Pattern and severity of childhood unintentional injuries in Ismailia city, Egypt

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Abstract

In 2009, more than 746 000 injury cases were registered in the Ministry of Health hospitals in Egypt, with an injury rate of 1 004/100 000 population. Around 38% of all injuries occur among children and young adults less than 20 years of age. Furthermore, more than 20 000 people lose their lives to injuries every year (27/100 000). However, these data lack information on injury pattern, severity, provided care and outcome of injuries, which are essential data for planning injury-control programmes.

The aim of this study was to determine the frequency, nature and risk factors of childhood injuries in the Suez Canal University Hospital Emergency Department.

The study included a total of 551 children of 12 years of age. The most common causes of injuries among those children were falls (60%), road traffic injuries (15%) and burns (7%). The most commonly sustained injuries were fractures (23%), cuts or open wounds (21%), sprains (20%) and burns (13%). Overall injury severity scores (ISSs) were low across all injury types, except road traffic injuries (RTIs). The majority of patients were treated and discharged without disability (50.5%), while 7.4% had long-term temporary disability that lasted for more than 6 weeks, and 1.9% sustained permanent disability. There were two deaths (0.4% proportionate mortality); both of them were due to falls from a height.

In conclusion, the study confirms the feasibility of documenting the burden of childhood injuries on health systems in Egypt. It also confirmed the need for tailored injury-prevention research in Egypt. The resulting data should encourage interventional trials to be conducted, appropriate injury-prevention strategies to be implemented and timely interventions to be planned.

Keywords: Childhood unintentional injuries, Egypt, risk factors.

INTRODUCTION

Child injuries are a growing global public health problem. They are a significant area of concern from the age of one year onward and they contribute increasingly to overall rates of death until children reach adulthood. Hundreds of thousands of children die each year from injuries or violence, and millions suffer the consequences of non-fatal injuries. For each area of child injury, there are proven ways to reduce both the likelihood and severity of injury – yet awareness of the problem and its preventability, as well as political commitment to act to prevent child injury, remains unacceptably low. In 2005, The World Health Organization (WHO) issued a call for a greatly expanded global effort to prevent child injury (WHO 2005). This was

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followed in 2006 by WHO's ten-year plan of action on child injury (WHO 2006), which was followed in 2008 by the *World report on child injury prevention* (WHO 2008).

It was estimated that as many as 90% of unintentional injuries can be prevented (Centers for Disease Control and Prevention [CDC] 2006). A combination of education, environmental improvements, engineering modifications, enactment and enforcement of legislation and regulations, economic incentives, community empowerment and programme evaluation is effective at reducing the incidence and severity of unintentional injury-related death and disability (National SAFE KIDS Campaign 2004).

In 1999, an injury surveillance system was implemented in Egypt. Its main objectives were to assess the contribution of injuries to the overall burden of diseases in the country and to determine the incidence and characteristics of the different types of injuries. In 2007, the national injury surveillance programme reported 20 000 deaths and more than 746 000 injuries (WHO/EMRO & Ministry of Health [Egypt] 2010). With the need to increase our understanding of injuries, their pattern and characteristics, and the impact of injuries on affected individuals, the recommendation was made to conduct more in-depth studies, such as surveys or active surveillances (Kobusingye et al 2001; WHO 2001; El-Sayed et al 2003).

This study was initiated in response to the lack of reliable child injury data in Egypt. A standardised protocol was designed and implemented for data collection. The study objectives were to determine the frequency, nature and risk factors of childhood injuries in Ismailia city by means of an injury surveillance system for data collection in the Emergency Department (ED) of Suez Canal University Hospital

The study represents the Egyptian chapter of the global childhood unintentional injury surveillance (GCUIS), which was intended to enhance the global evidence base for planning child injury interventions (Hyder et al 2009). Furthermore, this work was conducted in preparation for joining the Egyptian injury surveillance system.

METHODOLOGY

The study was conducted in the Suez Canal University Hospital, which is an 800-bed teaching referral tertiary hospital in Ismailia city. The city has a population of 300 000 inhabitants. All emergency patients are first seen in the Emergency Department (ED). From a common registration desk, patients are triaged into surgical or medical sections. Trauma patients, within our inclusion criteria, were included in the study.

A standard surveillance form was administered to the caretakers of injured children seen at the ED. The surveillance questions were based on a variety of sources, including the International Classification of External Causes of Injuries (ICECI), the South African Red Cross War Memorial Children's Hospital injury surveillance study instrument, and previous work done in Pakistan (Ghaffar et al 2004; International Classification of External Causes of Injuries Coordination and Maintenance Group 2004; Lalloo & Van As 2004; Fatmi et al 2007). By using a standardised electronic data entry form in Epi-Info version 3.3.2 (CDC 2006), the following data were recorded: demographic information; data on mortality and disability from injuries; injury severity score (ISS) (Baker et al 1974); risk factors such as age, gender, time of day and activity of the child when injured; use of safety measures; outcome of treatment in the ED; and expected outcome of the injury based on its ISS score. Physicians in the ED of the hospital were given comprehensive guidelines and training on using the surveillance instrument and how to grade injury severity (Gennarelli & Wodzin 2006).

In the study, injury was operationally defined as any type of unintentional damage to any body part. The study focused on children less than 12 years of age of either gender who presented to the ED. Quota sampling of 551 patients was collected from the ED for three months (August to October 2007). Excluded from the study were children who suffered intentional injuries perpetrated by others (i.e. stabbings, gunshot wounds, other physical violence or sexual abuse),

self-inflicted injury, and children without a parent or legal guardian. The respondent for the surveillance system was the caretaker who accompanied the child to the ED, while the unit of analysis was the injured child. Ethical approval for the study was secured from the research ethics committee (IRB) of the Suez Canal Medical School.

A pilot study was conducted in the Emergency Department of Suez Canal University Hospital Results of the pilot study, which was based on non-random sequential sampling, were submitted to the multi-centre GCUIS study coordinating centre at Johns Hopkins University, Bloomberg School of Public Health (JHBSPH) for quality checks (Hyder et al 2009). Oral consent from caregivers was obtained and the research assistant conducted ten-minute interviews with the caregivers of the injured children.

RESULTS

The study sample consisted of 551 children less than 12 years of age that were seen in the Suez Canal University Hospital ED in Ismailia city in Egypt. Of the total study cases, 361 were males (66%). About 78% of injuries occurred while children were playing (figure 1). The majority of the children arrived at the ED by private vehicle (34%), while only 22% arrived by ambulances (public or private). Most children were brought to the ED by their mothers (51%) or fathers (44%). Injuries that were not traffic-related occurred mostly in and around the home or at school (table 1). The most common external causes of injuries were falls (60%), road traffic injuries (15%) and burns (7%) (figure 2). The most commonly sustained injuries were fractures (23%), cuts or open wounds (21%), sprains (20%), concussion (13%) and burns (13%) (figure 3). The majority of injured children in this study were treated and discharged, while 17% of them were admitted to the hospital and two died in the ED, both as a result of falls from a height. Of the children treated, 51% were expected to suffer no disability, 40% were expected to suffer short-term disability (< 6 weeks), 7% would probably suffer long-term disability (≥ 6 weeks), and 2% would suffer permanent disability. Overall ISSs were low across all injury types, except RTI (table 2).

Around 60% of families reported supervising their children while bathing, and 43% stored hazardous material away from children. However, only a few families recounted using car seatbelts (3%), car child restraints (1%), car air bags (0.5%) or bicycle helmets (1%) (table 3). The majority of children received care via the government insurance system.

Falls were the most common cause of injury among children who presented to the ED, which included 333 children (60%). They occurred mainly from stairs (37%) or from beds or other furniture (26%). Most falls occurred during play (88%), and those who fell were generally treated and discharged with no disability (73%). The mean ISS was 4, while the median was 3. Two children died from fall-related injuries (table 2).

Of the 81 children involved in road traffic injuries, 12% were pedestrians, 40% were car passengers and 21% were motorcycle or three-wheeler riders. The striking vehicles were cars (22%), motorcycles or three-wheelers (11%) and buses or trucks (10%) (table 4). About 15% of the road traffic injury cases required hospitalisation, and this form of injury was the second-highest injury to cause long-term disability (15%). The mean ISS for road traffic injury victims was 13, which was the highest of all injuries (table 2).

Of the 41 children with burns, 63% of them were burned by hot liquids, 17% by fire or flames, and 12% by hot objects. Burned children had the highest admission rate (61%), while their mean ISS was only 4 (table 2).

Table 1: Descriptive data surrounding childhood injuries (*n* = 551)

		No.	%
Mode of transport of injured child to hospital	Private car	185	33.6
	Walking	124	22.5
	Public ambulance	115	20.9
	Taxi	95	17.2
	Private ambulance	7	1.3
	Motorcycle	3	0.5
	Bicycle	21	3.8
	Other	1	0.2
Who brought child to hospital?	Mother	279	50.9
	Father	242	43.9
	Other family member	17	3.1
	Teacher	6	1.1
	Friend	3	0.5
	Other	4	0.7
Where did injury occur?	Home: outside	188	34.1
	Home: inside	24	4.4
	Road, street, highway	84	15.2
	Schools and other public buildings	222	40.3
	Farm and countryside	14	2.5
	Sports/play area	6	1.1
	Other/refused to answer/doesn't know/ no answer	13	2.4

Table 2: Outcome and projected effect of childhood injuries (485)

Characteristics	RTI		Fall		Burn		Poisoning		Drowning		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Outcome of injury:												
– Treated and discharged with no disability	45	55.6	241	72.4	14	34.1	11	57.9	7	63.6	318	65.6
– Treated and discharged with disability	15	18.5	54	16.2	0	0	1	5.3	0	0	70	14.4
– Admitted to hospital	12	14.8	17	5.1	25	61.0	4	21.1	1	9.1	59	12.2
– Died	0	0	2	0.6	0	0	0	0	0	0	2	0.4
– Other	9	11.1	19	5.7	2	4.9	3	15.8	3	27.3	36	7.4
Projected effect of injury:												
– No significant disability	44	54.3	162	48.6	17	41.5	15	78.9	7	63.6	245	50.5
– Temporary disability (< 6 weeks)	22	27.2	155	46.5	12	29.3	3	15.8	3	27.3	195	40.2
– Long-term disability (> 6 weeks)	12	14.8	14	4.2	8	19.5	1	5.3	1	9.1	36	7.4
– Permanent disability	3	3.7	2	0.6	4	9.8	0	0	0	0	9	1.9
Injury severity score												
– Mean		13		4		4		4		4		7
– Median		18		3		9		5		4		4
Total (No.)		**81**		**333**		**41**		**19**		**11**		**485**

Table 3: Safety measure used by participating families

Safety measure	Number (Total 485)	Percentage (%)
Supervision of bathing child	276	56.9
Storage of hazardous material	207	42.7
Use of bicycle helmet	6	1.2
Use of car seatbelt	11	2.7
Use of car child restraints	4	0.8
Use of car air bag	2	0.4

Table 4: Road traffic injury data (*n* = 81)

Road traffic injury data	No.	%
Mode of transit: #		
– Passenger car	32	39.5
– Three-wheeler	12	14.8
– Motorcycle	5	6.2
– Bus (> 10 people)	6	7.4
– Minibus (< 10 people)	5	6.2
– Bicycle	6	7.4
– Walk/Run	10	12.3
– Other/Unknown	6	7.4
Striking vehicle or object: #		
– Car	18	22.2
– Three-wheeler	7	8.6
– Motorcycle	2	2.5
– Bus (> 10 people)	4	4.9
– Truck or heavy car	4	4.9
– Bicycle	4	4.9
– Other/Unknown	42	51.9

Not all the respondents responded to these questions.

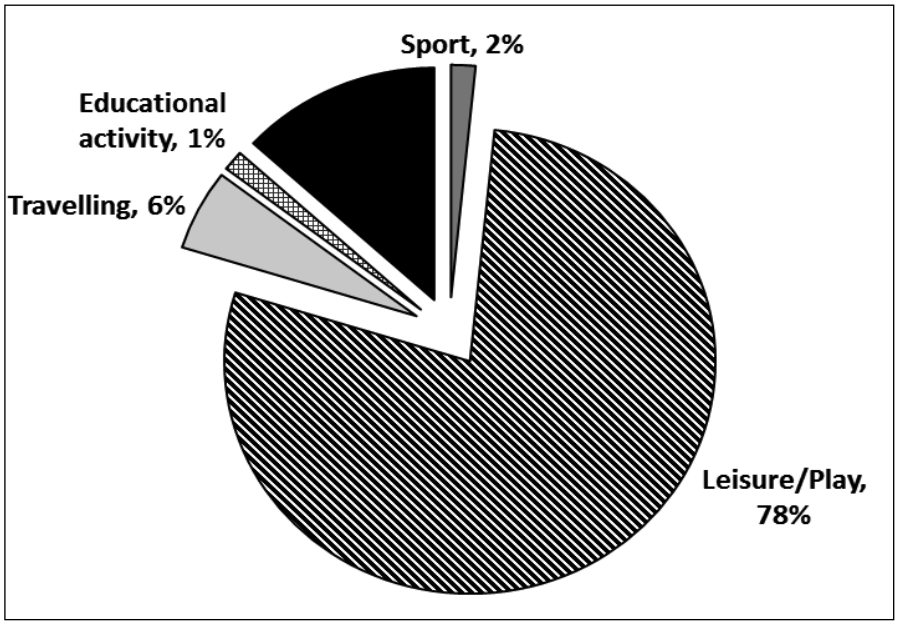

Figure 1: Activity of children at time of injury

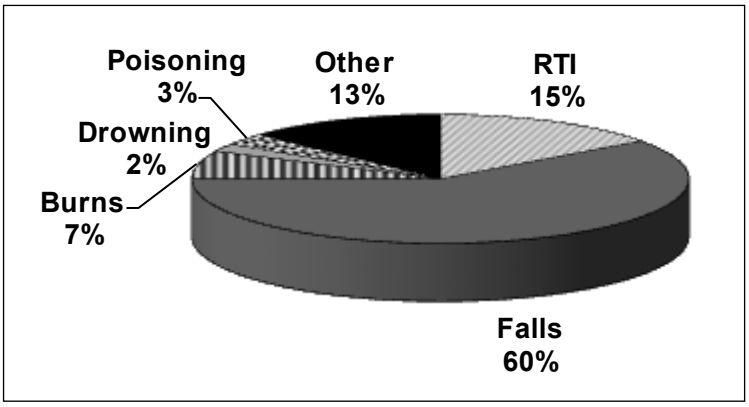

Figure 2: External causes of injuries among study children

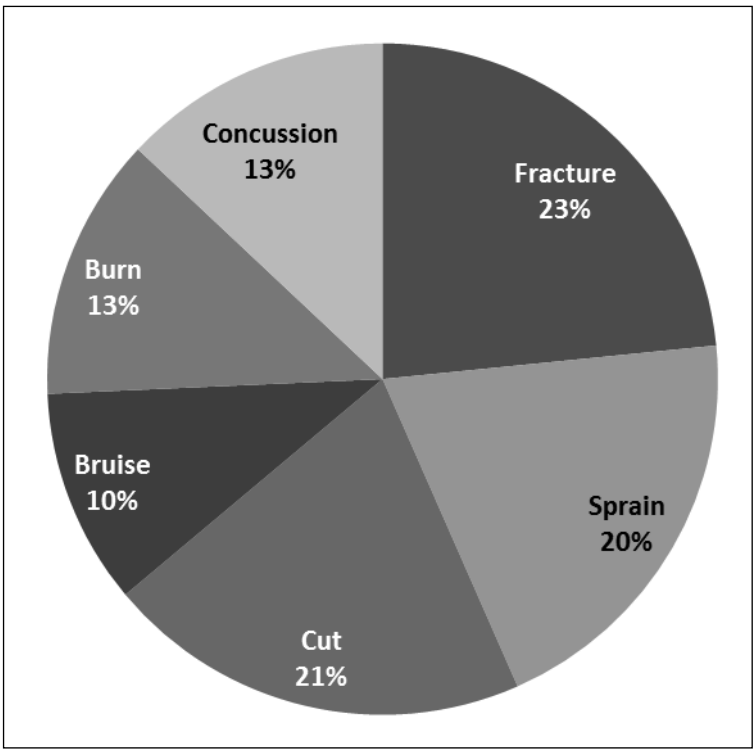

Figure 3: The most severe childhood injuries sustained

DISCUSSION

This study describes the Egyptian chapter of the Global Childhood Unintentional Injury Surveillance (GCUIS) study in four cities in developing countries (Hyder et al 2009). The study describes ED-based injury surveillance systems for children in Egypt, based on a standardised method. The results provide insight into the burden of childhood injuries in Ismailia city in Egypt.

The present study showed that the most common external causes of injuries were falls (60%), road traffic injuries (15%) and burns (7%). Males included two- thirds (66%) of all injured children presented to the ED. The GCUIS study reported that the proportion of external causes of injuries in the four study sites (Egypt, Pakistan, Bangladesh and Colombia) were fairly similar (Hyder et al 2009).

Although fall injuries were numerous in this study, they caused much lower morbidity than road traffic injuries or burns. In many parts of the world, most childhood injuries treated in hospitals are due to falls that occur mainly at home (Bangdiwala et al 1990). These findings were common in the other countries involved in the GCUIS study (Hyder et al 2009). Falls were also the most common cause of injury in an early study conducted among school children in Ismailia city, Egypt (El-Sayed et al 2003). Furthermore, a study conducted in Tanzania reported that falls were also the most common cause of severe injuries in children less than 10 years of age (Kamala et al 2011). The study findings of a preponderance of falls from stairs or beds and other furniture while children were at play in and around the home suggests the need for a mixed intervention consisting of safer play areas, safer construction, safer furniture for sleeping and playing, and improved supervision (Butchart 2000; WHO 2005).

The fact that a high proportion of children suffered road traffic injuries (RTIs) and were either vehicle occupants or pedestrians suggests that children of all ages are vulnerable to RTIs. In studies from Pakistan, pedestrians and motorcyclists accounted for most of those injured and killed on the road, and 80% of all unintentional injuries and 67% of all resulting deaths in children were related to road traffic injuries (Razzak et al 2004). A study in Port-Said city in Egypt reported that pedestrians were involved in 81% of road traffic injuries (Hassan & El-Sheikh 1998). However, the present study showed that pedestrians represent only 12% of all RTIs. The study data also call attention to the frequent role of commercial vehicles in road traffic injuries in Egypt, where buses, trucks and three-wheelers were the striking vehicle in a large proportion of childhood injury cases. In other studies, buses have been the most common striking vehicle, even though they represent a small proportion of all vehicles on the road (Razzak et al 2004).

Most children affected by burns often required hospital admission. However, in the present study and the other countries of the GCUIS study, younger children were found to be at risk from playing near hot liquids at home (Cuenca-Pardo et al 2008; Hyder et al 2009). An epidemiological review of burns highlighted the importance of certain risk factors, such as low maternal education and lack of supervision (WHO 2006; Forjuoh 2006).

The present study and the other countries involved in the GCUIS study showed a considerable number of poisoning cases, predominantly with medicines and kerosene (Hyder et al 2009). Furthermore, our study showed that more than 57% of all families did not store hazardous material in safe places, which put children at risk of accidental poisoning that could be fatal without rapid treatment. Management of such cases requires intensive supportive care, provision of appropriate antidotes and removal of the substance from the body, all of which place substantial demands on the health-care system (Meyer et al 2007).

In the present study and the other GCUIS study countries, children who drowned or nearly drowned comprised only a small number of the injured children presenting to the ED. However, in a previous school-based study in Ismailia in Egypt, the prevalence of near-drowning among school children was 16% (El-Sayed et al 2007). This observation could be due to the fact that in low- and middle-income countries (LMICs) most drowning victims die before reaching health facilities. Our study showed that more than 43% of parents reported that they do not supervise their children while bathing, which suggests a potential point of intervention (Brenner 2002).

The results of a facility-based surveillance system such as this study cannot be representative of the entire population, as the data are dependent on how often individuals seek care for injured children and are thus subject to a host of financial, social and cultural factors and injury severity, which influence the decision to seek care (D'Souza 1999). Hospital-based data, especially in developing countries with lower rates of utilisation, underestimate the injury burden. The results of this study were therefore never meant to represent population-based morbidity from injuries.

The study focused only on unintentional injuries in children less than 12 years of age. As a result, the burden of intentional injuries (violence) and of injuries in children older than 12 years has not been captured. Another shortcoming is that the study was conducted over a period of three months; therefore, seasonal variability may have influenced the results.

Capacity development was essential for the study implementation. The Ministry of Health in Egypt is including university hospitals among MOH hospitals in the national injury surveillance programme (WHO/EMRO & MOH 2010). Since Suez Canal University Hospital will be included in this programme this study was a very useful step for capacity building in preparation for the implementation of the injury surveillance programme in the hospital

CONCLUSIONS

The results of the study illustrate the feasibility of documenting the burden of childhood injuries on health systems in Egypt and of undertaking standardised child injury surveillance. They also suggest the need for tailored injury-prevention research in the country, where the resulting data should encourage the conduct of interventional trials. The next step would be to implement appropriate injury-prevention strategies, such as safe storage of medicines and cleaning supplies, protection of children from hot liquids, improved pedestrian safety, supervision during bathing, and use of stair-blocking gates. Ongoing child injury surveillance using standardised methods in Egypt is a strategy needed to track injuries and their risk factors and to monitor the impact of appropriate interventions (WHO/EMRO & MOH 2010).

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COMPETING INTERESTS

None declared.

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