

Epidemiological Study of Head Injuries in Andhra Medical College, King George Hospital, Visakhapatnam

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Abstract

Background: Traumatic brain injuries has become a silent epidemic with the rapid economic, demographic, and social transformation in India in recent decades. So, a study was performed in Department of Neurosurgery, King George Hospital (KGH)/Andhra Medical College, Visakhapatnam, a city which is well-developed port city with major public and private sector heavy industries and a rapidly developing IT hub in divided Andhra Pradesh.

Materials and Methods: Study included all patients with head injury attending KGH casualty and admitted to the Neurosurgery Department with a history of trauma for the duration of 1-year from January to December 2014. Data were collected from the medical records of the study included patients in terms of the clinical history and examination, demographic variables of the patients, time of injury, type of trauma, cause and mode, associated injuries, etc., are evaluated.

Results: 753 eligible patients were included in the study and their medical records are analyzed. Road traffic accident was the most common cause of injury (72.77%). The mean age of the study population was 39.81 years (with range <1-85 years). Most of the patients affected were of the age group 21-40 years age group (39.57%), with a male predominance of 614 (81.56%) patients and more than half of the bulk were rural population (56.7%). The most common victims of trauma were skilled and unskilled labourers (34.13%). Two wheeler was the most common vehicle involved (33.53%), in road traffic injury cases. The majority of injuries occurred between 6 in the evening and 12 in midnight (39.17%).

Conclusion: The burden of traumatic brain injury in developing countries like India is increasing, and this study will help in understanding the etiology and patterns of injuries.

Key words: Head injury, Road traffic accidents, Traumatic brain injury, Trauma registry

INTRODUCTION

Trauma remains one of the leading causes of death and disability in both developed and developing countries and is the third most common cause of mortality in India.¹ Traumatic injury is evolving as a major epidemic, one among the triple epidemic namely communicable, non-

communicable diseases and injuries, is now regarded as an important public health problem in India.² Traumatic brain injury (TBI) constitutes to the high morbidity and mortality among the traumatic injuries.³ In the natural history of trauma, the interaction of the agent, the host, and the environment results in an injury or damage. Injuries caused 10% of the total deaths worldwide and 13-18% in India.² Among the total disability-adjusted life-years, 15% were due to injuries.² Road traffic injuries are the leading cause of death worldwide in people aged <30 years.¹ The mortality and financial burden caused by the disability resulting from this spectrum of injuries are largely preventable. However, the development of effective injury prevention efforts depends on reliable and detailed information on the incidence and pattern of injury. Such information is

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under reported and incomplete in developing countries like India, whereas a national wide computerized vital statistics registers and health care records are available in developed countries. This study was conducted to understand the demographic and epidemiological pattern of injuries. Data from this study, along with other similar studies, helps in making policy and planning of trauma program.

MATERIALS AND METHODS

The present study was conducted in Department of Neurosurgery, King George Hospital, Visakhapatnam during the period of January-December 2014. The study group consisted of a total of 753 head injury patients presenting to the casualty department and admitted in neurosurgery ward. The data were analyzed retrospectively from the medical records. Unknown patients were excluded from the study. Basic demographic characteristics: Age, sex, place of injury, time and date, mode of injury, the first aid providers, mode of transport to the hospital, alcoholic intoxication, Glasgow coma scale (GCS) score, severity of head injury (defined as mild [GCS - 13-15], moderate [GCS - 9-12] and severe [GCS - 3-8]), associated injuries, computed tomography results, type of management, surgical intervention or intensive care units care or conservative and Glasgow outcome scale score were recorded. In the case of road traffic injuries, type of vehicle involved and execution of safety measures at the time of the incident were recorded. The collected data are analyzed using Microsoft excel.

RESULTS

Out of the 44,732 total King George Hospital admissions, admissions due to TBI were 753 in the year of 2014. It accounts for 1.68% of the admissions, the annual incidence of TBI. The mean age of the study population was 39.81 years (with range <1-85 years). Most of the patients affected were of the age group 21-40 years age group (39.57%) (Figure 1), with male predominance of 614 (81.56%) patients with male to female ratio of 4.4:1. The highest incidence of cases were noted in the month of January to be 90 cases (11.95%) (Figure 2). The majority of the cases are from rural areas 421 cases (56.7%) followed by urban 258 cases (34.2%) and border districts of neighbour states like Odisha and Chattisgard, 74 (0.095%) who have to travel a long way through difficult transport all the way to Visakhapatnam. Illiterates constitute the major bulk 473 cases (62.86%). The most common victims of trauma were skilled and unskilled labourers (34.13%) followed by unemployed (23.5%) and business men (14.4%) (Figure 3). Married people were 74.7% among the head injury patients followed by unmarried 19.3% and widow 0.02%.

The incidence of injury with respect to the time of occurrence in a day has shown a maximum number of incidents occur between 6.00 pm and 12.00 midnight of 295 (39.17%), followed by 12 noon to 6 pm having 213 cases (28.28%) (Table 1). The incidence of trauma with respect to the place suggests most injuries occur on roads about 448 cases (59.4%) followed by injuries at home

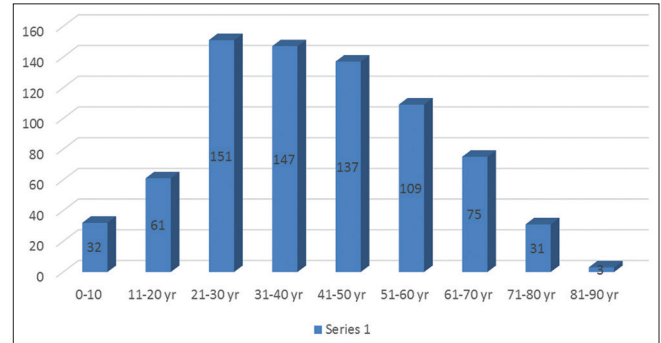


Figure 1: Age distribution

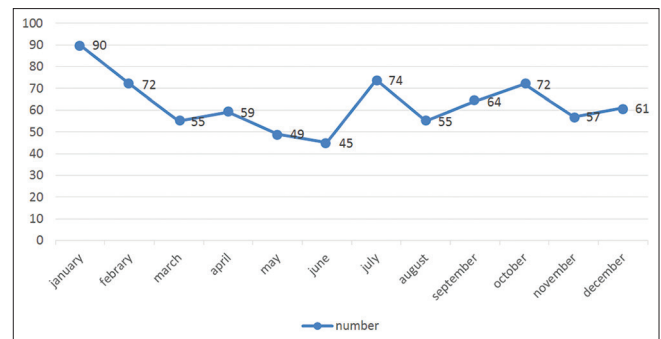


Figure 2: Distribution along month wise

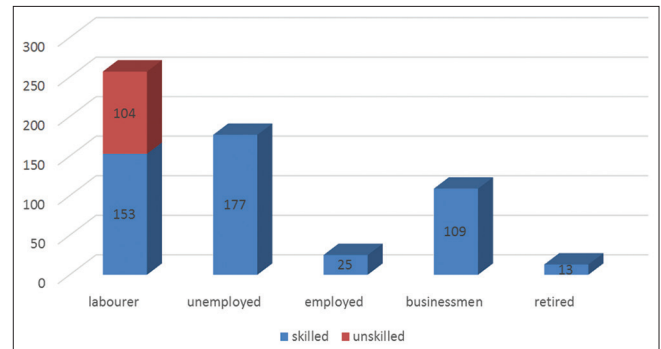


Figure 3: Profession of the patients

Table 1: Incidence of trauma with respect to time of the day

Time	Number	Percentage
06:00-12:00	118	15.67
12:00-18:00	213	28.28
18:00-00:00	295	39.14
00:00-06:00	137	18.19
Total	753	100

231 cases (30.6%), and then workplace showing 52 cases (6.9%) (Figure 4).

The most common mechanism of head injury was road traffic accidents (RTA) 548 cases (72.77%) followed by falls 73 cases (22.9%) (Figure 5). Accidents occurred under the alcoholic influence constitute to 126 cases (16.69%).

Out of 548 cases of RTA, two wheeler is the most common vehicle involved 396 cases (52.58%) followed by pedestrians (hit and run) cases 58 (7.7%), 4 wheeler 55 cases (7.3%), and 3 wheeler auto rikshaw 39 cases (5.1%) (Figure 6).

Almost none of the patients in our study were using any safety precaution like wearing a helmet or fastening seat belts while driving. Amongst the 396 cases of two wheeler injuries, only one was wearing a helmet at the time of accident. Similarly, none (55 cases of four wheeler accident victims) were on seatbelts at the time of accident. helmet, none was on seatbelts. From the site of injury, only 131 cases (17.3%) had transported by 108 ambulance service, rest were by private vehicle or ambulances.

The severity of the head injury of the patients at the time of arrival to the casualty was mild in majority 424 cases (56.3%) 13-15 GCS, followed by moderate (9-12 GCS) severity in 152 cases (20.18%), and severe in 177 cases (23.41%). Three cases were brought dead. Out of 753 case, 177 cases (23.77%) underwent emergency surgery while rest we managed conservatively (Table 2). 32 (4.2%) out of 753 cases had associated other organ injury. 156 cases (18.1%) needed ventilator support. The mortality rate was 21.1% (159 cases), most of them had a severe head injury. 69.7% (525) has a good outcome at the time of discharge (Table 3).

DISCUSSION

Changing and evolving trend of socio-economic factors especially in developing countries like India has made the injuries no more a hidden epidemic, but a major epidemic

Table 2: Diagnosis and mode of management

Diagnosis	Number	Operated	Conservative
Extra dural hemorrhage	98	43	55
Sub dural hemorrhage	118	59	59
Subarachnoid hemorrhage	69		69
Cerebral contusion/oedema	148	46	102
Depressed or compound skull fractures	27	27	
Non-depressed skull fractures	249		249
Intraventricular hemorrhage	2	2	
Diffuse axonal injury	42		42
Total	753	177 (23.5%)	576 (76.4%)

in par with other communicable and non-communicable disease epidemics. The need to implementation of safety protocols and the future progression of the injury burden was emphasized by WHO way back in 1990's, stating trauma will ascend the top 10 causes of disease burden from the ninth position to third by 2020 globally.⁴ With the implementation of the trauma protocols and safety measures lawfully, the epidemic wave has slowed in western developed countries, but the wave is exponentially growing

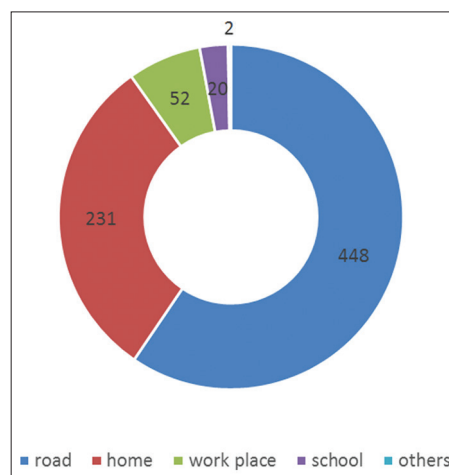


Figure 4: Incidence of trauma with respect to place of accident

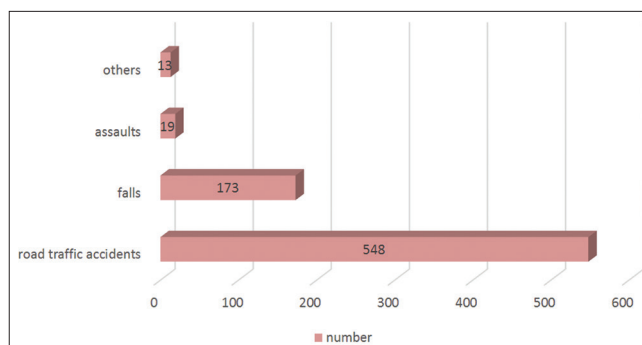


Figure 5: Incidence of trauma with respect to mode of injury

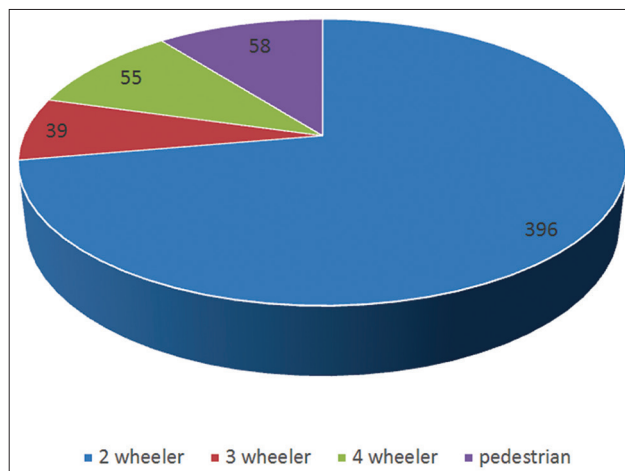


Figure 6: Type of vehicle in road traffic accidents

Table 3: Severity of injury and outcome scores

GCS	Total	Percentage	GCS				
			1 Death	2 Persistent vegetative state	3 Severe disability	4 Moderate disability	5 Good recovery
Mild (13-15)	424	56.3	20	0	0	0	404
Moderate (9-12)	152	20.18	42	0	3	20	87
Severe (3-8)	177	23.41	97	11	13	22	34
Total	753		159	11	16	42	525
%			21.03	1.4	2.1	5.5	69.72

GCS: Glasgow outcome score

in developing countries. Implementation of protocols in India, which were proven worth full in developed countries are necessary for decreasing the burden of injuries, is the main challenge for public health to execute. The WHO has taken initiative formulated - The Global Plan for the Decade of Action for Road Safety 2011-2020, for this decade (http://www.who.int/roadsafety/decade_of_action/plan/en/).

In our study, 21-50 years age group (57.7%) are the major suffers which are similar to other studies.⁵⁻¹⁰ This is also the same age group who are breadwinning and bread earning members of the family, mortality, and morbidity of the same drives the family deeper into financial crisis and psychological stress especially in families belonging to the lower middle class and below the poverty line. It also leads to economic loss to the country indirectly. Most of the people are married 71% hence any disability or death consequent to trauma leaves an enormous emotional impact on the partner and family. 4.4 times male preponderance is observed as in many other studies.^{5,7} Men for the livelihood are away from homes in comparison to women who are usually housewives. The majority of the drivers or mechanics in the vehicles or machinery as a profession are men who increase the risk of accidents more in men.¹¹⁻¹³ The seasonal variation has shown higher incidence in winter season (January 11.95%), whereas bimodal or summer peaks are seen in other studies.¹⁴ This variation could probably due to the mist and fog commonly associated with these hilly areas which can precipitate injuries due to poor vision.¹⁵

Rural population are having a higher incidence of injuries as compared to urban. This could be due to poor safety precautions of road safety such as poor quality roads, improper sign boards, poor street lights, highways going through the residential rural villages, inadequate knowledge of safety precautions due to illiteracy, and even lack of health facility nearby makes them to travel a long way which delays treatment and can increase the severity of traumatic injury in the transit.^{5,10} Labourers are by far the people commonly encountered with trauma, 34% skilled

as well as unskilled. The peak incidence of occurrence of injuries with reference to diurnal variation has shown to occur between 6.00 pm and midnight. Many studies are correlating with this time.^{6,10} The reasons could be the dim twilight condition with a day-long work stress, tiredness and fatigue and subsequent decreased alertness and caution may lead to increased chance of injuries.^{16,17}

Maximum incidence of injuries in relation to place occurred on the road (59.4%) followed by at home (30.6%), and then 6% at workplace.^{18,19} The most common cause is correlating with the other studies, but second place was injuries at home. Lacunae in the safety protocols and precautions on roads more so outside the perimeter of city limits and highways. Compromise on road dimensions, quality and associated lack of footpaths all along the way, zebra crossings, speed breakers and widespread disregard of traffic rules results in high incidence of roads, and the innocent pedestrians are also paying for it. The most common mechanism of the mode of injury showed RTA as the most common cause of injury (46.85%) followed by fall and assault injuries; these are in concordance with several other studies.^{2,7,9,19,20} National wide statistics in 2014 projected 51 cases of road accidents occur in a span of an hour.²¹ With economic reforms and transformation from agro farming to industrialisation phase in India, increasing population growth, decreasing farming due to various causes, population migration to cities, rapid urbanisation, increased purchasing power of common man, poor public transport system, and rapid motorisation with poor road safety measures has resulted in increasing incidence of RTA.⁵ Fall injuries are the next most common mode attributing to fall from a tree or electrical poll or a terrace or from heights. People due to their profession like toddy collectors or electrical linemen or for collecting wood for cooking causes for fall from tress or polls. People flying kites on the terrace and sleeping on walls of the terrace at night are also causes.²² Two wheeler accidents are the most common type of vehicle involved in accident which reflects the main modality of transport in their respective province.^{5,17,23}

Accidents occurred under the alcoholic influence constitute to 126 cases (16.69%). Both in developed and developing countries, injuries and accidents occurring due to alcohol intoxication is known major factor and is preventable.² The alcoholic breath at the time on first assessment at emergency department delays the diagnosis and in further treatment like alcoholic withdrawal symptoms.²⁴ Only 1 out of 396 cases wore the helmet, none was on seatbelts. This pathetic situation is a reflection of the failure of the authorities in the strict implementation of the road safety measures though mandated by law and lack of public inquisitiveness and responsibility for their own safety, execution of which can dramatically reduce the incidence of TBI. Only in metropolitan cities of India, helmet and seat belt usage is being implemented and being governed by traffic police, rest of the places is of the concern.

The prehospital transport of the patients to the hospital in done by 108 ambulance services in only 17.3% of cases, rest were being done by private ambulances and vehicle. The services by 108 should be extended to most of the traumatic patients with the concept of “Trauma Care for ALL.” 117 cases (23.5%) needed emergency craniotomy of burr hole evacuation rest were treated conservatively 32 (4.2%) out of 753 cases had associated other organ injury. 156 cases (18.1%) needed ventilator support the most common surgery was for cerebral contusions. The mortality rate is 21.17%; the bulk of the cases had severe head injuries with GCS <9 at the time of admission.¹⁹ The incidence death rate and morbidity of the injuries is to be reduced by a better-organized systems which include prevention, pre-hospital care, in hospital care, and rehabilitation. To achieve this goal holistic efforts are necessary from resource creation in terms of staff, equipment and funds for establishment and maintenance, awareness building up and education of the public right from the schooling level, legislation, planned and pre-programmed system for first aid provision at the scene of incident, and prehospital and hospital based care and up gradation of the existing centers at various zones within the reach of the people. The trauma care center like JPN Trauma Apex Center in AIIMS, New Delhi need not be established at all centers in India instead a cost effective and economical care centers without compromising the quality of services should be established. For doing so, adopting WHO Essential Trauma Care guidelines for trauma care, with necessary modulations in the Indian context, should be made operational. Compared to various other fields, progress in trauma care is still in a formative stage.^{25,26}

CONCLUSION

The lack of awareness among the pedestrians and disregard for traffic rules by the motorists were important reasons

for most of the accidents. Almost no use of helmets, though mandated by law, use of seat belts sparingly by the vehicle occupants, poor condition of roads, and increased social violence are recognised factors to which attention should be paid. All these aspects are preventable and need to be addressed. with the economic development, trauma care is reforming in India in the recent decade, with rapid industrialisation and motorization, the trauma care should also advance at a much faster rate to achieve the GOAL “Trauma Care for All”. The present study is first of its kind to depict the epidemiology of head injuries in and around North Andhra, though a hospital based, multi centric population-based studies are needed for complete epidemiological data. Such similar studies from various regions helps in planning and formulating public health intervention policies and development of a trauma system national wide which is cost effective, at the same time providing universal emergency care which is accessible to all as a basic right.

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