

Original Research Article

Epidemiology and pattern of paediatric trauma in one of the biggest trauma centres of India

Abhijeet Kunwar, Birju Manjhi*, Anand Saurabh, Shubhanshu Shekhar

Department of Orthopaedics (Trauma Centre), Institute of Medical Sciences, BHU, Varanasi, U. P., India

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*Correspondence:

Dr. Birju Manjhi,

E-mail: manjhibirju@gmail.com

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ABSTRACT

Background: The objective of the study was to assess the epidemiology and pattern of trauma in paediatric patients coming to a tertiary care trauma centre in Purvanchal region of country.

Methods: Study was conducted at Trauma Centre, Institute of Medical Sciences, BHU. A retrospective data was collected from the emergency entry record book for the paediatric patients coming to emergency with trauma from January to December 2018. A total of 328 patients were included in study. Patient with accidental hanging and those of sexual assault and drowning were not taken in study.

Results: Patients in the age group of above 6 years were most numerous 61%. Boys were more commonly injured than girls of same age group with M: F being 1.4:1. Fall was the most common mode of injury overall 45.12% and for the children below 6 years of age 63%. However, RTA was the most common cause in children of above 6 years age group 40.5%, closely followed by fall. Home was found to be the most common location of injury. Females outnumbered males in case of assault injury (7 of 12). Musculoskeletal injury was most common 42%, head injury 27%, polytrauma 12%, while superficial injuries in form of abrasion, contusion etc were 19%. Of all 42% were taken inpatient, 50% discharged on OPD basis and 8% went LAMA.

Conclusions: Most of the times the paediatric traumas occur in foreseeable circumstances, most of them occurring at home or around it suggesting the need for more supervision during playing and identification of specific risk factors for these injuries in our setting. Planning of strategies should be according to the epidemiological trends.

Keywords: Epidemiology, Pediatric, Fall

INTRODUCTION

In past few years, there has been substantial decrease in child mortality worldwide due to continuous and sustained steps taken in this direction. However, most of these initiatives have focused on reducing the burden of communicable diseases. At the same time, however children saved from these diseases are becoming victims of trauma on roads, streets, play areas, or at home. Trauma is emerging as an epidemic and a leading cause of morbidity and mortality in children. The WHO estimates that injuries are the cause of death in one million children

per year, however certain studies suggest that this number can be as high as 5 million per year worldwide.^{1,2} Paediatric trauma is a very significant cause of mortality and disability, being responsible for more deaths than all diseases combined.³ Children <15 years of age comprise about 32.8% or about 1/3rd of the total Indian population.⁴ The burden of child injuries in India is not clearly known because our knowledge is inadequate about their epidemiology, however according to certain data in India, up to one fourth of hospital admissions and approximately 15% of deaths in children are due to injury.⁵ As per National Crime Records Bureau (NCRB) report of 2006,

there were 22,766 deaths (<14 years) due to injuries among children.⁶

Though the principles of paediatric trauma management are similar to adults, anatomical peculiarities and differences in physiological reserve confer additional responsibilities on the treating doctor for an optimal outcome.^{7,8} It is very important to delineate a problem statement for our own region when gearing up to tackle this menace. A study on epidemiology of paediatric trauma can help to formulate effective injury prevention programs and hence decrease the paediatric trauma burden and their disability at the initial level.⁹ There are very few studies describing the epidemiology, prevalence, and potential risk factors of paediatric trauma in developing countries.¹⁰ Some researchers suggest falls as the most common mechanism, others report road traffic accidents (RTAs) as the most common cause. As trauma burden, pattern, mode of injury, site of injury, and outcome varies from region to region and also in different age groups, it is essential to understand these characteristics to formulate effective injury prevention strategies. This study is an attempt to describe the pattern of trauma, type of injuries, and epidemiology among paediatric population of Purvanchal region of India.

METHODS

This was a retrospective study conducted at Trauma Centre, Institute of Medical Sciences, Banaras Hindu University (BHU). Ethical clearance was obtained from the ethical committee of our institute. All the children up to age of 15 who came to emergency of our centre with history of trauma over a period of January to December 2018 were taken for the study. Data was collected retrospectively from the emergency ward entry record book with special emphasis on age, gender and mode of trauma. Patient with a history of sexual assault, accidental hanging and drowning were excluded from this study. Applying above criteria, we had 328 patients over these 12 months duration.

Record of approximate duration from the time of injury till the presentation to emergency was also noted. The children enrolled in the study were divided into two groups up to 6 years of age and more than 6 years of age. A note was also made about whether the patient received treatment at our centre primarily or was referred to us after primary treatment. Record was also checked for the kind of trauma i.e. whether the injury was to head, musculoskeletal system or was a polytrauma. How many patients were admitted or needed inpatient treatment and how many were discharge on OPD basis. Kind of trauma and mode of injury was recorded on age group basis. Burn patients were not included in the study as they are catered in another branch of emergency of our institute.

The data thus collected were subjected to statistical analysis using SPSS version 23.

RESULTS

According to the data collected in our study patients in the age group of 6 to 15 years suffered more injury 61% than children of the group less than 6 years 39% as shown in (Table 1).

Fall was the major cause of injury in children of age group less than 6 years 63% and RTA was the predominant cause of injury in the age group of 6 to 15 years 40.5% however fall was the most common cause combined for both the age group together 45.1%. Fall and RTA constituted about 80% of the cases that were enrolled in the study. Among the total cases of Fall injury, fall from the bed was the most common cause for the children under 6 year of the age group, while fall from the roof was the major source of injury for the patient in age group of 6 to 15 years (Table 1).

In both age group combined together; females were more common victim of assault than the males (7 of 12) (Table 1).

Table 1: Age group wise distribution of mode of injury.

Mode of injury	Upto 6 years N (%)	6-15 years N (%)
Total patients injured (n=328)	128 (39)	200 (61)
Total patients injured due to fall	148 (45.12)	
Fall from roof	28	22
Fall from tree	12	16
Fall from bed/chair	29	8
Play ground	12	21
Total patients injured due to RTA	117 (35.67)	
Hit by vehicle	24	49
Fall from vehicle	12	32
Assault	2	10
Machinery injury	6	26
Fall of heavy object	3	16

Male paediatric population contributed 191 of injured children approximating to 58.24% of the while females contributed around 41.76% in total paediatrics cases, hence making M: F ratio of 1.4:1 (Table 2).

Table 2: Gender wise incidence of trauma (n=328).

Gender	N (%)
Males	191 (58.24)
Females	137 (41.76)
Male: female	1.4:1

Among the RTA patients hit by vehicle was the major source of injury mostly pedestrian followed by fall from vehicle either as Rider or pillion rider. Mean time to reach the emergency since the time of injury was found to be 10±1.1 hours with the range of 2 hours to 36 hours.

Of total paediatric population coming to trauma centre 62% were referred from local centres after the primary treatment while 38% of patients got primary treatment at trauma centre.

Of all the injuries noted musculoskeletal injuries constituted about 42%, followed by head injury 27%, 12% of them were polytrauma, among these polytrauma patients blunt trauma abdomen was the most common entity along with head injury (less common) or musculoskeletal injury (more common) while 19% had injuries in form of abrasion contusion laceration and cut injuries (Table 3).

Table 3: Distribution according to anatomy of injury.

Type of injury	Number of patients N (%)
Orthopaedic injury	Upper limb - 65
	Lower limb - 46
	Spine - 12
	Pelvis - 5
	More than one fracture - 10
Head injury	89 (27)
Polytrauma	39 (12)
Superficial injury	62 (19)

Of the total paediatric patient coming to trauma centre 42% was admitted or needed an inpatient treatment while 50% patient were discharged from emergency on OPD basis and 8% went LAMA.

DISCUSSION

Trauma centre of our institute is so located that it touches the boundary of 5 states, catering to patients coming from all these areas and no wonder it has a patient turnover rate at par to any hospital of the country. Trauma is defined as any physical damage to the body resulting from abrupt exposure to forces exceeding the tolerance level, or the lack of warmth or oxygen. It usually occurs under foreseeable circumstances, so it is very important to recognize those settings where preventive measures could be implemented.

It has become evident that trauma is an emerging cause of pediatric population morbidity, mortality as well as impairment both in developing and developed countries. Accidental injuries of paediatric population are on the rise and have become an important social problem.¹¹ Injuries account for about 12% of the disease burden worldwide

and place a disproportionate burden on countries with limited resources.¹³ In 2004, over 9.5 lakh children under 18 years died as a result of injuries.¹⁴

Many children who survive trauma may develop a temporary or permanent disability, requiring continuing care and has a significant impact on their psychosocial health and financial burden.

Older children are at higher risk since they are more curious in nature and inquisitive, and also because of their mode of reaction and their impulsiveness. As the recreational, outdoor activities increase with age, so does the frequency of injuries. Like many studies done in different part of world like Iran, Singapore, Thailand, and India itself in the past showed that boys are more prone to be involved in trauma events.¹⁵⁻²⁵ Our result also matched these previous studies with M:F ratio in our study being 1.4:1.

There could be several possible explanations for these findings. Male children are given more freedom, opportunities, and facilities than females in all aspects in our society. Likewise, they are more exposed to potential risk factors and potential environment suitable for trauma such as playing on roads, rooftop, on trees, or near construction sites. The cultural role of males as bread earners could also be responsible for increased likelihood of being exposed to potentially risky environment.²⁶ The studies of Kulshrestha et al and Verma et al have also revealed that boys were more commonly involved as compared to girls.¹⁵⁻¹⁷

Although RTA was found to be the major cause of trauma in older age group children, however fall was the most common cause in younger children and both age groups combined as well. This way our study is in concordance with Sharma et al study and similar studies performed in different geographic regions which also showed that fall was the most common cause of paediatric injuries followed by RTA.^{7,27-30} A similar study in Nepal reported that falls were the most common injury, occurring in 65% of study participation.³¹ This was however in contrast to study by Babu et al and Kundal et al where they found RTA to be the leading cause of trauma, however their study was in predominantly urban set up.^{32,33}

Incidence of assault injury was slightly higher among female paediatric population compared to male child; this might be because of the girl child are not as preferred as the male child in this part of the country.

We cater mostly the population of eastern UP and northern Bihar with a serving radius of about 150kms. Population in his region have a low literacy rate and socioeconomic status of most of these patients is below average greatly affecting the possible outcome of the patient. As found in our study around 62% of the patient come to us through local district hospital and local centres after the primary treatment, however the referral system appears to need

some consolidation in order to keep the load of a tertiary centre in check.

It is interesting to note that fall and RTA together constituted approximately 80% of total enrolled patient a result similar to that found in study of Babu et al.³² More so most of these fall occurred at home suggesting the need for more supervision during playing and identification of specific risk factors for these injuries in our setting, like most of the roof or terrace in our region don't have any railings, predisposing the children to risk of fall, similarly the construction of stairs most of the time is not according to adequate standards and also without protection. In case of RTA as well children playing roadside unattended is a major problem in this part of the world specially in low socioeconomic group where mother and father both are busy earning bread, similarly under aged driving two wheelers is also a menace. Pillion rider not wearing helmets is cause of severe trauma.

Limitations

Being an exclusive trauma centre, it was not possible to find the prevalence of trauma among overall paediatric patients. Since ours is a tertiary centre with most patient being transferred from local centres, we might not be getting the exact picture of incidences of paediatric trauma in surrounding. As in case of any retrospective study, fine details for each and every patient was not possible.

CONCLUSION

As seen in this study and as evident from so many studies in the past that most of the times the paediatric traumas occur in foreseeable circumstances, most of them occurring at home or around it suggesting the need for more supervision during playing and identification of specific risk factors for these injuries in our setting. Secure playing environment for children, day care nurseries with trained staff for children of working parents can prevent lot of child injuries occurring at and around home. Strict road traffic rules with permission to drive only after legal age. A comprehensive trauma registration system is need of the hour to keep a better track on changing scenario of paediatric trauma and modify strategies accordingly. Preventive strategies should be made in paediatric patients on the basis of these epidemiological trends. As the saying rightly goes, "prevention is better than cure".

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