

Childhood Trauma Profile at a Tertiary Care Hospital in India

SUMIT VERMA, NEENA LAL*, RAKESH LODHA AND LAKHIRAM MURMU*

From the Departments of Pediatrics and Emergency Medicine*, All India Institute of Medical Sciences, Ansari Nagar, New Delhi, India.

Correspondence to: Dr Sumit Verma,
Senior Resident,
Department of Pediatrics,
All India Institute of Medical Sciences,
New Delhi 110029, India.
E-mail: drsumitverma@yahoo.com
Manuscript received: July 11, 2007;
Initial review completed:
October 4, 2007;
Revision accepted: April 23, 2008.

Childhood injuries are the leading cause of morbidity and mortality worldwide. We evaluated the type of pediatric injuries encountered in the emergency room amongst 225 children (boys 151, girls 64; age range, 2 mo-12 yr). Data were collected using a structured injury proforma over a period of 12 months. Injuries occurred at home (n=137, 60.8%), street (n=38, 16.8%), and playground (n=37, 16.4%). Most frequent injuries were falls (n=144, 64%) and road traffic injuries (RTI) (n=37, 16.4%). Injuries mostly consisted of fractures (n=72, 32%), bruises (n=39, 17.3%), and lacerations (n=35, 15.5%). Child abuse was recognized in 7 (3.5%) children. There was an average delay of 2 hour 50 minutes to reach the medical facility.

Keywords: Child abuse, Fall, Injury, Road traffic injuries.

Children are prone to injuries. According to the World Health Organization Report 2002, injuries were the sixth leading cause of morbidity and mortality in childhood(1). We conducted a prospective study to describe the injury profile of children attending emergency services at a tertiary care hospital in New Delhi, India.

METHODS

A prospective study was conducted from March 2006-February 2007, at the emergency services of a tertiary care hospital with approximately 3,000 pediatric injury visits annually. Resident doctors from pediatrics, orthopedics, pediatric surgery and neurosurgery are available round the clock in this service. Doctors from other specialties were available on call. The pediatric emergency service is well-equipped with an X-ray machine, emergency laboratory, CT scan and a minor operation theatre.

Data were collected in the shifts when the chief investigator was on duty (SV). A study proforma

with 24 variables was used to collect information about the injured child(2). Detailed information on place of injury, activity at time of injury, mechanism involved, intent and nature of injury was taken. A pictorial diagram to mark the injured site was included. Injuries were classified as minor, moderate or severe. Minor injuries included bruises and minor cuts. Moderate injuries included fractures and lacerations requiring skilled intervention in the form of fracture reduction and suturing, respectively. Severe injuries were the ones which received intensive surgical and medical management. Provisional working diagnosis in the emergency service was included in the study proforma. Disposition/outcome of all children from emergency service was recorded. Descriptive statistics were used to analyze the data.

RESULTS

Two hundred and twenty five children with a mean age of 6.14 years (range 2 months to 12 years) were enrolled. Males outnumbered females with ratio of

2.35:1. School children (6-12 years) were most commonly injured 50.6%, followed by preschoolers [(3-5 years) 26.6%], toddlers [(1-2 years) 18.6%] and infants [(0-1 years) 4%], respectively. Home was the most common place of injury [137 (60.8%)]. Other sites included street/highways [38 (16.8%)], park/playground [37 (16.4%)], school [8 (3.5%)] and miscellaneous (workplace, neighborhood etc.) [5 (2.2%)]. The site, nature, severity, mechanisms and activities at the time of injury are tabulated by the place of injury (**Table I**).

Pain [189 (84%)] ranked first among symptom complex in our patients. Bleeding and restricted movement of limbs constituted 86 (38.2%) and 59 (26.2%) of signs and symptoms, respectively. Loss of consciousness was seen in 22 (9.7%) children. Swelling of injured site and other signs (seizures, excessive crying) were seen in 17 (7.5%) and 8 (3.5%), respectively.

Consultations were taken for injured children included opinion and management by orthopedicians in 90 (39%), neurosurgeons in 65 (28.8%), pediatric surgeons in 56 (24.3%) and, ENT and dental specialists in 6 (2.6%) cases each. Other specialties involved in care included pediatric neurology and plastic surgery in 2 (0.8%) cases each and Poison Cell in 3 (1.3%) cases. Plain X-ray of the injured site was most commonly ordered in 121 (53.7%) followed by computed tomography of the head in 48 (21.3%) and ultrasonography of the abdomen in 6 (2.6%).

On an average, children were brought to hospital 168 minutes (range 10 to 2880 minutes) following an injury. The injured children were most commonly brought to the hospital by their father alone [111 (49.3%)], followed by both parents [42 (18.6%)], mother [39 (17.3%)], police [9 (4%)] and others (teachers, uncle, aunts, brothers or sister) [24(10.6%)]. Of the 70 children with minor injuries, 62 (88.5%) were treated and discharged whereas the rest were discharged after observation. Of those with moderate injuries ($n=129$), 98 (76%) and 5 were similarly managed, respectively. From amongst the 26 severely injured children, 23 (88.4%) were admitted and 1 was brought dead. 19.3% (25) of the moderately injured required admission.

DISCUSSION

Injury is defined as transfer of kinetic, thermal, radiation or chemical energy to the human body leading to tissue damage and destruction at cellular level. There are risk or protective factors identified and severity of injuries being predictable. However, accidents are defined as happenings that are not expected, foreseen or intended. They imply randomness and lack of predictability. This paradigm shift from “inevitability of accident” to “predicting and preventing injury” is an important public health issue(3).

Studies done over last few decades from Thailand(4,5), Singapore(6,7) and major Indian cities(8-10) have shown boys more commonly injured as compared to girls, home followed by road related injuries the most common site and falls being the most common mechanism leading to face and head injuries. Our study results are in consonance with the above study results with an increasing trend towards motor vehicle accidents and intentional injuries.

Emphasis on “agent-host-environment” model and understanding of the pre-event, event and post-event phases (Haddon’s matrix) have led to identification of many risk factors associated with childhood injuries(11). A child’s curiosity, limited knowledge, developmental ability at certain age, anatomical disadvantage along with inappropriate adult supervision, poor socioeconomic status, maternal factors like age, education, physical and mental health(12) in an unsafe environment sets the stage for childhood accidents.

In the present study, fall from heights (terrace/roof-tops) were related to the lack of awareness amongst the parents to make home a safe place for the child. Road traffic accident was second in order with streets and highways both equally dangerous. Ensuring rear seat placement of children has shown to decrease injury related morbidity and mortality and needs to carefully looked and inculcated into our system(13).

The limitation of the study was the sample size; we could not include all injured children over a period of 1 year due to shortage of manpower and

TABLE I SITE, NATURE, SEVERITY, ACTIVITY AND MECHANISM OF INJURIES IN CHILDREN (%)

Characteristics	Home <i>n</i> =137	Street <i>n</i> =38	Park <i>n</i> =37	School <i>n</i> =8	Others <i>n</i> =5	Total <i>n</i> =225
<i>Site of injury</i>						
Head and neck	88 (64.2)	15 (39.4)	9 (24.3)	1 (12.5)	4 (80)	107 (47.5)
Upper limb	35 (25.5)	9 (23.6)	18 (48.6)	5 (62.5)	1 (20)	68 (30.2)
Lower limb	25 (18.2)	19 (50)	11 (29.7)	1 (12.5)	1 (20)	57 (25.3)
Thoracic	1 (0.7)	0	1 (2.7)	0	0	2 (0.8)
Abdominal	5 (3.6)	1 (2.6)	1 (2.7)	0	0	7 (3.1)
<i>Nature of injury</i>						
Fracture	42 (30.6)	13 (34.2)	16 (43.2)	2 (25)	3 (60)	72 (32)
Bruise	21 (15.3)	13 (34.2)	2 (5.4)	1 (12.5)	2 (40)	39 (17.3)
Laceration	17 (12.4)	7 (18.4)	9 (24.3)	1 (12.5)	1 (20)	35 (15.5)
Open wound	20 (14.5)	5 (13.1)	4 (10.8)	2 (25)	0	32 (14.2)
Concussion	25 (18.2)	4 (10.5)	1 (2.7)	0	1 (20)	31 (13.7)
Sprain/dislocation	9 (6.5)	0	3 (8.1)	3 (37.5)	0	15 (6.6)
Clean cut	3 (2.1)	2 (5.2)	3 (8.1)	0	0	8 (3.5)
Others	4 (2.9)	2 (5.2)	1 (2.7)	2 (25)	0	8 (3.5)
<i>Severity</i>						
Minor	43 (31.3)	12 (31.5)	10 (27)	3 (37.5)	2 (40)	70 (31.1)
Moderate	76 (55.3)	21 (55.2)	25 (67.5)	5 (62.5)	0	129 (57.3)
Severe	15 (10.9)	6 (15.7)	2 (5.4)	0	3 (60)	26 (11.5)
<i>Activity</i>						
Playing	120 (87.5)	10 (26.3)	33 (89.1)	6 (75)	3 (60)	172 (76.4)
Traveling	0	34 (89.4)	4 (10.8)	1 (12.5)	0	39 (17.3)
Working	4 (2.9)	1 (2.6)	0	0	2 (40)	7 (3.1)
Sleeping	4 (2.9)	0	0	0	0	4 (1.7)
Studying	1 (0.7)	0	0	1 (12.5)	0	2 (0.8)
Others	1 (0.7)	0	0	0	0	1 (0.4)
<i>Mechanism</i>						
Fall	92 (67.1)	15 (39.4)	28 (75.6)	6 (75)	3 (60)	144 (64)
RTI*	0	37 (100)	0	0	0	37 (16.4)
Blunt trauma	12 (8.7)	1 (2.6)	6 (16.2)	0	1 (20)	20 (8.8)
Animal bite	5 (3.6)	5 (13.1)	2 (5.4)	0	0	12 (5.3)
Child abuse	4 (2.9)	0	2 (5.4)	1 (12.5)	0	7 (3.1)
Burns	4 (2.9)	0	0	0	0	4 (1.7)
Poisoning	3 (2.1)	0	0	0	0	3 (1.2)
Firearm/stabbed	1 (0.7)	0	2 (5.4)	0	0	3 (1.2)
Electrocution	1 (0.7)	0	1 (2.7)	0	0	2 (0.8)
Drowning	1 (0.7)	0	0	0	0	1 (0.4)
Others	2 (1.4)	0	0	0	0	2 (0.8)

*RTI: Road traffic injuries

WHAT THIS STUDY ADDS?

- Falls and Road traffic injuries are leading cause of injury visits to the pediatric emergency.

dengue fever outbreak shifting the impetus away from injuries. To sum up, our study adds information on childhood injuries currently prevailing in India.

Contributors: SV conceived the study idea and took care of injured children along with RL and LM. SV and NL gathered data and with RL and LM drafted the manuscript. RL critically analyzed and edited the manuscript.

Funding: None.

Conflict of Interest: None stated.

REFERENCES

1. Child and Adolescent Injury Prevention: a Global Call for Action. World Health Organization; March 2005. Available at www.who.int/violence_injury_prevention/other_injury/childhood/en/index.html. Accessed on April 13, 2008.
2. Holder Y, Peden M, Krug E, Lund J, Gururaj G, Kobusingye O. Injury Surveillance Guidelines. Geneva: World Health Organization; 2001.
3. Langley JD. The need to discontinue the use of the term "accident" when referring to unintentional injury events. *Accident Analysis Prevention* 1988; 20: 1-8.
4. Ruangkanchansaasetr S. Childhood accidents. *J Med Assoc Thai* 1989; 72: 144-150.
5. Kozik CA, Suntayakorn S, Vaughn DW, Suntayakorn C, Snitbhan R, Innis BL. Causes of death and unintentional injury among school children in Thailand. *Southeast Asian J Trop Med Public Health* 1999; 30: 129-135.
6. Ong ME, Ooi SB, Manning PG. A review of 2,517 childhood injuries seen in Singapore emergency department in 1999- mechanism and injury prevention suggestions. *Singapore Med J* 2003; 44: 12-19.
7. Thein MM, Lee BW, Bun PY. Childhood injuries in Singapore: a community nationwide study. *Singapore Med J* 2005; 46: 103-105.
8. Kulshrestha R, Gaiind BN, Talukdar B, Chawla D. Trauma in childhood-past and future. *Indian J Pediatr* 1983; 50: 247-251.
9. Sitaraman S, Sharma U, Saxena S, Sogani KC. Accidents in infancy and childhood. *Indian Pediatr* 1985; 22: 815-818.
10. Sharma AK, Sarin YK, Manocha S, Agarwal LD, Shukla AK, Zaffar M, *et al.* Pattern of childhood trauma: Indian perspective. *Indian Pediatr* 1993; 30: 57-60.
11. Home LD, Huttly SR, Abramsky T. Risk factors for injuries in young children in four developing countries: the Young Lives Study. *Trop Med Int Health* 2006; 11: 1557-1566.
12. Haddon W Jr. The changing approach to epidemiology, prevention, and amelioration of trauma: the transition to approaches etiologically rather than descriptively based. *Am J Public Health Nations Health* 1968; 58: 1431-1438.
13. Petridou E, Skalkidou A, Lescohier I, Trichopoulos D. Car restraints and seating position for prevention for motor vehicle injuries in Greece. *Arch Dis Child* 1998; 78: 335-339.