

## Original article

### Pattern of road traffic Accident and their consequences in Dhaka City

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#### Abstract

Road traffic injuries (RTIs) are one of the eight burning public health issues worldwide causing 1.3 million death every year. This study aimed to see the pattern of road traffic injuries, their consequences, and factors associated within Dhaka city. A cross-sectional study was conducted among Road Traffic Accident victims attended in three largest and tertiary care hospitals located inside the Dhaka metropolitan area through structured interviews between 25 January and 21 February 2017 with a sample size of 140. The majority of injured patients were between 18-37 years. More than 55% of injuries were severe, and intracranial injury (27.1%) was the most common type. T-junction (32.1%) and highways (31.4%) were most places for RTAs where half of the total victims were passengers. Our study indicates age, gender, and educational status were significantly associated with consequences of RTAs ( $p < 0.05$ ). Moreover, among the RTAs related variables, type of vehicle, RTA type, injury place, and treatment approach found significantly associated with consequences of RTAs ( $P < 0.05$ ). The findings of this study could play an important role to build awareness on RTAs among policymakers and general peoples to reduce mortality due to RTIs.

**Keywords:** Road Traffic Injuries (RTA), Type of vehicle, Place of injury, Time of injury.

#### Introduction

Road traffic injuries (RTI) is a global public health issue and one of eight major cause of mortality. Every year more than 50 million people are injured throughout the world due to RTA and is the leading cause of disability.<sup>1-3</sup>

According to the World Health Organization (WHO), Road Traffic Accidents (RTA) is behind more than 1.3 million deaths per year globally. Within 2030 RTIs will become the 5<sup>th</sup> most significant cause of mortality worldwide;<sup>4,5</sup> RTAs also have a significant impact on the global economy because, in most of the cases the economically productive people are subject as they move continuously.<sup>6</sup>

RTAs are very common in Low- and middle-income countries (LMICs) where more than 90% of global road traffic-related injuries happened. More than 65% of LMICs don't have policies in place to protect road users<sup>6,7</sup>. The death rates due to RTA in LMICs are more than double in comparison to high-income countries and losses about 5% their GDP due to RTIs in compared to 3% of the rest of the world.<sup>8,9</sup>

In Bangladesh, RTAs are a widely discussed public health issue resulting in over 21,000 fatalities every year. Most of these deaths commonly occur among pedestrians and passengers of light vehicles. RTIs are now Sustainable Development Goal (SDG) issue as most of these global deaths are occurring in LMCs.<sup>10-16</sup>

In the last few years, a continuing swing from infectious disease to non-communicable disease and injuries happened in Bangladesh. The United Nations (UN) announced the 2011–2020 period as a Decade of Action for Road Safety. Where, two SDG indicators aimed to decrease worldwide road traffic accidents, injuries, and death by 50% by 2020.<sup>17,18</sup>

Our study aimed to reveal the pattern of road traffic injuries of victims admitted to hospitals in Dhaka city, and factors associated with it. This kind of study is important for the planning and implementation of health care for the injured by decision makers.

#### Materials and Methods

This cross sectional study was conducted in three tertiary care hospitals in Dhaka metropolitan area named Dhaka Medical College Hospital, Mitford Hospital, and Square Hospitals Ltd as these hospitals have proper record keeping facilities. The study was conducted from 25th January 2017 and 21 February 2017 using an interviewer-administered questionnaire through face to face interview with patients or close relatives of patients; sample size was 140. Here, the consequences of injuries from road traffic were expressed by "Injury Severity Score" to determine the injury severity. If the Injury Severity Score was found greater than 15, we concluded the injury as severe.<sup>19</sup> The protocol for

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this research was approved by the Ethical Review Committee of the American International University Bangladesh. Written informed consent was taken from the patient himself or guardian/ close relatives of the severely injured study participant. Data were collected every day by the trained data collectors or researchers themselves from one of every three patients came with RTA in the Emergency Departments (EDs) of the selected hospitals. After checked for completeness and consistency, SPSS version 22 statistical package software was used to analysis. To summarize our data, various descriptive statistics like frequencies and proportions were calculated. After analysis, data were presented in appropriate tables and graphs; degrees of association were determined by chi-square test.

**Results:**

Out of 140 respondents, 67.9% were male, and 32.1% were female. Among the victims, the most of the injured victims were within 18-27 years age group (32.1%), followed by 28-37 years 29.3% and more than 57 years (6.4%). It is revealed that 67.9% of road traffic injuries occurred at day time whereas 32.1% took place at night. Among the respondents, 37.1% had secondary level education while graduation or above was 7.1% and 11 (7.9%) found illiterate. According to residence status, 45.7% resides in the suburbs, 38.6% in the main city and 15.7% in the slums. Among the respondents, 59.3% had a household income between TK 25000 to 50000, 25.7% had less than 25000, and 15.0% were of higher income (Table 1).

**Table 1. Socio-demographic characteristics of patients**

Variables	Category	Frequency	Percentage
Gender	Male	95	67.9
	Female	45	32.1
Age	18-27 years	45	32.1
	28-37 years	41	29.3
	38-47 years	26	18.6
	48-57 years	19	13.6
	>57 years	9	6.4
Education level	Illiterate	11	7.9
	primary	24	17.1
	Secondary	52	37.1
	Higher secondary	43	30.7
	Graduate or above	10	7.1
Residence type	Suburbs	64	45.7
	Main city	54	38.6
	Slums	22	15.7
Monthly household income (Taka)	25000-50000-	83	59.3
	<25000	36	25.7
	>50000	21	15.0

Out of 140 respondents, 46 respondents had head-on collision type comprising of 32.9%, and collision involving pedestrians and bikers includes of 35 respondents with the percentage of 25.0%, whereas only nine respondents had other types of RTA comprising of only 6.4% of the total. Place of injury of the RTA victims showed that T-junctions and highways are the RTA prone zones. Out of 140 respondents 45 respondents got injured on T-junctions making 32.1% and RTAs on highways occurred to 44 respondents comprising of 31.4% of total percentage and least in the railway crossings as only 5 respondents got injured there which contributes to 3.6% of the total. Among 140 respondents 27 were injured involving bus comprising of 19.3%, 26 respondents were injured involving other vehicles making 18.6%, 23 respondents got injured by minibus making 16.4%, 19

respondents are injured by the involvement of private car making it 13.6%, 18 respondents got injured involving micro bus making 12.9%; 12 (8.6%) respondents were injured involving truck, and by oil tankers as only 2 (1.4%) respondents. Out of 140 respondents 38 respondents had intracranial injury comprising of 27.1%, 36 had multiple abrasions/bruises/lacerations making 25.7% and the least 10.7% injury to liver/spleen/kidney occurred to 15 respondents. Among 140 respondents 70 respondents who were victims of road traffic accidents were passengers making 50.0% of the total. Pedestrian was 25.0% comprising of 35 respondents and 35 respondents were drivers making 25.0%. 105 (75%) of respondents required surgical treatment and 35 respondents are treated medically contributing to 25.0% out of total percentage (Table 2).

**Table 2. Distribution of road traffic injury-related variables**

Variables	Category	Frequency	Percentage
<b>Type of RTA</b>	Head on collision	46	32.9
	Single vehicle collision	25	17.9
	Intersection collision	25	17.9
	Collision involving biker and pedestrians	35	25.0
	Others	9	6.4
<b>Occurrence time</b>	Day	95	67.1
	Night	45	32.1
<b>Place of RTA</b>	Highway	44	31.4
	Cross junction	33	23.6
	T-Junctions	45	32.1
	Railway crossings	5	3.6
	Others	13	9.3
<b>Types of vehicle</b>	Bus	27	19.3
	Mini bus	23	16.4
	Private car	19	13.6
	Micro bus	18	12.9
	Truck	12	8.6
	Covered van	8	5.7
	Pick up	5	3.6
	Oil tankers	2	1.4
	Others	26	18.6
	<b>Injury patterns</b>	Intracranial injury	38
Multiple abrasions /bruise/Laceration		36	25.7
Fracture of lower limbs bones/ Fracture of ribs/ Fracture of pelvis		26	18.6
Fracture of skull/Decapitation		25	17.9
Injury to liver/ Injury to spleen/ Injury to kidney		15	10.7
<b>Severity level</b>	Severe	78	55.71
	Mild	62	44.28
<b>Victim type</b>	Passenger	70	50.0
	Pedestrian	35	25.0
	Driver	35	25.0
<b>Treatment approach</b>	Surgical	105	75.0
	Medical	35	25.0

Among the socio-demographic variables gender (Chi-square: 16.269), age of the injured patient (Chi-square: 34.995), educational status (Chi-square:11.115) are statistically significant ( $p < 0.05$ ) association with consequences of Road traffic accident (table3).

**Table 3. Association between socio-demographic characteristics and consequences of RTA**

Variables	Category	Consequences of RTI		Chi-square	P value
		Severe (%)	Mild (%)		
<b>Gender</b>	Male	64 (67.37)	31 (32.63)	16.269	0.00*
	Female	14 (31.11)	31 (68.89)		
<b>Age</b>	<37 years	31 (36.05)	55 (63.95)	34.955	0.00*
	>37 years	47 (87.04)	7 (12.96)		
<b>Educational status</b>	Highly educated	67 (63.81)	38 (36.19)	11.115	0.00*
	Not highly educated	11 (31.43)	24 (68.57)		
<b>Employment status</b>	Employed	57 (58.76)	40 (41.24)	1.190	0.27
	Unemployed	21 (48.84)	22 (51.16)		
<b>Economic condition</b>	Higher	13 (61.90)	8 (38.10)	0.384	0.535
	Lower	65 (54.62)	54 (45.38)		

$p < 0.05$  was considered as a statistically significant association

On the other hand, among the road traffic injury-related variables except for the time of injury, all showed statistically significant association with the consequences of RTI ( $p < 0.05$ ). (Table 4)

**Table 4. Association between road traffic accident-related variables and consequences of road traffic accident**

Variables	Category	Consequences of RTA		Chi-square	P value
		Severe (%)	Mild (%)		
<b>Type of vehicle</b>	Larger vehicles	58 (90.63)	6 (9.37)	58.235	0.00*
	Smaller	20 (26.32)	56 (73.68)		
<b>Type of RTA</b>	Head on collision	39 (84.78)	7 (15.22)	23.462	0.00*
	Others	39 (41.49)	55 (58.51)		
<b>Place of injury</b>	Highway and cross junction	51 (66.23)	26 (33.77)	7.674	0.01*
	Railway crossing and others	27 (42.86)	36 (57.14)		
<b>Treatment approach</b>	Surgical	63 (60.0)	42 (40.0)	8.371	0.006*
	Medical	15 (42.86)	20 (57.14)		
<b>Time of injury</b>	Day	50	45	1.138	0.286
	Night	28	17		

\*p value is from pearson’s chi square test

### Discussion

Road traffic accidents (RTAs) are one of the leading causes of hospital admission and death in Bangladesh. Not surprisingly, our study shows that the overwhelming majority of the surviving victims 67.5% were male, and 32.1% were female. This may be because males work predominately outside the home and bulk of drivers and helpers are male.<sup>20, 21</sup>

Among the age groups between 18-67 years old, the mostly injured group was 18-27 years consist of 32.1%, 28-37 years old group was 29.3% and the least vulnerable group was the 58-67 aged group (6.4%), and these findings corroborate with the findings of other countries.<sup>21, 22</sup> The results indicate young adults’ groups are more sufferers of road traffic injuries because these ages are the most active phase of one’s life. Due to RTIs, most productive people become subject to unproductive, which is impacting the overall economy. Moreover, young drivers are more prone to become addicted to alcohol and neglecting traffic rules and regulations.<sup>23</sup>

In the present study, we observed that a greater number of RTAs happened in the day time. Because in day times the roads of Dhaka city are full of traffic which creates increased risk of RTAs. A study conducted in rural Bangladesh recently found that a greater number of accidents happened between morning and noon.<sup>10, 24</sup> Our analysis showed that passengers are the leading victim group of road traffic injuries (50%), followed by drivers (25%) and pedestrians (25%). However, many analyses found pedestrians as the highest risk population of road traffic injuries.<sup>25, 26</sup> This may be due to socio-demographic variations among countries, village, and cities. According to our investigation, 45.7% resides in the suburbs, 38.6% in the central city and 15.7% in the slums. Among the respondents, 59.3% had a household income between 25000 to 50000, 25.7% had less than 25000, and 15.0% were of higher income.

Among the type of RTAs, collision type comprising of 32.9% and collision involving pedestrians and bikers comprises of 35 respondents with a percentage of 25.0%. Moreover, T-junctions and highways are found as the most RTA prone zones. It may be due to the high speed of cars on roads and frequent lane changing. The RTAs that were happened with our study participants, a large portion of those (19.3%) were involving a bus. Out of 140, 27.1% of the injuries were intracranial, and 25.7% were multiple abrasions/bruises/lacerations. These findings are in line with several previously conducted studies.<sup>10, 27</sup>

### Conclusion

This study has described the pattern of road traffic injuries, factors associated and consequences. Most of the injuries of the victims were severe in the category and most of them were young adults which is very alarming for our economy.

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