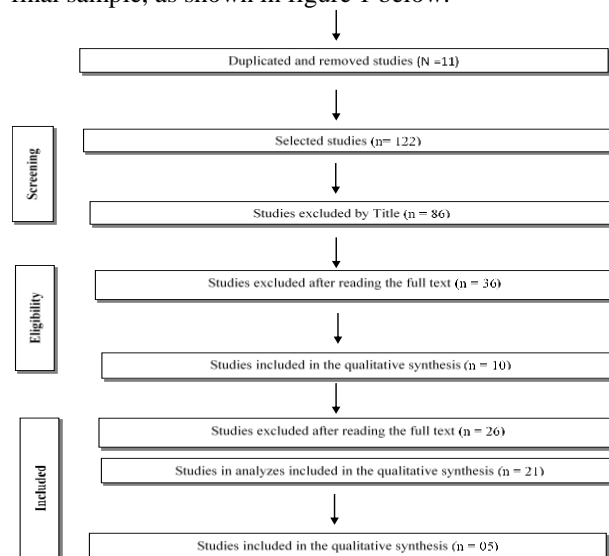


Figure 1. Flowchart of selection criteria and inclusion of studies. Source: Authors (2023)

We tried to identify the following aspects in the articles selected for the final phase: title of the article; authors, year of publication, objective and results. Therefore, the articles analyzed addressed different aspects.

The studies are broad, but well elaborated in the various approaches, although insufficient in the specialization of certain themes.

Table 1. Statement of the studies that make up the Bibliographic Journal

Title	Author/Year	Objective	Findings				
Effects of early combined resistance and endurance training in mechanically ventilated critically ill patients.	EGGMANN, S. <i>et al.</i> 2018.	Early resistance and endurance training in mechanically ventilated intensive care patients does not improve functional capacity or independence at hospital discharge compared with initial standard physical therapy, but may improve mental health 6 months after discharge from intensive care.	Neuromuscular weakness resulting in severe functional impairment is common in intensive care survivors. This study aimed to evaluate the effects of an early progressive rehabilitation intervention in at-risk mechanically ventilated adults.	Early and Enhanced Rehabilitation of Mechanically Ventilated Patients in Intensive Care: A Randomized Controlled Feasibility Trial.	MCWILLIAMS, S.T. <i>et al.</i> 2018.	Preventing the physical consequences of critical illness and supporting recovery from intensive care therefore has to be identified as a high-priority area for intensive care research.	pulmonary dysfunction after cardiac surgery, including physical and respiratory exercises, incentive spirometry and the use of mechanical devices. Approximately 270,000 patients are hospitalized annually in intensive care units in England, with about a third of them requiring mechanical ventilation. A strong correlation was observed between muscle weakness and prolonged mechanical ventilation, with survivors experiencing significant physical, cognitive, and mental health deficiencies.
Early mobilization reduces atelectasis and pleural effusion in patients undergoing coronary artery bypass grafting.	MORADIAN, S.T. <i>et al.</i> 2017.	Studies on MS after cardiac surgery are limited and, in most studies, MS is usually part of a package of physiotherapy services including cough, respiration and other therapeutic measures, so that the pure effect of in the reduction of pulmonary complications, such as atelectasis and pleural effusion in patients undergoing CABG. It is not well studied.	Atelectasis and pleural effusion are common after coronary artery bypass graft (CABG) surgery. Some experts believe that these complications can be seen in all patients after CABG. Several interventions have been used to treatment of	Impact of a progressive mobility program on the functional status, respiratory and muscular	SCHUJMAN, D.S. <i>et al.</i> 2020.	To investigate whether patients who participated in an ICU mobility program performed better in functional status, muscle assessment, mobility, and respiratory at discharge than	The intervention group participated in an early and progressive mobility program with five levels of

<p>systems of ICU patients: a randomized controlled trial.</p>		<p>patients who received conventional physical therapy.</p>	<p>activity. The control group was submitted to conventional treatment without a pre-established routine. We assessed functional status, activity level, respiratory status, muscle strength, and mobility at ICU discharge.</p>
<p>Effect of Early Mobilization Combined With Early Nutrition on Acquired Weakness in Critically Ill Patients.</p>	<p>ZHOU, W. <i>et al.</i> 2022.</p>	<p>Early mobilization is a promising potential intervention to combat ICU-AW, but it still requires further exploration. Mobilization could shorten the continuous immobilization prevalent in the ICU and stimulate muscle loading, contributing both to the stimulation of the muscle protein synthesis pathway and to the suppression of catabolism.</p>	<p>Intensive care unit acquired weakness (AW-ICU) is a serious neuromuscular complication in critically ill patients, with an overall incidence of 25-31% among the critically ill.</p>

Source: The Authors (2023)

4. Discussion

According to (Eggmann, 2018), Early training in critically ill patients refers to the implementation of rehabilitation and exercise interventions during hospitalization in intensive care units (ICU). Traditionally, patients admitted to ICUs are kept at rest to minimize physiological stress and allow for recovery. However, recent evidence suggests that early training can have significant benefits.

Therefore, exercise in mechanically ventilated critically ill patients, including resistance training (strengthening exercises) and resistance training (aerobic exercises), can help combat ICU-acquired muscle weakness, improve functional capacity, reduce mechanical ventilation time, shorten the length of hospital stay, and improve quality of life after hospital discharge (Eggmann, 2018).

In turn, training can be tailored to patients' individual needs, taking into account factors such as disease severity, hemodynamic stability, and functional capacity (Schujmann, 2020).

However, it is important to point out that each patient is unique, and not all critically ill patients will be able to participate in an early exercise program. The decision to implement early training should be based on a careful assessment of the patient's clinical status and ability to tolerate exercise (Schujmann, 2020).

In view of this, atelectasis is characterized by the partial or complete collapse of a portion of the lung due to airway obstruction. Pleural effusion occurs when there is abnormal accumulation of fluid in the pleural cavity, which surrounds the lungs. Both complications can lead to respiratory problems and prolonged hospitalization (Moradian, 2017).

The randomized clinical trial you mentioned investigated whether early mobilization can reduce the incidence of atelectasis and pleural effusion in patients undergoing coronary artery bypass grafting (Moradian, 2017).

Early and improved rehabilitation can help prevent muscle and respiratory complications, reduce ICU-acquired muscle weakness, improve functional capacity, accelerate physical recovery, reduce mechanical ventilation time, and shorten the length of hospital stay. In addition, these interventions can have a positive impact on patients' quality of life after hospital discharge (McWilliams, 2018).

It is important to highlight that early and enhanced rehabilitation should be tailored to the individual needs of each patient and carried out under the supervision of qualified healthcare professionals such as physiotherapists or rehabilitation specialists. The therapeutic approach should consider factors such as the patient's hemodynamic stability, the severity of the underlying disease, and functional capacity (McWilliams, 2018).

ICU-acquired muscle weakness is a common complication in critically ill patients who have spent prolonged time in the ICU and receive mechanical ventilation. Early mobilization, which involves performing exercises and physical activities tailored to the patient's capabilities, and early nutrition, which involves the proper administration of nutrients to prevent muscle loss, are therapeutic approaches that have been studied to combat ICU-acquired muscle weakness (Zhou, 2022).

The combination of early mobilization with early nutrition seeks to maximize the benefits and synergies between these two interventions, with the goal of improving muscle strength, physical function, and clinical outcomes for patients (ZHOU, 2022).

4. Conclusion

In conclusion, the effects of early mobilization in critically ill patients hospitalized in Intensive Care Units (ICUs) are significant and beneficial. Early mobilization refers to the initiative to start rehabilitation and physical activity as early as possible during the ICU stay, even when the patient is in critical condition.

Studies and scientific evidence have shown that early mobilization brings several advantages to critically ill patients. It helps prevent complications resulting from prolonged immobility, such as muscle weakness, atrophy, pressure ulcers, deep vein thrombosis and ventilator-associated pneumonia. In addition, early mobilization contributes to the reduction of the length of stay in the ICU and the period of mechanical ventilation, which results in shorter recovery time and, consequently, lower financial cost for the health system.

The benefits of early mobilization are not restricted to physical aspects alone. The practice also has a positive impact on the mental health of critically ill patients, promoting a sense of control, improved mood, and reduced anxiety and depression. In addition, the interaction with the health team during early mobilization strengthens the bond between patient and professional, resulting in a more humanized and empathetic relationship.

However, it is important to emphasize that early mobilization must be performed safely and appropriately, taking into account the patient's clinical conditions and stability. A multidisciplinary and coordinated approach, involving physicians, nurses, physiotherapists and other health professionals, is essential to ensure the safety and efficacy of this type of intervention.

Therefore, early mechanical mobilization is a very important therapeutic technique in the ICU, and can bring significant benefits to critically ill hospitalized patients.

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