

# Unintentional Accidents among Children: Associated Factors with moderate /severe forms

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## Abstract

Unintentional accidents are very common in children and are the main reason for consultation and hospitalization in paediatric surgery. Aim: To determine the factors associated with unintentional accidents resulting in hospitalization. Material and methods: This is a cross sectional study carried out in the Paediatric Surgical Emergency Department of the Children's Hospital of Rabat over a period of 4 years. We processed 1205 children's files; the data was collected and analysed by Jamovi. Results: for the 545 files selected, the median was 8 years [4; 12] and boys were predominant (70.4%). Sociodemographic factors were represented by low health insurance. In 95.1% of cases, the family lived in a house (50.1%) or an apartment (45%) compared to 4.9% who had insanitary house. For parents' level of education, fathers had a high school education (43.6%) or never attended school (16.9%), compared to 32.9% of mothers who did not attend school. No adult was present during the accident (54.6%). The accident occurred on weekdays (73.2%), especially on winter and summer (41.6% and 33.8%). The main lesions were fractures (53%). The lesions involved the limbs (52.5%) and the head (30.2%) and were multiple in 6.5% of cases. The outcome was simple in 96.1%.

Keywords: Child. Unintentional Accident. Associated factors. Morocco.

## Introduction:

Unintentional injuries consist on the subset of injuries for which there is no evidence of predetermined intent. They include everyday life injuries (EDL) as well as road traffic accidents (RTA), and work accident. Injuries are defined as damage to a person caused by an acute transfer of mechanical, thermal, electrical, chemical, or radiation energy or by the sudden absence of heat or oxygen [1]. Throughout the world unintentional injury in children is a very important public health issue [2].

Unintentional accidents are one of the most frequent reasons for consultation among children. They can affect all children backgrounds and all age groups. [3].

Unintentional injuries in childhood are serious health problems in modern society. They not only result in great economic loss and take many medical resources, but also cause immeasurable psychological hurt to children themselves and their families. [4].

The aim of this study is to underline the epidemiological profile of children with unintentional injuries, resulting in hospitalization,

and to describe the factors associated with a moderate/ severe form.

A better understanding of the number, circumstances of unintentional accidents in children, as well as the nature and severity of the injuries is a fundamental step in helping to understand these accidents, the mortality and morbidity of which are very important,

## Material and methods

The Children's Hospital of Rabat is a tertiary care hospital that is one of the ten health facilities of the Ibn Sina Hospital Center. It is organized in several sectors: emergency department, intensive care unit, hospitalization services and technical platform (Radiology, laboratory of biology and anatomopathology).

A cross-sectional, descriptive study was conducted in 4 years (2016-2019) in the pediatric surgical emergencies (PSE) department, children's hospital of Rabat, Morocco. We included patients less than 15 years, who presented unintentional accidents. Trauma related to poisoning and drowning, as well as those related to an intentional injury were excluded. Verbal and informed consent was obtained from at least one of the parents.

The data were collected using a questionnaire fulfilled by the resident of pediatric surgery, and

completed if necessary from the patient's file. The demographic, socioeconomic and injury characteristics were listed. The patients were divided into groups: Victims of traffic accidents, and those who have everyday life accidents and also into age groups. We also categorized the patients according to their lesion, thus the head trauma was defined as damage to the scalp, skull, or brain. A Polytrauma is a patient with one or more traumatic injuries, at least one of which is life threatening. Moreover, the lesions were classified into two groups: minor severity and moderate to high severity.

Data were analyzed using JAMOVI Software 1.6.23. [5]. Chi square test was used to compare variable as well as a binomial logistic regression.

## Results

During 4 years, 1245 patients consulted for unintentional accidents of which 545 files were selected. Almost 64% of patients are above 6 years old (Figure 1), and the male predominance is around 70.4%. The median age was 8 years [4; 12]. The sociodemographic variables were represented by low health insurance (AMO: 30.4% and RAMED: 46.5%). In 95.1% of cases, the family lived in a house (50.1%) compared to 4.9% who had unsanitary housing. The location of accident is represented in figure 2. Around 80% of accident is related to everyday life injuries, especially falls. The figure 3 underlines the fall's circumstances, which occurred mostly from ground level. For parents' level of education, fathers had a high school education (43.6%) or never attended school (16.9%), compared to 32.9% of mothers who did not attend school (Figure 4). No adult was present during the accident in 54.6% of the children. Regarding the time of occurrence of the accident, it was mostly on weekdays (73.2%), especially on winter and summer (41.6% and 33.8%). Most accidents happened between 8am 4pm (51%) versus 32% between 5pm and 8pm (Figure 5). In terms of injuries, the lesions involved the limbs (52.5%) followed by the head (30.2%) and were multiple in 15% of cases (Table 2). Moreover, the fractures were encountered in 53% of cases. Most patients had no complication (96.1%).

On the other hand, in a univariate logistic regression model, there were some factors associated to moderate /severe forms of the lesions. Indeed, the age (OR=0,949, IC à 95%: 0,903-0,997, p=0.036), the absence of an adult during the accident (OR=0.566, IC à 95%: 0.352-0.911, p=0.019), and the part of body injured, especially head trauma, multiple lesions and trunk lesions are statistically significant. Besides, the gender, the family size, the number of siblings and the type of trauma are not associated to severity. In multivariate analysis, adjusting on the factors above

mentioned, only the parts of body injured were associated to a moderate and severe form (Table 3)

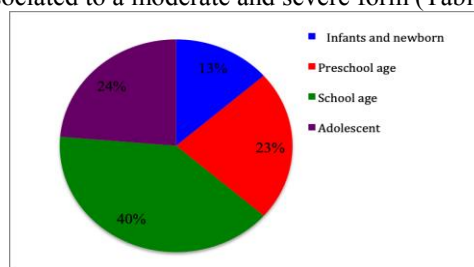


Figure 1: Pie graph showing age group children victims of unintentional accident, PSE department, children's hospital of Rabat.

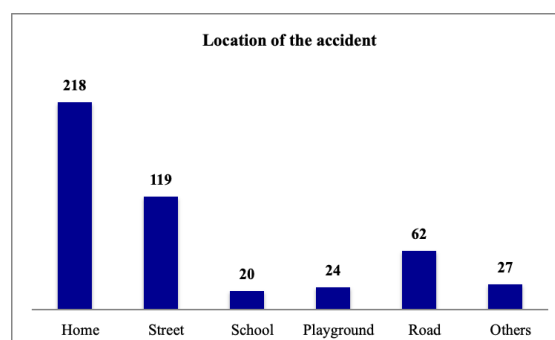


Figure 2: Bar graph showing the location of the unintentional accident, PSE department, children's hospital of Rabat.

Table 1: General characteristics of children victims of unintentional accidents, PSE department, children's hospital of Rabat

Characteristics	n (545)	%
<b>Schooling</b>		
No	139	25.9
Yes	398	74.1
<b>School level</b>		
Unschooling	138	25.8
Kindergarten	39	7.3
Primary	212	39.7
Middle school	117	21.9
High school	28	5.2
<b>Area</b>		
Urban	431	85.5
Rural	73	14.5
<b>Dwelling</b>		
House	247	50.1
Apartment	222	45.0
Shantytown	24	4.9

Table 2: Injuries characteristics of children victims of unintentional accidents, PSE department, children’s hospital of Rabat

Characteristics	n	%
(545)		
<b>General Circumstances</b>		
Fall	364	68.0
Burns	22	4.1
Collision	105	19.6
Other	44	8.2
<b>Injured body part (IBP)</b>		
Head	157	30.2
Thoraco-abdominal	10	1.9
Multiple injuries	80	15
Limbs	273	52.5

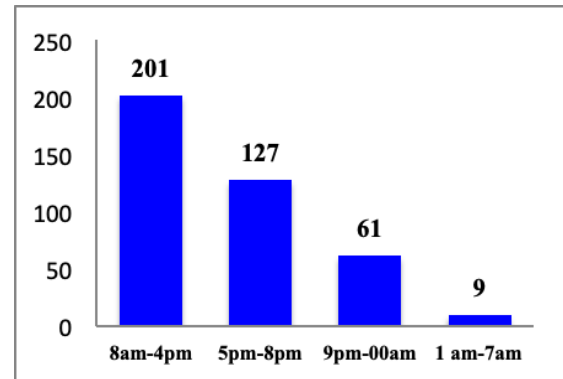


Figure 5: Bar graph showing the time of the unintentional accident by interval, unintentional accident, PSE department, children’s hospital of Rabat.

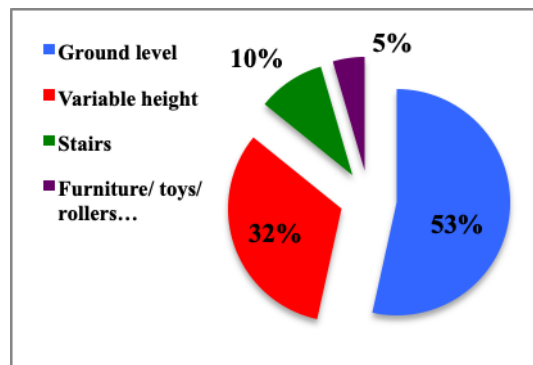


Figure 3: Pie graph showing the fall’s circumstances in children victims of unintentional accident, PSE department, children’s hospital of Rabat.

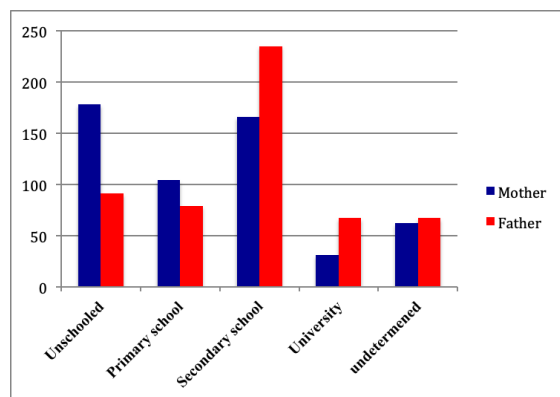


Figure 4: Bar graph showing the parent’s educational level, PSE department, children’s hospital of Rabat.

Table 3: Factors associated to moderate /severe forms of unintentional injuries among children, PSE department, children’s hospital of Rabat.

Independant variable	Univariate analysis			Multivariate analysis		
	OR	IC 95%	P	OR	IC 95%	P
Age	0.949	0.903-0.997	0.036	0.955	0.8612-1.059	0.386
Gender : Boy /Girl	0.707	0.448- 1.115	0.136	1.014	0.4901-2.099	0.970
Adult present: No/yes	0.566	0.352-0.911	0.019	0.761	0.3790-1.529	0.444
Schooled : No/yes	1.591	0.992-2.552	0.054	0.625	0.2188-1.784	0.380
Parts of body injured						
Head /Limb	4.361	2.6183-7.265	< .001	4.277	1.9027-9.615	<.001
Thorax-adbomen/Limb	5.703	1.4529-22.387	0.013	8.041	1.3568-47.648	0.022
Multiple site/ Limb	2.852	1.4689-5.536	0.002	4.075	1.4483-11.467	0.008
Circumstances : EDL/RTA	0.742	0.437-1.262	0.271	1.487	0.6367-3.475	0.359
Family size	1.015	0.7851-1.312	0.911	-	-	-
Accident time interval						
5 pm-8pm / 8am-4pm	1.473	0.827-2.624	0.188	1.719	0.8514-3.473	0.131
9 pm-00am / 8am-4pm	1.106	0.528-2.315	0.789	0.933	0.3466-2.514	0.891
1 am-7am /8am-4pm	3.110	0.665-14.553	0.150	1.446	0.1028-20.352	0.785

**Discussion:**

This study examined the general characteristic for children over a 4-year period. Several factors could explain the variability of injury rates reported in studies from different countries. The most significant factors are likely differences in data collection methods and in the population samples in terms of sociodemographic (age, sex, education, income), cultural (health care system), and lifestyle (health care-seeking behaviour) characteristics [2]. Compared with adults, children are susceptible to unintentional injuries, and the sorts and causes of unintentional injuries are closely related to children’s ages and growth levels [6].

In our study, the most common mechanism of unintentional injuries was falls (70.5%). Previous studies in the literature have shown frequencies ranging from 1% to 61% [7,8]. These results may be related to children’s poor balance and the onset of independent mobility [9].

Almost one-half of our children’s injuries occurred within the home environment (45.4%). In similar studies, the rate of occurrence at home ranged from 44% to 57%, because children spend most of their time at home [10-14]. Regarding the gender distribution, we found a higher incidence of unintentional injuries among boys, which corroborates several studies of unintentional injuries. This can be justified, among other factors, by their dynamic lifestyle and less controlled behaviour [5,15,16]. Some researchers showed that the occurrence of children’s unintentional injuries has common pathogeny with children abuse and ignorance [17]. Indeed, the stage of development and children age, the

likely nature of injury type and setting are associated with a child’s stage of development. Early childhood is characterised by a rapid increase in physical growth and cognitive functioning during which children become more mobile, independent and keen to explore their immediate environment. For pre-school children, home accidents, such as burns, scalds and poisonings, are more prevalent since the home is where they spend most of their time.

As children become older and greater independence allows them to leave further from home, the risk of outdoor injury increases.

The road environment presents a particular hazard, with children at risk as pedestrians, cyclists and subsequently as young drivers [18]. Our paper noticed a small proportion of injuries related to road traffic accident (RTA). This can be explained by the fact that some accidents due to cycles are considered as related to everyday life injuries, even if it occurs in the road, as well as those happening on the road to school. This paper highlighted the vulnerability of child under 16, and stressed on the need of more attention. When it comes to risk factors, some factors are known to be associated to severe for of injuries, such as the age greater than 5 years old, the falls from heights and sport-related injuries. [19,20]. The presence of an adult especially the mother seems to be protective [20]. In this study, head trauma, thoraco-abdominal and multiple sites are significantly associated to a moderate/severe form of injury.

Social protection is a right of the child, affirmed by Article 26 of the Convention International Rights of the Child, ratified by Morocco on June 21, 1993. This article has:

\*1. "States Parties recognize the right of every child to benefit from social security, including social insurance, and take the necessary measures to ensure the full realization of this right in accordance with their national legislation.

\*2. Benefits should, where appropriate, be granted on the basis of means and the situation of the child and of those responsible for the maintenance of the child, as well than any other consideration relating to a request for benefits presented by or on behalf of the child. "[21].

The parent's educational conditions are one of the factors of health inequalities among children [22]. Maternal education is generally recognized as a strong determinant of child survival. When it is taken into account, the impact of father's education on child survival is considered to be less important, or is used as an indicator of the socioeconomic level of the household [23]. On the other hand, family homes are thought of as a safe place for children, while the majority of the unintentional injuries happen at home or its surrounding. Thus, the need to prevent injuries might not be considered enough [24]. Furthermore, the Moroccan health insurance regime is a limited, unequal and fragile system with a total of just over 8.5 million people covered, which makes patient's care below expectations [21].

## Conclusion

This study provides a general overview of unintentional accidents among children in Morocco, and allows a better understanding of the common mechanisms and patterns of injuries, essential to predict, treat and prevent unintentional injuries. Some factors are associated to a severe form of injuries and should be taken in account to establish a preventive policy. The mother's education, the social environment, the medical insurance should be improved as well as the homes and transportation means. The caregivers and health care providers are also a part of this prevention.

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