

## Pattern, Severity and Outcome of Injuries Sustained in Road Traffic Accidents: A Tertiary Care Hospital-Based Study

Mohammad Ariful Islam \*<sup>1</sup>, Md Aziz Ullah<sup>2</sup>, Fatematul Jannat<sup>3</sup>, Soma Rahman<sup>4</sup>, Md Zillur Rahman<sup>5</sup>

### Abstract

**Introduction:** Road Expansion and motorization, in the country has been accompanied by a rise in road accidents leading to road traffic injuries (RTIs). Today RTIs are one of the leading causes of deaths, disabilities, and hospitalizations with severe socioeconomic costs across the world. The aim of the study is to determine the pattern, severity and outcome of injuries amongst road traffic accident victims. **Materials and Methods:** An observational study was carried out at casualty department of Cumilla Medical College Hospital, from April 2020 to September 2020. Total 192 patients following RTIs were included in this study. After history taking, clinical examination and collection of investigation reports, data was analyzed by using SPSS-23. **Results:** Out of 192 patients, 33.3% of the patients belonged to age group 21-30 years, 71.4% were male. More than two third (67.2%) patients accident took place in high way and 62 (32.8%) in other areas. According to pattern of victims 111(57.8%) patients was found in pedestrian of victims, 48(25.0%) in driver and 33(17.2%) in passenger. In injury severity score, 98(51.0%) patients were found minor injuries followed by 57(29.7%) moderate, 22(11.5%) serious and 15(7.8%) severe injuries. Ninety (46.9%) patients were found transfer for definitive care followed by 52(27.1%) discharge after Rx, 30(15.6%) wound infection, 18(9.4%) referred to higher center and 2(1.0%) death. **Conclusion:** The present study shows that fatal accidents mainly affected the young adults in productive age groups and pedestrians. Highways were most commonly affected location. Most of the accidents caused by motorized vehicles

**Keywords:** Road Traffic Accidents, road traffic injuries, Pattern, severity and outcome of road traffic injuries.

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### \*1. Corresponding Author:

**Dr. Mohammad Ariful Islam**

Medical Officer

Sadar Hospital, Brahmanbaria, Bangladesh.

Mobile : 01717072187

Email : arifulnn@gmail.com

### 2. Dr. Md Aziz Ullah

Assistant Professor

Department of Surgery

Cumilla Medical College

Cumilla, Bangladesh.

### 3. Dr. Fatematul Jannat

Assistant Professor

Department of Gynaecology and Obstetrics

Eastern Medical College

Cumilla, Bangladesh.

### 4. Dr. Soma Rahman

Associate Professor

Department of Radiology and Imaging

Anwar Khan Modern Medical College

Dhaka, Bangladesh.

### 5. Dr. Md Zillur Rahman

EMO, Mohammed Ali Hospital

Bogra, Bangladesh.

### Introduction:

RTAs are causing more than 1.2 million deaths annually<sup>1</sup>. The developing countries account for 85% of the deaths as a result of RTA<sup>2</sup>. RTAs are the eighth leading cause of death with similar impact as other communicable and non-communicable diseases<sup>3</sup>. Bangladesh has had a gradual shift from infectious disease to non-communicable disease and injuries in the past couple of years<sup>4-10</sup>. The World Health Organization estimated that it kills over 21,000 people in the country annually<sup>11</sup>. The WHO has predicted that traffic fatalities will be the sixth leading cause of death worldwide and the second leading cause of “disability-adjusted life years lost (DALYs)” in developing countries by the year 2020<sup>12</sup>. One DALY is roughly equivalent to one healthy year of life lost<sup>13</sup>. RTIs death rates are more than twice in low and middle-income countries (LMICs) compared to high income countries<sup>14-18</sup>. The reason is rapid urbanization and motorization<sup>1</sup>. According to the Road Safety Global Report (2015), Bangladesh lacks best practice legislations for all five road safety risk factors, including speeding, helmet use, drink driving, seatbelt use, and child restraint use, which make the situation even worse<sup>1, 19</sup>. Head is the most commonly affected site among the RTIs victims<sup>20,21</sup> which is then followed by upper limbs and lower limbs<sup>20</sup>. Skull fractures, subdural hemorrhages, frontal bone fracture, liver lacerations and rib fractures are common injuries<sup>22</sup>. Lacerations, abrasions and bruises are the most common forms of external injuries. Fractures, chest injury, abdominal injury are the internal types of injuries<sup>20</sup>. In the developing world, inadequate trauma management and

underdeveloped emergency system amplifies the magnitude of the problem because there are no well-established response teams in most places<sup>23</sup>. In this scenario, a severe road traffic injury patient's outcome becomes catastrophic. So appropriate information regarding burden, pattern and severity of RTIs patients are necessary for proper and integrated trauma management planning. The purpose of the study is to assess the burden of RTIs in terms of injuries and to explore the pattern, severity and outcome after management. The study results may help in the assessment of present trauma management protocol and encourage its modification for reducing RTI fatality and disability.

**Materials and Methods:**

This observational study was conducted between April 2020 to September 2020 at casualty department of Cumilla Medical College Hospital, Cumilla (CuMCH). Sample were collected by Consecutive purposive sampling method. Patients irrespective of their age and sex attending at Casualty Department of CuMCH following RTAs were selected for study. Exclusion criteria were – Brought in dead cases, patients not willingly participate in this study procedure, referred patient before interview. Data was collected in pre-organized data collection sheet from patients fulfilling inclusion exclusion criteria. Total 192 patients with RTI attending at Casualty dept of CuMCH during study period were included in this study. Detailed history and thorough clinical evaluation were done as per ATLS protocol on arrival at casualty department. After stabilization of vital sign of the patient, the following data was collected: Socio-demographic data including age and sex, pattern of trauma including types and site of Injury, clinical examination involving vital signs, GCS, investigations including routine and imaging studies like X-ray, CT scan etc. Then an ISS was performed according to the Guidelines in the AIS 2005 edition.

**Treatment:** Conservative or an operative intervention Performed.

**Outcome of the patient:** Discharge after treatment, transfer for definitive care, referred to higher center, died or wound infection. All the information were recorded in a pretested questionnaire. History taking, clinical examination and investigations by interview using structured questionnaires were done after taking informed written consent. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 23.0 for Windows. The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Clearance was taken from ethical clearance committee of CuMCH prior to the study. Confidentiality of the data was strictly maintained.

**Result:**

Demographic characteristics of our study population shows that one third (33.3%) of the patients belonged to age 21-30 years, 137(71.4%) were male, 63(32.8%) patients completed primary education, 131 (68.2%) has monthly income of 5,000-25,000

taka, 70(36.5%) were day laborer (Table I). Considering place of accident more than two third (67.2%) patients accident took place in high way and 62(32.8%) in other area (Table II). According to pattern of victims, there were 111(57.8%) patients in pedestrian of victims, 48(25.0%) in driver and 33(17.2%) in passenger (Table III). Table IV shows that 102(53.1%) patients were found external injury followed by 48(25.0%) head & neck, 41(21.4%) lower limb, 36(18.8%) upper limb, 31(16.1%) face, 9(4.7%) thorax, 7(3.6%) pelvis & spine and 6 (3.1%) abdomen injuries. External injuries were found in 102 patients among them 25(24.5%) had laceration injuries, 22(21.6%) had abrasion, 15(14.7%) had bruise, 5(4.9%) had crush and 35(34.3%) had multiple injuries (Table V). Internal injuries were found in 97 patients among them 43(44.3%) had fractures, 26(26.8%) had head, 14(14.4%) had visceral, 11(11.3%) had dislocation and 3(3.1%) had multiple injuries (Table VI). Head injuries were found in 26 patients among them 14(53.8%) had skull fractures, 9(34.6%) had brain injuries, 2(7.7%) had intracranial hemorrhages and 1(3.8%) had multiple injuries (Table VII). In abbreviated injury score, 102(53.13%) patients was found minor injuries followed by 51(26.57%) moderate, 17(8.86%) serious, 11(5.72%) severe, 5(2.60%) critical and 6(3.12%) are virtually unsurvivable (Table VIII). Table IX shows that 90(46.9%) patients were found transfer for definitive care followed by 52(27.1%) discharge after Rx, 30(15.6%) wound infection, 18(9.4%) referred to higher center and 2(1.0%) death.

**Table I: Distribution of the study patients by demographic characteristics (n=192)**

Demographic characteristics	Number of patients	Percentage
Age (year)		
≤10	12	6.3
11-20	36	18.8
21-30	64	33.3
31-40	39	20.3
41-50	24	12.5
51-60	11	5.7
>60	6	3.1
Sex		
Male	137	71.4
Female	55	28.6
Educational status		
Illiterate	38	19.8
Primary	63	32.8
SSC	54	28.1
HSC	23	12.0
Graduate	14	7.3
Monthly income (Taka)		
<5,000	3	1.6
5,000-25,000	131	68.2
>25,000	58	30.2
Occupational status		
Day laborer	70	36.5
Service holder	48	25.0

Demographic characteristics	Number of patients	Percentage
Occupational status		
Business	29	15.1
Student	26	13.5
Unemployed	19	9.9

**Table II: Distribution of the study patients according to place of accident (n=192)**

Place of accident	Number of patients	Percentage
High way	129	67.2
Other area	63	32.8

**Table III: Distribution of the study patients according to pattern of victims (n=192)**

Pattern of victims	Number of patients	Percentage
Driver	48	25.0
Passenger	33	17.2
Pedestrian	111	57.8

**Table IV: Distribution of the study patients according to site of injury (n=192)**

Site of injury	Number of patients	Percentage
Head & neck	48	25.0
Lower limb	41	21.4
Upper limb	36	18.8
Face	31	16.1
Thorax	9	4.7
Pelvis & spine	7	3.6
Abdomen	6	3.1
External	102	53.1

**Table V: Distribution of the study patients according to pattern of external injury (n=102)**

Pattern of external injury	Number of patients	Percentage
Laceration	25	24.5
Abrasion	22	21.6
Bruise	15	14.7
Crush	5	4.9
Multiple	35	34.3

**Table VI: Distribution of the study patients according to pattern of internal injury (n=97)**

Pattern of internal injury	Number of patients	Percentage
Fracture	43	44.3
Head injury	26	26.8
Visceral injury	14	14.4
Dislocation	11	11.3
Multiple	3	3.1

**Table VII: Distribution of the study patients according to pattern of head injury (n=26)**

Pattern of head injury	Number of patients	Percentage
Skull fractures	14	53.8
Brain injury	9	34.6
Intracranial hemorrhage	2	7.7
Multiple	1	3.8

**Table VIII: Distribution of the study patients according to abbreviated injury score (n=192)**

Abbreviated injury score	Number of patients	Percentage
Minor	102	53.13
Moderate	51	26.57
Serious	17	8.86
Severe	11	5.72
Critical	5	2.60
Virtually unsurvivable	6	3.12

**Table IX: Distribution of the study patients according to outcome (n=192)**

Outcome	Number of patients	Percentage
Transfer for definitive care	90	46.9
Discharge after Rx	52	27.1
Wound infection	30	15.6
Referred to higher center	18	9.4
Death	2	1.0

**Discussion:**

In this study observed that one third (33.3%) of the patients belonged to age 21-30 years, 137(71.4%) were male, 63(32.8%) patients completed primary education, 131(68.2%) patients come from 5,000-25,000-taka monthly income and 70(36.5%) patients were day laborer. Singh et al.<sup>20</sup> reported male victims 258 (74.35%) were more commonly involved than females 89 (25.65%) and majority of victims 141 (40.63%) were in age group of 20–30 years. However, other studies observed that the peak age of male victims was in the 4th decade, with the mean at 33 years<sup>27,28</sup>. Baset et al.<sup>11</sup> also observed fatal RTI cases, gender and age were not significantly associated with an increased risk of death due to an RTI. Education level was not seen to be associated with non-fatal RTI risk. Highest incidence (30.38 %) of RTA was observed among the age group 21 to 30 yrs. Solanki and Hemlata<sup>24</sup> the maximum 321(80.25%) cases were from the age group of 15 to 45 years. Majority of RTA cases were male 324(81.00%), while 76(19.00%) females, indicating 4:1, male female ratio. In this study showed that more than two third (67.2%) patients accident took place in high way and 62(32.8%) in other area. Singh et al.<sup>20</sup> reported maximum number of accidents took place on national highway (69.50%). This can be explained on the fact that national highway-24 is the busiest roads with vehicles travelling at high speeds, the roads being less wide multiple intersections and divider cuts are present at every kilometer for changing the side<sup>11,12</sup>. Rahman et al.<sup>13</sup> also reported most accidents

took place on highways 650 (79.95%).

In this study showed that 111(57.8%) patients were found in pedestrian of victims, 48(25.0%) in driver and 33(17.2%) in passenger. Baset et al.<sup>11</sup> reported transport workers had the highest rates for both RTI mortality (46.1/100,000; 95% CI 23.3–90.9). Rahman et al.<sup>13</sup> reported commonest victims were pedestrians 564 (69.37%). In this study observed that 102(53.1%) patients were found external injury followed by 48(25.0%) head & neck, 41(21.4%) lower limb, 36(18.8%) upper limb, 31(16.1%) face, 9(4.7%) thorax, 7(3.6%) pelvis & spine and 6 (3.1%) abdomen injuries. Singh et al.<sup>20</sup> reported extremities 499 (53.54%) and the maxillofacial injuries 180 (19.31%) were the most common body region injured. Head/neck was also more common and accounts for 175(18.78%) cases. The upper limb 216 (26.93%), lower limb 210 (26.18%), and head/neck 167 (20.32%) were the most common affected areas to suffer with external injuries seen in the victims. Similar results were also observed by others researchers<sup>27,29</sup>. Common sites for injuries were the lower and upper limbs and face<sup>29,30</sup>. Neeraj et al.<sup>21</sup> reported head injury was found 59.3% followed by fracture of upper limb 21.3%, fracture of lower limb 13.7%, chest injuries 4.4% and others injuries 3.3%. In this study observed external injuries was found 102 patients among them 25(24.5%) had laceration injuries, 22(21.6%) had abrasion, 15(14.7%) had bruise, 5(4.9%) had crush and 35(34.3%) had multiple injuries. Singh et al.<sup>20</sup> reported the most common pattern of injury was lacerations observed in 307 (38.28%), abrasions 306 (38.15%), followed by bruises 154 (19.20%). Rahman et al.<sup>13</sup> reported the cases 100% victims had multiple abrasion and bruise, laceration was present in 654 (80.44%) and intra cranial injury 527 (64.82%). Das and Gogoi also observed abrasion (72.8%) the most common external injury<sup>25</sup>. In current study internal injuries were found in 97 patients among them 43(44.3%) had fracture injuries, 26(26.8%) had head, 14(14.4%) had visceral, 11(11.3%) had dislocation and 3(3.1%) had multiple injuries. Das and Gogoi<sup>25</sup> study reported fracture (71.79%) was found to be the most common internal injury. The highest number of fractures was in upper limbs followed by lower limbs and facial bones<sup>27</sup>. In contrast, result of other study showed that the commonest injury was fracture of bones particularly of the head and face and closely followed by the lower extremity<sup>31</sup>. In this study, head injuries were found in 26 patients among them 14(53.8%) had skull fractures, 9(34.6%) had brain injuries, 2(7.7%) had intracranial hemorrhage and 1(3.8%) had multiple injury. Das and Gogoi<sup>25</sup> observed injury to brain was found in 16.84% of the patients. Farooqui et al.<sup>26</sup> reported skull injuries was found 59(29.64%) and brain was 78 (38.61%). In present study observed, in injury severity score, 98(51.0%) patients were found minor injuries followed by 57(29.7%) moderate, 22(11.5%) serious and 15(7.8%) severe injuries. Baset et al.<sup>11</sup> also reported the RTI injury severity index showed that 50% of RTI cases had low severity. Almost 20% of cases had been severely injured in a road traffic crash. The highest proportion of high injury severity was found among passengers (37.7%), followed by pedestrians (22.4%). In present study showed that 90(46.9%) patients were found transfer for definitive care followed by 52(27.1%) discharge after Rx, 30(15.6%) wound infection, 18(9.4%) referred to higher center and 2(1.0%) death. Alonge et

al.<sup>19</sup> reported the overall injury mortality rate was 38 deaths per 100 000 population per year. Baset et al.<sup>11</sup> also observed most RTI mortality, however, occurred among pedestrians (35%). Auto-rickshaw, pickup van, jeep, microbus, bus, bicycle, and motorcycle were the main modes of transportation that an individual was using prior to death resulting from RTI. Hyder et al.<sup>17</sup> reported children and adolescents represented an average of 13% of all RTI deaths. Farooqui et al.<sup>26</sup> observed that the majority of the RTA victims (n=46, 46.93 percent) died due to head injury. Poly trauma and haemorrhagic shock were the reasons in 34 (34.69 percent) and 14 (14.28 percent) individuals respectively.

#### Conclusion

The present study shows that fatal accidents mainly affected the young adults in productive age groups and pedestrians. Highways were most commonly affected location. Most of the accidents caused by motorized vehicles. Safe road practice and use of protective wears should be launched. Moreover, healthcare services should be mobilized in such a way that a victim is attended within 30 min of accident to reduce the burden of mortality.

**Conflict of Interest:** None.

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