




Early mobilization intensivist physiotherapy practice: interventions and barriers

Mobilização precoce a prática do fisioterapeuta intensivista: intervenções e barreiras

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ABSTRACT | INTRODUCTION: Patients in the Intensive Care Unit (ICU) require long periods of hospitalization, being subjected to immobilization, which results in significant loss of muscle mass. Early mobilization is a therapy performed in the ICU environment and aims to reduce functional impairment resulting from hospitalization. **OBJECTIVE:** To analyze the practice of early mobilization performed by the intensive care physiotherapist, identify the main interventions used by these professionals, and describe the barriers that make early mobilization unfeasible in patients admitted to intensive care units. **METHODOLOGY:** Field study, quantitative and transversal, carried out between February and May 2020, with intensive care physiotherapists from three hospitals in the city of Fortaleza, namely two of them are from the public network (one municipal and the other state) and the other from the private network. Intensive care physiotherapists working in the mentioned hospitals and who have a link with the institution were included in the study. Physiotherapists in the role of residents, interns, and preceptors present were excluded. For data collection, the online electronic form was made possible through the Google Forms application. The data were analyzed and tabulated using the Statistical Package for the Social Sciences (SPSS) version 20.0. The chi-square statistical tests were to determine differences in the responses of the safety criteria and barriers to the implementation of early mobilization and the length of experience in the intensive care unit and Kruskal-Wallis to compare early mobilization interventions between groups of physiotherapists from the three hospitals. **RESULTS:** 68 physiotherapists participated in the research, the majority (36.8%) having worked in intensive care for 6 to 10 years. The management of early mobilization is performed mostly by the physiotherapist. Regarding functional scales used in the ICU, the Medical Research Council (MRC) was the most cited by professionals with (67.7%). The most used mobilization strategy was sedation (91.2%). Respiratory distress was the most frequently cited clinical situation for interrupting early mobilization (83.8%). **CONCLUSION:** The most frequent interventions were sedation, the cycle ergometer, and transfers from an armchair bed. The patient-related barriers were hemodynamic instability, use of sedative and analgesic drugs.

KEYWORDS: Early Mobilization. Intensive therapy. Muscle weakness. Physiotherapist.

RESUMO | INTRODUÇÃO: Pacientes em Unidade de Terapia Intensiva (UTI) requerem longos períodos de internação, estando submetidos ao imobilismo, que resulta em perda significativa de massa muscular. A mobilização precoce é uma terapêutica realizada no ambiente de UTI e tem como objetivo diminuir o comprometimento funcional decorrente do período de internação. **OBJETIVO:** Analisar a prática de mobilização precoce realizada pelo fisioterapeuta intensivista, identificar as principais intervenções utilizadas por esses profissionais e descrever as barreiras encontradas que inviabilizam a prática da mobilização precoce, em pacientes internados em unidades de terapia intensiva. **METODOLOGIA:** Estudo de campo, quantitativo e transversal, realizado entre fevereiro e maio de 2020, com fisioterapeutas intensivistas de três hospitais na cidade de Fortaleza, a saber dois deles são da rede pública (um municipal e outro estadual) e o outro de rede privada. Foram incluídos no estudo fisioterapeutas intensivistas atuantes nos hospitais mencionados e que possuam vínculo com a instituição. Foram excluídos os fisioterapeutas na função de residentes, estagiários e preceptores presentes. Para coleta de dados foi utilizado o formulário eletrônico *on-line* viabilizada por meio do aplicativo *Google Forms*. Os dados foram analisados e tabulados através do Software Statistical Package for the Social Sciences (SPSS) versão 20.0. A estatística descritiva, com frequências absolutas e relativas foi utilizada para caracterizar o perfil da amostra estudada. Os testes estatísticos aplicados foram o Qui-Quadrado para determinar diferenças nas respostas dos critérios de segurança e barreiras para implementação da mobilização precoce e o tempo de experiência em unidade de terapia intensiva e o Kruskal-Wallis para comparar as intervenções de mobilização precoce entre grupos de Fisioterapeutas dos três hospitais. **RESULTADOS:** Participaram da pesquisa 68 fisioterapeutas, a maioria (36,8%) com tempo de atuação na terapia intensiva de 6 a 10 anos. O gerenciamento da mobilização precoce é realizado em sua maioria apenas pelo fisioterapeuta. Acerca da utilização de escalas funcionais utilizadas em UTI, a Medical Research Council (MRC) foi a mais citada pelos profissionais com (67,7%). A estratégia de mobilização mais utilizada foi a sedação (91,2%). O desconforto respiratório foi a situação clínica mais citada para a interrupção da mobilização precoce (83,8%). **CONCLUSÃO:** As intervenções mais frequentes foram a sedação, uso do cicloergômetro e transferências leito poltrona. As barreiras relacionadas ao paciente foram a instabilidade hemodinâmica, uso de drogas sedativas e analgésicas.

PALAVRAS-CHAVE: Mobilização Precoce. Terapia Intensiva. Fraqueza Muscular. Fisioterapeuta.

Introduction

Due to the hospitalization period, critical patients admitted to intensive care units (ICU) have decreased muscle strength. Myopathy, acquired in the ICU, is directly associated with decreased quality of life and morbidity and mortality in this group of patients.¹ Immobility, resulting from the restriction to the bed, leads to severe dysfunction of the musculoskeletal, cardiorespiratory, gastrointestinal, skin, and urinary systems, resulting in losing muscle mass and innervation.²

Early intervention is very important for improving musculoskeletal and respiratory repercussions resulting from the hospitalization period.³ Early mobilization (PM) is a therapeutic approach performed in the ICU environment, which aims to reduce the functional impairment of critically ill patients, and when performed safely, it can mitigate these deleterious effects.^{4,5}

The insertion of the physiotherapist in intensive care units (ICU) only occurred in 1970, and his consolidation as a member of the intensive care team has been progressive.⁶ In the care of critical patients, the physiotherapist is responsible for identifying the kinetic-functional disorders and determining the correct model of early intervention, its viability, constancy, frequency, and interruption.^{7,8}

However, to assess the applicability of PM in the ICU, the use of validated and tested instruments in this environment is essential.⁹ These instruments make it possible to measure the individual's ability to perform basic daily activities and favor the professional better conducting his therapeutic conduct.¹⁰

The evidence points to the conduct of PM as safe and effective because it has beneficial effects on functional capacity, providing a reduction in the hospitalization period.¹¹ Although it benefits these patients, its realization is not yet widely performed in ICUs.¹²

Therefore, the objective of this study was to analyze the practice of early mobilization performed by the Intensive Physiotherapist in patients admitted to intensive care units, as well as to identify the main interventions used by these professionals and to describe the barriers found that make the practice of early mobilization unfeasible.

Materials and methods

This is a field study, quantitative and transversal, carried out from February to May 2020, with intensive care physiotherapists from three hospitals in the city of Fortaleza, namely two of them are from public hospitals (one municipal and the other state), and the other participating hospital is private.

The Research Ethics Committee approved the study of the public hospitals mentioned with opinions No. 3,812,319 (CAAE 26223919.4.3001.5047) and 3,748,158 (CAAE 26223919.4.0000.5041). In the private hospital, the study was evaluated by the Study Center, obtaining the letter of consent to develop the study. The rules and guidelines of Resolution 466/12 of the National Health Council / Ministry of Health were obeyed. Intensive care physiotherapists working in the Hospitals mentioned above who have a connection with the institution participated in the study. Physiotherapists in the role of residents, interns, and preceptors present were excluded.

Initially, the participants were invited to participate in the study by the researcher, and those who accepted, signed the Free and Informed Consent Form (ICF), answering the questionnaire in a private room. Due to the COVID-19 pandemic, face-to-face activities were suspended. The study used as an instrument for data collection continued with the online electronic form technology made possible through the Google Forms application, through which an individual form was made easily and quickly accessible to the participants.

Participants were invited to participate in the survey through invitations sent to service heads and passed on to professionals via WhatsApp groups. The Informed Consent Form (ICF) was made available online on the home page, and the participant only had access to the data collection instrument if he agreed to participate in the research. Participants had one month after sending the questionnaire to answer it anonymously and voluntarily.

The questionnaire was built by closed questions about the practice of PM performed by physiotherapists, concerning the use of functional scales and resources for assessing muscle strength, the safety criteria for initiating PM and relevant clinical situations for its interruption, the identification of the professionals involved in its management, the conducts most used in clinical practice and barriers found to perform the therapeutic exercises.

The collected data were initially tabulated in the Excel 2017 software and then transferred to the SPSS (Statistical Package for the Social Sciences) version 20.0 statistical software. Descriptive statistics, with absolute and relative frequencies, were used to characterize the profile of the studied sample. The non-parametric Chi-Square test was used to contemplate the objective of understanding the relationship between safety criteria and barriers for the implementation of early mobilization and the time of experience in the intensive care unit, and to compare the early mobilization interventions between groups of Physiotherapists from the three hospitals used the Kruskal - Wallis Kruskal-Wallis non-parametric test, with $p \leq 0.05$ being considered.

Results

Sixty-eight physiotherapists participated in the study in three hospitals in Fortaleza, 30 (44.1%) from the municipal hospital, 21 (30.9%) from the state hospital, and 17 (25%) from the private hospital. The length of time these professionals have worked in the intensive care unit, and the existence of a standardized protocol for early mobilization (PM) in their respective units, and the use of functional scales are shown in Table 1.

Table 1. Length of practice of physical therapists, standardized PM protocol and functional scales used in ICUs in 2020. N = 68

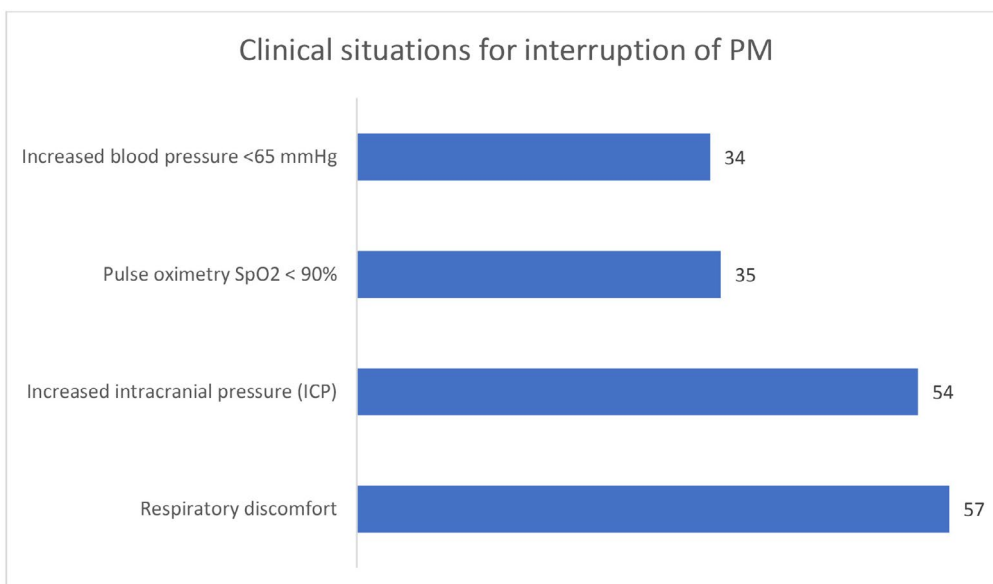
Formation Time	N (%)
< 5 years	15 (22,1)
Between 6 to 10 years	26 (36,8)
Between 11 to 15 years	8 (11,8)
Between 16 to 20 years	8 (11,8)
More than 20 years	12 (17,6)
Non-standard protocol	35 (51,5)
Applied Scales	N (%)
Medica Reserach Council (MRC)	46 (67,7)
Functional Independence Measure (FIM)	1 (1,5)
Barthel Scale	1 (1,5)
Core - Set	1 (1,5)

* 68 physiotherapists; ICU - Intensive Care Unit, MP - Early Mobilization, ICU - Intensive Care Unit.

When asked about the use of resources and / or scale to assess peripheral muscle strength in hospitalized patients, 57 (83.8%) responded that they use the Medical Research Council (MRC).

Figure 1 shows the clinical situations reported by the participants for interrupting early mobilization.

Figure 1. Clinical situations for interrupting early mobilization in intensive care patients, 2020. N: 68



Regarding the management of early mobilization (MP), 33 (48.5%) participants answered that only the physiotherapist was responsible for its implementation, 13 (19.1%) were the nursing technicians, and 10 (14.7%) replied that in addition to physiotherapists, doctors and nurses also participated in this management.

Table 2 shows data on the main PM interventions performed by intensive care physiotherapists in state, municipal, and private hospitals. It is observed that walking and orthostatic interventions were the most used for early mobilization among intensive physiotherapists from the state, municipal and private networks, presenting statistical significance.

Table 2. Comparison of PM interventions performed among intensive care physiotherapists in the municipal, state and private hospitals -2020. N: 68

Interventions	State Physiotherapist (%)	Municipal Physiotherapist (%)	Private Physiotherapists (%)	Value (p)
Sedestation	21 (37,98)	30 (33,77)	17 (31,5)	0,10
Cycloergometer	21 (33,71)	30 (35,33)	17 (31,5)	0,09
Transfer Bed / Armchair	21 (33,95)	30 (34,90)	17 (26,50)	0,20
Ambulation	21 (39,29)	30 (38,00)	17 (29,00)	0,05*
Orthostatism	21 (40,40)	30 (34,90)	17 (26,50)	0,04*
Stationary March	21 (35,79)	30 (36,43)	17 (29,50)	0,30

MP - Early Mobilization. Kruskal - Wallis * non-parametric test * p<0.05.

The results related to the safety criteria and barriers to PM implementation are described in correlation with the time of the participants' performance. Table 3 shows an association between the length of practice of physiotherapists in the ICU and the safety criteria for performing PM, without revealing statistical significance between the variables analyzed.

Table 3. Length of experience in the ICU X safety criteria for early mobilization. 2020. N = 68

CRITERIA FOR SAFETY	TIME OF ACTIVITY IN ICU					p-value
	<5 years	6-10 years	11-15 years	16- 20 years	> 20 years	
Hemodynamic Stability	14 (21,9%)	23 (35,9%)	8 (11,8%)	7 (10,9%)	12 (18,8%)	p = 0,07
FR<24rpm	5 (23,8%)	8 (38,1%)	3 (14,3%)	0 (0,0%)	5 (23,8%)	p = 0,03
SapO2 >90%	12 (31,6%)	12 (31,6%)	5 (13,2%)	2 (5,3%)	7 (18,4%)	p = 0,01
PIC 10- 20 mmHg	11 (24,4%)	14 (31,1%)	6 (13,3%)	4 (8,9%)	10 (22,2%)	p = 0,04
Glasgow >8	1 (6,3%)	9 (56,3%)	2 (12,5%)	0 (0,0%)	4 (25,0%)	p = 0,01

ICU - intensive care unit. Descriptive statistics. Non-parametric Chi-Square test * p≤0.05

Table 4 shows the main barriers to early mobilization correlated with the length of time in the ICU of the professionals most frequently identified, noting no statistical significance.

Table 4. Length of experience in ICU X Barriers for early mobilization - 2020, N = 68

PM BARRIERS	TIME OF ACTIVITY IN ICU:					p-value
	<5 years	6-10 years	11-15 years	16- 20 years	> 20 years	
Sedative Drugs / Analgesia	7 (21,2%)	9 (27,3%)	5 (15,2%)	3 (9,1%)	9 (27,3%)	p = 0,11
Hemodynamic Instability	12 (21,8%)	22 (40,0%)	6 (10,9%)	7 (12,7%)	8 (14,5%)	p = 0,35
Professional Unavailability	6 (25,0%)	9 (37,5%)	4 (16,7%)	0 (0,0%)	5 (20,8%)	p = 0,03
Lack of Mobilization Protocols	3 (20,0%)	7 (46,7%)	2 (13,3%)	1 (6,7%)	2 (13,3%)	p = 0,09
Patients on MV	1 (16,7%)	2 (33,3%)	1 (16,7%)	0 (0,0%)	2 (33,3%)	p = 0,07
Lack of therapeutic resources	5 (41,7%)	3 (25,0%)	0 (0,0%)	0 (0,0%)	4 (33,3%)	p = 0,08
Use of DVA	6 (27,3%)	8 (36,4%)	2 (9,1%)	1 (4,5%)	5 (22,7%)	p = 0,7

ICU - intensive care unit. VM - Mechanical ventilation. DVA - Vasoactive Drugs. Descriptive statistics. Non-parametric Chi-Square test * p≤0.05

Regarding the observation of improved functionality when performing early mobilization, 20 (29.4%) participants responded that they observe it through clinical improvement and medical evolution in the medical record, 27 (39.7%) through the description of the evolution of Physiotherapy in the medical record and 55 (80.9%) through the assessment using instruments or scales for assessing muscle strength.

Discussion

This study aimed to analyze the practice of early mobilization performed by the intensive care physiotherapist, identify the main interventions used by these professionals, and describe the barriers found that make early mobilization unfeasible in patients admitted to intensive care units. It is observed that walking and standing interventions have a significant association between intensive care physiotherapists, regardless of the hospital category. Regarding the barriers found to carry out this strategy, they were related to the patient's hemodynamic condition and the use of sedation. Aswegen et al.¹³ emphasize that the physiotherapist plays a crucial role in managing critical patient rehabilitation, with the clarification of the necessary skills to guarantee a safe and effective clinical practice being of paramount importance.

In the present study, 36.8% of the participants reported working time in the ICU from 6 to 10 years. A similar result was observed by Nozawa et al.¹⁴ when they determined the professional profile of the physiotherapist throughout Brazil. Lima et al.¹⁵ assessed the knowledge of physiotherapists working in an adult ICU on the contraindications to the mobilization of patients treated in the city of Recife.

Concerning PM management, almost half (48.5%) of the participants indicated the physiotherapist as the only one responsible for this intervention. A study by Lima et al.¹⁵ reveals that 60% of physical therapists are the main authors of this management. França et al.¹⁶ recommend that the physiotherapist is the professional responsible for implementing and managing the mobilization plan, which directly influences the training of future functional activities.

According to resolution 402/2011 of the Professional Specialty Physiotherapy and Intensive Care, it is the physiotherapist's responsibility to evaluate, prescribe and carry out the rehabilitation of critically ill patients.⁸ In our study, a small percentage (14.7%) of the participants reported that doctors and nurses also participated in this management besides the physical therapists. However, the multidisciplinary team must be responsible for identifying the indications and contraindications for carrying out early mobilization for a differentiated and safe evaluation.⁸

Regarding the existence of PM protocols in the units surveyed, 51.5% reported their inexistence. In the study by Koo et al.¹⁷, only 36% of the participants reported the absence of PM protocols in their units. Regarding this finding, it is known that the physiotherapist is responsible for the functional kinetic evaluation and the development of PM protocols that aim to optimize the cardiorespiratory capacity and decrease the patient's functional decline. In addition, the existence of protocols guides professionals to implement therapeutic exercises, bringing functional benefits to patients.¹⁸ However, the absence of early mobilization protocols constitutes significant losses in the critical patient's functionality. Therefore, the formulation of clinical protocols based on scientific evidence can be a reference for creating a standardized tool that can be beneficial to the functional outcome, with an impact on the quality of life of this population.²⁸

In our analysis, the majority (83.8%) of the participants use the MRC as a scale of functionality and assessment of peripheral muscle strength. Several studies recommend using MRC in critical adult patients to identify peripheral muscle weakness to minimize risks for functional decline.^{9,16,19} Knowing that the muscle weakness acquired in the intensive care unit is considered a frequent clinical condition, it presents itself in a globalized and symmetrical way, both in the peripheral and in the respiratory muscles, causing functional impairments and increased hospitalization time. Based on these premises, it is essential to use the MRC scale, as it is a simple way to assess muscle strength in critically ill patients.^{16,19}

The task force of the European Respiratory Society and European Society of Intensive Care Medicine in 2008 and the Physiotherapy Department of the Brazilian Association of Intensive Care Medicine in 2012 describe a hierarchy of mobilization activities in the ICU following a sequence of exercises that start from the change of position, with Level B recommendation for early mobilization and orthostatism.^{16,20} Our results reveal that sedation (91.2%) was the intervention for MP most cited by the participants. According to Hickmann et al.²¹, it optimizes pulmonary aeration and minimizes hypoxemia when accompanied by active exercises. Other intervention strategies in our study were using the cycle ergometer and transfer from bed to armchair, also present in the Rocha study²²,

which investigated the main protocols described in the literature and techniques used. Pires Neto et al.²³ reveals that a cycle ergometer protocol performed after 72 hours of hospitalization is safe.

In 2012, the Physiotherapy Department of the Brazilian Association of Intensive Care Medicine published minimum recommendations applicable to the Brazilian reality, with criteria and safety mechanisms in the early mobilization of critically ill patients.¹⁶ About the safety criteria for performing PM in our study, hemodynamic stability was pointed out as the main criterion regardless of the training time of the professionals surveyed. This fact can be justified due to the additional demand of the cardiovascular system to maintain blood pressure and cardiac output in conditions that require effort from patients who are restricted to the bed. In a systematic review study conducted by Conceição et al.⁵, hemodynamic stability was identified as the most widely used safety criterion for initiating PM in critically ill patients under mechanical ventilation (MV) admitted to the ICU.

In a consensus of multidisciplinary ICU specialists to seek consensus on the safe mobilization of patients on mechanical ventilation, safety considerations have been summarized in four categories: respiratory, cardiovascular, neurological, and clinical.²⁴ In this consensus, a peripheral oxygen saturation greater than 90% was a criterion for removing the patient from the bed since it is a parameter of the patient's hemodynamic stability, a fact observed in our study as a safety criterion for PM cited by professionals with experience in the ICU less than five years.

Among the clinical situations relevant to the interruption of early mobilization, respiratory distress and increased intracranial pressure (ICP) stood out in our findings. It is noteworthy that patients with elevated ICP are not candidates for PM management.²⁵ Despite being a technique with rare adverse events, it must be performed with care, avoiding cardiorespiratory and musculoskeletal complications.

Dubb et al.²⁶ identified 28 barriers to PM being classified into four groups: structural, cultural

barriers, related to the mobilization process, and those related to the patient. Our study identified that the barriers related to the patient were the most limiting; however, it is important to highlight that there are other less frequent barriers in this study, such as the lack of therapeutic resources to carry out this practice. Hemodynamic instability was the most cited, followed by sedative drugs and analgesia. According to the Brazilian Guidelines for Early Mobilization in Intensive Care Units, hemodynamic instability is the most significant limitation for performing early mobilization, with arterial hypertension with SBP > 170 mmHg considered a contraindication.⁸ Although necessary in some clinical situations, sedation limits the physiotherapist's intervention, so its interruption or even reduction to minimum levels is a therapy that can provide better outcomes and prognosis.²⁷

The COVID-19 pandemic was a limiting factor for conducting interviews with professionals at the research sites, consequently reducing the sample analyzed. Therefore, there is a need for more robust studies related to this approach and the implementation of tools that standardize the conduct of early mobilization and facilitate the practice of intensive care physiotherapists and the therapeutic management of critically ill patients.

Conclusion

The most frequent interventions were sedation, the cycle ergometer, and transfers to the armchair bed. The patient-related barriers were hemodynamic instability, use of sedative and analgesic drugs.

Author contributions

Paulo FVS and Viana MCC participated in the creation, data collection, interpretation of results and writing of the scientific article. Morais MCS participated in the statistical analysis and interpretation of results. Braide ASG participated in the statistical analysis, interpretation of results and writing of the scientific article. Malveira VMB participated in the data collection and writing of the scientific article.

Competing interests

No financial, legal or political conflicts involving third parties (government, companies and private foundations, etc.) have been declared for any aspect of the submitted work (including, but not limited to, grants and funding, participation in advisory council, study design, preparation manuscript, statistical analysis, etc.).

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