Original Article
African Journal of Paediatric Surgery
Vol. 4 (1); Jan - Jun 2007

A Prospective Study of Significant Non-fatal Injuries in Small Children in Cape Town: Lessons for Prevention

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Abstract

Background: Paediatric trauma is the leading cause of death in the 5-14 year-old age group in South Africa and elsewhere in the world, with attendant considerable morbidity.

Materials and Methods: This prospective study analyzed 100 consecutive children (under the age of 12 years old) presenting with injuries requiring admission to a trauma center in Cape Town.

Results: The most common cause of injuries were motor vehicle accidents (33%) followed by falls (31%), sports (8%), poisoning (3%), and bicycle accidents (2%). Fourteen (14%) children were injured non-accidentally. The majority of injured children were from poor socio-economic circumstances with a mean family income of 894R (130 USD) per month. Alcohol played a role in the etiology of at least 21% of the injuries.

Conclusion: Children are vulnerable to injuries in our society and there is presently too little direction on preventative aspects of these injuries.

Keywords: Trauma, Children, pattern, Cape Town.

Introduction

Trauma is a leading cause of death among children aged 1-14 years, worldwide[1]. Whereas deaths of other causes continue to decline, trauma remains a major contributor to paediatric mortality and is expected to increase. Paediatric trauma is also the leading cause of death in the 5-14 year-old age group in South Africa, the death rate in 1990 was 1.5 -3.8 times higher than in the USA[2]. The leading cause of accidental death remains road traffic accidents, but falls are the second most common cause of injury in the United States[1].

Although trauma in children has been described as 'the neglected disease of modern society', an increasing awareness of injury to children as a public health problem has resulted in the establishment of preventative programs[3-6]. Despite this global initiative, public awareness and education has not developed sufficiently in order to make a difference in the trauma profile in South Africa.

The aim of this study was to investigate the causes and types of trauma in children at the Tygerberg Hospital in Cape Town with a view to documenting the preventable aspects of such trauma.

Patients and Methods

The study was a descriptive prospective hospital based study carried out on 100 consecutive children treated at the Tygerberg Hospital in Cape Town over a 3-month period. The study population was defined as children aged 0- 13 years who presented to the Trauma Unit and subsequently admitted to the Paediatric wards of Tygerberg Hospital. The cut-off age of 13 years was used as a result of the Provincial management guidelines in which injured children over the age of 13 years can be managed in hospitals for adults. Children who were not admitted to hospital (i.e. out-patients) were excluded. Burns were not included as they were referred to Red Cross Children's Hospital in accordance with existing Western Cape

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burns policy.

Children and/or their caretakers were interviewed using a semi-structured questionnaire. The structured questionnaire included demographic information (age, sex, race, language and employment of parents) and mechanisms of injury (type, place, date of trauma and circumstances of the patient). Details of medical management were noted and preventable aspects of trauma were assessed in terms of existing prevention strategies: [The Child Accident Prevention Foundation of Southern Africa (CAPFSA)][7]. Inter-observer variation was avoided by using only one observer for all interviews. Study data were entered into a spreadsheet using Microsoft Excel for Windows 2007.

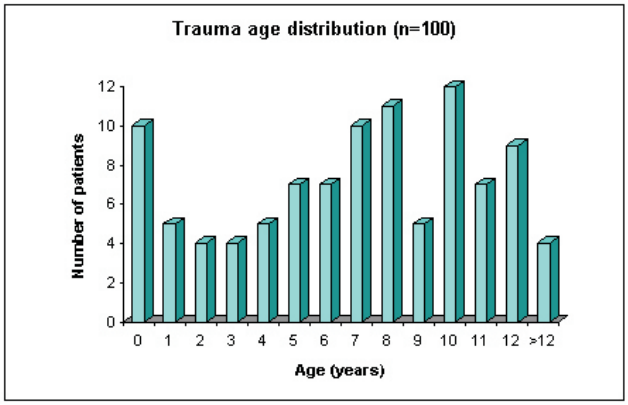
Table 1: Aetiology of Injury (*Motor Vehicle Crash)

Accident Type	Male	Female	Total
Fall	20	11	31
Transport Related	22	13	35
(MVC* Pedestrian)	(16)	(10)	(26)
(MVC* Passenger)	(4)	(3)	(7)
(Bicycle)	(2)	(0)	(2)
Sport	8	0	8
Poisoning	2	1	3
Non-Accidental	4	11	15
(Sexual)	(0)	(4)	(4)
(Stab wound)	(3)	(2)	(5)
(Gunshot wound)	(0)	(1)	(1)
(Assault)	(1)	(4)	(5)
Other	7	1	8
Total	63	37	100

Table 2: Place where Injury Occurred

Place of Trauma	Number
Street	36
Domestic	30
Park	12
School	8
Sporting Ground	4
Pavement	3
Other	7

Fig. 3: Age distribution of injured children



Results

One hundred consecutive patients under the age of 13 years were admitted with trauma during the period under study, (Male: Female=1.3:1). The highest incidence of accidental injury was in children aged between 8 and 12 years. Twenty-three (23%) children were aged 0-4 years, 40 (40%) were between 5-9 years and 37 (37%) were aged 10 years or older (Figure 1). The average age was 7 years. Sixteen (16%) children had a history of being previously involved in trauma requiring a hospital admission. Eighty patients were of mixed ethnic origin, 17 were Black and 3 Caucasian.

The majority was from poor socio-economic circumstances; the mean family income was R894 ± R915 (USD 130± USD133) per month. Fifty-four (54%) patients were living with both parents, 32 (32%) with one parent, 9 (9%) with people other than their parents and in 5 (5%) children the background could not be ascertained. In 24 families both parents were employed and in 4 families the parents or caretakers of the children were unemployed.

Traffic related injuries were the leading cause of trauma (Table 1). Of the 37 cases of Motor Vehicle Crashes (MVCs), 26 (74 %) were pedestrians, the remaining 11 children were passengers in motor vehicles. Only a minority was involved in bicycle

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accidents. All the 11 children injured as passengers were considered as preventable. Three unrestrained infants (2 were sitting on a lap in the back of a car, 1 in the front) suffered head injuries, while 4 (all above 6 years of age) were injured while sitting unrestrained or standing in the back of the car. In 9 (26%) cases of MVC the driver was influenced by alcohol and/or drugs and in another 10 cases excessive alcohol intake and/or drugs was suspected but was not proven. Proven and suspected excessive alcohol intake and/or drugs therefore were a contributory factor in 19 (54%) of the 35 traffic related crashes.

Thirteen (50%) of the 26 MVCs occurred while children were crossing the street either on the way home from school, playing or running on the road, (Table 2). Three patients sustained head injuries and fractures of long bones following a fall whilst hanging on to a moving motor vehicle, another 3 cases were as a result of driver error and in 3 other incidents, children were run over by a car while walking on a pavement or standing at a pedestrian crossing. In 2 cases children aged 3-4 years were unsupervised on the road and strayed in front of oncoming traffic. In 2 cases the exact mechanism of injury could not be established.

Bicycle accidents accounted for 2% (2) of the total. One child, who had no helmet on his head at the time, fell against the handlebars. The other child was run over by a car and was admitted to hospital with a fractured femur and tibia.

There were 8 sportrelated accidents. Home-related accidents accounted for 4 injuries. Two patients were cut by sharp objects, 1 patient suffered a dog bite and 1 was injured by a dislodged stone.

Fifteen children were injured non-accidentally, 6 by penetrating trauma (5 stabs, 1 gunshot). The patient with the gunshot was injured by a stray bullet. Five children were intentionally stabbed with sharp objects. In 2, a family member under influence of alcohol caused the stab. One patient was stabbed as part of gang-related violence. Four girls were abused, the reasons varied from neglect or sexual abuse.

Intentional injury occurred in 4 patients; 1 child was pushed from a climbing frame, another from a wall; a child's hand was injured in a machine following a push and another child was intentionally tripped while playing sport and fell onto a piece of glass.

Discussion

Trauma is an increasingly important factor contributing to paediatric mortality[1], despite the fact that deaths of other causes continue to decline in children. Falls are the most common cause of injury in the United States and elsewhere, but motor vehicle crashes are the largest cause of traumatic deaths[8,9]. Although falls were a relatively less important contributor to death in childhood in this series, they appeared to result in a higher morbidity[5].

The age at which children are injured appears to be important[10]. In this study, only injured children under the age of 13 years were assessed.

Unlike other studies which concentrate only on mortality data[3,9], this study analysed patients with significant but non-fatal injuries because prevention programs should focus not only on fatal but also non-fatal injuries[1].

In this study, falls were the second major single cause of childhood trauma after MVCS and injuries due to falls tended to be associated with a high morbidity. Domestic accident was significant in this report. Although organizations such as CAPFSA has been instrumental in having a number of legislations to prevent many domestic accidents, improved parental supervision is crucial and should be encouraged. Community-based prevention programs from community centres, churches etc, targeted at the appropriate populations are desirable in this regard.

Intentional trauma is not often addressed in other studies but appears to be increasing in our population. In 1997, Tygerberg hospital admitted 13 cases of childhood assault (0.5 %) but during this 3-month prospective study there were 15 cases (15%). The reason for this increase is unclear, but may be due to under-reporting previously.

The two major places where accidents took place

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were the street (36 cases) and near the house (30 cases). Most of the accidents in this study happened in the afternoon, after school (59%). This would suggest that children appeared to be more at risk when they are on their way home from school or playing in the street after school, mostly without adult supervision.

In this regard, the role of scholar patrols and supervision of children exiting school should be re-emphasized. Supervision of children while crossing the streets is important, especially when they are young. Dunne et al[9] reported that in the childhood age groups parents overestimated the abilities of their children to cross streets safely, but children under the age of 8 years are not neuron-developmentally matured enough to protect themselves[10]. Therefore parents should be made more aware of their children's street-crossing' skills, for instance by means of public training programs.

The role of alcohol in trauma should not be underestimated and may be higher in pedestrian injuries than recorded. In this study, in 9 instances the person causing the accident was definitely under the influence of alcohol. In a further 14 cases the patients or their parents did not know if the perpetrator was under influence of alcohol. Alcohol abuse is a major problem in South Africa. The legal blood-alcohol limit was 0.8 gram/literl in South Africa.

An important reason for the high accident rate is that cars exceed the speed limit, particularly in residential areas. Most of the children in this study were involved in accidents, playing on street, crossing the street or just running in the street. To achieve a reduction in these types of accidents, children should be separated from traffic. In certain areas, because of a paucity of playgrounds, streets act as play areas. A preventive strategy could be to create more playgrounds for children. In addition, speed humps may be necessary to reduce over-speeding around high traffic spots.

In keeping with other studies[11,12], low economical status of patients is a risk factor for injury. The mean income of the patient's family was R894 (USD130) per month while 46 children were not living with both parents.

The male to female ratio found in this study was 1.7:1 in keeping with a male preponderance shown in other studies[1,2]. The high incidence in patients of mixed ethnic origin (80%) in this study is in keeping with the pattern of referral to Tygerberg Hospital. Because of the variety of cultures in South Africa development of national injury prevention programs that are culturally and socially appropriate are in need of being developed.

Rivara[8] reported that 29 % of traumatic deaths

Une étude prospectives de graves blessures non-mortelles chez les petits enfants à Cape Town: leçons pour la prévention

Résumé

Arrière-plan: Le traumatisme pédiatrique, qui s'accompagne d'une morbidité considérable, est la cause principale de mort chez les enfants âgés de 5 à 14 ans en Afrique du Sud et ailleurs dans le monde. ***Matières et méthodes:*** Cette étude prospective a analysé 100 enfants consécutifs (âgés de moins de 12 ans) affligés de blessures exigeant l'hospitalisation à un centre de traumatisme à Cape Town. ***Résultats:*** Les causes les plus fréquentes des blessures étaient des accidents de voiture (33%) suivis des chutes (31%), des sports (8%), de l'empoisonnement (3%), et des accidents de la bicyclette (2%). Quatorze (14%) des enfants ont été blessés de façon non accidentelle. La majorité des enfants blessés étaient issus de circonstances socio-économiques pauvres avec un revenu familial moyen de 894R (130 USD) par mois. L'alcool a joué un rôle dans l'étiologie d'au moins 21% des blessures. ***Conclusion:*** Les enfants sont vulnérables aux blessures dans notre société et il y a actuellement très peu d'indications sur les aspects préventifs de ces blessures. ***Mots-clés:*** Traumatisme, enfants, mode, Cape Town.

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