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Accidental injury in children: hospital trauma records in a Spanish population

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1. Introduction

A significant reduction in disease as a cause of infant mortality has given prominence to accidental injury as a cause of death and disability. Spain occupies eighth place in the global mortality ranking for unintentional injury in the infant population (Roberts *et al.* 1998, Grossman 2000, UNICEF 2001).

Paediatricians can play a crucial role in injury prevention by recording the information of the trauma records of the injured patient (Katcher *et al.* 1999).

Defining the epidemiological situation of paediatric injury is the first step towards detecting problems and orientating prevention campaigns. An epidemiological registry for paediatric injury in the authors' hospital has been designed.

2. Methods

Children admitted to the hospital with unintentional injury were prospectively evaluated over a 1 year period. (September 2001–August 2002). Patient details were recorded in two centres of the same population area: Hospital Sant Joan de Déu (University Hospital in the city of Barcelona; 100 000 inhabitants under 18 years of age; 16 753 hospital admissions and 96 000 admissions to the Paediatric Emergency Department per year) and Hospital Comarcal del Alt Penedés (in the village of Vilafranca del Penedés-Barcelona; reference paediatric population 40 000 children under 15 years of age; patients are referred to Hospital Sant Joan de Déu for admission).

2.1. Inclusion criteria

- Aged under 18 years.
- Victim of unintentional injury (all aggressions were excluded).
- Hospital admission.

A self-designed questionnaire was applied to each selected patient, including 50 items about patient information, circumstances of accident, first medical care, hospital care and diagnosis and severity of injury.

A 24-hour recall period was indicated in all cases in order to minimize the extent of underreporting.

A selection of severity criteria was defined: admission to intensive care unit; mortality; prolonged hospitalization time; paediatric trauma score under 8 points; Glasgow coma scale under 8.

3. Results

A total of 1127 cases were recorded, of which the majority were males (65%). Mean age was 9 (SD 5.43) years for males and 6.8 (SD 5.03) years for females. There was a tendency among females for injury rate to decrease with age.

Injury distribution was quite uniform throughout the 1-year period, decreasing during winter. Injury rate increased during weekends and daytime accidents were more frequent between 14.00 hours and 19.00 hours (40% of cases). Main injury scenes were at home and on public highways, varying with age group. The main types of accident were falls and collisions (68.9% of cases) followed by traffic injury (more

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than 20% of all cases) and accidental poisoning. Only poisoning and choking were more frequently detected among females. Falls were frequently detected at ground level (28.2%) and 3.8% of children fell from a height of 1 m or more. Comparing injury scene and type of accident; burns, poisoning and choking took place more frequently at home, meanwhile, accidental falls took place at school and on public roads where traffic injury and injury bites happen.

The main risk situations detected were dangerous situations such as alcohol or drug intake by young drivers (15% of motorbike injuries) or malfunction of heating systems. Protection devices (bike helmets, car devices, safeguarding toxins) had only been employed in one-third of cases when possible. Inappropriate activities for the child's stage of development have also been detected (e.g. eating dried fruits, using a changing table with older infants and driving a scooter under 8 years). Adult surveillance was not frequent in children younger than 10 years. On the other hand, 40% of children who were under supervision were performing an unsafe activity, such as being in high-risk zones, for example, the cooking area in a kitchen.

First aid assistance was, in most cases, provided by a hospital emergency centre. Family or witnesses report having performed first aid procedures or similar (open airway) on only a few occasions (9.7%). Injury accounts for 7% of all annual paediatric hospitalizations. Minor surgical procedures were applied in 30% of cases, main surgery was necessary in 18.2% of all cases and 20% had a prolonged stay (longer than 72 hours) and were mostly victims of burns, motorbike injury, drowning and animal bites.

The most frequent type of injury was a single lesion (70% cases) located on the head and/or face or upper extremities (36.5%). A total of 18% of cases recorded by the hospital were multiple trauma; 13% were considered severe with 12% of patients fulfilling the severity criteria. Among these patients, 90% had been performing an unsafe activity at the time of the injury. There was a significant association between severity of injury and risk (table 1). More severe accidents were detected in patients younger than 1 year and older than 14 years (adolescents), mainly victims of drowning, animal bites and traffic injury. Figure 1 shows the correlation between the type of accident and the different age groups.

During hospitalization time, medical course complications were recorded in 5% of patients (mostly infections) and irreversible damage in 2.2% (kidney loss, amputation, oesophageal stricture). Mortality rate was 0.7%. There were eight patients who died (six with severe head injury, one carbon monoxide inhalation, one foreign body aspiration). This means a total of 445 life-years lost. The main diagnoses are shown in table 2.

Table 1. Statistical correlation between risk situation and severity of accident.

Variable			
Logistic regression			
Univariate analysis	Odds ratio		<i>p</i>
Dangerous activity	No danger	1	0.016
	Danger	1.5	
Protection device	No protection	1.22	0.515
	Protection	1	
Inappropriate for child's age	Appropriate	1	0.067
	Inappropriate	1.66	
Adult supervision	Supervision	1	0.272
	No supervision	0.762	

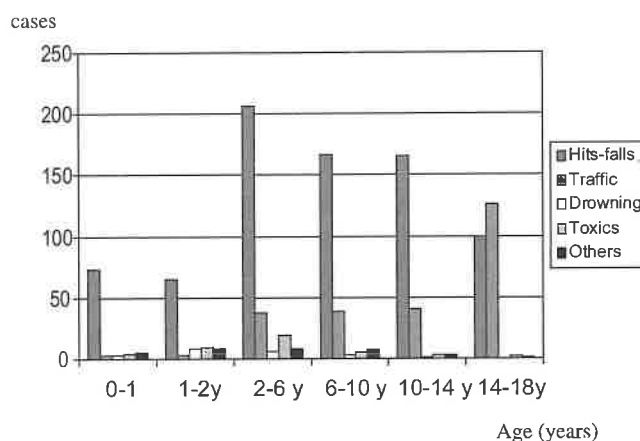


Figure 1. The correlation between the type of accident and the different age groups.

Table 2. Main diagnosis in the study group of patients.

Diagnosis	Cases	%
Head injury	577	51.1
Bone fracture of extremities	272	24
Multiple trauma	204	18
Abdominal contusion	66	5.8
Injury of extremities	38	3.3
Bronchoaspiration	16	1.4
Swallowed foreign body	15	1.3
Accidental drug poisoning	12	1
Carbon monoxide inhalation	10	<1
Burns	10	<1
Genital contusion/laceration	9	<1
Caustic ingestion	6	<1
Near-drowning	4	<1
Suffocation	2	<1

4. Discussion

Males predominate in every age group; this could be explained by their tendency to take risks or by a more

permissive attitude of parents and guardians. School seems to be quite a safe place compared with the home. The most frequent kind of accidents were falls, collisions and traffic injury as previously reported, but among the patients in this study the number of cases who suffered from monoxide dioxide intoxication, choking on dried fruits or burns by hot liquids was noteworthy (Grossman 2000, Pickett *et al.* 2003).

Regarding falls, it was found that many of them were related to potentially dangerous objects of everyday use (baby-walkers, changing tables, high chairs, etc.).

It is presumed that if the risk factors could be controlled, injury could be avoided or at least attenuated and this statement is supported by the fact that those patients who showed more severe injury were in risk situations more frequently than patients with a less severe injury. A high percentage of cases showed risk factors (80%). The employment of protective measures correlates with legislation at the moment so a motorbike helmet is more commonly used than a bicycle helmet because, at the time of writing, Spanish law does not require the latter (Rodgers 2002).

The analysis of first-aid care showed that few parents knew how to properly perform mouth-to-mouth resuscitation or airway procedures, which could affect the patient's recovery.

In summary, this paper has tried to define the profile of paediatric injury in the Barcelona area and it is believed that this can be the basis for developing a suitable prevention programme.

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