

# Accidents in childhood: casuistry of a tertiary service in a medium-sized city in Brazil.

## *Acidentes na infância: casuística de um serviço terciário em uma cidade de médio porte do Brasil.*

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### ABSTRACT

**Objective:** to investigate the main causes and most common risk situations related to childhood accidents, in our local reality. **Methods:** an observational, cross-sectional, retrospective, descriptive, and analytical study from the medical records of patients attended in the pediatric emergency services of the hospital complex of Hospital das Clínicas, Botucatu Medical School - UNESP, in 2016. We included patients from zero to 15 years old who had received medical care related to accidents, determining age, gender, type of accident, period of the day, accident place, and history of previous accidents. **Results:** considering all consultations with appropriate medical records, 936 (27.5%) were related to accidents: 588 (62.8%) in male patients and 348 (37.2%) in female patients. As to age, 490 (52.3%) happened with children from zero to five years, 245 (26.2%) with children from six to ten years, and 201 (21.5%) with children over ten years. Falls and local traumas were the most common types of accidents in all analyzed age groups. Most accidents occurred in the afternoon (46.1%), at home (60.7%), and 26.6% of the patients had a history of previous accidents. **Conclusion:** accidents were responsible for a large portion of urgent care. The high rate of patients with previous accident records indicated the repeated exposure of these children to risk situations.

**Keywords:** Accident Prevention. Child Health. Prevention & control. Health Services Research.

### INTRODUCTION

Accidents in childhood represent a serious problem for the health system worldwide<sup>1-3</sup>. Unintentional injuries are the major causes of childhood morbidity and mortality, accounting for about 25% of the causes of deaths among children aging from five to nine years old<sup>4</sup>. Data from World Health Organization show that childhood accidents account for approximately 830,000 deaths annually around the world<sup>4</sup>.

In Brazil, traffic accidents and drownings are the main causes of mortality, followed by suffocations, burns, falls, and poisonings<sup>5</sup>. Data from the Ministry of Health show that, per year, 4700 children die and 125,000 are hospitalized victims of accidents<sup>6</sup>. Trauma is responsible for 19.5% of the mortality in children up to adolescence, and, in the 5-19 age group, it is the main cause of death<sup>7</sup>.

Approximately 90% of unintentional injuries can be avoided through preventive measures<sup>4</sup>. Several studies prove the reduction in accident rates after the implementation of educational, legislative, and environmental prevention strategies<sup>8-11</sup>. These prevention activities can be optimized if elaborated based on aspects of local reality, considering the main risk factors and everyday situations related to the occurrence of accidents<sup>4</sup>.

However, nationally, this type of information is still limited, with few published cases. Since 2014, our group has developed childhood accident-prevention activities in elementary schools, aimed at parents, students, and teachers of the sixth grade<sup>12</sup>. In this way, we decided to investigate the main causes and most common risk situations related to childhood accidents in our local reality of a medium-sized city in the Southeast region of Brazil.

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## **METHODS**

An observational, cross-sectional, retrospective, descriptive, and analytical study was carried out from the medical records of patients attended in the pediatric emergency services of the hospital complex of Hospital das Clínicas, Botucatu Medical School - UNESP (HC-FMB-UNESP), in 2016. These appointments were conducted in two places: at the Children's Emergency Room of Hospital do Bairro, in the city of Botucatu (SP), and at the Referred Children's Emergency Room, located in HC-FMB-UNESP.

We included patients aged from zero to 15 years who had received medical care related to any of the following types of accidents: falls, drownings, burns, exogenous poisonings, accidents with foreign bodies, traffic accidents, local traumas, physical aggressions among children, and accidents with animals. Local traumas comprised incised wounds, lacerations and local contusions, unrelated to any other type of accident. Accidents with foreign bodies included ingestion, aspiration, and placement of foreign bodies into the ear. Accidents involving animals comprehended bites by dogs or other animals and stings of venomous insects. Burns included thermal, chemical, and electrical injuries. Exogenous poisonings comprised accidents related to the exposure to chemical agents, including caustic substances. Traffic accidents comprehended automobile accidents involving children as passengers of vehicles and trappings. Physical aggressions were represented by aggressions among children, not including cases of adult violence. Consultations that did not present adequate information record were excluded.

This study was approved by the Research Ethics Committee of Botucatu Medical School - UNESP (CAAE nº 55911316.7.0000.5411).

The emergency consultations related to accidents were analyzed in detail in order to obtain the following pieces of information: age, gender, type of accident, period of the day when the accident happened (morning, afternoon, and night), region of the body affected, environment of the accident, medical diagnosis defined in accordance with International Classification of Diseases (ICD), and history of previous accidents involving the child.

Data were submitted to descriptive and analytical statistical analysis. Quantitative variables were represented by absolute numbers and respective percentage values. We determined mean ( $\pm$  standard deviations) and median (minimum/maximum) values. Differences between proportions were analyzed using the binomial test. The statistical comparison between the ages of patients and gender, type of accident, and affected region of the body was performed through Mann-Whitney test, after the confirmation of the non-parametric data distribution through Kolmogorov-Smirnov test. The significance level was 5% and the analysis was performed in SPSS 22.0 for Windows.

## **RESULTS**

A total of 3612 urgent medical consultations involving children, registered in 2016, were reviewed. We excluded 213 consultations because they did not present minimal information in medical records. Nine hundred and thirty-six (27.5%) cases were related to accidents. Of these 936, 588 (62.8%) occurred in male patients and 348 (37.2%) in female patients. The mean age was 71.7 ( $\pm$  51.7) months, with a median of 60 (1 to 180) months.

In stratification by gender, there was no statistically significant difference among the ages of the patients ( $p=0.636$ ). Four hundred and ninety (52.3%) accidents occurred with children from zero to five years, 245 (26.2%) with children from six to ten years, and 201 (21.5%) with children from ten to 15 years of age.

Table 1 shows the distribution of accidents, stratified by type of accident, and the respective mean and median values of patients' ages. Figure 1 presents the percentage distribution of types of accidents by age group.

Falls and local traumas were the most common types of accidents in all analyzed age groups. The group of patients who suffered falls, local traumas, or who were victims of aggressions was composed by children older than the children in the group of patients who had accidents related to foreign bodies and exogenous poisonings ( $p=0.003$ ).

The distribution of types of accidents according to gender is presented in table 2. It is noted the highest proportion (with statistical significance) of boys who were victims of falls, local traumas, and accidents with animals.

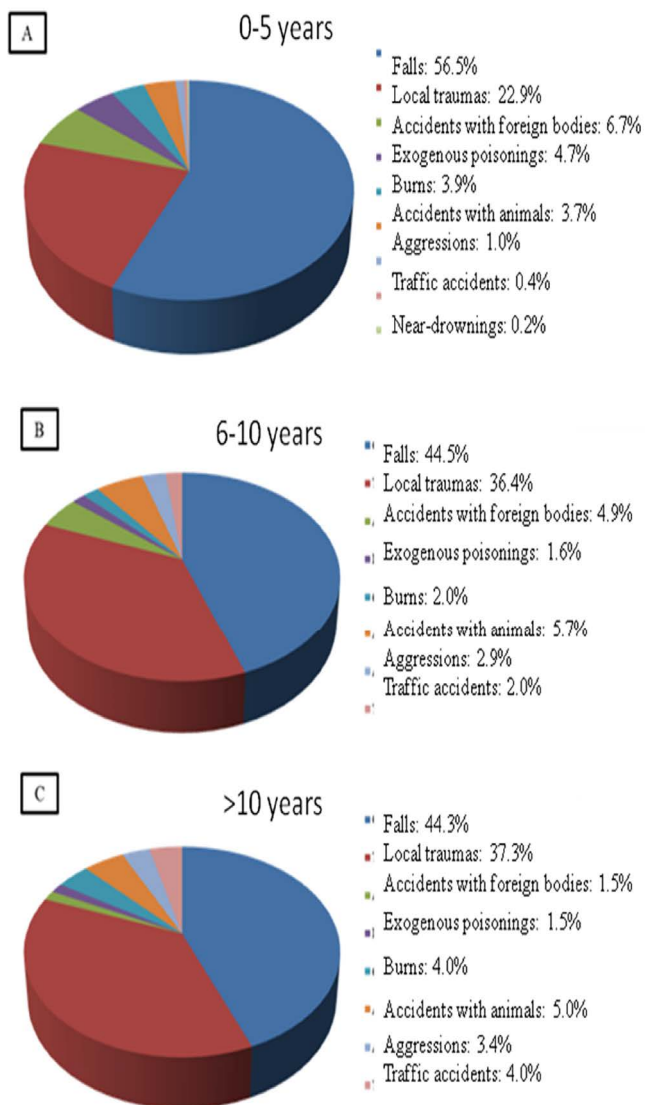
**Table 1.** Distribution of accidents according to type of accident and age.

Type of accident	Number (%)	Age (months)	
		Mean $\pm$ Standard deviation	Median (min/max)
Falls	475 (50.7%)	63.9 $\pm$ 50.0	48 (1/189)
Local traumas	276 (29.5%)	85.9 $\pm$ 52.8	78.5 (4/204)
Accidents with foreign bodies	48 (5.1%)	54.4 $\pm$ 37.6	43.5 (11/156)
Accidents with animals	42 (4.5%)	81.9 $\pm$ 46.5	77.5 (12/173)
Burns	32 (3.4%)	62.7 $\pm$ 54.2	32.58 (10/176)
Exogenous poisonings	30 (3.2%)	47.7 $\pm$ 43.0	31 (4/176)
Aggressions	19 (2.1%)	105.2 $\pm$ 49.1	120 (12/168)
Traffic accidents	13 (1.4%)	118 $\pm$ 48.7	120 (37/187)
Near-drownings	1 (0.1%)		9 months

**Table 2.** Distribution of accidents according to type of accident and gender.

Type of accident	Male		Female		p*
	n	%	n	%	
Falls	295	62.1	180	37.8	<0.0001
Local traumas	188	68.1	88	31.9	<0.0001
Accidents with animals	28	66.7	14	33.3	0.002
Accidents with foreign bodies	27	56.2	21	43.8	0.220
Burns	19	59.4	13	40.6	0.133
Exogenous poisonings	18	60.0	12	40.0	0.121
Aggressions	7	36.8	12	63.2	0.104
Traffic accidents	6	46.1	7	53.9	0.694
Near-drownings	0	0	1	0	n/a**

p\*: binomial test for two proportions; n/a\*\*: not adequate for statistical calculation.

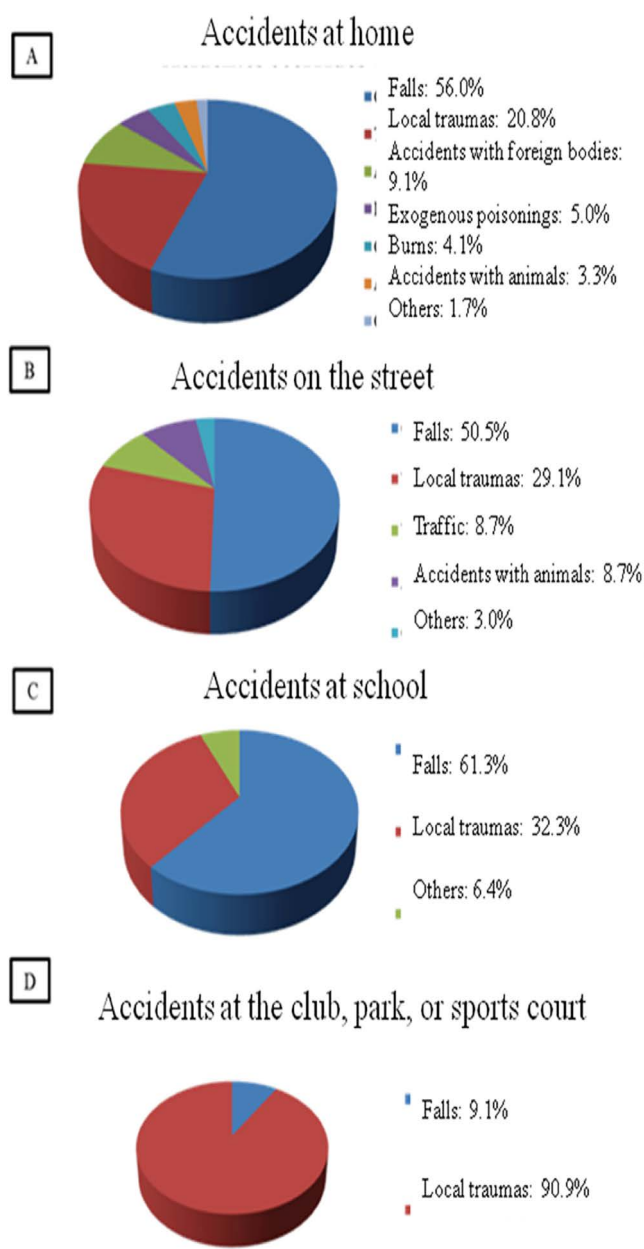


**Figure 1.** Distribution of types of accidents according to age groups: A) from 0 to 5 years; B) from 6 to 10 years; and C) over 10 years of age.

Table 3 shows the distribution of types of accidents according to specific characteristics and medical diagnoses defined in accordance with ICD. The region of the head, face, and neck, including cranioencephalic traumas, was the most affected by fall accidents. Local traumas were more related to injuries that affected upper and lower limbs. On the other hand, polytrauma mainly touched children who had been victims of traffic accidents. The victims of accidents with injuries in the head and neck region were significantly younger than the victims of injuries in other regions of the body ( $p < 0.001$ ).

Table 4 presents the distribution of accidents according to the period of the day and environment of the accident. Five hundred and two (53.6%) consultations provided information about the period of the day when the accidents occurred and 397 (42.4%) reported information on their environment.

Figure 2 represents the percentage distribution of types of accidents according to place of occurrence.



**Figure 2.** Distribution of types of accidents according to places of occurrence: A) home; B) street; C) school; and D) club, park, or sports court.

**Table 3.** Distribution of types of accidents according to their own characteristics and the diagnoses defined in accordance with ICD.

Type of accident (n)	Characterization	n	%	ICD codes*
Falls (475)	Head, face, and neck	264	55.5	S01/S01.0/S01.2/ S01.3/S01.4/S099
	Chest	3	0.6	S29
	Abdomen	9	1.9	S36
	Upper limbs	112	23.6	S40/S43.0/S50/S52/ S60/S62
	Lower limbs	51	10.7	S70/S80/S82/S90/S92
	Polytrauma	24	5.0	T07
	Perineum	5	1.1	S31
	Uninformed	7	1.6	-
Local traumas (276)	Head, face, and neck	67	24.3	S00.4/S01/S01.4/ S01.5/S05.4/ S099
	Chest	5	1.8	S29
	Upper limbs	92	33.3	S40/S50/S52/S60/S62
	Lower limbs	105	38.1	S80/S82/S90
	Polytrauma	3	1.1	T07
	Perineum	4	1.4	S31
Aggressions (19)	Head, face, and neck	8	42.1	S01/S01.2/S01.5/Y04
	Chest	2	10.5	S29
	Upper limbs	3	15.8	S60/S80/Y04
	Lower limbs	3	15.8	S80/S90/Y04
	Polytrauma	2	10.5	T07
	Uninformed	1	5.3	-
Burns (32)	Upper limbs	16	50.0	T22, T23
	Lower limbs	5	15.6	T24, T25
	Multiple regions	1	3.1	T29
	Head, face, and neck	9	28.2	T20
	Uninformed	1	3.1	-
Traffic accidents (13)	Polytrauma	5	38.5	T07
	Head, face, and neck	4	30.9	S01.2/S099
	Lower limbs	2	15.3	S70/S80/S82/S90/S92
	Uninformed	2	15.3	-
Accidents with foreign bodies (48)	Foreign body in the gastrointestinal tract	33	68.8	T18
	Foreign body in the airways	12	25.0	T17
	Foreign body in the ear	3	6.2	T16
Exogenous poisonings (30)	Caustic substances	6	20	T54.3,T18
	Other chemical agents or medicines	24	80	T50.9,X29
Accidents with animals (42)	Dogs	24	57.1	W54
	Other mammals (pigs)	2	4.8	W54
	Venomous insects	16	38.1	W57
Burns (32)	Thermal	21	65.6	T20, T21, T22, T23,
	Chemical	9	28.2	T24, T25
	Electric	1	3.1	W87
	Uninformed	1	3.1	-

\* ICD: International Classification of Diseases.

**Table 4.** Distribution of types of accidents according to period of the day and place of occurrence.

Variable	Characteristic	n	%
Period of the day (n=502)	Morning	87	17.3
	Afternoon	231	46.1
	Night	184	36.6
Accident place (n=397)	Home	241	60.7
	Street	103	25.9
	School	31	7.8
	Club, park, sports court	22	5.6

Nine hundred and fourteen (97.6%) consultations provided information about the occurrence of other accidents throughout life. Two hundred and forty-three (26.6%) presented positive history for previous accidents. None of the analyzed patients evolved to death.

## **DISCUSSION**

Our study presents the profile of childhood accidents attended at the two emergency services of the hospital complex of HC-FMB-UNESP. These services attend patients from the city of Botucatu (a medium-sized municipality in the interior of Sao Paulo state), being tertiary reference units of the Brazilian Health Care System (Sistema Único de Saúde) to assist a region with a population estimated at up to two million people<sup>13</sup>. The portion of consultations related to childhood accidents was quite significant, accounting for 27.5% of all urgent care performed in 2016. This rate was higher than those reported in other studies<sup>14,15</sup>, what might be justified by the characteristics of the services, which are reference for specialized emergency care in pediatrics.

The majority of patients treated for accidents were male, which is in agreement with other national and international studies<sup>14-18</sup>.

This can be justified by the cultural aspect of the main activities and games played by boys, which usually involve greater exposure to strength, speed, and body impact<sup>14</sup>. In contrast, it is interesting to note that there was a predominance of females for consultations involving aggressions among children, what shows that individuals of both genders are exposed to disagreements and possible damages caused by physical aggressions. Data recorded in consultations were not enough to analyze the gender of the child who had practiced the aggression.

The most affected age group involved children up to five years of age. This finding, also demonstrated in other studies<sup>16,19,20</sup>, can be justified by the fact that children in this age group have limited understanding of exposure to potential risks. They typically have magical thoughts, with egocentric perception and a proper logic of interpreting the environment, factors that may favor the occurrence of certain types of accidents, mainly falls<sup>16</sup>.

In all analyzed age groups, the most common types of accidents were falls and local traumas. This is in line with the majority of published studies<sup>14-17</sup>, confirming that falls are the main trauma mechanism in childhood and that they may cause numerous injuries, sometimes quite severe<sup>14</sup>.

In Brazil, the proportion of falls among patients younger than 15 years old was the largest cause of hospitalizations in 2017, in all age groups<sup>5</sup>. In turn, local traumas include incised wounds, lacerations and local contusions, results of contacts and collisions. This type of accident has also been quite common in other surveys<sup>15,16</sup>. In our study, there was a proportional growth in its incidence with increasing age, being more common in children over ten years of age. In addition, local traumas occurred most commonly in out-of-home environments, such as streets, schools, sports courts, and parks, what may be justified by being associated with more dynamic activities, such as outdoor games and sports.

The high number of accidents related to foreign bodies, mainly represented by their ingestion and impaction in the digestive tract, showed how much this type of accident is common in childhood, principally in children under five years of age, similarly to what has been reported in other studies<sup>14,21,22</sup>. Patients who were poisoned or injured by foreign bodies were younger than those who suffered other types of accidents. This can be justified by the fact that children up to five years of age commonly have keen curiosity, seeking to know new things, many times bringing this new "discovery" into the mouth. Thus, objects, such as coins, disc batteries, and nails, or toxic substances, such as caustic soda, are accidentally ingested and can lead to severe injuries with high morbimortality<sup>22-24</sup>. It should be noted that the indicators related to accidents with foreign bodies may have been influenced by the characteristics of our center, which is one of the few references for the treatment of endoscopic urgencies throughout the region.

The types of accidents and the respective related trauma mechanisms had a direct influence on the on the lesions' topography. Falls were more related to injuries on the head, face, and neck.

Local traumas led to a greater number of upper and lower limb injuries. In turn, polytraumas were more present in victims of traffic accidents. It is also interesting to note that lesions of the cephalic segment were more frequent in younger children when compared to other body segments. This can be justified by the greater relation between head size and the rest of the body, typical of younger children, making it more likely to injure this segment of the body<sup>25</sup>.

As evidenced by other studies, most of the accidents occurred in the afternoon and at home<sup>15,16</sup>. Probably, in the afternoon, children are at the apex of their activities, indoors, after returning from school and, likely, unattended. There was not enough information in the analyzed records regarding the children's supervision when the accidents occurred, impeding a more specific analysis on this aspect.

Although accidents are the main cause of childhood mortality<sup>4-6</sup>, in our survey, there were no recorded deaths in the analyzed consultations. It is worth mentioning that only the initial consultations of the emergency services were analyzed (not data related to possible hospitalizations in wards or intensive care units).

The high rate of patients who had records of previous accidents, undoubtedly, represents the repeated exposure of these patients to risk situations. Avoiding this type of exposure is the main objective of prevention activities, which represent the best form of treatment for this public health problem<sup>2,4,26</sup>. For all this, we believe that this data survey can positively contribute, by providing data on the profile of consultations due to accidents in children attended in a medium-sized Brazilian city, being able to direct future prevention activities.

## R E S U M O

**Objetivo:** investigar as principais causas e situações de risco mais comuns relacionadas aos acidentes na infância, em nossa realidade local. **Métodos:** estudo observacional, transversal, retrospectivo, descritivo e analítico, a partir dos prontuários médicos de pacientes atendidos nos serviços de urgências pediátricas do complexo hospitalar do Hospital das Clínicas da Faculdade de Medicina de Botucatu - UNESP, no ano de 2016. Foram incluídos os atendimentos de pacientes de zero a 15 anos de idade que haviam recebido atendimento médico relacionado a acidentes, determinando-se idade, sexo, tipo de acidente, período do dia e ambiente onde aconteceu o acidente e histórico de acidentes pregressos. **Resultados:** do total de atendimentos com registros adequados no prontuário, 936 (27,5%) estavam relacionados a acidentes: 588 (62,8%) em pacientes do sexo masculino e 348 (37,2%) em pacientes do sexo feminino. Quanto à idade, 490 (52,3%) acidentes ocorreram com crianças de zero a cinco anos, 245 (26,2%) com crianças de seis a dez anos e 201 (21,5%) com crianças com mais de dez anos de idade. Quedas e traumas locais foram os tipos de acidentes mais comuns em todas as faixas etárias analisadas. A maior parte dos acidentes ocorreu à tarde (46,1%), em casa (60,7%), e 26,6% dos pacientes apresentavam antecedentes de acidentes prévios. **Conclusão:** os acidentes foram responsáveis por grande parcela dos atendimentos de urgência. A elevada taxa de pacientes com registros de acidentes prévios indica a exposição repetida destas crianças às situações de risco.

**Descritores:** Prevenção de Acidentes. Saúde da Criança. Prevenção & controle. Pesquisa sobre Serviços de Saúde.

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