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PHYSIOTHERAPIST APPROACH TO NEWBORNS WITH CONGENITAL HEART DISEASE ADMITTED TO NEONATAL UNITS

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Abstract: Objective: The aim of this study is to understand the approach taken by physical therapists treating newborns with congenital heart disease admitted to neonatal units. **Methodology:** This is a descriptive, quantitative study conducted between January and October 2025 in hospitals and maternity wards in Fortaleza, Ceará. Data collection was performed using an adapted and structured online questionnaire addressing issues related to professional profile, participation in training, and aspects related to knowledge and physiotherapy practice in neonates with congenital heart disease. Data analysis used categorical variables, presented in percentages and counts, and numerical variables expressed by measures of central tendency, with the aim of understanding the role of physical therapy in newborns with congenital heart disease. The study followed ethical principles, ensuring the confidentiality of information and respect for participants. **Results:** Fifty-nine professionals participated, predominantly women (94.9%, N=56), with 45.8% (N=27) having specialization. Regarding the physiotherapy techniques performed, there was a preference for passive limb mobilization and bronchial clearance maneuvers. On the other hand, respiratory monitoring and adjustments were performed frequently by 94.9% (N=56) of the professionals, while only 5.1% (N=3) stated that they did not use them. About 43 (72.9%) of the professionals stated that they integrated the medical report into their clinical practice. **Conclusion:** The study showed good consolidated respiratory practices, highlighting the fundamental role of the physical therapist, although there are still gaps in motor intervention and technical training in view of the specificities of neonates with

heart disease.

Keywords: congenital heart disease; physical therapists; newborns.

INTRODUCTION

Congenital heart disease (CHD) is a structural malformation of the heart that occurs during fetal development, causing physiological and functional changes from birth. Genetic, environmental, or idiopathic factors can affect cardiac anatomy and function, compromising blood flow and pulmonary function. Many newborns (NB) with CH have difficulty swallowing and breathing in a coordinated manner, gastroesophageal reflux, risk of bronchoaspiration, thermal and vital sign instability, and immaturity of the immune system (Csuka et al., 2019; Pena et al., 2020).

The global prevalence of CH has remained relatively stable, with approximately 9 to 10 cases per 1,000 live births. The recent increase in diagnoses is explained by advances in imaging and clinical evaluation methods, such as fetal cardiovascular magnetic resonance imaging, which allows for a more accurate and detailed assessment of fetal cardiac conditions.

In Brazil, it is estimated that approximately 30,000 children are born annually with some form of CH, representing about 1% of births. Of these, approximately 40% require surgical intervention in the first year of life, totaling 12,000 procedures annually (Ministry of Health, 2022).

CHDs can be classified as cyanotic and acyanotic. Acyanotic CHDs involve abnormal communications between chambers or vessels, with blood flow generally from left to right, without mixing of arterial and

venous blood, but which can cause cardiac and pulmonary overload. Cyanotic CH, on the other hand, involves mixing of arterial and venous blood, resulting in hypoxia, often associated with right-to-left shunting, which requires immediate surgical intervention (Csuka et al., 2019; Monteiro; Forti; Suassuna, 2018).

The diagnosis can be made during intrauterine life, through ultrasound, or in the neonatal period, through cardiac auscultation, routine h y tests, or investigation of later clinical symptoms. Imaging tests such as echocardiography and magnetic resonance imaging are essential for accurately assessing the anatomy and severity of cardiac malformation (Campos et al., 2023).

Newborns with CH face additional challenges, such as limited mobility, a high risk of respiratory infections, and the need for constant monitoring of vital signs. The survival of these patients has improved due to advances in diagnosis, early interventions, and specialized treatments. Children with CH who require early cardiac surgery may experience neurodevelopmental changes, affecting motor, cognitive, and language functions, with varying degrees of progression (Fourdain et al., 2021).

The care of newborns with CH requires a multidisciplinary approach, involving neonatologists, nurses, speech therapists, nutritionists, and physical therapists. Recent studies indicate that integration between these professionals contributes to better clinical outcomes and favors the neuropsychomotor development of patients. Joint action is essential to ensure more effective interventions and optimize the quality of life of newborns (Patel et al., 2018; Ubeda Tikkanen et al., 2023).

Neonatal physical therapy plays a key role in the care of newborns admitted to neonatal units. Given the clinical instability and vulnerability of these patients, physical therapy is essential for optimizing cardio-respiratory function, preventing complications, and promoting overall development. In the context of congenital heart disease, the physical therapist is part of a multidisciplinary team, contributing to detailed assessment, ventilatory support, motor interventions, and continuous monitoring (Ubeda Tikkanen et al., 2023).

Despite advances, there are still differences in clinical practice regarding the techniques that should be prioritized, the ideal time for their application, and the most efficient way to integrate physical therapy approaches with those of other professionals. Given these demands, understanding how physical therapists have been working in neonatal units is essential to identify established practices, recognize existing gaps, and direct training strategies that improve the care provided to newborns with CC.

This research is justified by the need to delve deeper into the subject, considering the divergences and barriers that still exist in clinical practice. Understanding physiotherapy intervention, when performed early and systematically, is essential, as it can optimize ventilation, reduce complications, and shorten hospital stays.

Given the complexity of congenital heart disease cases, investigating the role of the physical therapist is crucial to improving clinical practice, promoting more favorable outcomes, and, consequently, improving the quality of life of these patients.

MATERIALS AND METHODS

This is a descriptive, exploratory study with a cross-sectional design and an online questionnaire, conducted between January and October 2025 in public and private hospitals and maternity wards in the city of Fortaleza, Ceará. The sample consisted of 59 neonatal intensive care physical therapists, of both sexes, working in Neonatal Intensive Care Units (NICUs) and Conventional Neonatal Intermediate Care Units (UCIN-Co). The sampling was non-probabilistic for convenience, including professionals who agreed to participate in the research.

Data collection was performed using the *Google Forms* platform, which enabled the application of an easily accessible questionnaire. Invitations to participate were sent via WhatsApp, accompanied by a link to the form (https://docs.google.com/forms/d/e/1FAIpQLSdvJ1aiFFfPJjHFgPDprlk8w7oGzA_aJv6sFxC1rnDFAI8FzAQ/viewform?usp=header) and a request to share with coworkers.

The instrument used was a structured questionnaire, adapted from previous studies (Clarke et al., 2025), containing 23 questions, 10 of which were multiple choice, 3 dichotomous, and 10 open-ended, organized into six thematic areas: professional profile, participation in training, physiotherapeutic assessment, physiotherapeutic techniques used, interventions related to ventilatory support and oxygen therapy, as well as barriers and challenges encountered in healthcare practice.

Access to the questionnaire was preceded by reading and accepting the Free and Informed Consent Form (FICF), ensuring the voluntary nature, anonymity, and confidentiality of the responses.

Categorical quantitative results were presented as percentages and counts, and numerical results were presented as measures of central tendency. Kolmogorov-Smirnov normality tests were performed for the numerical variables. The data obtained in the collection were tabulated and analyzed using 8SAS 9.4 M7 software, SAS Inc. Descriptive statistics with absolute and relative frequencies were used, with results shown in tables.

This study followed the ethical principles for research involving human subjects, in accordance with Resolution 466/2012 of the National Health Council, the Code of Ethics for Physical and Occupational Therapists – Resolution COFFITO 10 (Federal Council of Physical Therapy and Occupational Therapy (COFFITO; 1978, BRAZIL, 2016). The research was approved by the Ethics Committee under opinion No. 6,925,409, ensuring the confidentiality of participants as provided for in the TCLE.

RESULTS

The study sample consisted of 59 professionals, with a mean age of 40.2 years (SD=11.96) and a median age of 37 years (IIQ=33–47). In terms of gender, there was a predominance of females, corresponding to 94.9% (N=56), while only 5.1% (N=3) were male. The length of experience in neonatal physical therapy varied widely, with a mean of 10.2 years (SD=8.45) and a median of 7 years (IQR=4–13). Among the participants, the predominant level of training was specialization (45.8%, N=27) and residency (20.3%, N=12). Regarding the place of work, most worked in public hospitals (84.7%; N=50), followed by private hospitals (10.2%; N=6) and both services

(5.1%; N=3). In addition, it was found that 50.8% (N=30) of participants had already completed training or refresher courses in neonatal heart disease, while 49.2% (N=29) had not participated in such training.

Table 1 shows the components used by physical therapists in the assessment of newborns with CHD. It was found that most professionals do not use a specific protocol for this assessment (94.9%), while only 5.1% report adopting any formal protocol. It was also observed that the collection of general clinical data, such as respiratory rate, heart rate, and peripheral oxygen saturation, is widely performed by most participants (98.3%). Regarding the physical examination, which includes assessment of muscle tone and respiratory pattern, 86.4% of physical therapists reported incorporating it into their practice. On the other hand, the use of specific scales was less frequent, being reported by only 15.3% of professionals. Joint mobility assessment also showed low adoption, being performed by 25.4% of participants.

When asked about integration with the medical report, 43 (72.9%) of the professionals stated that they perform this integration in their clinical practice, while 16 (27.1%) reported not adopting this procedure.

Regarding the application of physiotherapy techniques in neonates under ventilatory support, there was widespread adherence to passive limb mobilization and bronchial clearance maneuvers, which were widely applied, being reported by 86.4% (N=51) of participants, with only 13.6% (N=8) reporting not performing them.

On the other hand, respiratory monitoring and adjustments were performed

You use any specific for for the physiotherapeutic asses- ment of newborns with congenital heart disease	N	%
No	56	94.9
Yes	3	5.1
General clinical data (respiratory rate, heart rate, and SpO2)		
No	1	1.7
Yes	58	98.3
Physical examination (muscle tone, breathing pattern, etc.)		
No	8	13.6
Yes	51	86.4
Specific scales		
No	50	84.7
Yes	9	15.3
Joint Mobility		
No	44	74.6
Yes	15	25.4

Table 1. Components of physiotherapeutic assessment in neonates with congenital heart disease.
Authors (2025)

AFE	N	%
No	25	42.4
Yes	34	57.6
DAA		
No	35	59.3
Yes	24	40.7
DRR+I		
No	19	32.2%
Yes	40	67.8
Sensory-motor stimulation		
No	20	33.9
Yes	39	66.1
Passive Mobilization		
No	31	52.5
Yes	28	47.5

Authors (2025) *AFE = Increased Expiratory Flow, AAD = Assisted Autogenous Drainage. RRD+I = **Retrograde Rhinopharyngeal Drainage with Saline Instillation.**

Table 2. Physiotherapy techniques used in neonates with congenital heart disease.

Lack of specific training	N	%
No	28	47.5
Yes	31	52.5
Physical limitations of the newborn		
No	27	45.8
Yes	32	54.2
Challenges in communicating with the multidisciplinary team		
No	30	50.8
Yes	29	49.2
Time restrictions for service		
No	46	78.0
Yes	13	22.0

Table 3. Main barriers faced in performing physiotherapy interventions in neonates with congenital heart disease.

Authors (2025)

by 94.9% (N=56) of professionals, while only 5.1% (N=3) reported not routinely employing this technique. Passive limb mobilization was reported by 49.2% (N=29), while 50.8% (N=30) reported not performing this intervention. These findings suggest that, among the physiotherapeutic procedures applied to neonates on mechanical ventilation, bronchial clearance maneuvers and ventilatory adjustments predominate, while approaches related to passive mobilization, as well as other interventions, are still adopted less frequently.

DISCUSSION

The findings of this study highlight the importance of physiotherapy in the care of newborns with CC, especially in the context of neonatal units. The observational and descriptive design made it possible to identify the professional profile, the most commonly used therapeutic approaches, and the difficulties faced by physical therapists. These results reinforce the essential role of

physical therapists in the multidisciplinary team, contributing to cardiorespiratory stability and the prevention of complications resulting from structural heart changes.

The present study demonstrated a predominance of females, which highlights a consolidated profile of practice in the neonatal area. This female predominance is consistent with the national scenario of physical therapy, in which women represent the majority of active professionals, especially in the hospital and intensive care areas, as they are more involved in direct and continuous care practices (Pena et al., 2020).

The length of experience and qualifications observed—with emphasis on specialization and residency titles—reflect the strengthening of technical and scientific training in neonatal physical therapy. These findings corroborate those described by Ubeda Tikkanen et al. (2023), who highlight that advanced qualifications are associated with safer practices and greater multidisciplinary integration in the management of newborns with CC.

In addition, the predominance of professionals working in public hospitals (84.7%) highlights the essential role of the Unified Health System (SUS) as the main field of practice and training for these specialists, reaffirming the importance of public policies in encouraging continuing education and qualification in neonatal units.

In this study, most physical therapists reported using objective clinical parameters, such as heart rate, respiratory rate, and peripheral oxygen saturation (SpO₂), combined with detailed physical assessment (muscle tone, respiratory pattern, joint mobility, and specific scales) as part of the assessment process for newborns with CC. This practice reveals structured clinical reasoning in line with international guidelines, which recommend a comprehensive analysis of the newborn's cardiorespiratory and motor status before implementing any physical therapy intervention (Csuka et al., 2019; Rhamelani; Rakhmawati, 2025).

The integration of the medical report into the physiotherapeutic assessment, reported by 72.9% of professionals, reinforces the importance of interdisciplinary action in the context of neonatal care. This integration allows for greater safety in clinical decision-making and favors more targeted approaches. Patel et al. (2018) emphasize that the systematic sharing of information among professionals in the multidisciplinary team is a determining factor for the clinical safety and effectiveness of interventions applied to neonates with CH.

The most commonly used physiotherapy techniques during the care of neonates with CC were sensory-motor stimulation (66.1%), DRR + I (67.8%), and AFE (57.6%), followed by passive mobilization (47.5%). These findings are in line with the

recommendations proposed by Vikhe et al. (2024), which emphasize the importance of early sensory-motor stimulation to promote neuromotor development, prevent delays, and minimize the effects of immobility resulting from prolonged hospitalization.

Physical therapy interventions contribute significantly to improving cardiorespiratory function, reducing pulmonary complications, and stimulating motor development, reinforcing the need for early and individualized intervention. Thus, the frequent use of techniques such as AFE, DRR + I, and sensory-motor stimulation observed in this study reflects a practice aligned with national and international evidence, in which physical therapy is recognized as an essential element for the functional recovery and overall development of these patients (Vikhe et al., 2024).

The results of the present study reveal significant adherence to respiratory interventions in neonates under mechanical ventilation, especially bronchial clearance maneuvers and ventilatory adjustments. This trend indicates the value of respiratory physiotherapy in optimizing pulmonary mechanics and gas exchange, according to Kaeslin; Latal; Mitteregger (2023), who highlight the high risk of motor delay and respiratory repercussions in this population.

However, there was less adherence to passive limb mobilization (49.2%) and so-called "other physiotherapy techniques" (30.5%). This pattern suggests the prioritization of respiratory practices, often considered more urgent, to the detriment of motor interventions, in addition to the absence of standardized protocols for early mobilization in this population. This gap had already been highlighted, pointing to a lack of consensus regarding the ideal time to start motor interventions and their standardization (Vikhe et al., 2024).

The analysis of the challenges faced by physical therapists showed that institutional and training factors stand out: lack of specific training (52.5%), physical limitations of the newborn (54.2%), and difficulties in interprofessional communication (49.2%). In contrast, time constraints for care were reported by 22% of professionals, indicating that barriers are more associated with the organizational structure of the service than with the availability of care time. These findings corroborate the recommendations of the Association of Pediatric Chartered Physiotherapists (APCP, 2023), which emphasize the need for highly trained teams with advanced skills in neonatal care.

Although the results reveal well-established good respiratory practices, there are still gaps in motor intervention and technical training regarding the specificities of newborns with heart disease. Recent reviews (Kaeslin; Latal; Mitteregger, 2023) point out that evidence on the functional impact of early motor interventions is limited, which reinforces the urgency for more clinical research in this area.

CONCLUSION

This study showed that the most commonly used physiotherapeutic approach was respiratory interventions aimed at neonates on mechanical ventilation. The findings of this study show strong adherence to bronchial clearance maneuvers and ventilatory adjustments, reflecting the priority given to respiratory support in this highly vulnerable population, indicating that, although physical therapists play an essential role in cardio-respiratory stability and the prevention of complications, there are still limitations in the performance of physical therapy in terms of motor intervention when compared to the prioritization of respiratory interven-

tions. This gap must be filled with greater detail and attention in the creation of protocols and specialized care.

Given this scenario, it is essential to implement institutional strategies aimed at improving neonatal physical therapy practice. Among the strategies, the following stand out: continuing education programs specific to neonatal physical therapy; reorganization of the service, with adequate allocation of time for physical therapy, avoiding overload and promoting full performance; standardization of interdisciplinary protocols that favor communication and integration among professionals. In summary, physical therapists demonstrate strong adherence to respiratory practices, which is a positive point. However, to improve neonatal care, especially in CC, it is essential to strengthen motor approaches, technical training, and institutional structure. Such advances will allow for more integrated, efficient care focused on the needs of the critically ill newborn.

As a limitation, the study had geographical and sampling restrictions due to the use of an online questionnaire and the voluntary participation of participants, which may limit the generalization of the results. In addition, the absence of longitudinal analysis prevents the measurement of the clinical impacts of the interventions described, together with the selection bias in relation to the most physiotherapy techniques used. Nevertheless, the data obtained provide important insights into physiotherapy practices in the neonatal context and constitute a relevant basis for future investigations that further explore the role of physiotherapists in the care of newborns with CC.

Thus, this study not only broadens the understanding of the role of physical thera-

pists in newborns with CH, but also indicates relevant ways to improve this practice through continuing education, the development of clinical protocols, and the encouragement of scientific research. Such initiatives are essential to ensure the quality of care in neonatal units.

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