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RESEARCH

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CHILD ACCIDENTS ATTENDED IN PUBLIC HOSPITALS OF PEDIATRIC REFERENCE

Acidentes infantis atendidos nos hospitais públicos de referência pediátrica

Accidentes infantiles atendidos en los hospitales públicos de referencia pediátrica

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ABSTRACT

Objective: The study's main goal has been to characterize the child accidents that resulted in searching for care in public pediatric referral hospitals in *São Luís* city, *Maranhão* State, Brazil. **Methods:** This cross-sectional and descriptive study was undertaken with 130 children aged up to 11 years old who suffered an accident. **Results:** Most of the accidents involved brown males within the age group from 1 to 3 years old. Their mothers aged from 20 to 30 years old and fathers aged from 30 to 40 years old, both of them having from 10 to 12 years of formal education. Falls were found to be the most frequent type of accident, with contusions being the most common type of injury and head/face the most affected region. The main place of occurrence was the home environment. Emergency care was delivered immediately before hospitalization. **Conclusion:** This study made it possible to understand and characterize the child accidents that required search for care in public pediatric referral hospitals in *São Luís* city. Considering the serious repercussions of these accidents, it is necessary to adopt preventive measures.

Descriptors: Child, accidents, child health services.

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RESUMO

Objetivo: Caracterizar os acidentes na infância que motivaram a procura dos serviços de saúde em São Luís, Maranhão. **Método:** Pesquisa transversal, descritiva, envolvendo 130 crianças de 0 a 11 anos, vítimas comprovadas de acidente. **Resultados:** Os acidentes acometeram mais meninos entre 1 e 3 anos, pardos, cujas mães tinham idade de 20 a 30 anos e pais entre 30 e 40 anos, ambos entre 10 a 12 anos de estudo. O tipo de acidente mais frequente foi a queda, sendo a contusão a lesão mais comum e a região mais atingida foi a cabeça/face. O principal local de ocorrência foi o domicílio, conduta imediata foi a emergência e como desfecho a internação. **Conclusão:** A pesquisa possibilitou conhecer e caracterizar os principais acidentes infantis atendidos em hospitais públicos da capital maranhense. Destarte, e considerando as sérias repercussões que os acidentes podem ter, é necessário adotar medidas preventivas contra esses eventos.

Descritores: Criança; Causas externas; Acidentes; Serviços de saúde da criança; Prevenção de acidentes

RESUMEN

Objetivo: Caracterizar los accidentes en la infancia que motivaron la búsqueda de los servicios de salud en São Luís, Maranhão. **Método:** Investigación transversal, descriptiva, implicando 130 niños y niñas de 0 a 11 años, víctimas comprobadas de accidente. **Resultados:** Los accidentes acometieron más niños entre 1 y 3 años, pardos, cuyas madres tenían edad de 20 a 30 años y padres entre 30 y 40 años, ambos con 10 a 12 años de estudio. El tipo de accidente más frecuente fue la caída, siendo la contusión el tipo de lesión más común y la región más afectada fue la cabeza/rostro. El principal local de incidencia fue el domicilio, conducta inmediata fue ir a Urgencias y como desenlace la internación. **Conclusión:** La investigación posibilitó conocer y caracterizar los principales accidentes infantiles atendidos en hospitales públicos de la capital de Maranhão. Por consiguiente, y considerando las serias repercusiones que los accidentes pueden tener, es necesario adoptar medidas preventivas contra esos eventos.

Descritores: Niño; Causas externas; Acidentes; Servicios de salud del niño; Prevención de accidentes.

INTRODUÇÃO

Brazil is one of the nations that has stood out for significantly reducing infant mortality (up to 1 year old) and childhood mortality (up to 5 years old). Until the late 1990s, Brazil faced the challenge of reducing the number of deaths of children under 5 years of age. At that time, lives were lost to diseases that are now easily preventable, such as infectious and parasitic diseases.¹

The changes in the epidemiological profile have highlighted morbidity and mortality due to external causes, including accidents and violence. External causes have measurable economic, social, and emotional repercussions. Deaths and aftereffects/incapacities produced by external causes demand that public health and safety policies must be implemented and followed in Brazil.²

Child accidents have been increasingly responsible for injuries and deaths among children worldwide. Children are

more prone to accidents due to their set of characteristics that make them more vulnerable, such as physical, mental and behavioral immaturity.³

The child, described in the *Estatuto da Criança e do Adolescente* (ECA) [Child and Adolescent Statute] as “the person up to eleven years old”,⁴ is more susceptible to external causes due to the development phase, curiosity, acquisition of motor skills and the spirit of adventure. Child accidents are closely related to several factors, such as family behavior; social network; lifestyle; educational, economic, social and cultural factors; and specific phases related to continuous learning.⁵

Data on deaths and hospitalizations from the *Departamento de Informática do Sistema Único de Saúde* (DATASUS) [Information Technology Department of the Brazilian Unified Health System] show that accidents were responsible for 3,733 deaths in 2016 and more than 110,000 hospitalizations in 2017 of people from 0 to 14 years old. Moreover, approximately R\$ 74 million were spent this year due to child accidents, which characterizes them as a serious public health problem.⁶

In 2014, the main causes of hospitalization were falls (47%), burns (16%) and animal bites (12%); other accidents, such as effects of nature, falling objects, aftereffects of other accidents, explosions, and contact with tools and other sharp objects, represent 21% of the hospitalizations, which is worrying.⁷

In 2011, a study carried out in the capital of *Maranhão* State, Brazil, showed that out of 166 children were admitted to hospital emergency rooms due to falls, which accounted for 55.4% of the hospitalizations, followed by transport accidents, which accounted for 21.1%. Regarding location, accidents were more frequent at home (63.3%), public roads (25.3%), and schools (6.6%). The most frequent injuries were fractures (44.6%) and cuts, perforations, and lacerations (12%). The most affected body regions were upper limbs (42.2%), lower limbs (22.9%), and head/face (12.7%).⁸

Because of the major implications of external causes in the Brazilian health scenario, the Brazilian Policy for the Reduction of Morbidity and Mortality due to Accidents and Violence was instituted in 2000 to guide health actions and services to face these situations. The policy considers accidents to be unintentional and preventable events that cause physical and/or emotional injuries and hinder children from doing daily activities and interacting with family members or people in other social environments.⁹

This policy reinforces the principles of the Brazilian Federal Constitution and defines seven guidelines for identifying institutional responsibilities and developing a set of joint and systematized actions in order to contribute to the prevention, protection, and quality of life of the population.⁹ Therefore, analyzing this issue is key because child accidents contribute to morbidity and mortality rates, affecting the potential years of life lost (PYLL) and hospitalizations among children.

It is believed that many child accidents requiring care could be avoided by adopting preventive measures. Thus, health care workers are responsible for guiding, supervising, and educating families.

Bearing the aforesaid in mind, the following research question was elaborated: “What are the characteristics of child accidents that required search for care in public pediatric referral hospitals in São Luís city, Maranhão State, Brazil?”. Hence, this study meant to characterize those types of child accidents.

METHODS

This cross-sectional and descriptive study was performed by analyzing the child accidents that demanded care in pediatric referral health facilities in the public sector of São Luís city.

Data collection followed the criteria described in chapter XX (External causes of mortality and morbidity) of the 10th revision of the International Statistical Classification of Diseases and Health-related Problems (ICD-10). External causes are injuries that characterize a set of health conditions, which may lead to death and include accidental, unintentional causes due to traffic, falls, poisoning, drowning, and other types of accidents. As for the intentional causes, or violent causes, they include self-inflicted aggression and injuries.^{8,10}

The sample was composed of 130 children within the age group from 0 to 11 years old who were victims of accidents and received care in referral health facilities during the period of data collection. Children victims of violence but who were suspected to be victims of accidents at the time

of admission were excluded from this study. This study was carried out in three pediatric referral health facilities from the public sector. Data collection took place in all of the three health facilities simultaneously from August 1st, 2016 to December 15th, 2016.

An instrument was developed for data collection, which consisted of two parts: (I) Identification and Information on family composition; and (II) Accident data. Data collection was carried out in the emergency room or within the first 24 h of hospitalization with the parents or legal guardians of the children after they provided written informed consent. Therefore, the absolute and relative frequencies of the characteristics of child accidents were obtained.

This study complied with ethical guidelines and current legislation. Furthermore, it was approved by the Research Ethics Committee of the University Hospital from the *Universidade Federal do Maranhão* under the Legal Opinion No. 1.643.507.

RESULTS

The most prominent age group included 48 children aged from 1 to 3 years old (36.9%) and followed by 33 children aged from 4 to 7 years old (25.4%), which combined represented 62.3% of the total number of children. **Table 1** addresses that 78 accidents (60%) were due to falls. This type of accident was more frequent in all age groups. Traffic accidents represented 10.8% of the occurrences, and 6.9% of the occurrences were due to foreign bodies.

Other types of accidents (6.9%) included those involving animals (bite, sting) and collision against other people or objects, among others.

Table 1 - Distribution of the types of child accidents by age group.

Type of child accident	Age group									
	< 1 year old		1-3 year old		4-7 year old		8-11 year old		Total	
	n	%	n	%	n	%	n	%	n	%
Traffic accidents	0	0	4	8.3	4	12.1	6	21.4	14	10.8
Fall	16	76.2	28	58.3	16	48.5	18	64.3	78	60.0
Burn	1	4.8	1	2.1	2	6.1	2	7.1	6	4.6
Electric shock	0	0	1	2.1	1	3.0	0	0	2	1.5
Foreign body	2	9.5	5	10.4	2	6.1	0	0	9	6.9
Intoxication	0	0	2	4.2	0	0	0	0	2	1.5
Choking/ Bronchoaspiration	1	4.8	2	4.2	0	0	1	3.6	4	3.1
Drowning	0	0	2	4.2	0	0	0	0	2	0.8
Injury	0	0	1	2.1	3	9.1	0	0	4	3.1
Other	1	4.8	2	2.4	5	15.1	1	3.6	9	6.9
Total	21	1100	48	100	33	100	28	100	130	100

Considering the children victims of accidents, 61.5% were male and 73.8% were brown. Regarding the socio-economic characteristics related to family structure, it can be observed that 49.2% of the mothers aged from 20 to 29 years old and 36.9% of the fathers aged from 30 to 39 years old. Most of the mothers (53.1%) and fathers (40.0%) had from 10 to 12 years of formal education, which is equivalent to having complete or incomplete high school.

Regarding the data on the individual who was with the child when the accident occurred, it can be observed

that the parents predominated (43.1%), followed by other children (24.6%), and other adults (10.0%), which included nannies, teachers, grandparents, uncles, and relatives.

As for the location of the child accidents, **Table 2** shows that the majority (61.5%) of them occurred at home and on public roads or spaces (25.4%). These results indicate that various types of child accidents, except traffic accidents and drownings, are more likely to occur at home.

Table 2 - Distribution of the types of accidents by location.

Types of child accident	Location									
	Home		Another residence		School		Public road		Total	
	n	%	n	%	n	%	n	%	n	%
Traffic accidents	0	0	0	0	0	0	14	100	14	100
Fall	54	69.2	10	12.8	2	2.6	12	15.4	78	100
Burn	6	100	0	0	0	0	0	0	6	100
Electric shock	1	50.0	1	50	0	0	0	0	2	100
Foreign body	2	77.8	1	11.1	1	11.1	0	0	9	100
Intoxication	1	50.0	1	50	0	0	0	0	2	100
Choking/ Bronchoaspiration	3	75.0	0	0	0	0	1	25.0	4	100
Drowning	0	0	0	0	0	0	1	100	1	100
Injury	3	60.0	0	0	0	0	2	40.0	5	100
Other	5	55.6	0	0	1	11.1	3	33.3	9	100
Total	80	61.5	13	10.0	4	3.1	33	25.4	130	100

Considering that fall was the most predominant type of accident, representing the reason for 78 children to seek hospital care, it was found that 39.7% of these children had contusions, followed by fractures (25.6%). Of these children, 23.1% had traumatic brain injury with head/neck injury being more frequent (64.6%), as can be seen in **Table 3**.

Table 3 - Distribution of the occurrences of falls among children by type of injury and most affected body region.

Variable	n	%
Type of injury		
Contusion	31	39.7
Cut	4	5.1
Fracture	20	25.6
Laceration	2	2.6
Polytrauma	1	1.3
Traumatic brain injury	18	23.1
Other	2	2.6
Most affected body region		
Upper limbs	13	18.4
Lower limbs	10	14.6
Head/face	53	64.6
Neck/chest	2	2.4
Total	78	100.0

DISCUSSION

Several factors, such as the environmental ones, determine the children's risk of suffering accidents. Thus, family characteristics and the constantly expanded and improved child development need to be known and addressed in a qualified manner by health care workers.¹¹

Several childhood-related factors associated with family composition and characteristics increase the risk of child accidents. The younger and more immature the child, the lower his/her perception of this risk.¹² The children's risk of accidents varies according to the coordination level of their nervous system, motor aptitude, perception of risks, and the instinctive protection of their mothers and other relatives.¹³

According to the study results, there was a predominance of accidents among children within the age group from 1 to 3 years old. Children are generally more susceptible to accidents in the first years of life.¹³ In this age group, it was observed that children are extremely dependent on their mothers and other adults in terms of safety. With the increase in mobility, motor skills, and growing exploratory activity, environmental risks intensify. When children learn to walk, their curiosity and desire to discover the outside world also increase. They begin to imitate older children and adults and engage in games with older children, which justifies the risks of accidents in this age group.¹²

Two studies analyzed the profile of public emergency and emergency services offered to children who suffered an accident or violence in Brazil. They showed that most of the children were in the age group from 2 to 5 years old, followed by 6-9 years old.¹⁴⁻¹⁵ Nevertheless, in another study, children in the age group from 6 to 9 years old were more affected, contrasting with the findings obtained in this study.⁸

The predominance of male children was observed in this study, which is in line with the findings of other studies performed in Brazil.^{8,12,16,17} The predominance of males is explained by the differences in the activities performed by males and females. Another explanation is the greater tendency for parents and society to give more freedom to male children. Generally, the games and activities performed by male children are more daring, more dynamic, more aggressive and of greater physical contact, which increases their tendency to assume greater risks, especially when in groups.¹⁷⁻¹⁸

Among the children who suffered accidents and sought care in health facilities, brown children predominated (74.4%). A study, which was carried out to investigate the profile of emergency care for children, revealed that 62.1% of the participants were brown, which corroborates the findings of this study.¹⁴

Concerning the socioeconomic profile of the children, their families had four members. The mothers aged from 20 to 30 years old and the fathers aged from 30 to 40 years old, both of them having from 10 to 12 years of formal education and an average income of one to two minimum wages. These findings were supported by another study, which revealed that people responsible for the children's safety, generally their mothers, are in the age group from 20 to 39 years old, have complete high school and a family income of up to two minimum wages, and live with 4 or 5 individuals.¹⁰ In contrast, the findings of this study revealed that 37.3% of the people responsible for the children's safety were mothers having from nine to 11 years of formal education, 26% were fathers with five to eight years of formal education, and 60.2% had an income below a minimum wage.⁸

In this respect, it is known that some socio-economic factors such as low *per capita* income, single and young mothers with a low level of formal education, precarious housing, and large families are associated with the risk of accidents. Additionally, lack of information and inadequate infrastructure of residences, daycare centers, and schools are some examples of factors that increase children's risk of accidents.¹⁷

The study results made it possible to infer that parents in large, low-income families may not be able to adequately supervise their children, who are sometimes left alone or with an older brother so that the parents can work or undertake domestic activities. In addition, children in low-income families may be exposed to various environmental hazards such as physical structures that facilitate the occurrence of accidents, inadequate leisure spaces, and exposure to street factors.⁶

Here, 43.1% of the accidents happened when the children were accompanied by their parents because they demand family care over a longer period.^{8,10} These children were not being supervised at the time of the accidents because of other domestic activities that demanded attention. Constant supervision is more difficult as parents undertake other activities and care for their children simultaneously.¹²

Therefore, it was stressed that the presence of parents does not guarantee their children's safety. The presence of the parents does not prevent accidents, and there are three possible reasons. Firstly, they may not know how to avoid accidents. Secondly, believing that the home environment is safe, they may give more freedom to their child. Finally, they may not supervise their child adequately.¹⁹

Bearing the above-mentioned in mind, it was noted that the domestic environment becomes highly dangerous for children in some situations because of the daily activities performed by family members.¹²

Herein, it was observed that falls were the most common cause of accidents among children in all age groups, which is in line with other publications.^{8,12,14,16,17,20} A study carried out with children who suffered an accident and received emergency care in health facilities identified that falls were the most frequent type of accident among children in the age groups from 2 to 5 years old (41.3%) and from 6 to 9 years old (54.3%).⁸ According to another study, falls represented 63.5% of the cases, being predominant in all age groups.¹²

These findings related to falls are justified by the motor, cognitive, and psychosocial maturation phase that these children experience. They learn to know their limits and adapt themselves to the environment, thus increasing the risk of falls. Still, in relation to falls, these are events probably related to leisure activities and sports, highlighting games involving running, cycling, skating, and skateboarding, among others.¹²

It was observed in this study that contusions were the most frequent type of injury among children who suffered a fall and sought care in a health facility, followed by fractures and traumatic brain injury. These results agreed well with a study performed in Brazil, which evidenced that contusions represented 31.7% of the cases.¹⁴ Nonetheless, other authors presented different results,^{8,21} showing that fractures were the most frequent type of injury.

Injuries due to falls were more frequently found in the head/face, followed by lower and upper limbs. This finding is supported by a study carried out in Federal District, Brazil,¹⁴ and another study carried out in *São Luís* city, *Maranhão* State, Brazil, in 2014, which indicated that upper limbs were the most affected part of the body.⁸

The study results highlight the extent of the danger that child accidents pose and reinforce the need to promote health mainly by means of educational actions in schools, daycare centers, communities, and basic health units. The predominance of child accidents at home reinforces this need.¹⁵

The Family Health Strategy and Health at School programs have been helping to reduce the number of child accidents in Brazil. They aim to promote family and child health at schools while taking their physical and social space into account.¹⁵ Educational actions for the prevention of child accidents can be carried out while delivering child care, especially during home visits. Health care teams should evaluate the physical structure and organization of the domestic environment to identify the risks of child accidents.²² One educational action is to encourage parents and legal guardians to read the chapter “Preventing Accidents” in the Children’s Health Book, which provides important guidelines on how to prevent child accidents.²³

Different types of accidents occur in the school environment according to children’s age and stage of physical and mental development. School-age children start to be strongly influenced by their friends, generating attitudes that challenge rules. Because their motor skills are well beyond their critical judgment, events such as false steps, racing games, falls from high places, and lacerations are typical risks among children. Falls, cuts and dental trauma predominate in schools because children play aggressively at break.²⁴

Therefore, the actions carried out in the school environment aim at the knowledge about some points that involve the safety of children in different educational environments so that critical awareness of safety in these spaces can be raised among parents, educators, and children. The environments attended by students (classrooms, sports fields, and playgrounds, among others) should be assessed frequently and regularly, detecting risks and/or equipment that may cause damage so that all necessary repairs can be immediately carried out to maintain children’s safety. Student activity should be constantly supervised by education professionals, especially at class breaks, playgrounds, swimming pools and during sports activities.²⁴

The limitations of this study refer to the retrospective nature of the information collected since it depended on the parents’ or legal guardians’ memories of the accident, especially when their children did not receive care immediately in a health facility after this incident. Furthermore, the severity of the event associated with the children’s and family members’ emotional state especially in emergency units was another limitation of this study.

CONCLUSIONS

Herein, it is possible to understand and characterize the child accidents that required search for care in public pediatric referral hospitals in *São Luís* city. Considering the serious repercussions of these accidents, it is necessary to adopt preventive measures.

The study results reaffirmed that most of the child accidents occurred at home since it is the place where children stay most of the time. This requires parents or legal guardians to be aware of the child’s developmental stages as well as environmental risks, taking measures to avoid them

since the home environment can also function as a means of intervention, facilitating preventive and educational actions.

The characteristics of child accidents found in this study demonstrated the representativeness of these events in the search for care in health facilities. Moreover, families and health professionals should be aware of the real possibility of domestic accidents, which cannot be neglected since they can lead to morbidity and mortality among children, otherwise, their ability to perform daily and family activities can be severely impaired.

Family members should have some knowledge of accident prevention, implement appropriate measures, avoid hazards, and have significant attention while caring for children at home. This knowledge can be acquired through conversation groups, workshops, and home visits designed to raise awareness so that precautions can be taken to avoid child accidents at home.

For this reason, it is necessary to train professionals to develop accident prevention strategies through booklets providing guidelines on risk recognition, prevention behaviors according to age group, and organization of the domestic environment; school committees that assess the environments attended by students; and protocols and guidelines in the hospital environment focused on understanding the children’s reality with the aim of encouraging the adoption of preventive behaviors aimed at minimizing the occurrence of child accidents.

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