Pattern of Morbidity and Mortality due to Road Traffic Accident Cases at BP Koirala Institute of Health Sciences, Dharan

Shrestha Sugam,1 Yadav BN,2 Jha Shivendra,3 Sah Bikash,4

1Department of Forensic Medicine and Toxicology, B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. 2Department of Forensic Medicine and Toxicology, B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. 3Department of Forensic Medicine and Toxicology, B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal. 4Department of Forensic Medicine and Toxicology, B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal.

ABSTRACT

Introduction: Road traffic injuries and deaths caused by motor vehicles is a growing public health problem all over the world. Head injury and blunt abdominal trauma are major health problems and are frequent causes of death among Road Traffic Accident (RTA) victims.

Methods: A total of 348 cases were examined in Emergency department and the Department of Forensic Medicine and Toxicology at B.P.Koirala Institute of Health Sciences, Dharan during the period of one year. Data were collected using proforma and analyzed using Statistical Package for Social Sciences (SPSS) 11.5. Injury Severity Score (ISS) was used to assess the severity of injuries.

Results: There were 318 morbidity and 30 mortality cases. Male to female ratio was 2.2:1. The commonest age group involved was 21-30 years i.e.32.1%. The most common vehicle involved was two wheelers (60.9%) followed by heavy four or more wheelers (20.9%) and the most common nature of accident was through collision of the vehicles. Abrasion was the most common injury occurred during the RTA(61.2%). 34.1% of the victims had laceration, 8.6% had contusion and 20.9% had fractures. Median Injury Severity Score was 31.5 in mortality and 1 in morbidity cases.

Conclusions: Road traffic accident is one of the major causes of morbidity and mortality. Injuries in various body regions are frequent findings in victims of RTA. The median Injury Severity Score (ISS) of mortality cases was significantly high compared to that of morbidity cases.

INTRODUCTION

Road traffic injuries and deaths caused by motor vehicles is a growing public health problem all over the world. ¹ In Nepal, as per estimates of morbidity and mortality for 1988-1999, injury contributed 9% to total mortality and is the third leading cause of death, with road accidents occupying the eighth position in the overall ranking. ² Head injury and blunt abdominal...
trauma are major health problems and are frequent causes of death among RTA victims. The Abbreviated Injury Scale (AIS) is an anatomically based, consensus derived, global severity scoring system that classifies an individual injury by body region according to its relative severity on a 6 point scale. Abbreviated Injury Scale (AIS), has subsequently been applied to large series of traffic accidents by to traffic and non-traffic accidents by and to multiple traumatized patients by.

In 1974 Baker et al developed the concept of a whole body score or Injury Severity Score (ISS), derived from the three highest individual AIS scores in different body regions. To calculate the ISS from an array of AIS scores for a patient, the three highest AIS scores in different body regions are squared then added together. ISS considers the body to comprise six regions as follows: 1. Head/neck 2. Face 3. Chest 4. Abdominal or pelvic contents 5. Extremities or pelvic girdle, 6. External (skin). In forensic casework, investigation of injury severity is important for evaluating the mortality, occasionally in terms of the adequacy of clinical management. For this purpose, the abbreviated injury scale (AIS) and injury severity score (ISS) for anatomical evaluation are widely used in both forensic and clinical medicine. The study of injuries from morbidity cases and the autopsy cases can be helpful to widen the knowledge of the medical faculty in the field of early diagnosis and management.

The objective of the study was to assess the morbidity and mortality patterns among RTA victims at BPKIHS, Dharan and to assess injuries pattern among RTA victims as per extent, severity, nature and type of injuries in different region of the body in our local setting and provide baseline data for establishment of prevention strategies as well as better management.

METHODS:
A descriptive cross sectional study was conducted on 348 cases taken from Emergency department and the Department of Forensic Medicine and Toxicology at B. P. Koirala Institute of Health Sciences (BPKIHS), Dharan. Ethical clearance was taken from the Institutional Ethical Committee of B.P. Koirala Institute of Health Sciences.

The study was conducted during a period of one year by using convenient sampling technique. All the injured cases and autopsies regarding RTA were included in this study and the bodies that were decomposed were excluded from the study. The sample size was calculated based on a research done by Choulagai B. Pet al. which shows prevalence of death among RTA cases was 23.3%. Taking proportion, p= 23.3%, q= compliment of P and permissible error of 10%. Using formula, \( n = \frac{Z^2 P (100-q)}{L^2} = \frac{(1.96)^2 x23.3x(100-23.3)/20% of 23.3}{} \) the sample size was calculated as 348 victims. Data was collected using semi-structured questionnaire and analyzed using Statistical Package for Social Sciences (SPSS) 11.5.

The informed consent was taken from the injured ones and were examined. The dead patients had an autopsy done on them. The relevant information was taken from inquest paper and police, relatives, neighbors, friends or other persons accompanying the dead body. The bodies that were decomposed were excluded from the study. Injury Severity Score (ISS) was used to assess the severity of injuries.

RESULTS:

SOCIO- DEMOGRAPHIC VARIABLES

Among the total Road traffic accident victims presenting to BPKIHS, Dharan, 348 were studied. The morbidity pattern was studied among 318 cases and the mortality pattern was studied among 30 cases which were autopsied (Table 1). Male to female ratio was 2.2:1. The commonest age group involved was 21-30 years i.e. 32.1% which
have been shown in figure 1.

**TABLE 1:** Type of health indicators: Dengue table and figures

| Type of health indicators | Number of Victim | Percentage |
|---------------------------|------------------|------------|
| Morbidity                 | 318              | 91.37      |
| Mortality                 | 30               | 8.62       |
| Total                     | 348              | 100.0      |

**RESULTS:**

**SOCIO-DEMOGRAPHIC VARIABLES**

Among the total Road traffic accident victims presenting to BPKIHS, Dharan, 348 were studied. The morbidity pattern was studied among 318 ca

Most of the victims had primary education (34.4%). 10% were illiterate. The remaining was Bachelor degree (26.7%), master’s degree (14.3%) and secondary education (14.4%). Most of the victims were students (31.8%) followed by service holder (25.5%).

**TABLE 2:** Demographics of RTA victims at BPKIHS, Dharan

| Variables         | Number (victims) | Percentage |
|-------------------|------------------|------------|
| Educational status|                  |            |
| Illiterate        | 36               | 10.3       |
| Primary           | 120              | 34.4       |
| Lower secondary   | 4                | 1.25       |
| Secondary         | 12               | 3.77       |
| Occupation        |                  |            |
| Student           | 111              | 31.8       |
| Business          | 19               | 5.4        |
| Farmer            | 31               | 8.9        |
| Service           | 89               | 25.5       |
| Housewife         | 70               | 20.1       |
| Labourers         | 17               | 4.8        |
| Professional      | 1                | 0.2        |
| Retired           | 10               | 2.8        |
| Marital status    |                  |            |
| Single            | 121              | 34.7       |
| Married           | 225              | 64.6       |
| Widowed           | 1                | 0.2        |
| Divorced          | 1                | 0.2        |

**FIGURE 2:** Percentage of time of RTA

**TABLE 3:** Vehicles involved in the RTA

| Type of vehicles involved | Number | Percentage |
|---------------------------|--------|------------|
| Heavy four or more wheeler| 73     | 20.9       |
| Light four wheeler        | 47     | 6.01       |
| Two wheeler               | 212    | 60.9       |
| Three wheeler             | 16     | 4.5        |
DISCUSSION:

Among the total Road traffic accident victims presenting to BPKIHS, Dharan, and 348 RTA victims were studied. The morbidity pattern was studied among 318 cases and the mortality pattern was studied among 30 cases which were autopsied. The most vulnerable group in our study was 21 to 30 years that comprised 32.1% of the victims followed by 31 to 40 years that comprised of 24.4% of the victims. This age group may lead more active life in the pursuit of their works and studies and are at the peak of their creativity having the tendency to take risk, alcoholic intoxication etc. thereby subjecting themselves to the dangers of accidents and injuries. Fatalities due to blunt trauma injury were maximum in the age group of 21-40 years (40.63%) in Putul Mahanta study.10

Males were predominantly involved in our study with male-female ratio being approximately 2.2:1. The fact that males are usually the earning members of the families makes them more mobile and thus, vulnerable to the accidents, as compared to females who are mostly indulged in household works in developing country like Nepal. Similar study done by Nzegwu et al found male to female victim ratio of 2.5:1.11

Students and service holder were the most injured because of the rush through heavy traffic to get to their occupation and to the school. Similar observation was noted in the previous study by others.12 Students are usually involved in road traffic crashes as they rush through heavy traffic to and from their schools. These school-age group children are usually very active and are often less supervised.

The study showed that most of the RTA was two wheelers accident. Motorcycle has become one of the most popular vehicle in Nepal as it is inexpensive, easy available and accessible to the people. As motorcycles are relatively unsafe vehicles, the riders must be considered as unprotected vehicle users and their injuries are usually severe.

Our study showed that maximum number of accident occurred during day and night time in comparison to morning time. The maximum accidents occurred between 12 pm to 3 pm or 6 pm to 9 pm in a study done in Dharan, eastern Nepal which supports our study result.13 Increased rate of injuries during the day can be explained by increased traffic jams as well as increased human activities in the city during the day time. Knowing the time of injury in trauma patient is important for prevention strategies.

In the present study 57.7% road traffic crash victims were found to have the habit of smoking and alcohol consumption. The

TABLE 4: Addiction of victims

| Type of addiction | Number | Percentage |
|-------------------|--------|------------|
| Smoking           | 1      | 0.2        |
| Alcohol           | 57     | 16.3       |
| Smoking + Alcohol | 201    | 57.7       |
| None              | 89     | 25.5       |

TABLE 5: Indicators of health and injury severity scale (ISS)

| Variables          | Categories | No of victims | Median ISS | Q1 | Q3 | p value | Remarks |
|--------------------|------------|---------------|------------|----|----|---------|---------|
| Indicators of health | Mortality | 30            | 31.50      | 26 | 37 | <0.001  | Sig     |
|                    | Morbidity  | 318           | 1          | 1  | 1  |         |         |
| Total              |            | 348           | 1.00       |    |    |         |         |

FIG 3: Percentage of type of injury among RTA victims (n= 348)
role of alcohol in impairing driving ability is well documented. Alcohol usage causes carelessness and loss of concentration as well as over speeding and neglecting to use safety equipment such as helmet. The data regarding consumption of alcohol prior to the accident were not adequate which the limitation of our study.

In our study, we found abrasion (61.2%) to be the most common injury occurred during the RTA followed by laceration (34.1%), fracture (20.9%), Blunt Trauma Abdomen and Chest (12%). Our study result is supported by study done at College of Medical Sciences, Chitwan, Nepal which reports that maximum injury found was abrasion (91%) followed by laceration (64%).

Median ISS for mortality cases was 31.50 and for morbidity cases was 1. Median ISS for mortality cases was found to be significantly high as compared to that of morbidity cases.

CONCLUSION

Road traffic accident is one of the major causes of morbidity and mortality. Injuries in various body regions are frequent findings in victims of RTA. Our study showed that median ISS of mortality cases was significantly high compared to that of morbidity cases.

Surprisingly, in developing country like ours where transportation facilities and expert doctors are not readily available some died on their way to hospital while others died after being treated even at the minimum ISS of 10. Proper examination and investigation play major role in management of the patient and could be lifesaving. Autopsy examination has proved its very importance in finding the exact cause of death and relationship between various injuries time and again.

ACKNOWLEDGEMENTS

I am thankful to Mr. Tika Ram Kattel, police officer for his help during this study.

I express my gratitude, heartfelt condolence and acknowledgement to all the visitors and family members of the victims who provided all the necessary information to accomplish this study.

I acknowledge all the victims who participated in this study who lost their valuable lives to various forms of trauma. May their souls rest in peace.

REFERENCES

1. Chalya, P.L., Mabula, J.B., Ngayomela, I.H., Kanumba, E.S., Chandika, A.B., Giti, G., Mawala, B. and Balamuka, D., Motorcycle injuries as an emerging public health problem in Mwanza City, Tanzania: A call for urgent intervention. Tanzania Journal of Health Research, 2010 12(4), pp.214-221.[DOI] [PubMed] [Full text]

2. Nantulya, V.M. and Reich, M.R., 2002. The neglected epidemic: road traffic injuries in developing countries. British medical journal, 324(7346), p.1139.[DOI] [PubMed] [Full text]

3. Schwartz, G., 1998. Trauma to the head. In Principles and Practice of Emergency Medicine. pp. 232-234.

4. Rating the Severity of tissue damage: The Abbreviated Injury Scale, J Am Med Assoc 1971;215: 277-280.[DOI] [PubMed] [Full text]

5. Bull J. P. The injury severity score of road traffic casualties in relation to mortality, time of death, hospital treatment time and disability. Accid Anal Prev1975;7:249.[DOI] [Full text]

6. Semmlow, J.L., Cone, R.: Utility of the injury severity score: A confirmation. Health Services Research, Spring, 1976. [Full text]

7. Moylan, J.A., Detmer, D.E., Rose, J., Schulz, R.: Evaluation of the quality of hospital care for major trauma. J. Trauma1976;16:517.[DOI] [PubMed] [Full text]

8. Baker SP, O’Neill w, et al The Injury Severity Score: a method for describing patients with multiple injuries and eval-
9. Tomomi Michiue, Takaki Ishikawa, Li Quan, Bao-Li Zhu Hitoshi Maeda, Forensic pathological evaluation of injury severity and fatal outcome in traffic accidents: Five illustrative autopsy cases of clinically unexpected death, Forensic Sci Med Pathol 2008;4:153-158. [DOI] [PubMed] [Full text]

10. Putul Mahanta. Study of abdominopelvic injuries in victim of road traffic accident. International journal of medical toxicology and legal medicine Jan-Mar 2010. 12(3):24-31

11. MA Nzegwu, JU Aligbe, AAF A Banjo, W Akhiwui, CO Nzegwu. Patterns of morbidity and mortality amongst motorcycle riders and their passengers in benin-city Nigeria: one-year review Ann Afr Med 2008 Jun;7(2):82-5. [DOI] [PubMed] [Full text]

12. Akinpelu OV, Oladele AO, Amusa YB, Ogundipe OK, Adeolu AA, Komolafe EO: Review of road traffic accident admissions in a Nigerian Tertiary Hospital. East Cent Afr J Surg. 2007, 12 (1): 64-67. [Full text]

13. Jha S., Yadav B.N., Karn A., Aggrawal A. and Gautam A.P, Epidemiological study of fatal head injury in road traffic accident cases: a study from BPKIHS, Dharan. Health Renaissance, 2010 8(2), pp.97-101. [DOI] [Full text]

14. Pokhrel AU, Acharya A, Yadav A. Pattern of morbidity and mortality due to Road Traffic Accident at College of Medical Sciences, Chitwan, Nepal JBPKIHS 2018; 1(2):42-49 [DOI] [Full text]