

PATTERNS OF CHILDHOOD INJURIES

Marwan Fa'ouri, MD, JB, Fadwa Najdawi, MD, JB**

ABSTRACT

Objective: To study the patterns of injuries in children in order to suggest possible preventive measures.

Methods: A prospective hospital-based study, analyzing the records of all children with trauma who were seen at the emergency department at Princess Haya Hospital in the south of Jordan over one year from June 1999-May 2000. One thousand and one hundred fifty two children (3 months to 15 years), in term of age, sex distribution, place, type, mechanism of injury and admission rate were analyzed.

Results: The study showed that boys got injured more often in all age groups, and children between 5-10 years constituted the largest group of injured children. Falling down was the most frequent cause of injuries followed by road traffic accidents. Burns and head injuries predominated in children below 5 years (mainly infants) and home was the commonest place of their injuries. The school age groups (> 5 years) were involved in accidents at school, sport centers and on roads. Fractures and lacerations constituted the major types of injuries, fractures and sprains predominated in children over 5 years and increased with age. Admission rate was 18.4%, which was higher among the age group 5-10 years and was due to falls in 53.8% and to road traffic accidents in 36.8%.

Conclusion: This study emphasized the need for urgent work to reduce the preventable causes of trauma. We recommend future research to identify the common causes of injuries among the pediatric population to help the decision makers find out methods to minimize accidental injuries in children.

Key words: Trauma, Childhood injuries, Accidents.

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Introduction

Trauma is one of the main causes of death in people under the age of 35 years all over the world. In Jordan, morbidity and mortality data related to injuries are lacking or incomplete. One study by the department of community medicine, University of Jordan reported a mortality rate of approximately 5 per 1000 population per year and the three leading causes of death were: diseases of the circulatory system, malignancy and accidents⁽¹⁾.

Injuries in children are considered the major public health problem with considerable socioeconomic impact which demands the involvement of all those concerned. Although the non-road causes were more frequent than road traffic accidents (RTA)⁽²⁾, the latter remain the major cause of mortality and morbidity worldwide. In England and Wales accidental deaths were mostly due to RTA and

accidental falling down was the next cause⁽³⁾. In the United States, one out of three children requires medical care for injuries each year⁽⁴⁾, and 50% of deaths in children are due to accidents⁽⁵⁾.

Prevention of childhood accidents is important both to the family and community. However, this has been either excluded from attention or treated in an inappropriate way^(6,7). Adequate measures for dealing with the preventable aspect of trauma are poorly understood and need more study, not only because of its fatality but because of the economic burden, as well. For example, in Jordan RTA cost the country about JD 103 million (\$US 146.3 million) during the year 1996⁽⁸⁾.

However, information on the pattern of injuries in children is scarce. In this prospective hospital-based study, we analyzed all injuries among children who were seen in the Emergency Department at Princess Haya Hospital over a one year period.

*From the Department of Family Medicine, King Hussein Medical Center, (KHMC), Amman - Jordan

Correspondence should be addressed to Dr. M. Fa'ouri

P.O. Box 8525 Amman 11121 Jordan

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Methods

This hospital-based study presents an analysis of trauma among children who were seen in the Emergency Department (ED) at Princess Haya Hospital, in Aqaba city, over a one-year period from June 1999-May 2000. This is the only public hospital in this region of the country serving approximately all the population including military and non-military subjects and their dependents, especially when dealing with emergency cases.

The number of injured children included in this study was 1152 children. Their age ranged from 3 months to 15 years (712 boys and 440 girls). The following parameters were recorded: Age, sex, place, type, mechanism of injury and the admissions. The study included all types of injuries except ingestion of poisonous material and drowning.

The children were first evaluated in the ED by the surgical resident on duty. After initial resuscitation and evaluation, the patients were either admitted or discharged and followed in the out-patient clinic if necessary. On the next day the data were recorded from the medical records. Children who arrived dead to the ED were included in the study.

Results

A total of 1152 children having trauma formed the basis of this study. As shown in Table I, there were 712 boys and 440 girls. Boys were the dominant in all age groups constituting 61.8% of the total number, with boys to girls ratio 3:2.

Children in the age group 5-10 years were more frequently exposed to trauma. Boys mostly exposed to trauma were between 11-15 years of age.

The mechanism of trauma is shown in Table II. Falling down was the most common cause and constituted about 49.7% of all cases. Among falls, falling at same level predominated and accounted for 29.9% of all injured children followed by sport-related injuries and bicycle injuries. (7.7% and 5.1%, respectively). Falling over stairs was more in children below one year, sport-related trauma was frequent among the 5-15 years group and falling off from bicycle was significant in the 5-10 years age group when compared to other age groups.

RTA formed the second most common cause of injuries. It was responsible for 20.4% of all cases and predominated among the (5-15) years age group.

It is noteworthy that burn, swallowing of foreign body and fall of heavy object were more seen in injured children < 5 years while RTA, fighting with others and sharp instruments injuries were more after this age (> 5 years).

Table III shows the place where the children sustained their injuries in relation to the different age groups. Injuries at home formed the commonest place (31.7%), however, injuries at home were relatively more common in children below 5 years while injuries at school,

playground and on road were most prevalent among children above 5 years.

The types of sustained injuries are listed in Table IV. Fractures and lacerations were the commonest type of injuries and formed 24.5% and 24.4%, respectively. Fractures were relatively more frequent in children above 5 years, accounting for 31.1% of all injuries in the 10-year age group. The relative frequency of sprains and dislocations also increased with age.

Lacerations were the commonest presentation in children aged 1-4 years and formed 32.9%, followed by fractures and burns.

Contusions, abrasions, cut wounds, burns and head injuries were not uncommon and it is noteworthy that burns and head injuries were the commonest type of injuries sustained in < 1 year age group followed by foreign body swallowing and lacerations.

Internal organs, eye and multisystem injuries were not common but were responsible for the most severe injuries (in addition to head injury) that required admission or intervention or transfer to a specialized hospital.

Table V shows that 18.4% of the total injuries was admitted to the hospital. The rate of admission was the highest among injured children 5-10 years of age (26%) followed by infants (21.6%).

The causes of admission are analyzed in Table VI. Falling down were the commonest cause of admission among all age groups followed by RTA (53.8% and 36.8%, respectively). In infants, burn was a common cause of admission and constituted 25% of cases admitted to the hospital in this age group when compared to other age groups.

Mortality related to trauma (which is defined as death occurring within 30 days following the trauma)⁽⁹⁾, was difficult to estimate in this study because we did not follow the injured children after admission. However during the study period, 5 children arrived dead and they mainly had head injuries and multisystem injuries, the majority of trauma deaths were related to RTA in 4 cases (80%) and one died after falling down from a height.

Discussion

Trauma is the leading cause of death in infants and children, so caring for the pediatric trauma victim requires a systematic approach which utilizes an understanding of the anatomic and pathophysiologic characteristics that make children different from adults⁽¹⁰⁾. Accidental injuries, especially among children have become one of the most serious health problems facing developing countries⁽¹¹⁾. The study of childhood injury pattern in our community is of great importance in planning for injury prevention strategies.

Our data showed that more boys were seen in the ED with injuries than girls. This may indicate that boys are more likely to be injured than girls, or alternatively, more attention is given to boys who are brought to the hospital for mild injuries while girls are not. Our

knowledge of the population under study, however, makes the latter explanation unlikely.

After analysis of age and sex distribution we found that most injuries occurred in the age group between 5-10 years (38.4%), which is consistent with previous studies^(2,12,13). Age of the child was highly associated with the place of trauma, as infants spend most of the time at home and are not aware of the danger around them, or the mothers or the caring persons are unaware of such danger so they sustained their injuries at home. As the baby grows up he becomes more involved in the community and starts to go to school and sport centers, such children are involved in accidents outside home. In our study we found that children between 5-15 years had sustained their injuries at school in approximately 34% of cases and on playground in 18% and on road in 23% of cases.

Age was also related to the type of injuries. Thus burn and head injury were relatively more common in children below 5 years, while fractures, sprains and minor injuries (laceration and abrasion) were more frequent in children above 5 years and fractures were relatively increasing as the child age increased, to reach 31.3% in the (11-15) years age group. In another study, fractures constituted 10-25% of all pediatric injuries and were more common in boys than in girls and were after 13-14 years twice as common.

The main leading causes of trauma in our study were; falls and they constituted (49.7%), RTA (20.4%), and burns (8.7%) followed by cutting, fighting with others, and fall of heavy object (Table II), and these results are comparable to those reported in several studies^(11,13,15,16).

Severe injuries are responsible for approximately 50% of deaths in children between 1-15 years, this high mortality rate associated with frequent sequelae leading to handicaps, is a major problem of public health in developed countries⁽¹⁷⁾.

Our study showed that severe injuries were not uncommon. Head injuries accounted for 8.1% of all injured children seen at the ED. Abdominal injuries were responsible for 1.6% of cases, chest injuries and eye injuries constituted 0.8% and 0.7%, respectively.

Many studies emphasized the importance of wearing a helmet when riding a bicycle regardless the age of the child^(18,19). Abdominal trauma mainly followed bicycle accidents and falls, and bicycle handlebar injuries were a significant cause⁽²⁰⁾. This study showed that falling from bicycles was relatively a common mechanism of falling especially among children > 5 years of age, however, in this study we did not have details on what the causes

of the injuries related to the bicycle falls were or whether the children were wearing helmets or not, but future research on this field can help reduce these kinds of injuries.

RTA formed the second leading cause of childhood injuries in this study (20%) and also the second cause for admission to the hospital after falls, especially in children over 5 years of age.

We are likely to see an increase in RTA as a result of increase in population and in rate of acquisition of vehicles. Therefore all efforts must be directed to prevent accidents by proper safety measures and improved traffic education and by emphasizing the importance of continuous trauma audit and trauma registry^(21,22). It has been found in the US that legally mandated application of vehicles safety belts is an effective way in lowering the incidence of injuries⁽²³⁾, and over the past 40 years, concerted efforts toward improving highway safety, promoting mandatory seatbelt, and national campaigns to educate the public on the dangers of speeding and driving while intoxicated have resulted in 25% decrease in motor vehicle deaths since 1969, despite an increase of 115% in the number of vehicle miles traveled by U.S citizens^(24,25). Programs that promote the use of safety belts and proper seating of children in the cars must be in the context of public health priorities of every community.

Conclusions and Recommendation

This study has highlighted the increased morbidity and dangers of childhood injuries and it calls for urgent action to prevent and eliminate preventable causes of trauma.

There is no simple method of accident prevention. Certain strategies are recommended, such as:

1. The enforcement of the use of seatbelts and good restraint systems in cars for children.
2. Educating children at school, through audiovisual programs on traffic rules and safety measures when using the road or playing in sport centers.
3. Educating caretakers of preschool age children on the hazards of burns, falls and objects which can be swallowed by such children.
4. The need for better design standards in the playgrounds of schools and sport centers since large number of injuries occurred there. However, because many injuries in children can be prevented or minimized and their disabling outcomes reduced, this study and future researches in the same field hopefully will help in the prevention of accidental injuries in children in the future.

Table I. Age and sex distribution of incident cases, Princess Haya Hospital, June 1999-May 2000.

Age groups (years)	Total		Boys		Girls	
	No	%	No	%	No	%
<1	37	3.2	22	59.5	15	40.5
1-4	283	24.6	155	54.8	128	45.2
5-10	442	38.4	278	62.9	164	37.1
11-15	390	33.8	257	65.9	133	34.1
Total	1152	100	712	61.8	440	38.2

Table II. Mechanism of trauma by age in years and breakdown of some common causes of falls.

Mechanism of injury	(<1) No.=37		(1-4) No.=28		(5-10) No.= 442		(11-15) No.=390		Total No.=1152	
	No	%	No	%	No	%	No	%	No	%
1. Falling	19	51.4	146	51.6	224	50.7	183	46.9	572	49.7
a. Falling on same level	12	32.4	95	33.6	106	24.0	132	33.8	345	29.9
b. Falling from height	1	2.7	12	4.2	22	5.0	5	1.3	40	3.5
c. Falling on stairs	6	16.2	16	5.7	0	0	0	0	22	1.9
d. Falling from bicycles	0	0	9	3.2	45	10.2	5	1.3	59	5.1
e. Falling from a swing	0	0	14	4.9	1	0.2	0	0	15	1.3
f. Falling from a horse	0	0	0	0	2	0.5	0	0	2	0.2
g. Sport related falls	0	0	0	0	48	10.9	41	10.5	89	7.7
2. Road traffic accidents	2	5.4	51	18.0	92	20.8	90	23.1	235	20.4
3. Fighting with others	0	0	2	0.7	34	7.7	39	10.0	75	6.5
4. Sharp instruments	0	0	16	5.7	28	6.3	17	4.4	61	5.3
5. Fall of heavy object	3	8.1	12	4.2	17	3.8	21	5.4	53	4.6
6. Burns	9	24.3	35	12.4	27	6.1	29	7.4	100	8.7
7. Bites	0	0	8	2.8	13	2.9	9	2.3	30	2.6
8. Foreign body swallowed	4	10.8	10	3.5	3	0.7	0	0	17	1.5
9. Electricity	0	0	3	1.1	3	0.7	1	0.3	7	0.6
10. Missile injury	0	0	0	0	1	0.2	1	0.3	2	0.2

Table III. The place of the sustained trauma among different age groups.

Place	(<1 yr.) No.=37		(1-4 yrs.) No.=283		(5-10yrs.) No.= 442		(11-15yrs.) No.=390		Total No.=1152	
	No	%	No	%	No	%	No	%	No	%
At home	30	81.1	201	71.0	74	16.7	60	15.4	365	31.7
At school	0	0	4	1.4	136	30.8	146	37.4	286	24.8
At playground	0	0	5	1.8	85	19.2	73	18.7	163	14.1
On road	2	5.4	51	18.0	98	22.2	95	24.4	246	21.4
Other places	5	13.5	22	7.8	49	11.1	16	4.0	92	8.0

Table IV. Types of injuries in relation to different age groups in years.

Type of injury	(<1) No.=37		(1-4) No.=283		(5-10) No. = 442		(11-15) No.=390		Total No.=1152	
	No	%	No	%	No	%	No	%	No	%
Abrasion	3	8.1	16	5.7	40	9.0	28	7.2	87	7.6
Laceration	5	13.5	93	32.9	102	23.1	81	20.8	281	24.4
Contusion	3	8.1	20	7.1	35	7.9	21	5.4	79	6.9
Cut wound	0	0	23	8.1	34	7.7	24	6.2	81	7.0
Fracture	1	2.7	42	14.8	117	26.5	122	31.3	282	24.5
Sprain	0	0	5	1.8	25	5.7	35	9.0	65	5.6
Dislocation	1	2.7	3	1.1	3	2.9	10	2.6	27	2.3
Burn	9	24.3	35	12.4	27	6.1	29	7.3	100	8.7
Foreign body swallowed	4	10.8	10	3.5	3	0.7	0	0	17	1.5
Head injury	8	21.6	28	9.9	21	7.0	26	6.6	93	8.1
Abdominal injury	2	5.4	3	1.1	6	1.4	8	2.1	19	1.6
Chest injury	0	0	2	0.7	4	0.9	3	0.8	9	0.8
Eye injury	0	0	2	0.7	3	0.7	3	0.8	8	0.7
Multisystem injury	1	2.7	1	0.4	2	0.5	0	0	4	0.3

Table V. Admissions in relation to different age groups.

Age Group (Years)	No. of Cases	Admissions	
		No.	%
< 1	37	8	21.6
1-4	283	42	14.8
5-10	442	115	26.0
11-15	390	47	12.1
Total Number	1152	212	18.4

Table VI. Admissions in relation to the mechanism of injury in different age groups in years.

Mechanism of injury	<1 year No. ** = 8		1-4 years No.=42		5-10 years No. =115		11-15 years No.=47		Total No.=212	
	No	%	No	%	No	%	No	%	No	%
Falling down	4	50	27	64.3	59	51.3	24	51.1	114	53.8
RTA*	2	25	11	26.2	48	41.7	17	36.2	78	36.8
Missile injury	0	0	0	0	1	0.9	1	2.1	2	0.9
Burns	2	25	3	7.1	2	1.7	1	2.1	8	3.8
Other causes	0	0	1	2.4	5	4.3	4	8.5	10	4.7

* RTA : Road traffic accidents.

** No: Number of admissions.

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