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Availability of physical therapy assistance in neonatal intensive care units in the city of São Paulo, Brazil

Disponibilidade de assistência fisioterapêutica em unidades de terapia intensiva neonatal na cidade de São Paulo

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ABSTRACT

Objective: To describe the characteristics of physical therapy assistance to newborns and to provide a profile of physical therapists working in intensive care units in the city of São Paulo, Brazil.

Methods: This cross-sectional study was conducted in every hospital in São Paulo city that had at least one intensive care unit bed for newborns registered at the National Registry of Health Establishments in 2010. In each unit, three types of physical therapists were included: an executive who was responsible for the physical therapy service in that hospital (chief-physical therapists), a physical therapist who was responsible for the physical therapy assistance in the neonatal unit (reference-physical therapists), and a randomly selected physical therapist who was directly involved in the neonatal care (care-physical therapists).

Results: Among the 67 hospitals eligible for the study, 63 (94.0%) had a

physical therapy service. Of those hospitals, three (4.8%) refused to participate. Thus, 60 chief-PTs, 52 reference-physical therapists, and 44 care-physical therapists were interviewed. During day shifts, night shifts, and weekends/holidays, there were no physical therapists in 1.7%, 45.0%, and 13.3% of the intensive care units, respectively. Physical therapy assistance was available for 17.8 ± 7.2 hours/day, and each physical therapist cared for 9.4 ± 2.6 newborns during six working hours. Most professionals had completed at least one specialization course.

Conclusion: Most neonatal intensive care units in the city of São Paulo had physical therapists working on the day shift. However, other shifts had incomplete staff with less than 18 hours of available physical therapy assistance per day.

Keywords: Infant newborn; Infant, premature; Intensive care units; Physical therapy department, hospital; Physical therapy modalities

Conflicts of interest: None.

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INTRODUCTION

Physical therapy is part of the multi-professional assistance provided in intensive care units (ICUs).⁽¹⁾ The continued development of physical therapy care in neonatal units has led to enhanced techniques and resources for this population,⁽²⁾ which has contributed to reduced neonatal morbidity,⁽³⁾ shorter hospital stays, and lower hospital costs.^(4,5)

Furthermore, there is a growing concern about the clinical evolution and the quality of life of patients discharged from ICUs.^(6,7) In this context, physical therapists have increasingly contributed to the prevention and treatment of possible respiratory and motor complications.⁽⁴⁾

In clinical practice, the specific function of physical therapists in the neonatal ICU varies by country. In addition, physical therapy staff might undergo different levels of academic degrees and continuing education.^(8,9)

Although still controversial, in some countries, including Brazil, chest physical therapy techniques such as vibration, chest compression vibration, percussion, expiratory flow increase technique, manual hyperinflation with vibration and postural drainage are often performed in pediatric units.⁽¹⁰⁻¹²⁾

In Brazil, there is a law that requires physical therapy assistance in neonatal ICUs; however, little data are available on the compliance with this law. The National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária* - ANVISA) states that there must be at least one physical therapist for every 10 ICU beds or a fraction thereof in the morning, afternoon, and night shifts. This assistance must be available for a total of 18 hours per day.⁽¹³⁾

In this context, the aim of this study was to determine both the availability and level of training of physical therapists who worked in ICUs with a least one bed for neonates in the city of São Paulo, Brazil, in 2010.

METHODS

This is a cross-sectional, interview-based study that involves physical therapists who provided assistance to newborns admitted to ICUs in São Paulo, Brazil, from February 2010 to January 2011. The study was approved by the Ethics Committee of the *Universidade Federal de São Paulo* (CEP # 1636/09), and the professionals involved gave consent to participate in the study.

We included all hospitals in the city of São Paulo that were registered at the National Registry of Health Establishments⁽¹⁴⁾ as having at least one ICU bed for newborns in 2010. For each institution, one physical therapist (PT) from each of the following three categories was included in our study: the executive responsible for the physical therapy department in the hospital (chief-PT), the physical therapist responsible for assistance in the neonatal unit (reference-PT), and one physical therapist responsible for direct neonate assistance (care-PT).

The care-PT was randomly selected from a list of physical therapists working in each neonatal unit. Initially, three physical therapists were randomly selected, but only one was interviewed. If after five attempts the researcher was unable to interview the first physical therapist selected, a second physical therapist replaced this professional. This

process was then repeated, and a third physical therapist selected was included if necessary. Physical therapists who were students, trainees or professors were excluded from our study. Physical therapists who had already participated in this study as a member of one of the three professional categories in another hospital were not interviewed again.

The first author of this study personally conducted the interviews with the department chief-PT. Closed and objective questions were used, and specific work data were obtained. The questionnaire included questions regarding the number of hours per day of physical therapy assistance available in the unit, the exclusivity of the professionals in the neonatal unit, the number of care-physical therapists, the professional working regime, and the number of patients cared for within six working hours.

Furthermore, for all categories of professionals, the questionnaire contained questions on academic background, professional training, performance, and time dedicated to continuing education. Interviews with reference-PTs and care-PTs were conducted over the phone according to their availability; these interviews lasted an average of 6-10 minutes. A Digital Voice Recorder® - Sony Model Number ICD-PX720 (Canada) was used to record all interviews. The files were then transferred to a computer for review.

Statistical analysis

Numerical variables were expressed as means and standard deviations and compared by t-test (normal distribution) or Mann-Whitney test (non-normal distribution). Categorical variables were expressed as number and percentage and were compared by χ^2 or Fisher's exact test. Statistical analyses were performed using Statistical Package for Social Sciences (SPSS) for Windows v.17.0 (IBM SPSS Statistics, Somers, NY). A p value <0.05 was considered to be statistically significant.

RESULTS

Of the 80 ICUs that cared for newborns in the city of São Paulo, 67 (83.8%) had active beds for newborns in 2010. Of the 67 units, four (5.9%) had no physical therapy service and were excluded from the analysis. Three hospitals refused to participate; thus, professionals from 60 (95.2%) hospitals were considered for interview (Figure 1).

Of the 60 hospitals included, 30 were public and 30 were private. There were 672 beds in total, with 363 beds (54.3%) in private hospitals and 309 (46.0%) in public hospitals. In addition, 16 (26.7%) of the 60 hospitals were

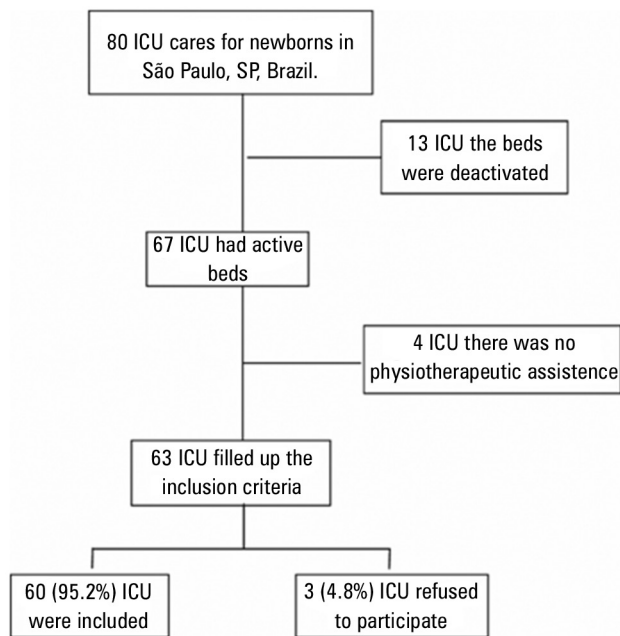


Figure 1 - Flowchart of studied intensive care units in the city of São Paulo, Brazil. ICU - intensive care unit.

associated with universities, 11 (18.3%) had neonatal and pediatric beds, and only one (1.7%) had specific staff for respiratory and motor physical therapy.

On average, ICUs offered physical therapy for 17.8 ± 7.2 hours/day; however, public hospitals had fewer staff members and daily hours of physical therapy assistance than private hospitals. The average number of patients cared for in six working hours was 9.4 ± 2.6 neonates per physical therapist, with a higher number of patients in private hospitals compared to public ones. Moreover, a higher number of private hospitals had physical therapy assistance on night shifts and on weekends than public hospitals (Table 1). The number of NICUs, beds for sick neonates, physical therapists and daily hours of physical therapy assistance in the five Regional District of Health are shown in figure 2.

Regarding the professional profiles among the 60 chiefs of physical therapy departments, 56 (93.3%) were physical therapists, two (3.3%) were physicians, one (1.7%) was a phonoaudiologist, and one (1.7%) was a psychologist. Selection for employment at the department of physical therapy was made by public tender in 67% of public hospitals and by analysis of curricula and/or exams in 83% of private hospitals. The physical therapy department chiefs had worked at their respective hospitals for 11.0 ± 6.8 years and had held their specific positions for 7.6 ± 6.0 years. In addition, 25 (41.7%) of

the chiefs also provided direct assistance to newborns. These professionals had graduated 18.0 ± 7.2 years prior. Two (3.3%) had a graduate degree only, 46 (76.7%) had completed a professional specialization 12.0 ± 6.7 years ago, three (5.0%) had expertise in business administration, six (10.0%) had master's degrees, and two (3.3%) had doctoral degrees.

There were no reference-physical therapists in six (10%) of the hospitals; one (1.7%) professional had already been interviewed as chief-PT in another institution, and one (1.7%) refused to participate. Thus, 52 (98.1%) reference-PTs were interviewed. These professionals were contract workers in 79.2% of public hospitals, while this was the case in 39.3% of private hospitals ($p=0.006$). With the exception of one reference-PT, all professionals in this group coordinated and assisted patients in the ICU, and only 11 (21.2%) were working exclusively in the neonatal unit. Reference-PTs had been working in the ICU for 8.2 ± 4.8 years, and their weekly workload was 33.7 ± 9.5 hours. Among the 52 reference-PTs, 12 (23.1%) worked more than 30 hours per week, and no significant difference was found between public and private hospitals (25% versus 21%, $p=0.761$).

Only 48 of the 60 (80.0%) ICUs had care-physical therapists. Of these therapists, four (8.3%) professionals refused to participate; thus, 44 (91.7%) care-PTs were interviewed. Care-PTs were employed based on public tender in 90.9% and 36.4% of cases in public and private hospital ICUs, respectively ($p=0.002$). Weekly workload was 32.3 ± 8.9 hours, and nine (20.5%) professionals were working more than 30 hours per week. Among 44 care-PTs, 20 (45.5%) reported that they took care of more than 10 patients in 6 hours. Overall, these professionals assisted 10.3 ± 3.6 neonates per 6-hour shift.

No differences were found between private and public hospital in terms of academic background, professional training, performance, and training time for reference- and care-PTs. The only difference was that a higher number of reference-PTs working in private hospitals had also graduated from private universities (Table 2).

DISCUSSION

This study found that in the city of São Paulo, physical therapists are part of the assistance team in 94% of ICUs that attend newborns. This study also found that the same team performed respiratory and motor physical therapy in all but one unit.

The departments of physical therapy appeared to be relatively well structured with longitudinal care during

Table 1 - Differences between public and private intensive care units

	Public (N=30)	Private (N=30)	p value
Mixed ICU (neonatal and pediatrics beds)	4 (13)	7 (23)	0.317
University hospitals	10 (33)	6 (20)	0.243
Number of physiotherapists per unit	3.3±2.8	7.4±4.5	<0.001
Physical therapy assistance (hours/day)	9 (30)	9 (30)	1.000
Hours/day of physiotherapeutic assistance	14.1±6.9	21.4±5.4	<0.001
Number of patients assisted in a 6 hour shift	8.4±2.4	10.4±2.4	0.003
Weekdays assistance			0.424
Regular daily staff	20 (67)	18 (60)	
On call staff	6 (20)	5 (17)	
Both	3 (10)	7 (23)	
No PT assistance	1 (3)	0	
Weekend assistance			0.011
Daily staff	5 (17)	3 (10)	
Staff on duty	16 (53)	24 (80)	
Both	1 (3)	3 (10)	
None	8 (27)	0	
Night assistance	9 (30)	24 (80)	<0.001

ICU - intensive care unit; PT - physical therapy. Results expressed as number (%), mean±standard deviation.

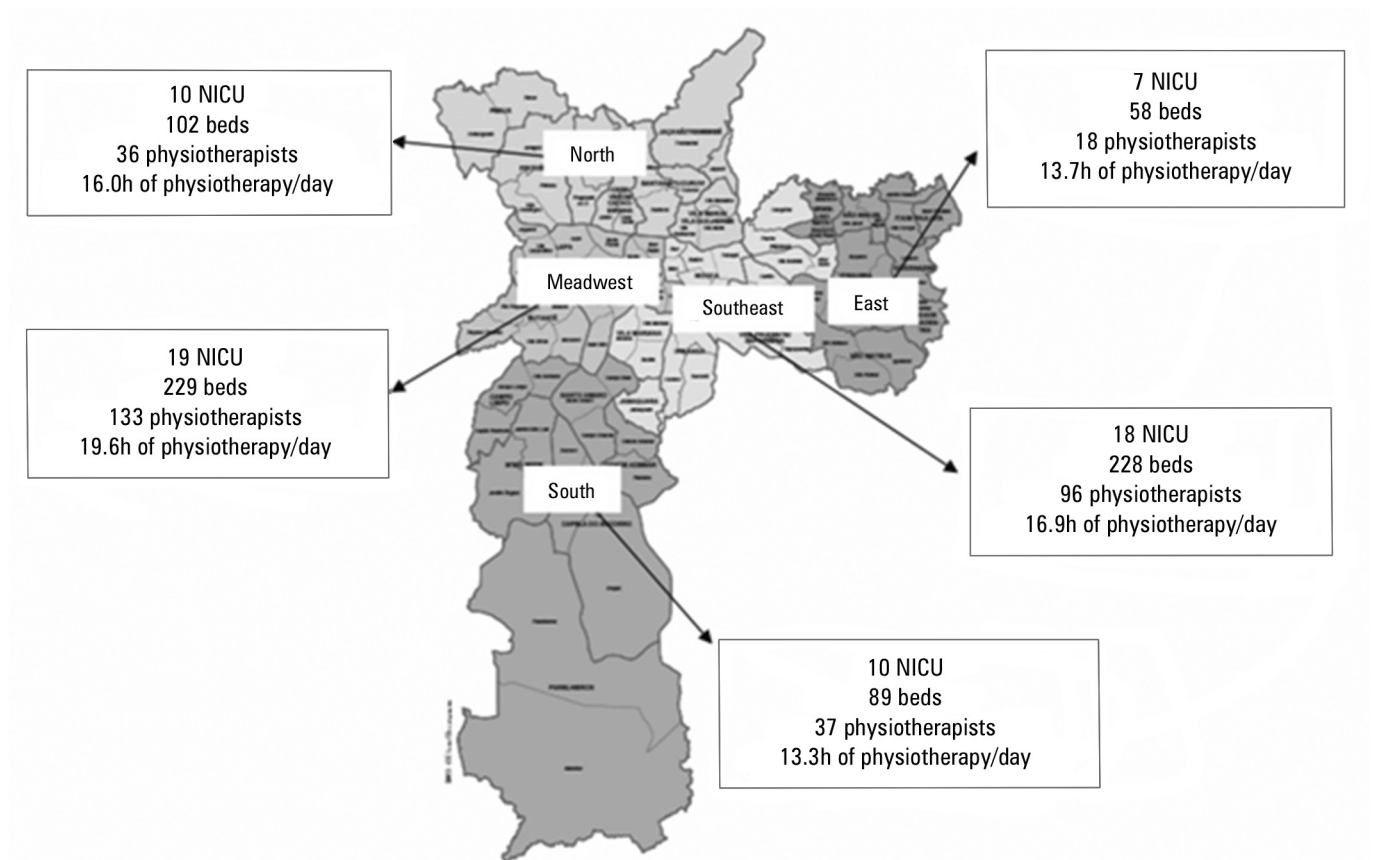
**Figure 2** - Physical therapy assistance for neonates in the five Regional Districts of Health. NICU - neonatal intensive care unit.

Table 2 - Characteristics of the reference and the assistant physiotherapists according to hospital category, expressed in percentage

	Reference physiotherapists		p value	Care physiotherapists		p value
	Public (N=24)	Private (N=28)		Public (N=22)	Private (N=22)	
Graduation in a private university	75	96	0.024	91	96	0.220
Degree			0.217			0.483
Specialization	79	96		73	86	
Master´s	8	4		14	5	
Doctorate	0	0		0	0	
None	8	0		14	9	
Currently attending a course	29	14	0.190	27	18	0.472
Courses/year			0.465			0.767
One	38	39		32	32	
Two	29	43		50	50	
Three or more	29	18		18	14	
Do not usually attend courses	4	0		0	5	
Work on weekends	71	71	0.962	86	73	0.262
Number of jobs in hospitals			0.610			0.304
1	58	61		82	68	
2	42	36		18	23	
3	0	4		0	9	
Physical therapy staff	79	79	0.718	59	68	0.531

Results expressed as %.

the daytime. In sum, 80% percent of reference-PTs and 60% of care-PTs provided individualized and continuous assistance to neonates every day.

However, the distribution of hours of physical therapy assistance for neonates per day was not similar among regional health districts. Only the Midwest district had adequate hours of physical therapy assistance according to the ANVISA,⁽¹³⁾ and both the East and Southern districts had the worst hours available. Moreover, the latter two districts have a lower number of hospitals and had a higher birth rate in 2010 than the other districts.⁽¹⁵⁾

Moreover, for the night shift, 70% of public ICUs and 20% of private ICUs had no physical therapists on duty; this finding suggests that nursing staff performed procedures such as respiratory physical therapy as well as patient mobilization and positioning. This situation could compromise the quality of neonatal care and overload the nursing staff. According to Chaboyer et al. (2004),⁽¹⁶⁾ this situation reflects the lack of definition for the role of physical therapists in the ICU and the fact that there is little scientific evidence supporting their role. One study that mailed questionnaires (which had a 50% return rate) to staff at 101 ICUs in the UK, Australia, Canada, South Africa, and Hong Kong showed that 60% of ICU coordinators believed that physical therapy duties could be performed by nursing staff.⁽¹⁷⁾

In the present study, we found that on weekends, neonates received assistance from physical therapists on duty in approximately 70% of ICUs; this assistance provided by professionals who might not know patients' complete histories and clinical outcomes could result in a loss of continuity of care. Moreover, a third of the hospitals we studied had no physical therapist on duty on weekends, which further underscores the discontinuity of treatment and leads to worsening clinical conditions.⁽¹⁸⁾

Similarly, an Australian study using telephone interviews showed that 90% of ICUs had physical therapists on duty on weekdays, but only 25% provided assistance on weekends. The maintenance of human resources, both in terms of quantity and quality, at all work shifts during the entire week is essential to reduce complications and improve clinical prognoses for neonates.⁽¹⁹⁾

In Europe, Norrenberg and Vincent⁽²⁰⁾ sent questionnaires to 460 ICUs in 17 countries. Among the 102 (22.2%) ICUs that participated in the study, all provided respiratory therapy. However, 25% of those ICUs had no physical therapist who was exclusively dedicated to the neonatal unit, 88% had no physical therapist on duty on weekends, and only 34% had physical therapy at night. The findings differed from country to country; in the UK, 80% of the units studied had a physical therapy service at night, while in Germany and Sweden no physical therapy assistance was available during the night shift.⁽²⁰⁾

In India, a study that included 35% of the existing institutes, 79% of neonatal ICUs had a dedicated physical therapist, but only 24% had a physical therapist during the night shift.⁽²¹⁾

In the present study, 11 (18%) ICUs cared for neonates and pediatric patients. Moreover, only 11 (21.2%) reference-PTs and 12 (27.3%) care-PTs worked exclusively in the neonatal ICU at their hospitals. This situation may result in a higher risk of cross-infections and a lack of qualified professionals trained exclusively in the care of newborns.⁽²²⁾ The American Academy of Pediatrics recommends that newborns should be assisted in exclusive units with subdivisions according to the level of care complexity.⁽²³⁾

In the present study, we found that some aspects of the physical therapy assistance provided were not in accordance with the Brazilian law. Specifically, the provision that physical therapy assistance should be available in the ICU for at least 18 hours per day was not met. In addition, less than 25% of professionals were exclusively dedicated to neonatal units.⁽¹³⁾

Brazilian legislation determines a workload of 30 hours per week for physical therapists.⁽²⁴⁾ However, in this study, we observed a work overload, with 20% of reference and care-PTs working an average of 3.5 hours more a week than recommended. Additionally, 63% and 27% of physical therapists from private and public institutions, respectively, took more than 10 calls over a six-hour period, which could reflect mandates imposed on professionals to achieve hospital financial goals.⁽²⁵⁾

In addition to the administrative function, 42% of chief-PTs also participate in the direct assistance of patients, which may interfere with the performance of both functions. This phenomenon may also be because less than 10% of chief-PTs had administrative training. The fact that some chiefs were professionals in other fields, specifically psychologists and phonoaudiologists, suggests that there is some difficulty in organizing neonatal assistance, specifically in the area of physical therapy.

In terms of academic training among the 60 chiefs we studied, two (3.3%) had only graduate degrees, 46 (76.6%) professionals had undertaken a specialization course, and eight (13.3%) professionals had postgraduate degrees. Of the 96 reference- and care-PTs interviewed, only 10 (10.4%) had completed their graduate program at a public institution; this finding shows that there is a lack of public schools with physical therapy courses. The vast majority of professionals had completed a specialization course, but fewer than 10% had a master's degree.

One interesting finding of our study is that professionals had graduated on average 10 years earlier. However, almost all of these professionals were frequently updating their knowledge, which suggests that they were interested in keeping up with the development of scientific-technical knowledge;⁽²⁶⁾ this phenomenon may have been the result of market pressures. One study also showed that in institutions that require continuing education, professionals dedicate more time to academic activities compared to those professionals who worked in hospitals without this requirement.⁽²⁷⁾

The main strength of the present study is that we included 94% of the ICUs that provide assistance to newborns in the city of São Paulo. In addition, we interviewed three categories of professionals involved in the physical therapy care of newborns in each neonatal unit, allowing a broad view of newborn care, from coordination to bedside assistance. Our study also details the organization of physical therapy care and government legislation. At the same time, the present study examined relevant features of physical therapists, including their academic background and their ability to acquire and renew their knowledge. Altogether, this information will assist the design of strategies to improve multidisciplinary care of newborns.

A limitation of the study was that it used a cross-sectional design based on questionnaires. We were also unable to interview all care-PTs because of their large number. However, we did include one random professional from each service level. We believe that this design involved less bias than an attempt to include all professionals, as this latter approach could have led to poor adherence and selection bias.

CONCLUSION

This study showed that most intensive care units that provided assistance to newborns in the city of São Paulo had physical therapy assistance. However, we still need to address the shortage of on-duty physical therapists, especially during night shifts and on weekends and holidays.

On a positive final note, we found that most physical therapists who worked in intensive care units that assisted neonates in São Paulo had expertise in the area and were regularly undertaking refresher courses.

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RESUMO

Objetivo: Descrever as características da assistência fisioterapêutica prestada a neonatos e delinear o perfil dos fisioterapeutas que trabalham em unidades de terapia intensiva na cidade de São Paulo.

Métodos: Estudo transversal realizado em todos os hospitais da cidade de São Paulo que tinham registro de pelo menos um leito de terapia intensiva para neonatos, segundo o Cadastro Nacional de Estabelecimentos de Saúde em 2010. Em cada unidade, foram incluídos três categorias de fisioterapeutas: um executivo, responsável pelo serviço de fisioterapia do hospital (chefe da fisioterapia); um fisioterapeuta responsável pela assistência fisioterapêutica na unidade neonatal (fisioterapeuta de referência); e um selecionado ao acaso e diretamente envolvido no cuidado ao recém-nascido (fisioterapeuta assistencial).

Resultados: Dentre os 67 hospitais elegíveis para o estudo, 63 (94,0%) dispunham de um serviço de fisioterapia. Três (4,8%) desses hospitais recusaram-se a participar. Assim,

foram entrevistados 60 chefes da fisioterapia, 53 fisioterapeutas de referência e 44 fisioterapeutas assistenciais. Durante os turnos diurnos, noturnos e de finais de semana/feriados, respectivamente, não havia fisioterapeutas disponíveis em 1,7%, 45,0% e 13,3% das unidades de terapia intensiva. A assistência fisioterapêutica estava disponível por 17,8±7,2 horas/dia, e cada fisioterapeuta cuidava de 9,4±2,6 neonatos durante um turno de 6 horas. A maioria dos profissionais havia concluído pelo menos um curso de especialização.

Conclusão: A maioria das unidades de terapia intensiva neonatal da cidade de São Paulo tinha fisioterapeutas atuando durante o turno diurno. Entretanto, os demais turnos tinham equipes incompletas e menos de 18 horas de assistência fisioterapêutica disponível ao dia.

Descritores: Recém-nascido; Prematuro; Unidades de terapia intensiva; Serviço hospitalar de fisioterapia; Modalidades de fisioterapia

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