Physical therapy and early mobilization in the adult intensive care unit: Historical context, concepts and public policies

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ABSTRACT

Immobility in critically ill patients can generate complications that affect recovery, such as muscle atrophy and skeletal weakness, causing a burden both for patients and for the Unified Health System (SUS). The consequences of immobility can persist for up to five years after hospital discharge, characterizing a public health problem, as it increases comorbidities, mortality rates, and the frequency of need for high-complexity care, overloading both families and the Brazilian health system. Thus, the objective of this study was to review the narrative literature on the benefits of PM in the ICU, aiming to improve the understanding of this topic, with a potential positive impact on patient care, highlighting the importance of public policies applied to this area. It is noteworthy that physiotherapy and Early Mobilization (PM) in the Intensive Care Unit (ICU) can contribute to mitigate the effects of immobility. However, the implementation of early mobilization faces challenges due to the lack of clear guidelines and institutional barriers, which can result in reduced quality of life, difficulties in the patient's social and professional reintegration, and generate significant financial costs. The Additional Cost and Utilization of Resources after critical hospitalizations mainly affects young people without comorbidities, resulting in economic impacts and challenges for the health system. The Unified Health System (SUS) plays a crucial role in mediating the demand for physiotherapy and the supply of services, although it faces obstacles in promoting the physical and functional health of the Brazilian population.

Keywords: Ambulation, Early, Intensive Care Units, Hospital Physiotherapy Service, Health Policy, Public Health Expenditures.

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INTRODUCTION

Neuromuscular diseases are gaining prominence as a significant cause of physical morbidity in critically ill patients. Research is being conducted to further understand the risk factors and mechanisms underlying neuromuscular dysfunction after critical health conditions. The importance of understanding prevention and treatment strategies for these complications, with prolonged bed rest as a relevant risk factor that can be intervened (Hashem; Parker; Needham, 2016; Lord *et al*., 2013; Stiller, 2007).

Early mobilization (PM) of critically ill patients admitted to the intensive care unit (ICU) is a safe and effective strategy to prevent adverse consequences of prolonged bed rest. This practice contributes to the improvement of clinical outcomes, including improvement of physical capacity, reduction of mechanical ventilation time, reduction of ICU and hospital length of stay, resulting in reduced hospital costs. In addition, MP promotes functional independence, improves respiratory function, reduces the effects of immobility, and provides psychological benefits, resulting in a better quality of life after ICU admission (Hashem; Parker; Needham, 2016; Lord *et al*., 2013; Stiller, 2007; Zhang *et al*., 2019).

There is an increase in evidence demonstrating the functional benefits of PM performed by physiotherapists in critically ill patients. However, it is important to note that the practice is still infrequent (Li *et al*., 2013; Adler; Malone, 2012; Needham *et al*., 2010; Morris *et al*., 2011). In the Brazilian context, recently, it was found that no more than 10% of critically ill patients are mobilized out of bed (Fontela *et al*., 2017).

In the field of physical therapy, the importance of addressing not only the techniques directed to sick patients is highlighted, but also understanding the biopsychosocial complexities of the individual, going beyond rehabilitative interventions (Rebelatto *et al*., 1999). It is necessary to adopt measures that improve the quality of health services without increasing costs, aiming to improve effectiveness without compromising effectiveness (Martinez, 2013).

The complications of immobility entail considerable burdens both for patients, reflected in reduced quality of life and obstacles to social and professional reintegration, and for the Unified Health System (SUS), resulting in significant and long-lasting financial burdens. (Fan *et al.* 2014 and Garland *et al*. 2004).

Thus, promotion, prevention and rehabilitation are essential to reduce work incapacity and disability retirement. Collaboration between SUS and Social Security plays an important role in the creation of government strategies to reintegrate workers and improve quality of life, reducing the need for pensions (Brasil, 2014).

Thus, the objective of this study was to review the literature on the history, concepts, public policies, benefits and relevance of physical therapy in early mobilization in the Intensive Care Unit,

aiming to improve the understanding of this theme, with a potential positive impact on patient care, highlighting the importance of public policies applied to this area.

METHODS

This is a narrative-type literature review based on scientific articles published in the Medline/PubMed, Lilacs/VHL, SciELO and CAPES journal portals. The research was conducted from June to October 2023, with inclusion criteria that included articles in Portuguese and English, related to the themes of PM in the adult ICU, history of physiotherapy and its relationship with PM, concepts of physiotherapy and PM, as well as public policies in the health area related to these topics. The excluded articles were those that were not freely accessible. The search for relevant articles was conducted using descriptors in Health Sciences (DeCS/MeSH) and included the following keywords in Portuguese and English: "Early Ambulation", "Intensive Care Units", "Critical Care", "Hospital Physiotherapy Service", "Rehabilitation Hospitals", "Public Health", "Health Policy" and "Public Health Expenditures".

RESULTS AND DISCUSSIONS

The long stay in the ICU can lead to considerable complications after hospital discharge, requiring the intervention of physical therapy, through the promotion of PM, with the objective of preventing functional dysfunctions and improving the quality of life of individuals submitted to traumatic hospitalizations in the ICU. The economic implications of a prolonged period of hospitalization as health deterioration continues may considerably exceed the direct costs associated with hospitalization, including the occurrence of substantial losses of income and long-term social burdens. This emphasizes the urgent need to develop comprehensive public policies in the areas of health and social care aimed at this issue.

HISTORY OF PHYSIOTHERAPY IN THE WORLD AND IN BRAZIL

Throughout history, the practice of mobilization and manipulation has developed simultaneously in different parts of the world. Hippocrates in the year 460 to 385 B.C. described the use of gravity in the manipulation of the spine (Cyriax and Schiötz, 1975; Jones *et al*., 1923), in addition, also played a key role in developing the term "Rehabilitation Medicine", highlighting rehabilitation as an area of expertise (Kladny, 2015).

Subsequently, in the nineteenth century, manual therapies and therapeutic exercises gained popularity among British nurses, leading to the need for training of these professionals. The Society of Trained Massage Therapists was established in *1894, and over time, this society evolved to*

become the Chartered Society of Massage and Medical Gymnastics in 1920, and finally, in 1944, became the *Chartered Society of Physiotherapy*. (Pettman, 2007).

In this context, several professionals from around the world sought training within this new area of activity and the American Mary McMillan stood out in North America, due to her post-graduation work, leading to the position of "rehabilitation counselor" at the *Walter Reid Army Hospital* and later, in the years 1921 to 1925, she held the position of director of Physical Therapy at *Harvard Medical School,* being recognized by American therapists as the "mother of Physical Therapy" (Pettman, 2007).

During the twentieth century, physiotherapy played an essential role, especially as a result of the aftermath of the two world wars. The large number of individuals who suffered injuries in the wars required an innovative rehabilitation approach to reintegrate them into everyday activities. Thus, physiotherapy experienced a remarkable advance in this period, driven by innovative discoveries and techniques that developed independently of other areas in health (Da Silva, 2021).

And, in 1929, the first technical course in physical therapy appeared in Brazil, due to the increasing prevalence of disorders of the locomotor system, mainly caused by the sequelae of the poliomyelitis epidemic, as well as the significant increase in occupational accidents (Vieira; Amâncio Filho, 2006). The Rehabilitation School of Rio de Janeiro (ERRJ) was a pioneer in the training of physiotherapists, training professionals to work mainly in the rehabilitation of the physically disabled and those injured by the sequelae of poliomyelitis (Barros, 2008).

Forty years after the emergence of the first technical course in physiotherapy in Brazil, the profession was regulated, transforming it into a higher education course, which occurred by Decree-Law 938 of 1969, in the midst of the military dictatorship (Paim, 2003; Bishop, 2009). As a result of the regulation of the physical therapy profession, in 1975, the Federal Council of Physical Therapy and Occupational Therapy (COFFITO) was created with constitutional objectives of standardizing and exercising ethical, scientific and social control of the professions of Physical Therapist and Occupational Therapist (Haddad *et al*., 2006). In the 1990s, physiotherapy expanded its specializations and activities (Bispo, 2009), leading COFFITO to recognize intensive physiotherapy in 2001 (RESOLUTION No. 402/2011). In 2010, the Ministry of Health, through ANVISA, established standards for the presence of physical therapists in Intensive Care Units (ICUs), through Collegiate Board Resolution No. 7 (Brasil, 2010).

In the educational context, the National Curriculum Guidelines aim to train professionals able to work in health (Haddad et al., 2006*), however, there are challenges in aligning physiotherapy education with social demands and health policies (Meyer et al., 2006).*

SOCIODEMOGRAPHIC AND CLINICAL PROFILE OF PATIENTS ADMITTED TO ADULT INTENSIVE CARE UNITS IN BRAZIL

Understanding the health of a community, including its determinants and dynamics, plays a crucial role in the formulation of strategies and high-impact decision-making, contributing to advances in health care excellence and the optimization of services provided (Lisboa *et al*., 2012; Lanetzki *et al*., 2012), being directly influenced by socioeconomic disparity and regional discrepancies (Brasil, 2016).

The complex regionalization of health services in Brazil is influenced by several factors, such as the country's vast territory, regional diversity, the responsibilities of the State in health, and the participation of multiple governmental and non-governmental actors, public and private, in the provision of health care (Viana *et al*., 2015), in addition, ICUs have a wide diversity in terms of location, patient profile, and availability of resources, which makes it challenging to implement measures to improve the quality of services (Bauman; Hyzy, 2014).

Regarding the availability of ICU beds in Brazil, there are significant regional disparities, with most beds concentrated in the Southeast Region and only about half of them accessible to SUS (Federal Council of Medicine, 2018; Toledo, 2011). This unequal distribution can result in inter-regional travel to access ICU services. According to a systematic review study conducted by Aguiar et al., in 2022 it showed that the majority of patients admitted to ICUs in Brazil are male, elderly, married, white or brown, and with low schooling and, with regard to the causes of ICU admission, cardiovascular diseases are predominant and the use of invasive mechanical ventilation is often necessary (Aguiar et al., 2022).

INTENSIVE CARE UNIT ADMISSION AND FUNCTIONAL DECLINE

ICUs emerged in response to the need to provide continuous assistance and specialized care to patients (Lino, 2001), however many patients in the ICU experience long periods of immobility, which can lead to ICU-Acquired Muscle Weakness (FMAUTI), which can result in significant morbidities after hospital discharge (Puthucheary et al., *2013, Sibilla* et al., 2020; Kleyweg *et al*., 1991).

Consequently, survivors of ICU admission may face cognitive, psychological, and physical challenges, especially those receiving muscle relaxants and sedatives (Garland *et al*., 2004; Kress *et al*., 2014). The decline in physical, psychological, and/or cognitive function after a critical illness has been termed "post-critical care syndrome" (Needham *et al*., 2012; Elliott *et al*., 2014).

The diagnosis of FMAUTI is based on manual muscle tests and manual dynamometry (Hermans *et al*., 2015). According to Morris et al. (2007), the medium and long-term consequences are related to immobility during ICU stay, resulting in loss of functionality in several body systems.

The World Health Organization (WHO) defines functioning as the ability to perform activities and participate in society (Rosenbaum; Stewart, 2004). Physiotherapy in the ICU can play a crucial role in improving patient functionality, allowing for greater social participation (Malkoc *et al*., 2009; Nordenfelt, 2003).

The condition of ICU discharge is critical, as studies have reported significant mortality rates after discharge (Williams *et al*., 2005; Wunsch *et al.,* 2010) and this may be associated with functional decline, characterized by the loss of skills in activities of daily living, which may be the result of prolonged stay in bed, generating, in addition to the increase in the mortality rate, health impacts such as social isolation, reduced quality of life, and additional costs (Cornette *et al*., 2006; King, 2006; Moritz *et al*., 1995; Inouye *et al*., 2000).

According to Lone et al. (2016) and Needlam et al. (2012), this increase in mortality rate and hospital costs may also be associated with a complex interaction between pre-existing factors, acute disease factors and the organization of health services, and physicians are increasingly aware of the burden that ICU survival represents for patients and families. often complex challenges in the health and social care of survivors, many of whom experience chronic deterioration in health.

Therefore, the physiotherapeutic approach to the functional decline of critically ill patients not only faces challenges, but also represents a new perspective that can have significant impacts on society, since it aims to restore the independence and social participation of these individuals (Duarte *et al*., 2012).

EARLY MOBILIZATION

MP consists of the hierarchical progression of functional activities, which include activities in bed and ambulation, and the selection of patients is based on criteria such as clinical stability and active participation of the patient, and the evaluation is performed by functionality scales (Morris *et al*., 2007). The purpose of PM in the ICU is to promote functional independence, improve respiratory function, reduce the effects of immobility, and provide psychological benefits (Stiller, 2007). Studies have shown that the implementation of PM in the ICU resulted in fewer complications and improved functionality for patients (Hodgson *et al*., 2014; Mcwilliams *et al*., 2015; Engel *et al*., 2013).

In addition, with the implementation of PM in the ICU, substantial net financial savings were identified, with a significant reduction in the length of hospital stay (Lord *et al*., 2013). However, despite the recommendations to start MP as soon as possible (Gosselink et al., 2008*), the ideal time for its implementation is still a matter of debate in the literature (Menges et al., 2021*; Ding *et al*., 2019).

Unfortunately, most patients admitted to the ICU are mobilized in a limited way, focusing only on respiratory physiotherapy (Lottering *et al., 2016) leading to rapid muscle degradation*

compromising functionality as PM may be less effective if started after muscle loss has occurred (Puthucheary et al, *2013).*

Another factor that compromises the effectiveness of the practice of MP in the ICU is the lack of guidelines, imposing the need to construct clinical protocols for its implementation (Berry *et al*., 2013; Burtin *et al., 2009), where barriers such as lack of knowledge of professionals, sedation practices, lack of human resources and equipment, among others, are identified (Garber* et al., 2011). The participation of the multidisciplinary team is essential for the success of PM in the ICU, given the scarcity of physiotherapists in this environment (Waldauf *et al*., 2020).

THE IMPACT ON PUBLIC HEALTH OF 'SURVIVORS' OF A TRAUMATIC INTENSIVE CARE UNIT STAY

Studies emphasize the decreased quality of life of surviving patients, mainly due to reduced physical function (Dowdy et al., 2006*) and the persistence of physical and psychological changes, along with higher healthcare costs, even years after discharge (Herridge et al., 2011*). Garland et al. (2004) reported that a significant portion of patients required assistance in activities of daily living five months after hospital discharge, and Herridge et al. (2003; 2011) point out that loss of muscle mass and ICU Acquired Muscle Weakness (FMAUTI) are also common problems reported from one to five years after hospital discharge.

According to Fan et al. (2014), this FMAUTI is also related to higher hospital mortality rates and mortality rates in the first years after discharge. In addition, a substantial number of patients continue to face the consequences of FMAUTI, including restrictions in the ability to move and move, significantly affecting their daily lives and these disabilities represent an additional cost for patients and the SUS, in addition to resulting in significant reductions in the quality of life and social and professional reintegration of these individuals.

Studies indicate that this additional cost or the excessive use of hospital resources is more common in young patients and in those without previous comorbidities, as these patients are usually in good health before suffering a critical illness that leaves them with a health problem. In addition, the economic implications can be considerably greater than the direct costs associated with acute hospitalization, including significant household income losses and long-term social costs. Therefore, these findings have important implications for health and social policymakers (Iwashyna, 2012) as they impact on the increase in comorbidities, the increase in the mortality rate, the increased need to use high-complexity services, and overwhelm families and the health system (Aquim *et al*., 2020).

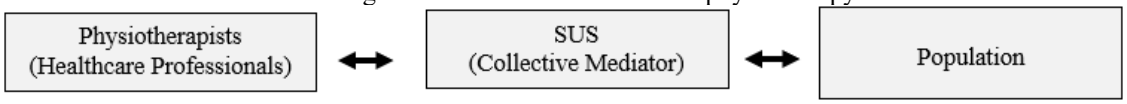
PUBLIC POLICIES RELATED TO THE IMPLEMENTATION OF EARLY MOBILIZATION IN THE ADULT INTENSIVE CARE UNIT

The productive restructuring of global capitalism has generated profound transformations in contemporary society, encompassing different relations of production, changes in the economy, international relations, and scientific and technological advances that have resulted in a new order of economic and political organization, with impacts on various aspects of social life. In this context, alternative approaches to adapt to these changes have emerged (Laurell, 1997).

And one of these changes is the neoliberal-capitalist model of education that prioritizes technicality over social concerns, emphasizing fragmentation, specialization, and a focus on healing (Paim, 2003). As a result of the curative orientation prevalent in health care during the military period and the lack of curricular regulation in the 1970s, physiotherapy has evolved as a rehabilitation-oriented profession, focusing on the tertiary level of care, where specialized care is critical due to the potential risks to critically ill patients (Bispo, 2009).

In this circumstance, Meyer et al. (2006) argue that training in physical therapy is inadequate and is not aligned with the principles of the SUS and the new models of health care. According to Bispo (2009), it is up to the State to regulate, finance and guarantee the provision of health services through the SUS, highlighting the need for greater State intervention in the promotion of the physical and functional health of the population. Chart 1 presents a diagram that illustrates the importance of the role of the SUS in mediating the demand for care and the supply of professional and institutional services, as well as in creating the conditions to improve the population's level of health.

Chart 1 – Diagram of collective mediation of physiotherapy care



Fonte: Adapted from Frenk (1994).

In the context of physical therapy in Brazil, Rebelatto et al. (1999) emphasize the need to consider not only physical therapy practice directed to the sick individual, but also the biopsychosocial complexities of the individual, going beyond rehabilitative interventions. This is in line with the idea that responsibility for health goes beyond the technical act and should involve both an individual and a collective approach (Bispo, 2009). In addition, the precarious accessibility to health services in Brazil and the high prevalence of physical-functional dysfunctions highlight the need for measures that optimize the quality of health services by promoting excellence in the quality of care (Martinez, 2013).

Reis et al. (2018) also highlighted the importance of quality care in health promotion, prevention, and rehabilitation to reduce work disability and the need for disability retirement, since

Bercker et al. (2005) observed that patients who evolved with a critical condition during ICU stay faced reduced functionality, weakness, and muscle fatigue. which has significantly impacted their work capabilities.

According to this scenario, Reis et al. (2018) also observe the importance of interdisciplinarity between SUS and Social Security for the creation of public policies aimed at the reinsertion and readaptation of workers in the labor market, improving their quality of life and reducing the need for retirement.

Mendes (2001) points out that, despite the achievements of the health reform and the creation of the SUS, the Brazilian health system faces a continuous dispute between two contradictory projects. On the one hand, there is the health reform project, based on principles of solidarity, universality, equity and comprehensiveness, which considers health as a right of citizenship and defends the responsibility of the State to guarantee access to health services for all. On the other hand, there is the neoliberal project, which advocates segmentation and privatization as alternatives for organizing the sector and assigns the responsibility for health services to the users themselves.

The laws that regulate the SUS, such as laws 8.080/90 and 8.142/90, emphasize the importance of health promotion and prevention actions, without neglecting care (Brasil, 1990). Article 196 of the Federal Constitution establishes health as a right of all and a duty of the State, with policies aimed at reducing the risk of diseases and universal access to health promotion, protection and recovery services (Brasil, 1988). Ordinance 373 of 2002, which deals with the Operational Standards for Health Care (NOAS - SUS 01/02), highlights the role of the Ministry of Health in improving the quality of services and the responsibility of state managers in managing high complexity/cost and prioritizing investments to ensure the quality of health services (Reis *et al*., 2018).

In addition, the 2030 Agenda, in Sustainable Development Goal (SDG) No. 3.8, emphasizes the importance of access to quality health services at all levels of care (UN, 2015). The UN Universal Declaration of Rights, in Article 25, establishes that every human being has the right to a standard of living that includes health and medical care, highlighting the importance of ensuring the well-being of the population (UN, 1948).

CONCLUSION

Physiotherapy, when dealing with critically ill patients in the ICU, faces uncertainties related to practice, evidencing an approach focused on the attention to respiratory dysfunctions specific to the disease, often neglecting the biopsychosocial complexities of the individual. This issue can be attributed to vocational training under neoliberal-capitalist influence, which prioritizes technicality over social concerns, resulting in fragmentation, excessive specialization, and an exclusive focus on

healing. Poor infrastructure conditions and accessibility to health services in Brazil also contribute to a high prevalence of post-discharge physical-functional dysfunctions.

Given this scenario, it is imperative that physiotherapy professionals constantly seek updating, adapting and promoting new approaches in their practice. This involves the promotion of excellence in care through the development of guidelines and protocols for Early Mobilization, training of the team, implementation, monitoring and investment by the State to provide adequate conditions for the development of this practice in ICUs. This approach aims to reduce the rate of work disability and the need for disability retirement, since critically ill patients have great potential to develop loss of functionality, muscle weakness and fatigue, significantly impacting their work capabilities.

It is crucial to note that the regulations of the Unified Health System (SUS) highlight the importance of health promotion and prevention initiatives. The Federal Constitution recognizes health as a right of all and a duty of the State, with policies aimed at mitigating disease risks and providing universal access to services that promote, protect and restore health. Ordinance 373 of 2002 reinforces the role of the Ministry of Health in improving the quality of services, with state managers being responsible for managing high complexity/cost and prioritizing investments to ensure the quality of health services.

DECLARATION OF INTERESTS

We declare that there are financial, commercial, political, academic and/or personal conflicts of interest.

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