Original Article

Knowledge and care practice of physical therapists in pediatric intensive care units on early mobilization: cross-sectional study

Conhecimento e prática assistencial dos fisioterapeutas em unidades de terapia intensiva pediátrica sobre mobilização precoce: estudo transversal

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ABSTRACT | INTRODUCTION: Early mobilization (MP) can be defined as sufficient physical activity to promote physiological improvements and reduce your hospital stay. Practice with children is still a challenge. **OBJECTIVE:** To evaluate the knowledge of physical therapists working in pediatric intensive care units (PICUs), as well as to verify the clinical practice regarding PM in critical pediatric patients. **MATERIAL AND METHODS:** Observational, transversal, and descriptive survey study, through an online questionnaire. The variables studied in this research were related to three domains, professional profile, professional knowledge about the existing scientific evidence about the benefits of PM, and the research participant's perception of the importance of PM in these patients and the barriers experienced by him. **RESULTS**: 42 responses were considered in the collection of results; 92.9% were female, 45.2% had more than 10 years of training in physical therapy, and 42.8% worked for 5 to 10 years in a pediatric ICU. Regarding the practice of early mobilization, 88.1% said they believe that the studies suggest benefits, and 7.1% that there is no scientific evidence to support its performance. All professionals reported using PM in their care routine. **CONCLUSION:** It can be seen that, in this observed sample, all professionals perform the practice of PM in their care routine and that the lack of knowledge of the multidisciplinary team is considered as the main barrier to performance.

KEYWORDS: Critical care. Pediatric Intensive Care Units. Exercise. Early walking.

RESUMO | INTRODUÇÃO: A mobilização precoce (MP) pode ser definida como atividade física suficiente para promover melhoras fisiológicas e redução no seu período de internação; entretanto, a prática com crianças ainda é um desafio. **OBJETIVO:** Avaliar o conhecimento dos fisioterapeutas atuantes em unidades de terapia intensiva pediátrica (UTIP), bem como verificar a prática clínica quanto à MP em pacientes pediátricos críticos. **MATERIAL E MÉTODOS:** Estudo observacional, transversal e descritivo, através de um questionário on-line. As variáveis estudadas nesta pesquisa foram referentes a três domínios, perfil e conhecimento do profissional sobre as evidências científicas existentes acerca dos benefícios da MP e percepção do participante sobre a importância da MP nestes pacientes e as barreiras vivenciadas por eles. **RESULTADOS:** Foram consideradas 42 respostas na coleta de resultados, 92,9% do sexo feminino, 45,2% tinham mais de 10 anos de formação em fisioterapia, e 42,8% atuam de 5 a 10 anos em UTI pediátrica. Sobre a prática da mobilização precoce, 88,1% disseram acreditar que os estudos sugerem benefícios e 7,1% que não há evidência científica que suporte sua realização. Todos os profissionais relataram utilizar a MP em sua rotina assistencial. **CONCLUSÃO:** Pode-se observar que, nesta amostra, todos profissionais realizam a prática da MP em sua rotina assistencial e que a falta de conhecimento da equipe multidisciplinar é considerada como principal barreira para realização.

PALAVRAS-CHAVE: Cuidados críticos. Unidades de Terapia Intensiva Pediátrica. Exercício. Deambulação precoce.

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Introduction

The deleterious functional effects acquired from immobility and absolute bed rest in the Intensive Care Unit (ICU) are common in adult and pediatric units.[1] Patients confined to bed for a long period, submitted to mechanical ventilation (MV), may present reduced peripheral and respiratory muscle strength, increasing their hospital stay, prolonging MV weaning, and promoting functional dependence.[1] For many years, immobility in bed was for critically ill patients, when confined for a long period in the ICU, as they were considered severe to participate in mobilization therapies.[2] Studies were carried out from 1950, which proved that immobility was harmful to health and organic systems.[3]

Muscle weakness is associated with several risk factors such as immobility in bed, the use of corticosteroids, hyperglycemia, sepsis, multiple organ dysfunction, diagnosis of Acute Respiratory Distress Syndrome (ARDS), and use of neuromuscular blockers.[1] After 48 hours of immobility, injury, or disease, muscle strength tends to decrease, and it is greater between the first two to three weeks of stay in the ICU, with a loss of about 40% of muscle strength in the first week of immobilization. Acquired muscle weakness is related to the patient's age. Studies show that it affects approximately 5.1% of older children and 0.7% of younger children.[4] New technologies and alternatives have been studied to minimize the harmful effects of prolonged rest since rehabilitation at the beginning of critical illness can positively influence the child's recovery.[5]

Early mobilization (EM) is the physical movement sufficient to provoke physiological improvements in critically ill patients. It is performed inside the ICU in the first two to five days of the critical illness, immediately after the patient's stabilization.[4] Most studies are performed with adult patients and indicate its benefits. Its practice with children is still a challenge, but recent evidence demonstrates that the practice is viable and safe.[6] In the pediatric population, some activities are described to perform early mobilization, from bedside sitting activities to walking and age-specific activities by the variation in neurocognitive development found in pediatrics.[7]

The protocol of Betters et al. reported that the duration of interventions was variable, taking the patient's tolerance as a reference. The evolution of the EM protocol is carried out by increasing the patient's muscle strength and coordination. Once the patient's evolution is perceived, the proposed exercises can be transitioned to greater independence, respecting the child's age and stage of development, with the objective walking.[8]

The absence of specific practical guidelines for the pediatric population, the lack of knowledge of the multidisciplinary team, the concern with patient safety, the level of sedation, and the availability of professionals and resources constitute important barriers to the practice of early mobilization in pediatric ICUs.[2] Thus, identifying the EM performed in care practice is essential. This research aims to assess physical therapists' knowledge working in pediatric intensive care units and verify clinical practice regarding early mobilization in critical pediatric patients.

Material and Methods

This is an observational, transversal, and descriptive study. The survey was held through an online questionnaire. The Research Ethics Committee approved this study of Hospital Roberto Santos CAAE registration: 29391920.8.0000.5028, under opinion number 3.922.440, following resolution 466/12 of the National Council of Ethics Research involving human beings.

We included physical therapists working in the Pediatric ICU in the city of Salvador/BA and Feira de Santana/BA. The collection period was from March 2020 to November 2020, through an invitation sent by e-mail to professionals, with the link to access the survey questionnaire on Google Forms and wide

dissemination carried out in messages to groups of professionals in the area. Upon opening the link, the professional was immediately directed to the questionnaire page, where there was a text clarifying the objectives and importance of the research and the ICF. It was only possible for the professional to access the questions in the questionnaire after accepting this term. We excluded the questionnaires in which the participant showed interest in giving up participating in the research, but there was no occurrence of this event.

A pilot study was carried out with 4 Physical therapist professionals, specialists in intensive care working in Neonatology and Pediatrics, to refine the collection instrument, identify issues that would generate difficulties in understanding, and make adjustments after this stage. Questionnaires answered in this phase were not considered for this sample.

A structured questionnaire with 19 questions was designed to be used as an instrument in this research. A pilot study was carried out with 4 Physical therapist professionals, specialists in the field of intensive care, working in Neonatology and Pediatrics, to refine the collection instrument, identifying issues that would generate difficulties in understanding, and adjustments were made after this stage. Questionnaires answered in this phase were not considered for this sample. It was composed mostly of objective questions. Three questions to avoid induction in the participants' answers were discursive, but even these had their answers categorized and counted, keeping the quantitative characteristic of the study. Seeking to avoid measurement bias, the questionnaires did not present any identification, guaranteeing the anonymity of the participants and greater veracity in the answers.

The sample was a convenience sample, consisting of the number of questionnaires completed during the data collection period. The variables studied in this research had three domains: the professional profile; the professional's knowledge of the existing scientific evidence about the benefits of EM in critically ill pediatric patients through subjective questions with a predetermined template; and the perception of the research participant about the importance of EM in these patients beyond the barriers experienced.

After data collection, the data were tabulated, and descriptive statistical analysis was performed, using concepts of descriptive statistics to calculate the absolute and relative frequencies (percentages) of categorical variables. Next, the data were tabulated in Microsoft Excel 2013 text sheets. Then, a procedure for checking and cleaning the data to avoid possible inconsistencies in the results was performed, then analyzed using the statistical analysis software Stata, v.12.

Results

We considered 48 answers of the 50 questionnaires answered on the platform. During data recording, two questionnaires that were the same were identified. Thus, considering a high risk of having been answered by the same participants, we decided to exclude them to avoid the risk of collection bias. Table 1 shows the sociodemographic characteristics, professional training and performance, and knowledge related to the early mobilization of critically ill patients. Of the analyzed participants, 75% do not have the title of specialist. All professionals said they are up-to-date in matters related to the pediatrics area, based on their knowledge of early mobilization. They reported using it in their clinical practice. As for the means used for updating, 83.3% use scientific articles and 81.2% use courses.

Table 1. Characteristics of physical therapists working in the Pediatric ICU-2020 (n=48)

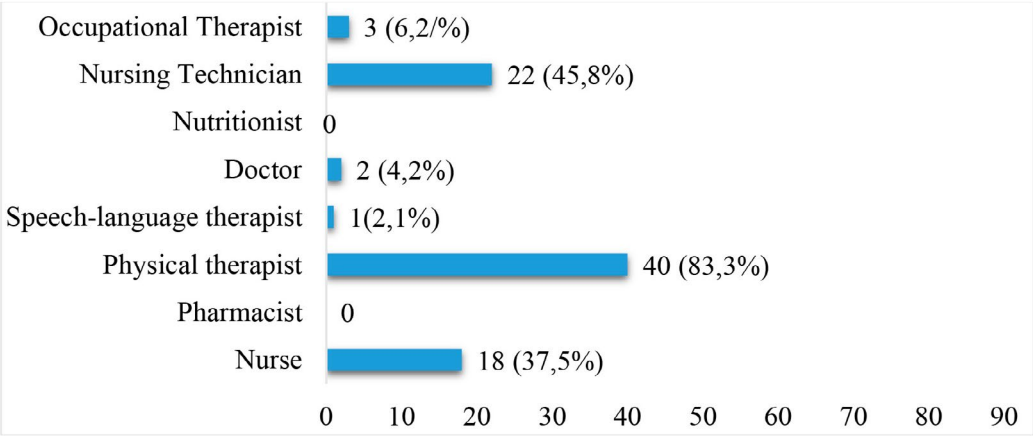
Characteristics	n (%)
Gender	
Female	44 (91.7)
Male	4 (8.3)
Undergraduate Length	
Less than 5 years	7 (16.7)
5 to 10 years	18 (37.5)
More than 10 years	23 (47.9)
Working time	
Less than 5 years	19 (39.6)
5 to 10 years	20 (41.7)
More than 10 years	9 (18.7)
Specialization [1]	
I do not have	1 (2.4)
Residency in the hospital area in child health	4 (8.3)
Residence in the hospital area	7 (14.6)
Residences in other areas	0 (0)
Graduate studies in a hospital or pediatric intensive care	22 (45.8)
Hospital graduate or general intensive care	9 (18.7)
Graduate in Pediatrics	6 (12.5)
Graduate in other areas	11 (22.9)
Title specialist	
Yes	12 (25)
No	36 (75)
Are you looking to keep up-to-date on matters relating to pediatrics?	
Yes	48 (100)
No	0 (0)
Means used to update knowledge [1]	
Scientific articles	40 (83.3)
Conversation with other professionals in the area	22 (45.8)
Courses	39 (81.2)
Specializations	12 (25)
Internet news	8 (16.7)
Workshops	5 (10.4)
Books	10 (20.8)

[1] question with one or more options.

Regarding early mobilization, 41.7% of physical therapists said it should be performed within the first 24 hours of admission after hemodynamic stabilization, and 8.3% did not know how to give their opinion. We highlight that 4.2% reported that it should be performed regardless of time, after admission, as long as the child has hemodynamic stability, and after the patient's hemodynamic stabilization, which usually occurs between 24 and 48 hours after admission to the ICU (Table 2).

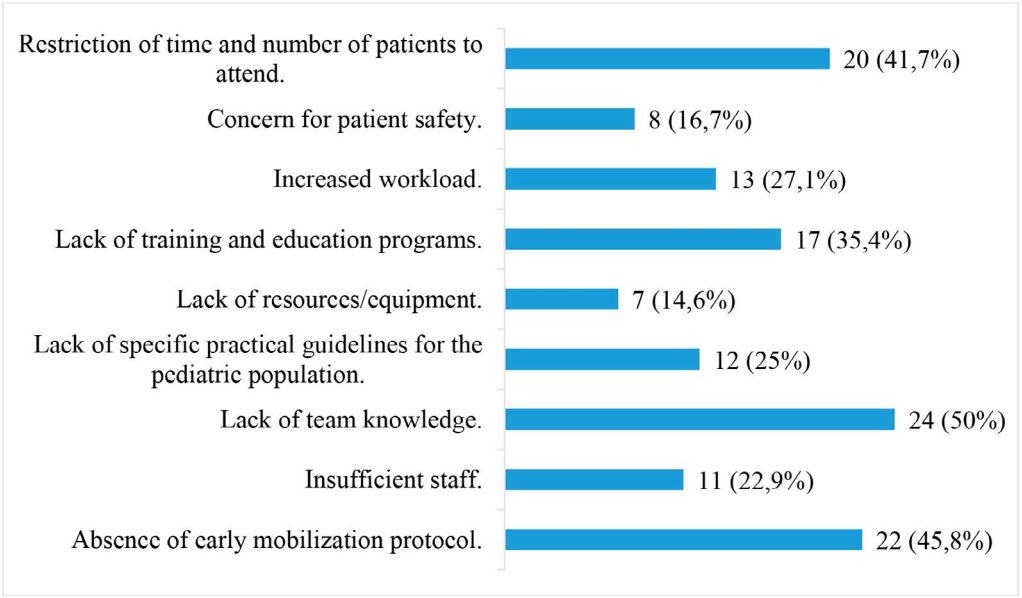
As observed in Graph 1, the professionals of the multidisciplinary health team (nurse, pharmacist, physical therapist, speech-language therapist, doctor, nutritionist, nursing technician, occupational therapist) participated in the practice of early mobilization in their care routine; 83.3% were physical therapists.

Figure 1. Members of the multidisciplinary team participating in the EM in the Pediatric Intensive Care Unit-2020



We also observed that related to institutional and team barriers, 24 professionals (50%) reported lack of knowledge of the team, 22 professionals (45.8%) lack of an early mobilization protocol, and 20 professionals (41.7%) reported time restriction and the number of patients to attend, Graph 2.

Figure 2. Institutional and EM team barriers in the Pediatric Intensive Care Unit-2020



Regarding the practices of early mobilization in pediatric ICUs, we observed that kinesiotherapy (64.6%), walking (58.3%), and sitting (58.3%) are the main conducts that professionals believe for the early mobilization. As for the practice of walking in ventilated children, 64.40% of the professionals use as the main criteria for performance: the level of collaboration (41.7%) and the patient's hemodynamic stability (33.3%), Table 2.

Table 2. Early mobilization practices in pediatric ICUs-2020 (n=48)

Characteristics	Gross value (%)
Conducts	
Position change	4 (8.3)
Positioning	14 (29.2)
Joint Mobilization	11 (22.9)
Stretching	8 (16.7)
Kinesiotherapy	31 (64.6)
Trunk and/or cervical control	1 (2.1)
Settling	28 (58.3)
Vestibular stimulus	2 (4.2)
Orthostasis	20 (41.7)
Walking	28 (58.3)
Walking with mechanical ventilation	
I do not know how to say	3 (6.2)
No	14 (29.2)
Yes	31 (64.6)
Criteria for using mechanical ventilation ambulation	
Collaboration level	20 (41.7)
Sedation level	5 (10.4)
Hemodynamic stability	16 (33.3)
Absence of vasoactive drugs	2 (4.2)
Use of tracheostomy	2 (4.2)
Patient safety	6 (12.5)
Reason for IOT controlled	1 (2.1)
Reduced ventilation parameters	4 (8.3)
Muscle strength	5 (10.4)
Orthostasis capacity	5 (10.4)
Team collaboration	3 (6.3)
Family collaboration	1(2.1)
Physical structure	2 (4.2)
Time when early mobilization should be performed	
First 24 hours after admission and after hemodynamic stabilization	20 (41.7)
Regardless of the time, during the ICU stay	18 (37.5)
They do not know what to say	4 (8.3)
Between 1st and 10th day after admission and hemodynamic stabilization	3 (6.2)
First 72 hours after admission and after hemodynamic stabilization	1 (2.1)
Other options	2 (4.2)
Adverse events	
Hypotension/Hypertension	23 (47.9)
Bradycardia/Tachycardia	12 (25.0)
Arrhythmia	0 (0)
Drop-in peripheral oxygen saturation (SpO2)	12 (25)
Increased work of breathing	29 (60.4)
Change in mental state (agitation or sleepiness)	17 (35.4)
Pain or discomfort	19 (39.6)
Loss of devices (access, probe, etc.)	7 (14.6)
Accidental extubation	7 (14.6)
Fall	0 (0)

Also, on the professionals' care routine, we observed that 31.3% use scales to monitor patients' functional decline. Of the scales, 7 professionals (14.6%) cited the Pediatric Functional Status Scale (FSS), 1 professional (2.1%) Alberta, 1 professional (2.1%) Denver, and six professionals indicated that they used scales but did not report the brand.

Discussion

The main objective of this study was to assess the knowledge of physical therapists working in the PICU and verify their clinical practice regarding early mobilization in critically ill pediatric patients. The practice of EM has been highlighted both in the adult population and in the pediatric population. Studies show that early mobilization is feasible, safe, economical, and improves functional outcomes for patients in the short and long term in critically ill adults. However, studies in the pediatric population are scarce.[9,10]

Recent research revealed that EM in the PICU is safe and viable when approached systemically and is associated with significant gains in physical and neurocognitive outcomes.[9,11,12] The results reveal that although some professionals report that there is no scientific evidence to support the performance of EP, all professionals, based on their knowledge, use EP in their clinical practice.

Studies define early mobilization as any mobility therapy performed within 48 hours after admission to the PICU, contraindicated in clinical situations of hemodynamic instability, respiratory instability, neurological instability, and post-surgical events are absent.[2,13] In other studies, early mobilization was defined as safe and feasible within 72 hours of admission to the PICU.[12,14] In this study, although 45.2% of professionals said that it should be performed within the first 24 hours of admission after hemodynamic stabilization, the fact that it had time-varying events demonstrates in clinical practice the lack of consensus of when to start early mobilization in this population.

The support and assistance of the multidisciplinary team are essential for the success of the EM program.[10] A study by Fagundes et al. on the knowledge and perception of the multidisciplinary team on early mobilization in the PICU of a university hospital showed that the greater the knowledge about EP, the greater the perception of its importance. It also revealed that within the multidisciplinary team (physiotherapist, doctor, nurse, and nursing technician), EP is seen with greater importance by physical therapists.[15] In this research, among the members of the multidisciplinary team in the care practice of the participants, the most cited professionals were physical therapists, nursing technicians, and nurses. However, some professionals did not mention the physical therapist as a professional who performs the procedure despite the question including the physical therapist in the list, diverging from the result that all reported performing the EP in their care practice.

In the study by Choong et al., with 61 physicians and 27 physical therapists working in Canadian PICUs, the lack of guidelines was the main institutional barrier reported (75.4% physicians/48.1% physical therapists). The participants of this research also mentioned it but in a smaller frequency (26.2%).16 In another study by Choong et al. demonstrates that institutional practice guidelines can facilitate timely patient assessments and enable safe mobilization as early as possible in most critically ill children.[13] In other studies, the main barriers mentioned are resource limitations, the need for patient cooperation, and apprehension about the early mobilization expressed by health professionals and family caregivers.[12] In this research, the main barriers mentioned were the lack of knowledge of the team, restriction of time and number of patients to be seen, and the absence of an early mobilization protocol. The team's knowledge about the benefits, importance, and safety through educational programs and implementation of protocols and specific guidelines for EP in the pediatric population is essential for the success of the therapy.

The pediatric population represents a heterogeneous population with different stages of development, with diverse cognitive and functional abilities and a variety of diagnoses, creating another challenge for implementing a standard rehabilitation plan in the PICU, as the ability to fulfill the activities is variable.[9,10]

A study by Wieczorek et al. defined increasing mobility activity levels based on the patient's clinical status, categorizing them as bedside therapies or mobility therapies. Bedside therapies included passive and active range of motion, active and passive positioning. Mobility activities included sitting on the edge of the bed, sitting down, transferring, walking, and playing. In this study, the main conducts cited were kinesiotherapy (passive and active), walking, and sitting, corroborating the current literature. In addition to conventional mobilization practices, other studies used video games/interactive and/or cycle ergometers to facilitate mobilization.[5,13] The participants of this study did not mention interventions using virtual reality and exergaming. These interventions could make the service more interactive and attractive, as it is a popular modality among children and can achieve better compliance than traditional exercises.[7]

Betters et al. assessed whether it was possible and safe to use early mobilization in ventilated patients, carrying out activities exclusive to each patient's tolerance capacity, from the simplest such as changes in position to the most advanced such as walking.[8] When the professionals were asked for the first time, before starting the protocol, about the safety of the practice, 30% said it was safe. In the second time during follow-up, 63% said it was safe to mobilize the patient during mechanical ventilation. The level of sedation of the patient for professionals is considered a barrier, as the patient has to be collaborative.[8] Another study reports that intubated patients commonly had contraindications for mobility therapies.[13] In this study, 64.60% reported that children who have previously been able to walk are indicated to undergo mechanical ventilation during the period, with the main criteria for performance being the patient's level of cooperation and hemodynamic stability.

According to their care practice, the main adverse events reported by the participants were increased work of breathing, hypotension/hypertension, pain, or discomfort. Another study reports eminent barriers, hemodynamic instability, accidental displacement of devices, falls, pain, and anxiety.[10] However, large-scale pediatric surveys do not report adverse events related to early mobilization practices.[9,10,17] In the study by Choong et al., the barriers commonly reported by professionals were clinical instability of the patient, patient on MV, risk of dislodgement of devices or catheters, and excessive sedation.[16]

One of the main objectives of early mobilization is to re-establish the patient's functionality in its state before hospitalization. For this, it is essential to use tools to measure the functional condition of patients, such as the use of scales.[18] In this research, 68.8% reported not using scales in their care practice, 14.6% of the participants mentioned the pediatric FSS. The pediatric FSS, translated and validated in Brazil, is a scale developed with a conceptual basis in scales of activities of daily living and adaptive behavior. Its objective is to assess the functional outcomes of hospitalized pediatric patients.19 Scales are an essential tool for measurement, and the functional motor and cognitive outcomes of patients can be determined after discharge from the pediatric intensive care unit.[18] Therefore, intensive care physiotherapists must use functional scales in planning the EM when transferred from the ICU to the inpatient units and hospital discharge.

Therefore, educational programs and the implementation of protocols and guidelines aimed at PM in the pediatric population are suggested, as well as larger-scale research aimed at analyzing the practice of physical therapy professionals in the state of Bahia.

This study had some limitations. The online questionnaire tool brings the possibility of measurement bias since the interpretation of the questions can be different according to each participant, even though a pilot study was previously carried out to calibrate the questions. Finally, the low adherence of professionals influenced the sample size, interfering with the external validity of the study, and it is prudent to consider the results obtained for the population studied considering the characteristics of regional assistance.

Conclusion

We found that all physical therapists perform the EM practice in their care routine in this sample. We also observed that more than half of the participants claim to know the scientific evidence about EM. Few professionals reported that there was no evidence to support its performance. Our findings also demonstrate the lack of knowledge of the multidisciplinary team as the main barrier reported by the participants to the practice of early mobilization.

Authors' contributions

All the authors of the article had equal participation in the conception and design of the study, the production of data, the statistical analysis, the preparation and writing of the manuscript, and the final critical review after finishing the work.

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, advisory board participation, study design, preparation manuscript, statistical analysis, etc.).

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