International Surgery Journal
Kanwar A et al. Int Surg J. 2019 Jun;6(6):1917-1921
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20192145

Original Research Article

One year study of epidemiology of trauma patients admitted in the main tertiary care hospital of the hilly state of Himachal Pradesh

Arvind Kanwar[1], Parikshit Malhotra[2]*, Vikas Panwar[3], Arun Chauhan[4], Dhruv Sharma[4], D. K. Verma[4]

Department of Surgery, [1]YS Parmar Government Medical College, Nahan, [2]Shri Lal Bahadur Shastri Government Medical College, Mandi at Nerchowk, [4]IGMC, Shimla, Himachal Pradesh, India
[3]Department of CTVS, IGMC, Shimla, Himachal Pradesh, India

Received: 12 April 2019
Accepted: 13 May 2019

***Correspondence:**
Dr. Parikshit Malhotra,
E-mail: drpm1972@gmail.com

ABSTRACT

Background: Trauma in Himachal Pradesh is an increasingly significant problem, particularly in light of rapid development and increasing motorization. In the state of Himachal due to the predominantly hilly terrain people are more vulnerable to accidents, resulting in various injuries. Moreover, an increase in industrialization, ongoing construction of hydel projects and subsequent increase in accidents have also affected an increase in the incidence of trauma. Social and environmental changes are resulting in alterations in epidemiology of trauma. The present study was done to study the pattern, cause, mode and burden of trauma in patients presenting to IGMC Shimla.
Methods: This prospective study was done on 4267 patients of trauma admitted to various departments of IGMC, Shimla during the period from June 2014 to May 2015. Detailed history of the patient, mode of injury was collected. Complete trauma profile and blood investigations were done in all patients. Postmortem findings of the trauma victims who died in IGMC or who were brought dead due to trauma were recorded.
Results: The mean age of the patients in the study was 33.56 years. Male preponderance was noted (M:F-2.7:1). The commonest mode of injury was due to fall (75.60%). Of the total, 72.39% patients admitted with isolated injuries confined to one particular region, 11.72% patients with multiple injuries with in a single region, 13.01% patients with polytrauma, and 2.44% patients with burns. The rate of mortality was 2.06% (n=88).
Conclusions: Improved infrastructure, behavior patterns of the individuals, can decrease the rate of trauma in the state. Development of strong and supportive management policies by the emergency departments in hospitals can reduce the mortality rate related with trauma.

Keywords: Epidemiology, Trauma, Himachal Pradesh

INTRODUCTION

Trauma is the principal public health problem in every country regardless of the level of socio-economic development and modern trauma care. However despite its huge importance, trauma has been called the neglected disease of modern society. Incidence of trauma is increasing with the increasing incidence of road traffic accidents, industrial accidents, violence and assault. Even if all surgical and medical diseases are conquered trauma will still remain. Worldwide, about 16,000 people die every day as a result of an injury (5.8 million deaths per year) and the number of deaths may rise to 8.4 million for 2020.[1,2]

As per the data published by WHO in 2018 on road safety, road traffic injuries are the leading cause of death for children and young adults of age 5-19 years. The number of deaths raised to 1.35 million by the end of 2016.[3] Trauma in India is an increasingly significant

problem, particularly in view of rapid development and increasing motorization.[4] In the state of Himachal due to the predominantly hilly terrain people are more vulnerable to accidents, resulting in various injuries. Moreover, an increase in industrialization, ongoing construction of hydel projects and subsequent increase in accidents have affected an increase in the incidence of trauma.[5]

Keeping all this in view, the present study was conducted to study the pattern, cause, mode and burden of trauma i.e. polytrauma including head injury, chest injury, abdominal trauma, burns etc., presenting in IGMC Shimla, as no such study has been done previously in the state of Himachal Pradesh in the recent past.

METHODS

This prospective study was conducted in the department of surgery of Indira Gandhi Hospital, Shimla over a period of one year from 1st June 2014 to 31st May 2015. A total of 4267 trauma patients, with their hospital stay of more than twelve hours, admitted to various departments of Indira Gandhi Medical College (IGMC) i.e. surgery, orthopaedics, ENT, ophthalmology and dental, were included in the study. Trivial injuries with duration of hospital stay less then twelve hours were excluded from the study.

In all trauma patients an appropriate primary survey i.e. general condition of the patient, pulse rate, blood pressure, respiration, hydration and pallor/cyanosis was noticed and resuscitation was initiated. A detailed history, especially history with particular reference to mode of injury, any history of alcohol/drug intake or substance abuse, time elapsed since presentation to hospital, treatment received before and during the transportation, presenting symptoms, history of allergies, medications, past medical history, last meal or oral intake and events leading to presentation, was taken. Resuscitation was continued concomitantly while a detailed physical examination was done for identification of all injuries which was followed by secondary systemic examination of the patients.

Trauma profile of the patients (X-ray cervical spine, chest X-ray, abdominal X-ray erect/decubitus and supine, X-ray pelvis and long bones etc.) as per the requirement, along with emergency blood investigations such as hemoglobin, total leukocyte count, random blood sugar, blood urea, serum creatinine, blood grouping, cross matching and electrocardiogram were done.

In order to classify the trauma patients an AIS (abbreviated injury score) was used, which is a trauma-specific, anatomically based coding system with two numerical components: (1) an injury descriptor ("pre-dot") that is unique to each injury and (2) a severity score ("post-dot") graded from 1 (minor) to 5 (critical injury), all fatal injuries scored a 6. Severity scores are consensus assessments assigned by a group of experts.

Postmortem findings of the trauma victims who died in IGMC, Shimla or who were brought dead due to trauma were recorded. The data collected in the present study was analyzed. The statistical analysis included calculation of percentages and proportions.

RESULTS

The present study was conducted on 4267 patients of trauma having their hospital stay of more than twelve hours, admitted to various departments of IGMC. Socio-demographic data of the patients is presnted in Table 1. The age of patients ranged from 1-101 years with the mean age of 33.56 years, out of which 2824 (66.18%) patients were in the age group of less than 40 years with 2263 (53.03%) patients belonging to 11-40 years age group. Of 4267 trauma patients included in the study, 3117 (73.05%) were males and 1150 (26.95%) were females.

Table 1: Socio-demographic data of the patients (n=4267).

	No. of patients (N)	Percentage (%)
Age groups (in years)		
0-10	561	13.15
11-20	600	14.06
21-30	894	20.95
31-40	769	18.02
41-50	643	15.07
51-60	408	9.56
61-70	237	5.55
71-80	98	2.30
81-90	46	1.08
91-100	9	0.21
>100	2	0.05
Sex		
Female	1150	26.95
Male	3117	73.05
Mode of injury		
RSA	709	16.61
Fall	3226	75.60
Assault	34	0.79
Occupational	161	3.77
Stab	3	0.07
Gunshot	8	0.18
Burns	104	2.43
Animal related	12	0.28
Others	10	0.23
Pattern of injury		
Single region	3089	72.39
Multiple injuries with in a region	519	11.72
Poly trauma	555	13.01
Burns	104	2.44

In the present study, fall was the commonest mode of injury accounting for 3226 (75.60%) patients followed by RSA was the second with total of 709 (16.61%) patients, occupational injuries 161 (3.77%), burns accounted for 104 (2.43%) patients. Animal assault related injuries like bear bite, leopard bite, bull horn injuries were 12 (0.28%), gunshot accounted for 8 (0.18%) patients. There were total of 34 (0.79%) patients with history of assault. Stab accounted for the least no. of patients i.e. 3 (0.07%). Miscellaneous were 10 (0.23%) including sports related injuries, and self-inflicted cut injuries. In the present study there were total of 3089 (72.39%) patients with isolated injuries confined to one particular region. Patients with multiple injuries with in a single region were 519 (11.72%), patients with poly trauma were 555 (13.01%) and burns accounted for 104 (2.44%) patients.

In the present study, 663 (20.55%) patients with fall, 108 (15.2%) patients of RSA and 8 (23.52%) patients of assault had history of alcohol consumption.

Table 2: Pattern of single regional injuries (n=3089).

Regions	No. of patients (N)	Percentage (%)
Head	171	5.54
Face	53	1.72
Neck	27	0.87
Thorax	25	0.81
Abdominal and pelvic organs	34	1.10
Bony pelvis	224	7.25
Spine	282	9.13
Upper extremity	1417	45.87
Lower extremity	772	24.99
Unspecified	84	2.72

Out of the 3089 patients who suffered single regional injury, most common site of isolated injury was upper extremity comprising 1417 (45.87%) patients followed by lower extremity with 772 (24.99%) patients. Head injuries accounted for 171 (5.54%), facial 53 (1.72%), neck 27 (0.87%), thorax 25 (0.81%), abdominal and pelvic regional injuries 34 (1.10%), bony pelvis 224 (7.25%), spine 282 (9.13%) and unspecified were 84 (2.72%) (Table 2).

Table 3: Pattern of multiple regional injuries (n=519).

Regions	No. of patients (N)	Percentage (%)
Head	201	38.73
Face	25	4.82
Thorax	47	9.06
Abdominal and pelvis	6	1.15
Bony pelvis	15	2.89
Spine	47	9.06
Upper extremity	106	20.42
Lower extremity	72	13.87

Out of the total of 519 patients who suffered multiple injuries, 201 patients (38.73%) had a component of head injury and 106 patients (20.42%) had components of upper limb injury, lower limb injuries were seen in 72 (13.87%), abdominal and pelvic injuries constituted 6 (1.15%), whereas thoracic accounted for 47 (9.06%), facial injuries were 25 (4.82%), bony pelvis 15 (2.89%).

Table 4 demonstrates polytrauma regional injuries affected by patients. Out of the total 555 patients with poly trauma, majority i.e. 492 patients (88.64%) had only 2 regional injuries while 57 patients (10.27%) had 3 regional injuries, 4 (0.72%) had injuries to 4 regions, whereas there was a single patient each with 5 and 6 regional injuries.

Table 4: Number of polytrauma injuries (n=555).

Number of regions	No. of patients (N)	Percentage (%)
2	492	88.64
3	57	10.27
4	4	0.72
5	1	0.18
6	1	0.18

In the present study burns accounted for 104 (3.28%) patients, of which flame burns were 87 (83.65%) being the most common mode. Scald burns accounted for 7 (6.7%) patients, electric burns accounted for total of 10 (9.6%) patients (Table 5).

Table 5: Types of burn injuries affected by patients (n=104).

Types of burns	No. of patients (N)	Percentage (%)
Flame	87	83.65
Scald	7	6.73
Electric	10	9.62

In our study, there were total of 88 deaths due to trauma accounting for (2.06%) of cases, out of which 42 (47.72%) were due to fall, 32 (36.36%) due to burns and 14 (15.90%) had met RSA (Table 6).

Table 6: Etiology and no. of deaths of patients (n=88).

Mode	No. of patients (N)	Percentage (%)
RSA	14	15.91
Fall	42	47.73
Burns	32	36.36

In the present study autopsy of patients who died of trauma revealed that traumatic brain injury constituted the most common cause of death with total of 32 (36.36%) deaths, out of which fall was the most common cause with total of 22 patients. Septicemia with MODS

was seen among burn patients and constituted total of 28 (31.82%), with blunt trauma chest accounting for 10 (11.36%) deaths, blunt trauma abdomen constituted 5 (5.68%) deaths.

Table 7: Traumatic deaths with exact cause (n=88).

Cause of death	Type of injury				No. of patients (N)	Percentage (%)
Traumatic brain injury	10	22	0	0	32	36.36
Blunt trauma chest	3	7	0	0	10	11.36
Blunt trauma abdomen	1	4	0	0	5	5.68
Traumatic brain injury with blunt trauma abdomen	0	4	0	0	4	4.55
Traumatic brain injury with blunt trauma chest	1	1	0	0	2	2.27
Traumatic brain injury with blunt trauma abdomen with blunt trauma chest	0	3	0	0	3	3.41
Septicemia with mods	0	0	28	0	28	31.82
Asphyxia with pulmonary edema	0	0	0	4	4	4.55

DISCUSSION

In the current study, the age of patients ranged from <1 year to 101 years. The mean age of the patients was 33.56 years. This was similar to the findings of Uthkarsh et al.[6] The mean age of study population in his was 35.5 years. In another study by Swarnkar et al, the most common age group affected was 11-40 year (64.06%).[7] Young adults are more prone to injuries due to the fact that they indulge more in outdoor activities, have risk taking behaviour, abuse drugs and this age group belongs to the working class of the society and is at risk of injuries. Moreover this is the most productive group, suggesting the huge productive loss to the society.

In our series, the male to female ratio was 2.7:1. Similar observation was made by Dsouza et al (M:F- 2.3:1).[8] Samuel et al in their study on epidemiology of injuries at a tertiary care center in Malawi, found that males (75.7%) were predominating in total injured patients.[9] Several possible reasons for this have been suggested including greater number of vehicles driven by males and more participation in high risk activities, i.e. outdoor work. More over males being the earning member of family are exposed to various occupational and agricultural hazards in our set up.

The predominant mode of injury in the present study was non- penetrating or blunt injury in 92.21%. Penetrating injuries accounted for 7.79% only. Similar finding were reported by Wui et al in their study on epidemiology of trauma in an acute care hospital in Singapore, with blunt injury being the cause of trauma in 98.13%.[10] Studies by Alexandrescu et al and Padalino et al on epidemiology of injury in Europe and UK observed that penetrating injury was observed only in 5% of all trauma cases.[11,12]

In this study, fall was the commonest mode of injury accounting for 75.60% patients, RSA was the second in mode of injuries with total of 16.61% patients followed by occupational injuries accounting for 3.73%, and burns accounting for 2.43%, animal related injuries were 0.28%, whereas 0.18% patients were victims of assault. Similarly in study done by Dsouza et al, Kalaiselvan et al and Ghimire A et al, injuries due to fall was being the most common mode of injury.[8,13,14]

In the present study, association of alcohol consumption was seen in 663 (24.71%) patients with fall as mode of injury, 108 (15.2%) were those with RSA, whereas 8 patients were victims of assault. We could not screen for other intoxications attributable to drugs, due to non-availability of regular testing at our institution. Swarnkar et al in their epidemiological study with special reference to mode of injury in central India, also reported that alcohol intoxication was present in 11.58% of RTA cases.[7]

In the present study, 72.84% patients were with injuries to single region, 11.72% patients had multiple injuries within a region, poly trauma accounted for 13.01% of patients while rest were those with burns 2.44%. This was in accordance with the findings of Verma et al.[15]

We observed in this present study, that 53.67% of the patients with polytrauma were due to RSA. The observations regarding profile of RSA victims differ from other studies, as RSA in the present study contributed to only 16.61% as compared to other studies and mainly constituted vehicles falling down/ slipping down the hill, contrary to pattern of RSA in plane areas where high speed head-on collisions predominate.[16]

Major cause of extensive burns in our population was flame accounting for 83.66%. This was in accordance with the findings of Allorto et al.[17] Shanker et al in their epidemiological study of burn patient reported flames accounting for 83.75% of total burns.[18]

In this study, trauma mortality was 2.0% (88 of 4267 patients). These results are similar to those of Sogut et al and Sanddal et al in which mortality due to trauma was 4% and 7% respectively.[19,20]

Limitations of the study

One of the limitations of the present study is that it was not carried out in multiple centres but was limited to one regional emergency centre for 1 year and thus the sample size and terms were somewhat limited. Present study included only those patients who had their hospital stay more than twelve hours. More over because of absence of trauma injury registry at our institution detailed data could not be collected. One final limit is the fact that deaths outside of the emergency centre such as discharge against the advice / left against the advice (LAMA), have not been accounted for in this present study.

CONCLUSION

To conclude, trauma is a major health hazard increasing day by day due to the process of economic development and modernization. The present study confirms the need, for prioritizing attention in trauma patients and organized systems of care from rapid evacuation and transport to rapid sequence management on the basis of ATLS. Definitive management requires effective trauma team approaches involving general surgeons, cardiovascular & thoracic surgeons, neurosurgeons, orthopedic surgeons and constant education.

So trauma centres with adequately well trained manpower is the need of the hour. Educating the public at large about trauma is paramount, as trauma is better prevented than cured.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Krug EG, Sharma GK, Lozano R. The Global Burden of Injuries. Am J Public Health. 2000;90(4):523–6.
2. Murray C, Lopez A. Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. Lancet. 1997;349(9064):1498-504.
3. Global status report on road safety 2018: Summary. Available at: https://apps.who.int/iris/bitstream/handle/10665/277370/WHO-NMH-NVI-18.20-eng.pdf?ua=1. Accessed on 10 January 2019.
4. Rastogi D, Meena S, Sharma V, Singh GK. Epidemiology of patients admitted to a major trauma centre in northern India. Chin J Traumatol. 2014;17(2):103-7.
5. Asher M. Kinnaur's Curse? Environmental Threat from Hydroelectric Projects. Economic & Political Weekly. 2015;50(18).
6. Uthkarsh PS. Profile of Injury Cases Admitted To A Tertiary Level Hospital In South India. International J Injury Control Safety Promotion. 2012;19(1):47-51.
7. Swarnkar M, Singh P, Dwivedi S. Pattern of Trauma in Central India: An Epidemiological Study with Special Reference to Mode of Injury. IJE. 2009;9(1).
8. Dsouza C. Epidemiological Trends of Trauma in Tertiary Care Centre in Dakshina Kannada District of Karnataka, India. JCDR. 2014 ;8(3):66-8.
9. Samuel JC, Akinkuotu AC, Villaveces A, Charles A. Epidemiology of Injuries at A Tertiary Care Center In Malawi. World J Surg. 2009:33(9): 1836-41.
10. Wui LM, Shaun GE, Ramalingam G, Wai KMS. Epidemiology of Trauma in an Acute Care Hospital in Singapore. J Emergencies Trauma Shock. 2014;7(3):174-9.
11. Alexandrescu R, O'Brien SJ, Lecky FE. A review of injury epidemiology in the UK and Europe: Some methodological considerations in constructing rates. BMC Public Health. 2002;9:226.
12. Padalino P, Intelisano A, Traversone A, Marini AM, Castellotti N, Spagnoli D, et al. Analysis of quality in a first level trauma center in Milan, Italy. Ann Ital Chir. 2006;77:97-106.
13. Kalaiselvan G, Dongre AR, Mahalakshmy T. Epidemiology of Injury in Rural Pondicherry, India. J Injury Violence Res. 2011;3(1):61-6.
14. Ghimire A, Nagesh S, Jha N, Niraula S, Devkota S. An Epidemiological Study of Injury among Urban Population. Kathmandu University Med J. 2010;7(4):402-7.
15. Verma PK, Tiwari KN. Epidemiology of road traffic injuries in Delhi. Results of a survey. Regional Health Forum. 2004;8:6–14.
16. Equabal MZ, Rizvi SJ, Husain M, Srivastava VK. A study of the pattern of head injury in district Aligarh. U.P. India. JIAFM. 2005;27(2):103-7.
17. Allorto NL, Oosthuizen GV, Clarke DL, Muckart DJ. The spectrum and outcome of burns at a regional hospital in South Africa. Burns. 2009;35(7):1004-8.
18. Shankar G, Powar R, Naik VA. Epidemiological Study Of Burn Patients Admitted In A District Hospital Of North Karnataka, India. Indian J Burns. 2014;22(1): 83.
19. Sogut O, Sayhan MB, Gokdemir MT, Boleken ME, Al B, Kose R, et al. Analysis of Hospital Mortality and Epidemiology in Trauma Patient: A Multi-Center Study. J Curr Surg. 2011;1:19-24.
20. Sanddal TL, Esposito TJ, Whitney JR, Hartford D, Taillac PP, Mann NC, et al. Analysis of preventable trauma deaths and opportunities for trauma care improvement in Utah. J Trauma. 2011;70:970-7.

Cite this article as: Kanwar A, Malhotra P, Panwar V, Chauhan A, Sharma D, Verma DK. One year study of epidemiology of trauma patients admitted in the main tertiary care hospital of the hilly state of Himachal Pradesh. Int Surg J 2019;6:1917-21.