

Respiratory physiotherapy in Spanish Pediatric and Neonatal Intensive Care Units

Fisioterapia respiratoria en Unidades de Cuidados Intensivos pediátricas y neonatales españolas

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Dear Editor,

Patients admitted to the Pediatric Intensive Care Unit (PICU) or Neonatal Intensive Care Unit (NICU) often suffer respiratory complications¹ and could benefit from respiratory physiotherapy (RP) techniques that can shorten hospital stay.² While the international literature has addressed the role of physiotherapy in PICUs/NICUs,^{3,4} no such studies have been published in Spain to date. The present study analyzes the situation of RP in Spanish PICUs/NICUs.

An internal validation was carried out involving 6 experts in RP and with training in Intensive Care and Pediatrics, in order to assess the suitability of form and contents. Following due approval from the Teaching and Research Ethics Committee of the University of A Coruña (CEID-UDC-2018-0019), in September 2019 an electronic survey was sent to the 45 Spanish PICUs/NICUs of the registry of the Spanish Society of Pediatric Intensive Care (*Sociedad Española de Cuidados Intensivos Pediátricos*),⁵ addressed to the Physiotherapy coordinator at each center. A period of 6 months was allowed for receiving the reply, with a total of three reminders if needed.

A total of 24 hospitals answered the survey (53.3%): 22 public centers (91.7%) and two private centers (8.3%), with 26.1 ± 17.4 staff physiotherapists, of which two (1–3) were in charge of the service in the PICU/NICU (Table 1). The mean number of beds was 19.3 ± 12.9 (range 5–50), with a physiotherapist / bed ratio of 1/8. The implementation of physiotherapy was dependent upon referral by the Department of Rehabilitation or the specialist in Intensive Care in 16 (66.7%) and four (16.7%) hospitals, respectively. In another four centers (16.7%), RP consultation was directly requested from any specialized physician or – in the case of consultation for motor physiotherapy – from the Department of Rehabilitation. Twenty answers were obtained regarding the percentage of children that received physiotherapy; specifically, $37.1 \pm 32.1\%$ of the patients received treatment both in the PICU and in the NICU in 15 Units (75%). In three Units (15%), estimates were made for PICU ($17.1 \pm 4\%$ of the patients) and NICU ($14.5 \pm 16.3\%$ of the admitted patients). The remaining two Units (10%) considered the seasonal factor: children treated in summer ($18.4 \pm 2.3\%$) and in winter ($90 \pm 14.1\%$). In one of the NICUs, physiotherapy was provided for all infants with a gestational age of under 28 weeks. The duration of the sessions ranged from 10–35 min, with an average of 22.5 ± 7.7 min. The service was available only in the mornings in 19 of the Units (79.2%),

and only on working days in 19 Units (79.2%). On the other hand, 70.8% of those surveyed considered that the number of physiotherapists associated to the service was insufficient to cover the care needs. In 22 of the Units (91.7%), the physiotherapists were not exclusively dedicated to work in the Unit; 14 (63.6%) also offered RP to patients in the ward and 9 (19.8%) to ambulatory patients. In addition, 18 (81.8%) performed physiotherapy in patients admitted to the ward and 14 (63.6%) in outpatient clinics.

Academically, the participants had 20.3 ± 5.1 years of general working experience, and 11 (45.8%) had between 3–10 years of experience in the PICU/NICU. For 19 of the participants (79.2%), having specific training in RP in critical pediatric patients was not a requirement for their job position. At present, 19 (79.2%) have training in RP, and of these, 15 (62.5%) have training in pediatric RP; 14 (58.3%) have training in RP in Intensive Care; and 10 (41.7%) have training in RP and in the management of mechanical ventilation. Only 8 participants (33.3%) had training in all three areas. Lastly, 16 of the Units (66.7%) provided clinical practice training at grade or master level (Table 2).

Our results evidence low commitment of the physiotherapist to the PICU/NICU. This is in contrast to the situation found in Brazil, for example, where 21.2% of the staff physiotherapists are exclusively related to the PICU/NICU.³ Nevertheless, the physiotherapist / bed ratio is better than in the PICUs in Brazil (1:9.3), in the PICUs/NICUs in Korea (1:20),^{3,4} and in Spain referred to adult Intensive Care (1:13).⁶ In any case, the situation falls short of the recommendations of the European Society of Intensive Care Medicine (ESICM),⁷ which advises a ratio of 1:5.

With regard to the patient referral system, our findings are consistent with those corresponding to adult Intensive Care in Spain, with a Department of Rehabilitation referral rate of 65.1%.⁸ Likewise, in terms of the mean duration of each session, our data coincide with those recorded in Korea,⁴ where 36.2% of the participants reported a duration per session of under 10 min and 29.3% less than 30 min. The same situation was found in adult Intensive Care in Spain, where the mean duration of the rehabilitation sessions was 16–30 min.⁶ Thus, the characteristics identified in our study do not comply with the standards and recommendations referred to the quality of Intensive Care published by the Spanish Ministry of Health,⁹ which estimate that each patient requires at least 30 min a day of physiotherapy.

On the other hand, the ESICM⁷ recommends that physiotherapists who work in the Intensive Care Unit (ICU) should do so full time, with a coverage of 7 days a week. While this objective is not met by the analyzed Spanish PICUs/NICUs, at European level 75% of the adult ICUs have at least one or two physiotherapists with full time dedication.¹⁰ In relation to weekly coverage of the service, our results fall short of those recorded by the hospitals in Barcelona, where the percentage reaches 47%,⁶ and of those published in Europe, with a percentage of 83%.¹⁰ Lastly, nocturnal service was inexistent in the Units participating in our study, and very low in the Spanish adult ICUs⁸ — while the figure reaches 34% in the European general ICUs.¹⁰

As limitations of the present study, replies were not obtained from all the hospitals with PICU/NICU, despite the long time allowed for them to reply. In turn, most of the centers belonged to the Spanish public healthcare system, which might not be representative of the situation of RP in the PICUs/NICUs of private centers.

The present study underscores the need to integrate physiotherapists within the interdisciplinary teams of the Spanish PICUs/NICUs, facilitating direct patient referral to physiotherapy on the part of the specialist in Intensive Care, and with exclusive and full-time dedication.

Financial support

The present study has received no financial support.

Conflicts of interest

None.

Acknowledgements

Thanks are due to María José Segrera Rovira, Mireia Pardàs Peraferrer, Roberto Martínez Alejos and Salvador Llanes Castell, as part of the panel of experts that contributed to validation of the survey, and to Mariona Farrés Tarafa, for supplying the list of Spanish PICUs and NICUs.

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Table 1. General characteristics of the Intensive Care Units participating in the survey.

Hospital center	Region (Autonomous Community)	City	Type of hospital center	Type of ICU	No. of beds	No. of physiotherapists in ICU	Physiotherapist dedication in ICU	Weekend availability of physiotherapy	Patient referral to physiotherapy
H. Materno Infantil de Granada	Andalucía	Granada	Public	PICU and NICU	16	1	Part time	No	DR
H. Materno Infantil de Málaga	Andalucía	Málaga	Public	PICU and NICU	14	3	Part time	No	DR
H. Regional de Málaga	Andalucía	Málaga	Public	PICU and NICU	40	3	Part time	No	DR
H. Universitario Virgen del Rocío	Andalucía	Sevilla	Public	PICU and NICU	38	2	Part time	No	Dependent on demand ^a
H. Universitario Marqués de Valdecilla	Cantabria	Santander	Public	PICU	6	1	Part time	No	DR
H. Universitario de Burgos	Castilla y León	Burgos	Public	PICU and NICU	15	1	Part time	No	Specialist ICU
H. Clínico Universitario de Valladolid	Castilla y León	Valladolid	Public	Mixed	9	1	Part time	No	DR

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H. Virgen de la Salud de Toledo	Castilla y la Mancha	Toledo	Public	PICU and NICU	12	4	Part time	No	DR
H. de la Santa Creu y Sant Pau	Catalonia	Barcelona	Public	PICU and NICU	8	1	Part time	Yes	DR
H. Sant Joan de Déu	Catalonia	Barcelona	Private	PICU and NICU	24	2	Full time	Yes	DR
H. Universitari Vall d'Hebron	Catalonia	Barcelona	Public	PICU and NICU	20	1	Part time	No	DR
H. Universitari Parc Taulí	Catalonia	Sabadell	Private	PICU and NICU	17	2	Part time	No	Specialist ICU
H. Universitario General de Castellón	Valencian Community	Castellón	Public	Mixed	5	2	Part time	Yes	DR
H. Materno Infantil Badajoz	Extremadura	Badajoz	Public	PICU and NICU	9	2	Part time	No	DR

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H. Universitario Materno Infantil de A Coruña	Galicia	A Coruña	Public	PICU and NICU	9	1	Part time	Yes	Dependent on demand ^a
H. Clínico Universitario de Santiago de Compostela	Galicia	Santiago de Compostela	Public	PICU and NICU	7	1	Part time	No	DR
H. Nuestra Señora de Candelaria	Canary Islands	Tenerife	Public	PICU and NICU	16	2	Part time	No	DR
H. Clínico San Carlos	Madrid	Madrid	Public	PICU and NICU	30	2	Part time	No	Specialist ICU
H. La Paz	Madrid	Madrid	Public	PICU and NICU	50	4	Full time	No	DR
H. General Gregorio Marañón	Madrid	Madrid	Public	PICU and NICU	35	6	Part time	Yes	DR
H. Universitario 12 de Octubre	Madrid	Madrid	Public	PICU and NICU	35	4	Full time	No	DR

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Hospital center	Region (Autonomous Community)	City	Type of hospital center	Type of ICU	No. of beds	No. of physiotherapists in ICU	Physiotherapist dedication in ICU	Weekend availability of physiotherapy	Patient referral to physiotherapy
H. Universitario Ramón y Cajal	Madrid	Madrid	Public	Mixed	8	2	Full time	No	Specialist ICU
H. General Universitario Santa Lucía	Murcia	Cartagena	Public	NICU	6	1	Part time	No	Dependent on demand ^a
H. Universitario de Cruces	Basque Country	Vizcaya	Public	PICU and NICU	24	9	Full time	No	DR

H: hospital; DR: Department of Rehabilitation; NICU: Neonatal Intensive Care Unit; PICU: Pediatric Intensive Care Unit.

^a If consultation is due to a disorder of respiratory origin, referral is dependent on the specialist in the ICU or the pneumologist, while in the case of disorders of locomotor origin, referral is made by DR.

Table 2. PICUs and NICUs offering university clinical training in physiotherapy.

Hospital center	University	Academic title
H. Materno Infantil Málaga	Universidad de Ciencias de la Salud de Málaga	Degree in Physiotherapy
H. Regional de Málaga	Universidad de Ciencias de la Salud de Málaga	Degree in Physiotherapy
H. Universitario Marqués de Valdecilla	Universidad Gimbernat de Cantabria (Campus Torrelavega)	Title not specified
H. de la Santa Creu y Sant Pau	Universidad Autónoma de Barcelona	Title not specified
H. Sant Joan de Déu	Universidad Autónoma de Barcelona (Escuela Universitaria de la Gimbernat)	Degree in Physiotherapy
H. Universitari Vall d'Hebron	Universidad Autónoma de Barcelona (Escuela Universitaria de la Gimbernat)	Degree in Physiotherapy
Empty Cell	Universidad Autónoma de Barcelona (Escuela Universitaria de la Gimbernat) and Escuela Universitaria de Fisioterapia de la ONCE de Madrid	Master not specified
H. Universitari Parc Taulí de Sabadell	Universidad Autónoma de Barcelona (Escuela Universitaria de la Gimbernat) and Fundación Universitaria del Bages	Master in Thoracic Physiotherapy
H. Materno infantil Badajoz	Universidad de Extremadura	Degree in Physiotherapy
H. Universitario Nuestra Señora Candelaria	Universidad de La Laguna	Title not specified
H. General Universitario Gregorio Marañón	Universidad Complutense de Madrid and Universidad Pontificia de Salamanca	Title not specified
H. Clínico San Carlos	Universidad Complutense de Madrid	Degree in Physiotherapy
H. La Paz	Centro Universitario La Salle, Escuela Universitaria de Fisioterapia de la ONCE de Madrid, Universidad Nebrija	Degree in Physiotherapy
H. Universitario 12 de Octubre	Universidad Complutense and Universidad Pontificia de Comillas	Degree in Physiotherapy
H. Universitario Ramón y Cajal	Universidad de Alcalá	Degree in Physiotherapy
H. General Universitario Santa Lucía	Universidad Católica San Antonio de Murcia	Title not specified

Table 2. PICUs and NICUs offering university clinical training in physiotherapy.

Hospital center	University	Academic title
H. Universitario de Cruces	Escuela Universitaria de Fisioterapia de la ONCE de Madrid	Master in Cardiorespiratory Physiotherapy

H: hospital.