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SCIENTIFIC LETTER

Epidemiology and management of pediatric burns across Spanish emergency departments: A multicenter study from the SEUP Traumatic Pathology Working Group☆,☆☆

Epidemiología y manejo de las quemaduras infantiles en los servicios de urgencias españoles: estudio multicéntrico del Grupo de Trabajo de Patología Traumática de la SEUP

Dear Editor:

Burns are one of the leading causes of traumatic injury in childhood, ranking as the fourth leading cause of pediatric trauma worldwide after road traffic accidents, falls, and interpersonal violence.[1] The global incidence of pediatric burns is estimated at around 0.7%–0.9%, with 15%–20% of cases requiring hospital admission; children aged less than 2 years are particularly vulnerable due to their dependence and increased exposure to household hazards.[2,3] In Spain, few multicenter studies have analyzed the epidemiology and management of pediatric burns in emergency departments, which led to the performance of this study.

We conducted a multicenter, cross-sectional, observational, and descriptive study in patients aged less than 15 years who were treated for burns in the emergency departments of the SEUP Trauma Working Group between January 2021 and December 2022. The study was based on the retrospective review of health records. Qualitative data were compared by means of the χ^2 test or the Fisher exact test, and the level of significance was set at 0.05. We performed a post hoc analysis using the Bonferroni correction. The statistical analysis was conducted with the R software.

Six hospitals participated (five secondary care hospitals and one tertiary care hospital), with a total volume of 273 740 pediatric emergency department visits; 585 of the visits were related to burns, corresponding to a relative frequency of 0.21% (95% CI, 0.20—0.23) or 2.1 cases per 1000 visits. There was a predominance of male patients (57.1%) and children aged less than 5 years (69.1%), which was consistent with other series.[2–4] Twenty-two percent of the cases occurred in June or July, with a slightly higher frequency during the summer months. Similarly, the frequency increased on weekends and in the afternoon, and 7.5% of cases occurred on official holidays (excluding Saturdays and Sundays).

Most burns were accidental (99.3%), and the most frequent setting was the home (77.1%), especially the kitchen due to contact with hot liquids. Although the proportion of burns occurring at home and caused by scalding decreased among children aged more than 5 years, the home and scalding continued to be the most common setting and mechanism, albeit with a more heterogeneous distribution. After correcting for multiple comparisons, differences between age groups persisted, mainly in terms of sex, setting, and causative agent, but not in terms of the affected body surface area or topical treatment. Superficial second-degree burns were the most common type (63.2%).

Nearly 40% of burns were treated at home in some way before visiting the emergency department. This included practices that are not recommended in 12.2% of cases, such as application of toothpaste, ice or oils, which reflects deficient knowledge of first aid.[5]

When it came to the initial assessment, 61.7% of the reports did not document the affected body surface area, and 85.5% did not document a pain assessment. In the emergency department, 191 patients received systemic treatment, with considerable variation in the use of analgesic agents, fluids, and topical treatments, including up to 10 types of analgesics/sedatives, five types of intravenous fluids, and 22 types of dressings. Regarding blister management, debridement was performed in 82% of cases (n = 139) (Table 1).

Most cases were managed on an outpatient basis; 12.3% required admission or transfer, and 82.4% follow-up at the primary care level. In the subset of patients with documented pain assessments (n = 85), 23.5% reported no pain, 31.8% mild pain, 30.6% moderate pain, and 14.1% severe

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Table 1 Clinical and epidemiological characteristics of pediatric burn patients by age group.

	Total, n = 585	Infant (0—2 y) n = 214	Preschool-aged (3—5 y) n = 190	School-aged (6—9 y) n = 96	Adolescent (10—14 y) n = 85	*P*
Sex: male	57.1%	68.9%	55.3%	47.9%	49.4%	.006
Setting: home	77.1% (n = 336[¶])	88.8% (n = 134[¶])	84.5% (n = 103[¶])	57.1% (n = 49[¶])	50.0% (n = 50[¶])	< .001
Mechanism: accidental	99.3%	100.0%	98.4%	100.0%	98.8%	.065
Causative agent: hot liquid	42.6% (n = 572[¶])	51.2% (n = 211[¶])	42.9% (n = 182[¶])	30.9% (n = 94[¶])	34.1% (n = 85[¶])	< .001
*Burned BSA ≤ 5%	80.8% (n = 224[¶])	84.0% (n = 105[¶])	78.7% (n = 61[¶])	78.6% (n = 28[¶])	73.3% (n = 30[¶])	.009
No documented pain assessment	85.5%	86.4%	82.6%	84.4%	90.6%	.35
Received analgesia**	31.9%	37.9%	33.2%	20.8%	30.6%	.682
Received IV fluids	5.6%	9.8%	4.2%	3.1%	4.7%	.505
Blister debridement	82% (n = 139[¶])	87.7% (n = 57[¶])	76.1% (n = 46[¶])	73.7% (n = 19[¶])	88.2% (n = 17[¶])	.434
Topical treatment	84.7%	86.8% (n = 205[¶])	86.6% (n = 187[¶])	85.9% (n = 92[¶])	74.1% (n = 85[¶])	.034
High complexity***	12.3%	14.5%	12.1%	7.3%	10.6%	.359

* BSA: body surface area.
** Intravenous, oral, inhaled, subcutaneous, intranasal.
*** Defined as requiring admission or referral to a burn unit or ICU.
[¶] Percentage calculated over the total cases with data available for that variable.

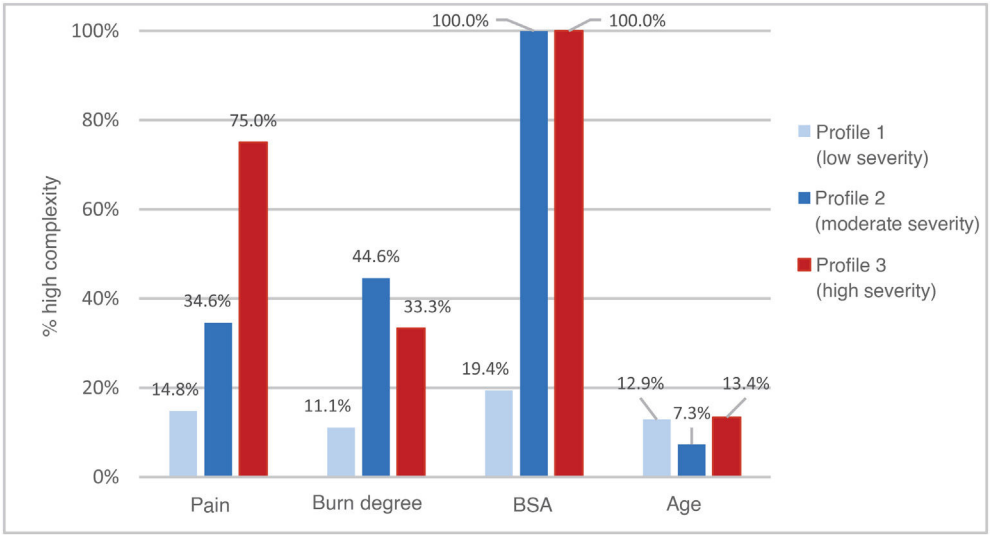

Figure 1 Percentage of patients assigned to high-complexity care based on clinical severity profiles.
Three clinical severity profiles: Pain (mild, moderate, and severe); degree of burn (2nd-superficial, 2nd-deep, and 3rd); burned BSA (<10%, 10%–20% and >20%); age group (adolescent, school-aged and <5 years).
The *y*-axis shows the percentage of patients who required hospitalization or transfer to a referral hospital.
Values expressed as percentages; some categories had a small sample size.

pain. Moderate or severe pain was associated with a higher probability of hospital admission or referral ($P = .005$). Likewise, the degree of the burn was associated with the level of complexity of the discharge destination ($P < .001$), with a higher frequency of admission to specialized burn units in patients with deep burns, consistent with other series.[6] For descriptive purposes, we defined three clinical severity profiles based on variables related to burn depth and extent, pain intensity, and age, with the aim of illustrating their association to the level of complexity of the discharge destination (Fig. 1).

Our results highlight the need to reinforce prevention efforts, especially in children aged less than 5 years, and to improve first-aid training. We identified deficiencies in pain assessment and management, as well as significant heterogeneity in topical and systemic treatment, which may be

related to the lack of standardized protocols. This finding reinforces the need to promote consensus-based recommendations to promote standardization. The high percentage of missing data due to lack of documentation of certain clinical variables—particularly pain and burned body surface area—precluded robust multivariate analyses; therefore, the findings should be interpreted as exploratory associations.

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Declaration of competing interest

The authors have no conflicts of interest to declare.

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