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RESEARCH ARTICLE

CLINICO- DEMOGRAPHY PROFILE AND OUTCOME OF TRAUMA PATIENTS ADMITTED IN THE EMERGENCY DEPARTMENT OF A TERTIARY CARE TEACHING HOSPITAL IN EASTERN NEPAL: A RETROSPECTIVE STUDY

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ABSTRACT

Background: Trauma is a major increasing cause of morbidity and mortality in both developed and developing countries like Nepal. The traumatic injuries account for major financial loss and may lead to permanent deformities and dysfunction leading to mental and psychological health problems. According to the Nepalese Ministry of Health and Population, unspecified Injuries are the third largest single cause of hospitalization and 10% of Nepal's total burden of diseases. This study was done to improve the understanding of different spectrum, the mode of trauma, severity of injuries, and outcome of trauma victims in our hospital. **Materials and Methods:** This was a retrospective observational study of all adult trauma patients more than 18-year-old presenting to our emergency department (ED). Details of the incident in terms of causes, severity, mode, and outcome of injuries were noted. **RESULT:** Most vulnerable age group for traumatic injuries was between 20-40 years. The gender distribution was 70% males and 30% females. 80% patients arrived in Emergency ward beyond one hour of accident (golden hours) between 8 am to 5 pm being stayed 24 hours. Fall from height on the ground (45%) was the most common mode of injury, followed by Road traffic injuries (41%), cut injuries (7.5%), trauma related assault, sports and animal injuries (6.2%) electrical injuries (0.7%), industrial injuries 0.3%. Regarding implementation of Australian triage system (ATS) in relation with different mode of trauma, fall from height (137), out of which ATS 2 was 6, ATS 3 was 114 and ATS 4 was 17. Road traffic injury (124) out of which ATS 2 was 12, ATS 3 was 100 and ATS 4 was 12. Regarding implementation of ATS scoring in relation with injured area involved, upper extremity (130) out of which ATS 2 was 5, ATS 3 was 108 and ATS 4 was 17, Lower extremity (119) out of which ATS 2 was 10, ATS 3 was 98, and ATS 4 was 11. Extremity injuries (upper and lower limbs) were the most common injuries seen in 70% of patients followed by traumatic brain injury (TBI) (7%), thoracic injuries (6%), abdominal injuries (6%), Spinal injuries 6%, facial injuries (3.4%) and neck injuries (0.8%) with two wheeler accidents contributing to the majority. 78% patients had moderate severity of injury, 17% had minor injury and 4% had serious injuries and 0.7% had severe injury. Emergency Department (ED) team alone managed around half of the patient (50%), while around 50% patients were admitted in different wards for further evaluation and treatment in terms of either conservative management or surgical interventions. 42% were discharged in a stable condition. 2% were gone on left against medical advice (LAMA), 1% referred to other centre. out of which 49% patients had managed operative followed by 51% had non operative. **Conclusion:** Falls and Road traffic injuries are the predominant causes of trauma. A simple scoring system such as Australian triage system (ATS) has been used to prioritize injured patients according to urgency.

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INTRODUCTION

Trauma is a major cause of morbidity and mortality in both developed and developing countries like ours. The usual causes are road traffic injuries (RTIs), fall from height, occupational injuries, and assault. Injuries are thought to contribute around 10% of Nepal's total burden of diseases. According to the Ministry of Health and Population, unspecified Injuries are the third largest single cause of hospitalization in Nepal (2016) with road accidents occupying the eighth position in the overall ranking. According to the World Health Organization report on road safety, RTIs would be the fifth leading cause of death worldwide by the year 2030⁽¹⁾ Approximately 1.24 million people die every year on the world's roads and another 20 to 50 million sustain nonfatal injuries as a result of road traffic crashes. Road Traffic injuries (RTIs) is still the major public health concern and estimated to be one of leading cause of death throughout the world particularly in developing countries like ours. These injuries account for major financial loss and may lead to permanent deformities and dysfunction leading to mental and psychological health problems. 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 which is the most crucial period that determines the patient's outcome⁽²⁾ We also studied the utility of Australian triage score (ATS) which are used to prioritize the patients' management according to urgency. It is, therefore, important to quickly assess the severity of the injury accurately and quickly. This study was done to improve the understanding of the mode of trauma, severity of injuries and outcome in our hospital so that effective prevention and comprehensive management strategies could be made.

MATERIALS AND METHODS

The study was a retrospective study of trauma patients presenting to the adult emergency department (ED) of B. P. Koirala institute of health science, Dharan. The study recruited all trauma patients more than 18 years of age presenting to the ED between (January 2019 to December 2020). The inclusion criteria were all patients who had sustained trauma through RTA, industrial incidents, electrical injuries, fall from height or level ground, or trauma related to assault, sports and animals. Patients aged below 18 years presenting with trauma and adult patients dead on arrival were excluded from the study. Randomly selected of 306 discharged file of traumatic patients from emergency ward were retrospectively studied after ethical approval by Institutional Review Board (IRC) with the help of self-designed questionnaires to detect demography profile, number of injuries, causes of injuries, type of injuries, severity of injuries, mode of injuries, outcome of injuries (*in the form of discharge with recovery, admission, left against medical advice, death*). Details of history and physical examination findings of all patients were recorded on a standard data collection sheet. The following 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 operative intervention.

Australian triage system (ATS): It is a five-level emergency department triage algorithm that has been continuously developed in Australia as well as abroad and subjected to several studies.³ The ATS is based on adult physiological predictors (airway, breathing, circulation, and disability).⁽⁴⁾ It is designated to categorize patients arriving at the hospital's emergency department in order of urgency. It is a clinical tool used to establish the maximum waiting time for medical assessment and treatment of a patient.

Triage priority level was defined as follows:

ATS Category:

Triage priority (ATS 1): Immediate life threatening. Maximum waiting time is 0 minute

Triage priority (ATS 2): Imminent life threatening or important time critical. Maximum waiting time is 10 minute

Triage priority (ATS 3): Potential life threatening or potential adverse outcomes from delay more than 30 minutes or severe discomfort or distress .maximum. waiting time is 30 minute

Triage priority (ATS 4): Potential adverse outcomes from delay more than 60 minutes or severe discomfort or distress. Maximum waiting time is 60 minute

Triage priority (ATS 5): Less urgent or delay with administrative issue only. Maximum waiting time is 120 minute.

All patients had routine blood investigations and relevant radiological tests based on the initial primary and secondary surveys. The region of the body affected was noted and injuries were classified as mild, moderate, severe and serious injuries. After initial stabilization by the Emergency department (ED) team, the patients were handed over to the necessary respective departments for further management if necessary. Patients with minor injuries were discharged by the ED team after a short observation period and those who required surgery or prolonged observation were admitted in the respective wards. In- hospital outcome of all the admitted patients was noted.

Data of the patients were obtained from the electronic hospital records. Collected data were entered in Microsoft excel 2007 and converted it into SPSS for statistical analysis

RESULTS

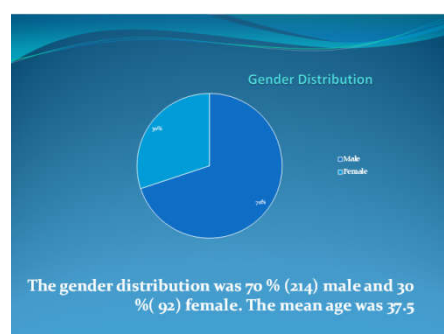


Fig. 1. Gender distribution

Most vulnerable age group for traumatic injuries was between 20-40 years. . The gender distribution was 70% males and 30% females.

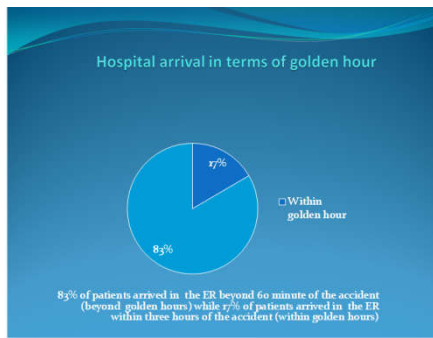


Fig. 2. Hospital arrivals in terms of golden hour

People from plain region (66%) were predominant population. 97% were brought by their relative 83% patients admitted in emergency ward beyond 60 minutes of accident (golden hours) between 8 am to 5 pm, being stayed 24 hours. More than two thirds of the patients (67%) were referred from other hospitals.

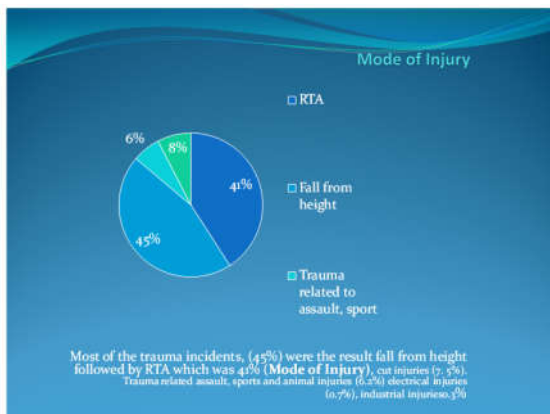


Fig. 3. Mode of injury

Fall from height on the ground (45%) was the most common mode of injury, followed by Road traffic accident (41%), cut injuries (7.5%), trauma related assault, sports and animal injuries (6.2%) electrical injuries (0.7%), industrial injuries 0.3%

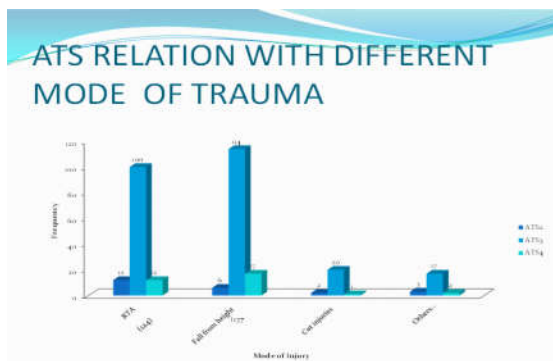


Fig. 3. ATS Relation with different mode of injuries

Australian triage score (ATS) relation with different mode of trauma, fall from height(137), out of which ATS 2 was 6, ATS 3 was 114 and ATS 4 was 17),Road traffic injury(124) out of which ATS 2 was 12, ATS 3 was 100 and ATS 4 was 12.

ATS scoring in relation with injured area, upper extremity (130) out of which ATS 2 was 5, ATS 3 was 108 and ATS 4 was 17, Lower extremity (119) out of which ATS 2 was 10, ATS 3 was 98, and ATS 4 was 11. Australian triage score (ATS) relation with different mode of trauma, fall from height(137), out of which ATS 2 was 6, ATS 3 was 114 and ATS 4 was 17),Road traffic injury(124) out of which ATS 2 was 12, ATS 3 was 100 and ATS 4 was 12. ATS scoring in relation with injured area, upper extremity (130) out of which ATS 2 was 5, ATS 3 was 108 and ATS 4 was 17, Lower extremity (119) out of which ATS 2 was 10, ATS 3 was 98, and ATS 4 was 11.

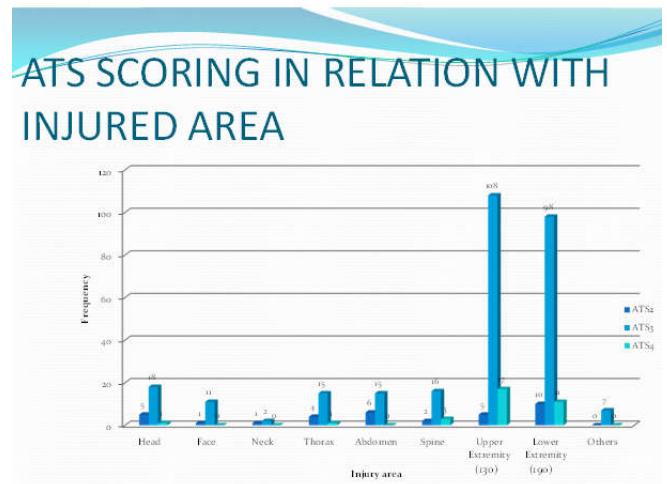


Fig. 4. Ats Scoring In Relation With Injured Area

Extremity injuries (upper and lower limbs) were the most common injuries seen in 70% of patients followed by traumatic brain injury (TBI) (7%), thoracic injuries (6%), abdominal injuries (6%), Spinal injuries 6%, facial injuries (3.4%) and neck injuries (0.8%) with two wheeler accidents contributing to the majority.78%

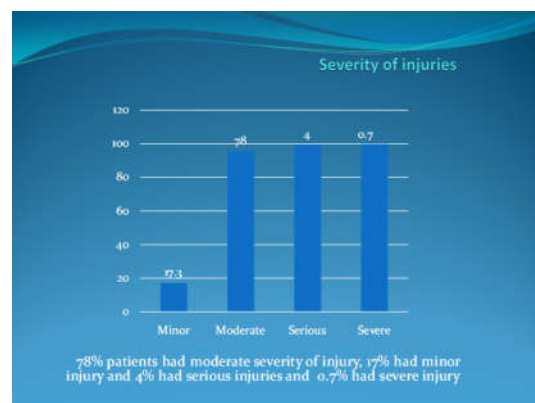


Fig. 5. Severity of injuries

Patients had moderate severity of injury, 17% had minor injury and 4% had serious injuries and 0.7% had severe injury. Emergency Department(ED) team alone managed around half of the patient (50%), while around 50 % patients were admitted in different wards for further evaluation and treatment in terms of either conservative management or surgical interventions., 42% were discharged in a stable condition.2% went on left against medical advice (LAMA),1% referred to other centre. Out of which 49% patients had managed operative followed by 51 % had non operative

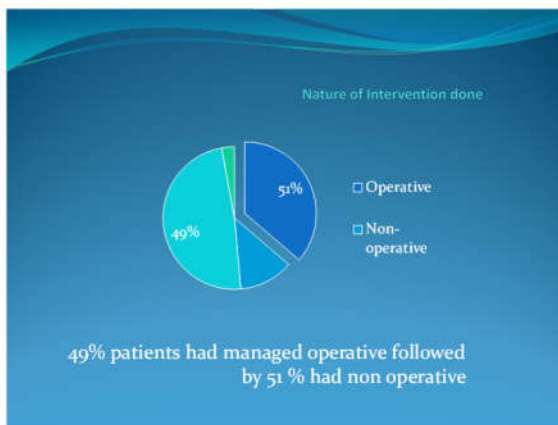


Fig. 6. Nature of interventions

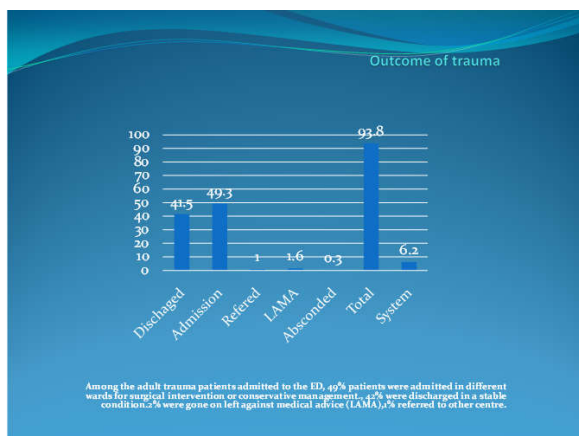


Figure 7. Outcome of injuries

DISCUSSION

Traumatic injuries (RTI) are still the major public health problem in Nepal. According to Nepalese Ministry of Health and Population, unspecified Injuries are the third largest single cause of hospitalization in Nepal (2016) with road accidents occupying the eighth position in the overall ranking. The Global Burden of Diseases study has estimated between 13,500 to 18,000 deaths annually in Nepal due to injuries with a further 780,000 to 1,000,000 Disability Adjusted Life Years (DALYs) attributed to injuries each year. Injuries are thought to contribute around 10% of Nepal's total burden of diseases. The World Health Organization (WHO, 2016)¹¹ has identified road traffic injury as the tenth most frequent cause of death worldwide and predicts 40% increase in global deaths owing to injuries in general by 2030. Approximately 1.24 million people die every year on the world's roads and another 20 to 50 million sustain nonfatal injuries as a result of road traffic crashes. In the developed country like United States, traumatic injuries account for 30% of life years lost.⁽⁵⁾ Every year, injuries caused by violence, road traffic accidents result in over 5 million deaths in the world.¹¹ Although a male predominance among trauma victims is seen in most international studies; the sex ratio in our study was very heavily skewed toward males.^(6, 7, 8) This is explained by the fact that in our country, males are predominantly engaged in outdoor activities and operation of automobiles and hence are more vulnerable to injuries. Patients 20–40 years of age were more likely to sustain a traumatic injury. This is consistent with most international findings.

The mean age of 35 years in this study is also consistent with literature on trauma⁽⁴⁾ However, more than two thirds of these injuries were due to two-wheeler accidents and Four-wheel vehicles offer a fair amount of protection to those inside unlike two wheeler passengers and pedestrians who are directly exposed to the elements of the road. This explains the overwhelming majority of the accidents involving two wheelers and pedestrians, consistent with other Nepalese and Indian studies.^(9,11,12) With rapid economic growth, there is a rapid increase in automobiles and industries across the country. Nations of the world including Nepal have been implementing different strategies towards Road safety law enforcing agencies about prevention of injuries, which encompass improving the road system, limiting the speed, enforcement to use seat belts, drink-driving laws, prohibition for phoning during driving and wearing helmets^(12,13,) Falls from height comprised around half of all trauma cases in our study, which is similar to findings of other studies related to trauma.⁽³⁾ RTIs and fall from height are the usual causes among regular civilians. RTIs were the common cause of trauma, a result consistent with other studies from India and abroad⁽⁶⁾ Similar pattern of injuries was noted by Goyal *et al.* in a study from rural Maharashtra as well as studies from North India^{15,16}

Fall injuries are the most common type of injuries endured by Nepali people with 37.5 per cent of injuries reported. (A Countrywide population-based survey about fall injuries in Nepal) .Road traffic injuries account for 19.8% and burn injuries account for 14.2 %, By Himalyan News Service Published: 08:06 am Jul 23, 2015. Other causes of injuries in our study were fall-related injuries, occupational injuries, , electrical injuries burns, violence, and drowning across the world.⁽¹⁴⁾ Similar pattern of injuries was noted by Puspa Raj Pant *et al* (Published: 14 April 2021) in a study “The prevention of – and first response to – injuries in Nepal: a review of policies and legislation” found that (39 %) were exclusively related to road traffic injuries(RTIs), (18%) to occupational injuries. Most of the occupational injuries that presented to us were related to cut injuries at the workplace and were predominantly limbs injuries. Majority of traumatic patients had limbs injuries in our study. Similar pattern of injuries noted by shailvi gupta *et al* found that the most commonly affected anatomic site was the extremity injuries which was 42.0% inconsistent with the study titled “Injury prevalence and causality in developing nations: Results from a countrywide population-based survey in Nepal” .These injuries account for major financial loss from time away from work and may lead to permanent deformities and dysfunction. Most of Australian triage score (ATS: 3 score of traumatized patients, mild to moderate severity of injuries were managed successfully either conservative management or surgical interventions by different expertise. discharged in a stable condition. Majority of traumatic patients (80%) in our study were directly arrived to our hospital beyond 60 minutes of injuries, called golden hours. The concept of this golden hour is the first 60 minutes following trauma is a critical period for getting patients to a trauma center and has been called the “golden hour.⁽¹⁷⁾ It is a well-known concept, suggesting that shortening time from injury to definitive care is critically important for better outcome of trauma patient. Time management is considered as a key factor to reduce mortality in trauma patients. The ‘golden hour’ is a concept that critically injured patients are required to receive definitive care within 60 min from the occurrence of injuries, after which mortality significantly increased.^{18,19}

The definitive resuscitative trauma care must be initiated within this early window which has been practiced worldwide for more than 4 decades⁽²⁰⁾. There are two studies both by Sampalis *et al.* from Quebec in the 1990s (Sampalis *et al.*, 1999, Sampalis *et al.*, 1993) and they found significant correlations between reduced out-of hospital time and decreased mortality in severely injured patients. As shown in our study in methodological section, a simple scoring system such as the Australian triage system (ATS) may be more practical in resource limited setting by primary care physicians to assess the severity of trauma and to refer to higher centers after giving first aid and stabilizing the patient. Most of primary and secondary health centers in our country lack certain essential facilities such as blood bank, computed tomography scan and operating theatres for evaluating, and treating severe cases of trauma. Specialists in trauma care are not available in most rural hospitals; hence, most of traumatic patients need to be referred to higher centers like BPKIHS, Dharan where all facilities are available to manage those traumatic patients successfully.

Conclusion

Our study shows that falls and RTA are the predominant causes of trauma which is the main burden as well as ultimate challenge in the Emergency ward of Nepal. Increasing awareness and proper training of primary physicians and the paramedical team about prevention and early management of trauma are the urgent need of the time. A simple scoring system such as the Australian triage score (ATS) should be used in resource limited settings like ours to prioritize traumatized patient according to urgency.

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