

# Prevalence of pressure injuries and other dependence-related skin lesions among paediatric patients in hospitals in Spain

A recent prevalence study is the first to examine epidemiological data on the different skin injuries that affect neonates and children admitted to paediatric hospitals in Spain.

## ABSTRACT

### Introduction

Children admitted to hospitals may develop different types of skin injuries (dependence-related skin lesions) caused by pressure, or moisture and/or friction. Most epidemiological studies examine only pressure injury (PI; previously known as pressure ulcers). There is a wide range in the reported values (0.47% – 43%) for the prevalence of PI in paediatric hospital units.

### Aim

To establish the prevalence of PI, moisture-associated skin damage (MASD), and skin tears in paediatric hospital units in Spain.

### Methods

A cross-sectional study (epidemiological survey) was conducted by the Spanish Advisory Group on Pressure Ulcers and Chronic Wounds (GNEAUPP) in 2017. All public and private Spanish hospitals were invited to participate. The data were collected using a secure online form; hospital and unit characteristics, numbers of children admitted, and numbers of PIs, MASDs, combined lesions, and skin tears were recorded. Values for prevalence and the associated 95% confidence intervals (CIs) were calculated.

### Results

Seventy-three paediatric units from 23 hospitals completed the survey (total 1,027 patients). The PI prevalence was 3.31% (95% CI 2.38% – 4.59%). By unit type, the PI prevalence was 1.79% (0.69% – 3.69%) for general paediatrics wards and 9.39% (4.50% – 15.11%) for paediatric intensive care

units. All PIs were acquired after admission. Most of the PIs (86.1%) were category 1 or 2, and were located on the head (occipital), nose, or other areas of the face. The prevalence of MASD was 1.56% (0.96% – 2.52%); that of combined lesions was 0.49% (0.21% – 1.13%). There were no statistically significant differences between the general wards and intensive care units. The intensive care unit skin tear prevalence was 0.10% (0.02% – 0.55%).

### Conclusions

The prevalence of PI in paediatric hospital units in Spain was low compared with published values for other countries. All the PIs were hospital-acquired (i.e., they developed after admission). PI prevention likely needs improvement in these units. The MASD prevalence was very low; most of the lesions were due to incontinence-associated dermatitis. This national survey is the most comprehensive to date on skin injuries in hospitalised children in Spain.

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### INTRODUCTION

People admitted to hospitals are often in a vulnerable or dependent condition. The patient's skin is exposed to different and potentially damaging agents and forces such as pressure, moisture, and



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friction. In this environment, dependence-related skin lesions (DRSLs) frequently develop in adults, neonates, and children.<sup>1</sup>

Proposed hypotheses have emerged regarding the aetio-pathogenesis of pressure ulcers that place ulcers and injuries within DRSL framework. Within the DRSL-defined framework proposed by García-Fernández et al. in 2014,<sup>1</sup> the term “injury” has steadily been used more often compared with “ulcer” because damaged skin remains intact in some cases of pressure injury (PI); this outcome is largely incompatible with the concept of ulcer pathogenesis. Use of the term “pressure injury” has become current in South-east Asia, Australia, and New Zealand. In 2016, the term PI was adopted by the National Pressure Ulcer Advisory Panel in the United States and the Spanish Advisory Group on Pressure Ulcers and Chronic Wounds (Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas; GNEAUPP) in Spain. Using the DRSL model, clinical nurses in all health care settings identify and classify different skin injuries according aetiology (i.e., PIs (formerly known as pressure ulcers), moisture lesions, friction lesions, and combined lesions).<sup>2</sup> Correct classification of injuries is important for epidemiological investigation and for the implementation of appropriate preventive and treatment measures.

Children admitted to hospitals develop PIs,<sup>3,4</sup> but until recent years this issue was not considered an area for research.<sup>5</sup> Most of the few studies of the epidemiology of PIs in paediatric populations have focused this problem in paediatric intensive care units (PICUs).<sup>3</sup>

Since 2001, the GNEAUPP has conducted a national epidemiological study every 4 years to determine the prevalence of PIs in hospitals, nursing homes, and primary care facilities in Spain.<sup>6-9</sup>

Since 2002, recognition of the importance of PIs in paediatric populations has been increasing worldwide. The 2007 National Pressure Ulcer Advisory Panel (NPUAP) article, “Pressure ulcers in neonates and children: an NPUAP white paper”<sup>10</sup> and other articles<sup>10-13</sup> emphasise the important role of research in the reduction and prevention of PIs. However, few results are available on the prevalence and incidence of this type of skin lesion in children. The few existing studies are not systematised and present disparate methodological approaches and results.

Studies of PI prevalence in paediatric hospital settings have found values ranging between 0.47% and 13.1% in paediatric hospital wards.<sup>3,14,15</sup> A 2005 national GNEAUPP study found a prevalence of 17.77% for PICUs in Spain.<sup>7</sup> Prevalence increased to 33.3% in 2009<sup>8</sup> and 3.33% in

2013.<sup>9</sup> VanGilder et al. found a prevalence of 9.3% in US PICUs in 2007, 7.4% in 2008, and 7.2% in 2009.<sup>16</sup> In 2013, Still et al. found that the prevalence of pressure ulcers ranged between 8.8% and 23% in US PICUs.<sup>17</sup> Huffines and Logsdon used the Neonatal Skin Risk Assessment Scale to assess skin condition and found a 1997 prevalence of 19% in skin breakdown in high-risk neonates in neonatal intensive care units (NICUs) in the United States.<sup>18</sup> Razmus et al.<sup>19</sup> found 2008 values for prevalence between 0.47% and 13% and August et al.<sup>20</sup> found a 2014 value of 31.2% in US and Australian neonatal ICUs, respectively. The current prevalence of PI in hospitalised children in Spain is mostly unknown. Therefore, this population was targeted in the survey for the 5th national study of prevalence of PI and others dependence-related skin lesions performed in 2017. The aim of this study was to establish the prevalence of PI and DRSLs in paediatric hospital units in Spain.

## METHODS

### Study design

A cross-sectional design was used for the study. All publicly and privately owned and managed hospitals in Spain were invited to complete the epidemiological survey used to collect data for the study. A letter of invitation soliciting participants was widely published in the GNEAUPP social media, forums for wound-related discussions, and sent by email to the nurse managers of most Spanish hospitals. The data collection period was open for 2 months (November and December 2017). Each participating hospital chose one day during this period to collect data.

### Population and sample

The study population included all children from 1 day of age to 14 years of age admitted to the hospital paediatric units, both in inpatient wards (general paediatric units) and intensive care units (ICUs) (in Spain, people over 14 years of age are admitted to adult units). Convenience sampling was used; data were collected from hospitals with children's units that chose to participate in the survey.

The Research Ethics Committee of Jaen (Jaen, Spain) approved the study protocol. The data were recorded at the unit level; no personal patient data were registered so only anonymised data were used.

### Data collection

The data were collected using a secure online questionnaire. Each hospital had the opportunity to request a specific link to access the survey. The questionnaire asked for information about hospital and unit characteristics; risk assessment scales used; number of patients admitted to the unit; number of patients with any DRSLs (PI,

moisture-associated skin damage (MASD), friction injuries, combined injuries, and skin tears); use of preventive mattresses; sex and age of the patients; and ulcer or other lesion characteristics. Whether the lesion developed before or after (i.e., hospital-acquired injury) admission was recorded for each injury.

To help clinicians correctly identify and categorise lesions, the research team included detailed written information in the survey on DRSL classification by aetiology, including images of the different injury types. PI, MASD, friction lesions, combined lesions, and skin tears were classified according to the GNEAUPP system.<sup>2</sup> Briefly, this system includes these categories: for PIs, category 1 (Non-blanchable erythema), category 2 (Partial-thickness ulcer), category 3 (Full-thickness skin loss); category 4 (Full-thickness tissue loss); and Deep tissue injury. For MASDs, category 1A (Mild-moderate erythema without loss of skin integrity), category 1B (Intense erythema without loss of skin integrity), category 2A (erythema with loss of skin integrity, erosion < 50% of the area), category 2B (erythema with loss of skin integrity, erosion > 50% of the area). For friction lesions, category 1 (erythema without blister), category 2 (erythema with blister), category 3 (partial-thickness ulcer).

### Data analysis

The data were tabulated into a spreadsheet and checked for inconsistencies. Incomplete or inaccurate records were detected and corrected or removed. Each prevalence value (expressed as a percentage) was estimated by dividing the number of patients with each type of lesion by the total number of patients admitted to a ward. The 95% confidence intervals for mean prevalence values were estimated using the Wilson method.<sup>21</sup> Compared with the commonly-used Wald method, the Wilson method gives more robust estimates of confidence intervals when the data consist of small percentage values. Frequency and percentage values were used to summarise categorical variables. Mean and standard deviation (SD) of the mean values were used to summarise continuous variables.

### RESULTS

A total of 73 paediatric units from 23 hospitals located in 17 provinces of Spain completed the survey; data from 1,027 patients were recorded.

Different hospital staff members provided the data for the survey: clinical nurses (8.7%), members of the hospital's Committee of Pressure Ulcers (39.1%), ward managers (34.8%), and hospital nurse managers (8.7%). Table 1 presents the results for the hospitals' characteristics. Most of the responding hospitals were publicly owned and man-

**Table 1.**  
Characteristics of hospitals (N=23)  
with paediatrics units.

	Frequency (%)
<b>Hospital type</b>	
Public	18 (78.3)
Public with private management	4 (17.4)
Private	1 (4.3)
<b>Size</b>	
100 to 199 beds	2 (8.7)
200 to 499 beds	12 (52.2)
500 to 749 beds	2 (8.7)
More than 750 beds	7 (30.4)

aged and were part of the health services for the autonomous regions in Spain.

### Characteristics of the paediatrics units

Of the 73 units, 64.4% (47 / 73) were paediatric hospitalisation wards and 35.6% (26 / 73) were ICUs for children or neonates. The use of pressure ulcer risk assessment scales (PURAS) in each unit was recorded. 46.6% (34 / 73) of the units reported systematic use of PURAS to assess patients; 21.9% (16 / 73) used PURAS occasionally, and 30.1% (22 / 73) did not use PURAS. The scales used were the Braden Q Scale in 24.7% (18 / 73) of the units; both the Braden Q and the Neonatal Skin Risk Assessment Scale (NSRAS) in 16.4% (12 / 73); the Braden Scale in 11.0% (8 / 73); the mEntal state, Mobility, Incontinence, Nutrition, Activity (EMINA) Scale, in 8.2% (6 / 73); the Norton Scale in 4.1% (3 / 73); and the NSRAS Scale in 4.1% (3 / 73). Up to 23.3% of the units used a PURAS to assess adults but did not use a specific scale to assess children.

### Prevalence of pressure injury and other dependence-related skin lesions

Twenty-six units (35.6%) had at least one patient with any DRSL on the day chosen for data collection. Among these units, the mean ratio for DRSLs per patient was 1.20. Table 2 presents the results for overall and injury-specific prevalence values for DRSLs. PI was the most frequent type of injury. The mean prevalence of all types of injuries was higher in PICUs than in inpatient wards (Table 3).

In the inpatient wards, the percent of children classified as "at risk" was 7.0% and the frequency of PI among "at risk" children was 9.87%. In PICUs, the percent "at risk" was 32.0% and the frequency of PI in "at risk" children was 17.43%. Most of the units had prevalence values in the range 0% - 4.9%. However, the results indicated that

**Table 2.**

Prevalence of pressure injuries and other dependence-related skin lesions in children admitted to hospitals (N=1,027 children).

Type of lesion	Number of patients	Prevalence	95% CI <sup>a</sup>
Pressure injury	34	3.31%	2.38 – 4.59%
Moisture-associated skin damage	16	1.56%	0.96 – 2.52%
Combined lesions <sup>b</sup>	5	0.49%	0.21 – 1.13%
Skin tears	1	0.10%	0.02 – 0.55%
Any dependence-related skin lesion	47	4.58%	3.46 – 6.03%

<sup>a</sup>95% Confidence Interval

<sup>b</sup>Lesions caused by pressure plus moisture or pressure plus friction.

**Table 3.**

Prevalence of pressure injuries and dependence-related skin lesions by type of unit.

Type of lesion	Inpatient wards (N=47)	Intensive care units (N=26)
	Prevalence Mean (95% CI)	Prevalence Mean (95% CI)
Pressure injury	1.79 (0.69 – 3.69)	9.39 (4.50 – 15.11)
Moisture-associated skin lesion	1.42 (0.80 – 2.53)	1.98 (0.85 – 4.54)
Combined lesions <sup>a</sup>	0.54 (0.05 – 1.38)	0
Skin tears	0	0.43 (0.34 – 1.59)
Any dependence-related skin lesion	3.49 (1.77 – 5.10)	10.23 (4.81 – 18.11)

<sup>a</sup>Lesions caused by pressure plus moisture or pressure plus friction.

there was a bimodal distribution in numbers of PICUs (i.e., one peak in the 0% - 4.9% group and another in the ≥20% group) (Figure 1).

#### Characteristics of the patients with any DRSL

We collected data on 43 paediatric patients with any DRSL. There were 60.5% (26 / 43) male and 37.2% (16 / 43) female patients. The mean age was 17.8 months (SD 39.3; range 1 day to 14 years of age) (Table 4). The

results for numbers of DRSLs developed by the patients are presented in Table 5. Patients most often had only one injury in the inpatient wards, but in PICUs some of the patients developed up to three injuries.

The use of pressure relief mattresses (PRMs) was recorded in the group of paediatric patients that had developed at least one DRSL. In the hospitalisation wards, 75% of patients had no PRMs, 15% had static PRMs (viscoelastic), and 10% had a dynamic PRM (alternating air). In the PICUs, 61.9% had no PRM, 33.3% had a static PRM, and 4.8% had a dynamic PRM.

**Table 4.**

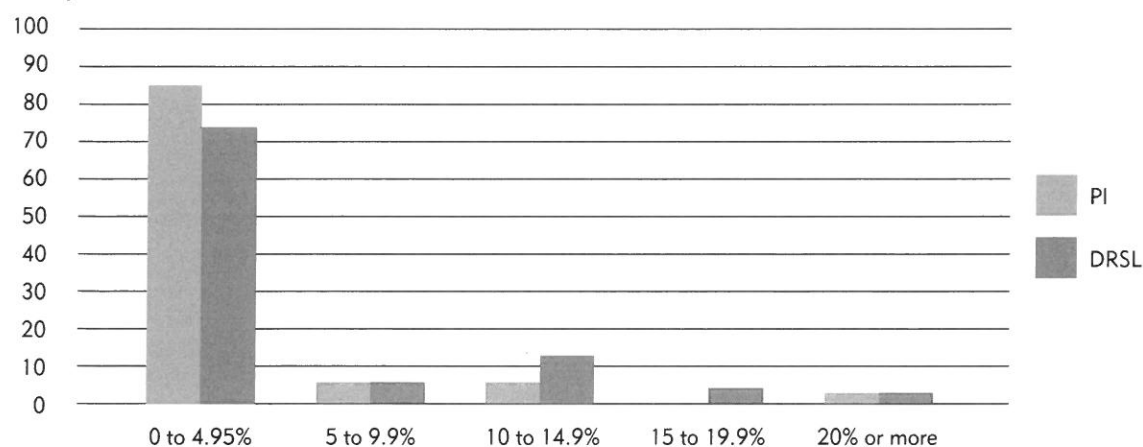
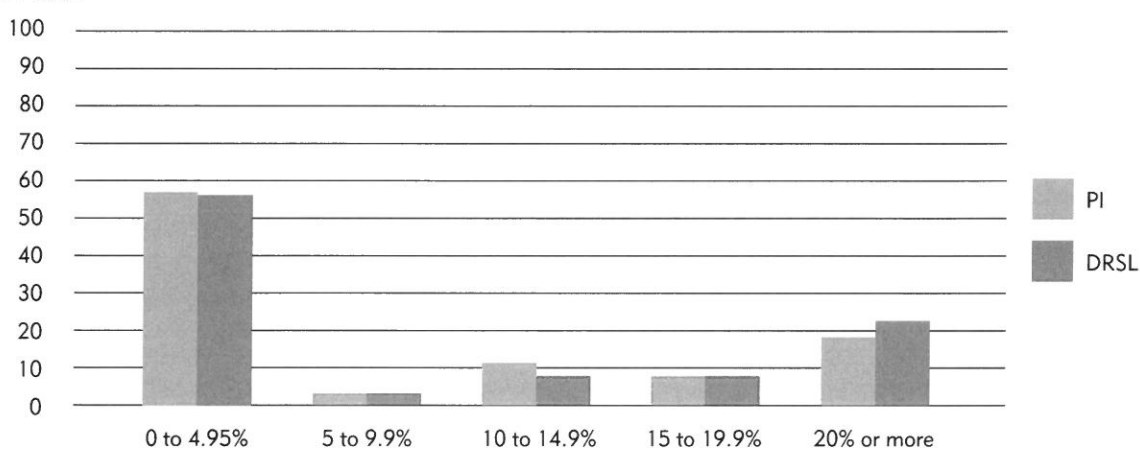
Characteristics of paediatric patients with any dependence-related skin lesion.

	N (%)
Sex	
Male	26 (60.5)
Female	16 (37.2)
Age	
Less than 1 month	17 (39.5)
1 to 6 months	13 (30.2)
6 to 12 months	4 (9.3)
1 to 3 years	4 (9.3)
3 to 6 years	1 (2.3)
6 to 14 years	4 (9.3)

#### Characteristics of the injuries

A total of 51 lesions were described for the 43 patients with any DRSL. There were 70.6% (36 / 51) PI lesions, 27.5% (14 / 51) MASD lesions, and 2.0% (1 / 51) skin tear lesion. All injuries were classified as hospital-acquired because they developed after hospital admission.

The PI lesions were classified in categories according the GNEAUPP system (2). The number of injuries in each category was: category 1, 44.4% (16 / 36) injuries; category 2, 41.7% (15 / 36); category 3, 11.1% (4 / 36); and category 4, 2.8% (1 / 36). For the MASD lesions, 57.1% (4 / 14) were category I A (mild-moderate erythema without loss of skin integrity), 14.3% (1 / 14) was category I B (in-

**a Hospitalisation wards****b PICUs****Figure 1.**

Percentage of paediatric hospital units according to pressure injury (PI) and dependence-related skin lesion (DRSL) prevalence.

**Table 5.**

Types and numbers of dependence-related lesions that developed in paediatric patients.

Number of lesions per patient	Inpatient wards N (%)	PICUs N (%)
<b>Pressure injuries</b>		
0	10 (50)	3 (13)
1	10 (50)	15 (65.2)
2	0 (0)	4 (17.4)
3	0 (0)	1 (4.3)
<b>MASD</b>		
0	10 (50)	19 (82.6)
1	9 (45)	4 (17.4)
2	1 (5)	0 (0)
<b>Skin tears</b>		
0	20 (100)	22 (95.7)
1	0 (0)	1 (4.3)

**Table 6.**  
Anatomical locations of injuries according to lesion type.

	PI N (%)	MASD N (%)	Skin tears N (%)
Head (occipital)	8 (22.9)		
Nose	5 (14.3)		
Face	4 (11.4)		
Heels	3 (8.6)		
Armpits	3 (8.6)		
Mouth, lips	3 (8.6)		
Ears	2 (5.7)		
Coccyx	1 (2.9)		
Feet	1 (2.9)		1 (100)
Toes	1 (2.9)		
Back, dorsal spine	1 (2.9)		
Abdomen	1 (2.9)	1 (7.1)	
Buttock	1 (2.9)	3 (21.4)	
Perineal zone	0	9 (64.3)	

tense erythema without loss of skin integrity), and 62.3% (9 / 14) were MASD that was not classified.

The mean PI area was 0.99 cm<sup>2</sup> (SD 1.68; range 0.04 – 6.0 cm<sup>2</sup>). The mean MASD area was 1.6 cm<sup>2</sup> (SD 1.68; range 0.09 – 4.0 cm<sup>2</sup>). The only skin tear identified had an area of 0.64 cm<sup>2</sup>. The mean length of time since lesion onset for PI was 21.76 (SD 31.4) days (median 7 days; range 1 – 145 days). The mean time to MASD lesion onset was 7.6 (SD 7.47) days (median 5 days; range 1 – 19 days).

The results for anatomical location of the lesions are presented in Table 6. There was a between-lesion difference in location for the PI versus the MASD lesions. A high percentage of the PIs were on the head and face. Medical devices might have caused these PIs, but this factor was not recorded in the survey.

## DISCUSSION

To our knowledge, this study is the first to examine epidemiological data on the different skin injuries that affect neonates and children admitted to hospitals in Spain. Most of the published epidemiological studies only report results on analyses of data on pressure ulcers.<sup>3-12</sup> A few studies examined incontinence-associated dermatitis (IAD).<sup>3</sup> No studies have examined the prevalence of all lesions during the same period. Because children admitted to hospitals are exposed to different agents that can damage the skin, it is important to consider all potential injuries when conducting prevalence studies, not PIs only. A similar study was performed by McLane et al.<sup>3</sup> in nine children's hos-

pitals in the United States. They examined the prevalence of pressure ulcers and other types of skin breakdown in children. The study found a prevalence of 4.0% for pressure ulcers and 14.8% for skin breakdown (e.g., IAD, skin tears, and intravenous extravasation). Neonates and infants are susceptible to skin tears because their skin is very fragile. Therefore, skin tears should be included in prevalence studies, as did McLane et al.

Compared with other studies, our study is more representative of a paediatric population; it included the largest sample of paediatric hospital units in Spain to date. Seventy-three units from 23 hospitals were included in this study, compared with 10 units from eight hospitals in the 4th national prevalence survey performed in 2013,<sup>9</sup> or the six hospitals included in the Garcia-Molina et al. study.<sup>22</sup> Most of the published studies on PI epidemiology in children include only one or a few hospitals.<sup>5,23,24</sup> They have value as descriptive or quality evaluation studies, but sampling from the national population is needed to obtain prevalence values for comparison.<sup>3,25</sup>

## Pressure injuries

This study found an overall PI prevalence of 3.3% in Spanish hospitals that responded to the survey. This prevalence value is equal to that found in 2013 in Spain (3.31%).<sup>9,26</sup> It is at the lower end of the range found in other published studies (0.47% to 43.1%.<sup>3,14,16,23,27</sup> However, this 3.3% PI prevalence in Spain is higher than the prevalence values reported for hospitals in the United States in 2012 (1.4%).<sup>25</sup> Although we did not find a high value for prevalence in



this study, all the PIs were hospital-acquired, compared with the 1.1% hospital-acquired PI prevalence reported by Rauzumun and Bergquist-Beringer.<sup>25</sup> Our survey was not designed to measure PI incidence, but this result for hospital-acquired PI offers some information about the effectiveness of preventive measures in paediatric units.

We found a difference between the PI prevalence in general paediatric wards (1.79%) versus PICUs (9.39%). This result is consistent with studies that found higher values for prevalence in PICUs. Prevalence was 1.90% in Spain<sup>22</sup> to 4.0% in Brasil<sup>24</sup> in paediatrics wards. Values for PI prevalence in ICUs in several countries have been reported (17.8% in Spain,<sup>22</sup> 32.8% in Brasil,<sup>24</sup> 7.2% - 9.3% in the United States).<sup>16</sup> The values are higher in NICUs (28.2% in Spain,<sup>22</sup> 10.2%<sup>28</sup> and 23%<sup>10</sup> in the United States). Therefore, the PI prevalence in PICUs in Spanish hospitals is likely lower than that reported for most countries, but improvement is needed.

The results of our analysis suggested that there was large variability in prevalence values across units from different hospitals. Seventy-four percent (54 out of 73) of the paediatric units reported having no patient with PI at the time of the survey (0% prevalence). By unit type, 83% were general inpatient wards and 57.7% were ICUs. These high numbers of units without patients with PI suggested that the prevention programmes are effective. There were also a number of units (especially PICUs) with prevalence values higher than 20%. Taken together, these results indicate that there is large variability in the effectiveness of prevention practices. The characteristics and functions of these high-prevalence PICUs should be examined to determine the factors that contribute to this variability. Prospective studies of incidence should also be performed to confirm the results of these prevalence studies.

Risk assessment using PURAS and the use of PRMs are important aspects of PI prevention. Almost 50% of the units used a scale to systematically assess the risk of PI, but 30% did not. Some specific paediatric scales were used (Braden Q and NSRAS), but some units used scales developed for adults. The use of PURAS is not usually collected in prevalence studies, but our findings were consistent with the findings of other studies; the most often-cited PURAS are the Braden Q for children<sup>12</sup> and the NSRAS for neonates.<sup>18,29</sup> None of the respondents to our survey reported using the Glamorgan scale<sup>15,30</sup> in any of the paediatric units. This difference is likely because there are Spanish-validated versions of the Braden Q<sup>31</sup> and NSRAS<sup>32</sup> scales, but not the Glamorgan scale.

Use of a high specification support surface for children at

risk for or with a PI is recommended by evidence-based guidelines<sup>33,34</sup> and reduces PI incidence.<sup>26</sup> However, our study found low use of PRMs for at risk children and for children with ulcers. The results indicated that a PRM was not in place in up to 75% of the patients with PI in general paediatric wards and 61.9% of the patients in PICUs. Only a limited number of studies of the use of PRM or other preventive measures in children are available for comparison. Most prevalence studies do not collect data on prevention. Some studies found low percentages of patients with pressure ulcers having a PRM at hospitals (42.9% in neonates in Spain<sup>32</sup> and 27% in the United States).<sup>5</sup>

Our study found proportions of 86.1% for PI categories 1 and 2, 11.1% for category 3, and 2.8% for category 4. Most other studies found that >80% of PIs are category 1 or category 2.<sup>28,35</sup> However, a US study found lower percentages for categories 1 and 2 (65%), but higher percentages for deep tissue injuries (14.3%) and unstageable pressure ulcers (10.1%).<sup>25</sup> Our results are consistent with the results of other studies that have found that in children the head (occipital), nose, and face are the anatomical locations most frequently affected by PI in children.<sup>5,24,25</sup> Only a small number of children developed PIs affecting the heel or other locations in the foot; no children were affected by a coccyx PI. In contrast, these locations are frequently affected by PIs in adults.<sup>6-9</sup> The ulcers found on the nose and other areas of the face were likely associated with the use of medical devices (e.g., non-invasive ventilation),<sup>22,36</sup> but we did not collect data on the medical devices used.

### Moisture-associated skin damage

We found prevalence values of 1.56% for MASD and 0.49% for combined lesions (pressure plus moisture or friction plus moisture). There was a small difference in the prevalence of MASD for inpatient wards (1.42%) versus PICUs (1.98%). All the lesions, except one affecting the abdomen, were classified as IAD because they were located on the buttocks or perineal area. There are no other study results available on the epidemiology of MASD in children admitted to hospitals in Spain to compare with the low prevalence values found in this study. McLane et al.<sup>3</sup> found a prevalence of 14.8% for skin breakdown (including diaper dermatitis) in paediatric units in the United States. The incidence of MASD (especially IAD) should be considered when planning studies of skin integrity in hospitalised children. These lesions are preventable and likely are indicators of quality of care. Use of the term "diaper dermatitis" should be avoided when referring to these lesions because, in some way, it implies that the development of these lesions is a normal consequence of caring for infants or incontinent children; which is not true.



The measured prevalence values for the MASD and combined lesions are likely lower than the true values. This survey was the first time that these lesions were included in the national survey of DRSLs. It is likely that they are not recorded in the electronic health records of many paediatric units and that the numbers were underestimated.

This study has some limitations. First, study participation was voluntary, so a random sample of the population was not used. It is possible that the hospitals more engaged in PI prevention were more willing to participate, which would bias the results towards lower prevalence values. However, the high number of participating paediatric units from hospitals in different regions in Spain may have reduced the effects of this bias.

Second, the data were self-reported by each hospital and were based on the records kept at the institution. This self-reporting could lead to an underestimation of prevalence. The possible effects of bias were likely reduced by the guaranteed anonymity of the survey; no participating hospital was identified. Clinicians and managers likely had confidence in this anonymity because prevalence studies have been conducted in Spain by the GNEAUPP for more than 20 years to obtain reliable prevalence values as standards for comparison.

Third, the use of medical devices (e.g., tubes, ventilation masks) was not recorded, so it was not possible to identify what injuries were related to these devices.

### Implications for clinical practice

Infants and children admitted to hospitals may develop PIs and other injuries caused by exposure to moisture or friction, or both. Injuries that occur when people are physically dependent or vulnerability are known as DRSLs. All these aetiologies should be considered together during design of care plans that aim to maintain the skin integrity of children in paediatric hospital units.

### CONCLUSIONS

The prevalence of PI in paediatric hospital units in Spain was 3.3%. This value is low compared with the results for PI prevalence for other countries. All the PIs developed after admission (i.e., all were hospital-acquired PIs); the study revealed that prevention of PIs within these units needs improvement. We found large between-unit variability in PI prevalence, especially in PICUs. Two groups were identified, one had low values for prevalence of hospital-acquired PIs and the other had high values for prevalence of hospital-acquired PIs (>20%).

The prevalence of MASD in paediatric units was low; most were associated with IAD and there were no significant differences among general wards and PICUs. The MASD prevalence value was probably underestimated because this survey was the first time that moisture lesions were included in the national survey for DRSL.

This national survey is the most comprehensive to date of skin injuries in hospitalised children in Spain.

### Key Messages

- The prevalence of pressure injuries and other dependence-related skin lesions in children admitted to hospitals in Spain was examined using an epidemiological survey.
- The aim of this research was to update the estimated values of the prevalence of pressure injuries and other skin injuries in children in hospitals.
- The overall prevalence of pressure injuries in paediatric hospital units in Spain was 3.3%; the prevalence was higher (9.39%) in paediatric intensive care units.
- The prevalence of moisture-associated skin damage in children was 1.56%. This type of lesion is not frequently recorded in epidemiological studies.



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