

Demography, Epidemiology, Current Profile and State of Management of Acute Trauma in Northern Frontier District Kupwara of India, Jammu and Kashmir

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Abstract

Trauma is a major problem in India with severe and wide-ranging consequences for individuals and society as a whole, particularly in light of rapid development and increasing motorization. Emergency management of trauma in rural India is at a primitive stage of development. Emergency medical services are yet to be legally regulated. There is lack of trauma care related infrastructure, self-motivation, standard training, education and operating protocols.

Results: Males were 155 (77.5%), females 45(22.5%). M: F ratio of (3.4:1). There was significant preponderance of male victims in our study. Patients were of the age group between 3 to 80 years with means age of 36.65 and median 31 years. Youngest patient studied was 3 and eldest 80 years old. 152(76%) were married and 48(24%) unmarried. Married to un-married ratio was (3.16:1). Educational status of the victims showed that 64(34%) of injured belonged to formally un-educated class. Commonest mode of injuries, 93(46.5%) were due to fall from height, 2nd being 62(31%) road traffic accidents (RTAs). Mode of injury had no statistical significance to injury severity or severity of neuro-trauma in our study. Family members accompanied 119 out of 200 (59.5%). 183(91.5%) were transported by common means of local non-ambulance transportation. Time interval from pack and go of the victim from its place near the incident to arrival in our emergency room was considered care delay. Care delay of the study patients showed that only 65(32.5%) patients reported to our hospital within one (Golden) hour and about two third, 135(62.50%) reported after one (Golden) hour. Study of the pre-hospital life support-stabilization showed that only 53(26.5%) out of 200 patients received some elementary first aid before arriving to our hospital. Incidence of accidents was slightly more in country side 77(38.5%). Country side was mostly near to home. Road was second 62(31%) and home third 61(30.5%) location of injury. Poly-trauma and the Injury Severity Score (ISS) showed that 140(70%) out of 200 had 2 and 3 body regions injured, 36(18%) had more than 3 body regions injured and 24(12%) had only one body region injured. Higher scores were associated with worse outcome. Brain injury and neuro-trauma severity scaled by (3–15 point) Glasgow coma scale with severity score (0–4) showed that only 3(1.5%) study patients had severe brain trauma while 30(15%) had moderate brain trauma and 167(83.5%) had only mild to no neuro-trauma.

Conclusion: The civilian population in northern rural Indian Kashmir is exposed to high levels of trauma and the principal cause of life-threatening injuries is blunt trauma and fractures. Our study shows that falls and falls from height, mostly falls from trees, buildings and hillocks and RTAs are the predominant causes of acute traumatic injuries. Increasing awareness and proper training of the field staff about pre-hospital management of trauma are the urgent need of the time.

Keywords: Northern rural frontier India; Demography and trauma epidemiology; Modes of injury; Injury severity scoring; Emergency medical service.

Introduction

Trauma is one of the leading causes of morbidity and mortality in both developed and developing countries.^{1,2,3} The usual causes are road traffic accidents (RTAs), fall from height, occupational injuries and assaults. Trauma is one of the commonest causes of temporary and permanent disability.⁴ RTAs are responsible for 1.2 million deaths worldwide each year.⁵ According to WHO report on road safety, RTAs would be the fifth leading cause of death worldwide by the year 2030.⁶ As per global statistics trauma accounts for 10% of all deaths and of this a quarter of deaths occur in East Asian Region.⁶ Occupational injuries leading to disability are also of major concern in a country like India as many industries continue to be unregulated. Trauma is a major problem in India with severe and wide-ranging consequences for individuals and society as a whole.⁸ The majority of trauma deaths occur in the prehospital periods due to insufficient prehospital care where the first 60 minutes after trauma has been considered as the 'GOLDEN HOUR' of trauma.^{1,9} Unfortunately most of the world's population does not have access to pre-hospital trauma care. In many countries, few victims receive treatment at the scene and fewer still can hope to be transported to the hospital in an ambulance. Transport, when available, is usually provided by relatives, untrained bystanders, drivers or police officials.¹⁰ It is clear to majority of the stakeholders that WHO in its guidelines for essential trauma care has set forth core essential trauma care services that can reasonably be provided to every injured person in every country at different levels of health care system from basic to advanced levels.¹¹ According to available data, people with life threatening but potentially treatable injuries are upto six times more liable to die in a country where no organized trauma systems exist than in a country where an organized and well-resourced trauma systems are in place.¹²

Due to tough hilly geography of the district Kupwara, people are at higher risk of suffering accidents and injuries. In addition there is a trend of unsafe work culture due to non-availability of safety equipment and mechanisms in place. Unskilled people are involved in handling difficult skill intensive jobs like climbing trees, interrogating mountains and operating machinery and skill intensive equipment.¹³ There exists rash and hurried driving practices on poorly maintained narrow roads on hilly terrains which add to RTAs.¹⁴ Avalanches, landslides, floods, lightning and striking stones cause a good number of accidents.¹⁵

Aims and Objectives

- To study the demography and epidemiology of traumatic injuries (e.g. sex ratio, age distribution and incidence etc) in northern rural India.
- To recognize how different types of traumatic injuries impact upon the structures of the human body and recognize the links between mode of injury, site and location of the accident with possible impairments of body organ systems.
- To understand the local adequacy and proficiency of the acute management of major and minor trauma and to identify the types of services locally available to people and their families required for acute trauma care.
- To understand the availability and adequacy of basic diagnostic/therapeutic facilities related to acute trauma care and to project the need of the non-available facilities.
- To precisely understand to categorize patients requiring either referral to higher centers for further care or admission and constant care in this hospital for observation and treatment.
- To define the common outcome of the people with acute traumatic injury in this geographical area so that an effective prevention, comprehensive planning and management strategies could be planed.

As an attempt to teach and train the emergency health care providers to convey the information appropriately to those individuals who were involved in ongoing patient care like attendants, vehicle driver and medical staff because this is expected to facilitate understanding to optimize continuing patient care during referral and transportation.

To teach instructions to on the way care providers regarding maintenance of basic patient care until responsibility for patient care is taken over by staff of the next receiving hospital.

Material and Methods

This study was a prospective study and was carried in the sub-district hospital (SDH) Kupwara from May 2017 to Nov.2017 over a period of 7 months and included 200 patients of acute traumatic injuries. This time period included summer and autumn

seasons in this geographical region. For this study a detailed proforma was prepared. Details of history and physical examination findings of all patients was recorded on a proforma.¹⁶ The following things were extracted: Demographics, mode of injury ,time of injury and time of presentation, triage priority, severity of injury, type of injury, presence of vascular injury and proportion of patients undergoing surgical intervention. Patients who reported after 6 hours of injury were excluded from the study. Consent for inclusion in the study was also recorded on the pro forma.¹⁷

All patients had routine blood investigations and relevant radiological investigations.¹⁸ The severity of the injury was assessed .The region of the body was noted and injuries were classified as superficial and deep. All abrasions, superficial injuries and minor soft tissue injuries were considered as superficial injuries. All penetrating injuries, fractures, dislocations, head injuries and other internal injuries were classified as deep injuries.¹⁹

The study was in accordance with the main study curricula of the master’s program MSc. HM that was offered by International Telematic University UNINETTUNO.²⁰

Results

200 patients of the acute traumatic injuries who arrived in the emergency room of sub-district hospital Kupwara over a period of seven months from May 2017 to November 2017 were enrolled for study. Study patients were of either gender. Males 155 (77.5%), Females 45 (22.5%) with male to female ratio of 3.4:1. There was statistically quite significant preponderance of male patients in our

Table 1: Sex distribution of our study population.

Gender	Number (f)	% age
Male	155	77.5
Female	45	22.5
Total	200	100

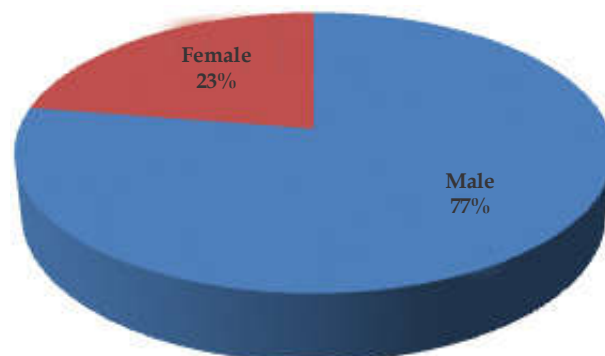


Fig. 1: Pie chart showing percentage sex distribution of the patients.

study. Study patients were of the age group between 3 to 80 years with mean age of 36.65 and median 31.00 years. Youngest study patient was 3 year old and eldest study patient was 80 year old. Out of 200, married were 152= (76%) and unmarried 48= (24%). Married to un-married ratio was 3.16:1 that was statically significant. The unmarried were less in number most of them being young pre-marital age group. (Table 1 & 2) (Fig. 1 & 2)

Table 2: Marital status of the study population.

Marital status	Number (f)	%age
Married	152	76
Unmarried	48	24
Total	200	100

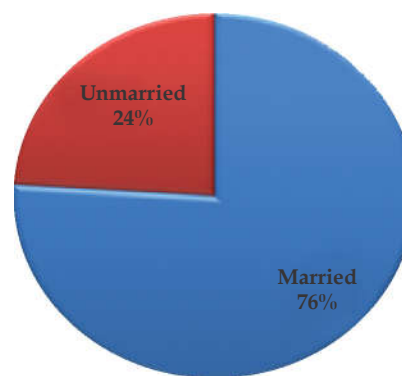


Fig. 2: Pie chart showing percentage marital status of the study population.

Table 3: Educational qualification of the study population.

Level of education	Numbers (f)	% age
No formal education	68	34
Primary level	32	16
Secondary level	32	16
Graduate level	50	25
Post-graduate level	18	9
Total	200	100

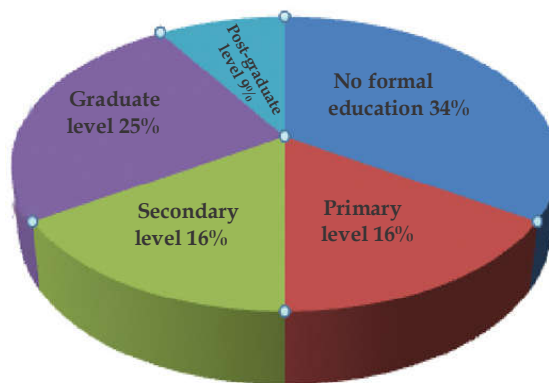


Fig. 3: Pie chart showing %age of educational status of the patients.

Table 4: Distribution of occupational status of the study population.

Occupation	Number (f)	% age
Government employees	64	32
Laborers	68	34
Students	38	19
Unemployed Female house wives	12	6
Businessman and traders	16	8
Preschool children	2	1

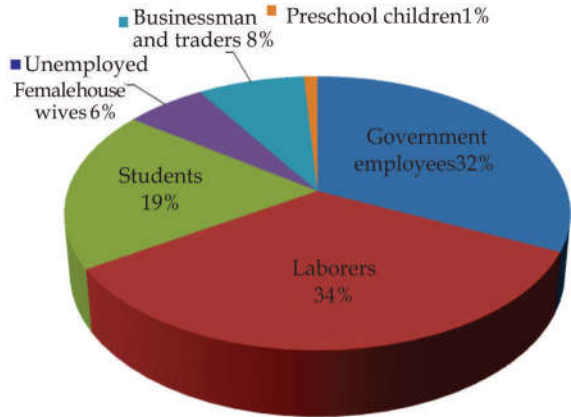


Fig. 4: Pie chart showing percentage occupational status of injured.

Most of the victims in our study were unskilled laborers of lower educational level. (Table 4 and fig. 4)

Table 5: Mode of injury of study victims.

Mode of injury	Number(f)	% age
Falls from height	93	46.5
RTAs	62	31
Assaults	27	13.5
Hit with objects	18	9
Total	200	100

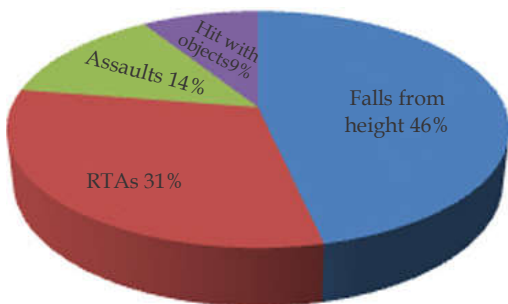


Fig. 5: Pie chart showing Percentage distribution of mode of injuries.

Table 6: Distribution of day-of-the week pattern of injuries.

Days of week	Number(f)	% age
Monday	27	13.5
Tuesday	27	13.5
Wednesday	31	15.5
Thursday	28	14

Friday	25	12.5
Saturday	13	6.5
Sunday	49	24.5
Total	200	100

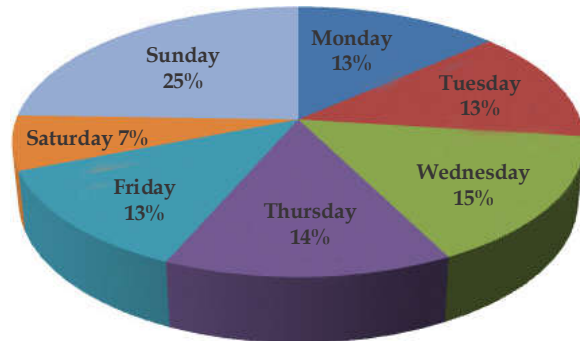


Fig. 6: Pie chart showing %age distribution of the day-of-the week pattern of accidents.

Table 7: Distribution of class of the people accompanying the victims.

Accompanying team	Number(f)	% age
Family members	119	59.5
Neighbors and strangers	54	27
Police	27	13.5
Total	200	100

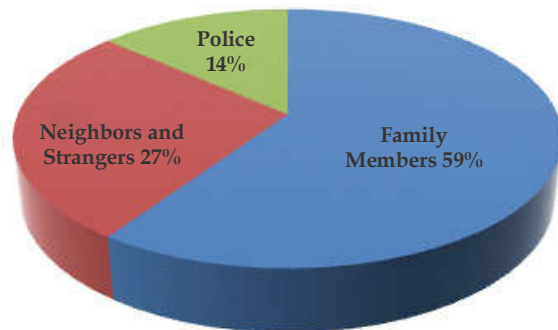


Fig. 7: Pie chart showing patient's accompanying team to the hospital.

Table 8: Distribution of patients as per their mode of transportation.

Mode of Transportation	Number(f)	% age
Non-Ambulance	183	91.5
Ambulance	17	8.5

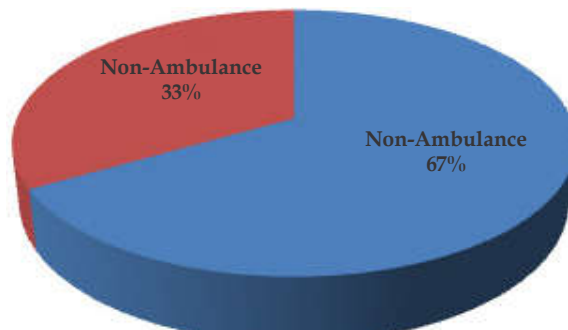


Fig. 8: Pie chart showing percentage distribution of mode of transportation.

transportation.

Table 9: Distribution of study population as per their care delay in hours.

Care delay hours	Number(f)	% age
≤1 Hour	65	32.5
2Hour	72	36
3Hour	30	15
4Hour	16	8
5Hour	8	4



Fig. 9: Pie chart showing percentage distribution of patients as per care delay in hours.

Table 10: Distribution of study group according to place of accident was as under.

Place of injury	Number(f)	% age
Country side	77	38.5
Home or near residential place	61	30.5
Road including drivers, passengers and pedestrians.	62	31

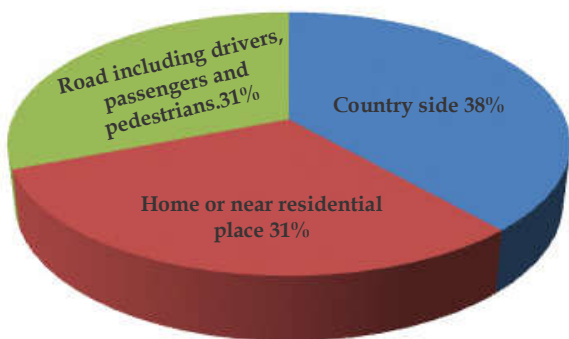


Fig. 10: Pie chart showing patient %age relative to place and location of accident.

Table 11: Patient outcome.

Patient Outcome	Number(f)	% age
Treated and discharged	74	37
Stabilized and referred for further care	119	59.5
Declared dead could not be referred	7	3.5
Total	200	100

Discussion

Till a few years back, the management of trauma patient was in the domain of general surgeons, but after 1980s there has been a sudden realization

by the world community about the necessity of improving the management of trauma victims. Germany and the USA put the lead role in this concept and from here started the new discipline of surgery, “ Trauma care management system” and “Trauma care specialists’ who started taking over management of trauma patients from general surgeons.¹⁴ In the past few years, concept of “trauma centers” has come up, where the team is trained to look after only trauma victims and to manage trauma to any part of the body. Improved quality of care ultimately leads to reduced social and economic burden of injury to the community as a whole.²¹

Trauma is a major problem in India with severe and wide-ranging consequences for individuals and society as a whole.²² With rapid economic growth, there is a rapid increase in automobiles and industries in India and hence, an increase in the incidence of trauma cases.²³ Purpose of our study was similar to a study by Joshipora MC et al¹⁰, who in their study observed that trauma-care systems in India are at nascent stage of development.²⁴ Outcome of more severely injured patients in our study were in resemblance to a study by Mock CN et al.¹¹ Our observations reveal that unskilled adult age group of lower socio-economic and educational level comprised most of the victims of acute severe trauma.²⁵ Our observations of age group and economy are similar to Mock CN et al.¹¹ Our study showed preponderance of male victims of adult age group, similar to most other studies.^{1,2,4,6} However, the predominant mode of injury in our study was falls from standing height. RTAs ranked second in our study because our study population was rural and mostly comprised of unskilled labor class.²⁶ Our study did not differentiate between occupants and pedestrian injuries during RTAs. Two wheeler accidents comprised a good number among RTAs in our study. Use of crash helmets is a rare practice in young bikers among our study population. Our observations and recommendations are in accordance to the study conducted by Pruthi N et al.¹²

Our study mainly focused on demography, modes, severity, days of the week, pattern, educational and occupational status of the victims.²⁷ As per our findings predominant mode of injuries was due to falls from height and these accidents were associated with more fractures, both simple and compound of the limbs and spine in addition to open wounds other than compound fractures. Falls from standing heights were associated with quite high incidence of spine injuries. Most of the victims in our study were unskilled laborers of

lower educational level.²⁸

Our pre-hospital care conditions and atmosphere was similar to that observed in the study by Wesson HKH et al.¹³ Their review of the literature concluded that the high rate of injury related deaths and disabilities in India could be in part due to the absence of integrated and organized systems of trauma care. In their review they observed that there was a lack of administrative capabilities, including trauma data systems, trauma specific training, quality improvement, and development of designated trauma teams. Their review of the literature concluded that the high rate of injury-related deaths and disabilities in India could be in part due to the absence of integrated and organized systems of trauma care. Their study suggested that the pre-hospital transport time can be decreased through improved communication and transport modalities and the Indian trauma care system could also be strengthened through hospital-based training programs and trauma response teams.²⁹

Incidence of head injuries and neuro-trauma in our study was of less magnitude than the other systemic injuries. Neuro-trauma whenever present was not better managed during pre-hospital period and the management scenario was same or even pathetic than rest of the traumatic incidents. The main reason for this pathetic affair being lack of training and lack of infra-structure. The mismanaged pre-hospital period was associated with more and long lasting physiological and haemodynamic derangements, worsening the outcome. Our observations were similar to those of Meema et al.²⁵ They concluded that the outcome of a TBI (traumatic brain injury) is influenced by pre-hospital care, and thus pre-hospital management of the TBIs can definitely improve the outcomes.³⁰ The patients who survive from the primary insults, some may still have long term disabilities.³¹

Conclusion

Our study highlights the burden of acute traumatic injuries and current state of management in the emergency departments of northern rural India. The observations of our present study give a clue that improving the economic level of the study population will not only reduce the incidence of accidents but definitely will improve the quality of management and hence outcome of the patients of acute trauma of higher acuity and severity. First responders at the scene of accident in our study were mostly the by-standers and other neighboring lay public, most of them inexperienced in acute

trauma management. Most of the existing sub-district hospitals, community health centers; primary and secondary health centers and lower level health care delivery places lack requisite resources including skilled men power and infrastructure. In the pre-hospital setting, non-availability of quality transportation services and lack of organized emergency medical services are the most significant impediments to providing optimal care. An emergency medical service as per definition is "a comprehensive system which provides the arrangements of personnel, facilities and equipment for the effective, coordinated and timely delivery of health and safety services to victims .In addition to financial constraints for acute care, there is misappropriation of resources due to mismanaged planning and policy making Our observations concluded that most of the injuries were preventable by improving social discipline, health and social economy. Because of the regional nature of some rural trauma problems, the establishment of regional trauma advisory committees may facilitate identification of problems and their appropriate solutions. Increasing awareness of existing disparities, as well as stakeholder involvement in the realms of policy and advocacy to improve the current situation

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