DIU Journal of Health and Life Sciences Volume 07, No. 01 & 02, 2020
https://doi.org/10.36481/diuhls.v07i1-2.dmgqkq08

ROAD TRAFFIC ACCIDENTS AND ITS ASSOCIATED RISK FACTORS: A STUDY ON NATIONAL HIGHWAYS IN BANGLADESH

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Abstract: *: Bangladesh, in recent years, has witnessed a growing number of road accidents resulting in fatalities and injuries of many people. The main objective of this study was to find out the factors leading to accidental road deaths and severe injuries on national roads in Bangladesh. The study was conducted by applying (a 500) semi-structured questionnaire-based survey method. A software package, SPSS, was used to analyze the data. The study found that about (34.8%) of accidents took place by head-on collisions and (27.6%) of those by back-on collisions. About one-fifth of the respondents (20.0%) stated that accidents happened because of high speed; (19.0%) of them told about the carelessness of the drivers were responsible; and (21.4%) of them considered the mistakes of other drivers as reasons. (52.2%) were injured by a bus, 15%by truck accidents, and 9.8% of them were found to be injured by motorcycles. About (56.0%) of the accidents took place on the highways, and 34.6% of the accidents on the local roads. Therefore, the study recommended more vigilance and sincere steps from the concerned authority to ensure the proper implementation of the laws and road traffic management.*

Keywords: *: Road accident, injuries, national highways, road trafficking, Road traffic management*

Introduction

In Bangladesh, the road transport system plays a vital role in the national economy through the movements of passengers and goods. Besides, due to flexibility and higher accessibility, the modal shift from other modes of transport (viz, rail, water) is increasing daily. In parallel, road safety problem is also rising and taking a heavy toll on human lives. High fatality, grievous injury, serious injury, and property damage are common phenomena on Bangladeshi roads. In most cases, the accidents occur in the rural part of national and regional highways. Despite underreporting, according to the Accident Research Institute (ARI) (BUET), around 55 percent of road accidents occur on the national highways of Bangladesh[1]. According to WHO, the lower and middle-income countries are at high risk of road traffic fatalities, as nearly 90% of the road traffic deaths occur in those countries, while it belongs to only 54% of the world's vehicles[2]. According to the Bangladesh Police, from 2009-to 2016, the fatalities due to road traffic crashes were 18,510, along with 14,442 injured people (BRTA)[3]. In 2015, the death incidents due to road accidents were 2,376, while 1,958 people were severely injured.

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However, according to the World Bank, Bangladesh loses about 7,500 cores of BDT, which is said to be 1.5% of GDP4. However, the social and familial trajectories are also big, as the study indicates the destitute situation by the deaths or injuries of the sole earning members of families. The closure of earnings leads a family into economic hardship and results in starvation and lower living standard.

The United Nations has adopted the resolution, Decade of Action (DoA), to ensure road safety 2011-2020.5 The resolution urges the signatories to implement far-reaching road safety measures to reduce accidental road fatalities and serious injuries by 2030. The UN General Assembly incorporated road safety in its agenda for Sustainable Development Goals. In SDG-3, it said about declining road accidental death rate and injuries. Besides, it asserted the confirmation of safe, affordable, accessible, and durable transport systems universally for all in SDG-116.

The road safety problems of the national highways need to be addressed with a clear understanding of the extent and complexity of the factors and hazards associated with accidents. RHD needs to have the skills and expertise to identify, analyze, evaluate, and mitigate these safety concerns. Effective road safety good practices around the world are indeed extremely important. Traditional black spot treatment is now obsolete because of the rear and random nature of road crashes. A safe system approach or system will be popular around the globe. To understand and mitigate the road safety catastrophe, the world's condition, context, nature, facts, and practices need to be addressed, especially in countries with safer roads. The main aim of this study was to explore the causes and factors of road traffic accidents on the national highways in Bangladesh.

Methods and Materials

The study was conducted by applying the quantitative methods of social research. Semi-structured-based questionnaire survey method was exploited to get a comprehensive picture of road traffic accidents and associated risk factors in Bangladesh. The data were collected from the passengers, pedestrians, drivers, and traffic police in different bus-truck terminals and black spots on national highways in Bangladesh. A convenient sampling technique was used to cover the target population. All the targeted respondents were covered as samples of 500 under the total semi-structured questionnaire survey in face-to-face interviews. The collected data were checked manually and automatically, along with cross-checking analysis. The categorization, edition, and data analysis were done using the SPSS program. The analysis was done by targeting research questions and core objectives.

Results

A: Socio-demographic characteristics of the respondents

Table 1 illustrates that around one-third of the respondents (36.2%) were in the age group of 20-30, while more than one-fourth of the respondents (30%) were 30-40 years old. However, the age group of 35.19±11.026 years was the mean age of the respondents. Around (97.8%) of the respondents were males in this research study, while the remaining 2.2% were females. Close to one-fifth of the respondents of the study (21.6%) were able to pass secondary education, and about a similar portion of the respondents (21%) passed their elementary (primary) education. Around one-fifth of the respondents (19%) acquired honors degrees, and around the

one-seventh of the respondents (14.4%) got master's degrees. However, one-tenth of the respondents (11.8%) were uneducated in this study. Close to one-third of the respondents (71.8%) who participated in the study were married. Around one-fourth of the respondents (27.4%) were unmarried. The rest, a little proportion of the respondents, 0.8%, were divorcees. Around half of the respondents (43%) were employed in private jobs, while around one-tenth of the respondents (7.6%) were employed in government jobs. Around one-fifth of the respondents (17.4%) were also doing business in this study. A small portion of the students (17.4%) also took part in the study. The rest portion of the respondents (2.8%) is freelancers.

Table 1: Socio-demographic characteristics of the respondents (n=500)

Socio-demographic variables	Frequency	Percent
Age (Years)		
≥20	16	3.2
20 - 30	181	36.2
30 - 40	150	30.0
40 - 50	98	19.6
50 - 60	42	8.4
≤60	13	2.6
Mean±SD	35.19 ±11.026	
Sex		
Male	11	2.2
Female	489	97.8
Educational Qualification		
Uneducated	59	11.8
Primary	105	21
Secondary	108	21.6
Higher secondary	58	11.6
Honors	98	19.6
Masters	72	14.4
Marital Status		
Married	359	71.8
Unmarried	137	27.4
Divorcee	4	0.8
Occupation		
Government employee	38	7.6
Private Job	215	43.0
Businessman	87	17.4

B: Road Traffic behavior

Table 2 illustrates that almost two-thirds of the respondents in this study use the bus, while a small portion (2.6%) use private cars. Around one-seventh of the respondents of the study (15.2%) use motor-cycles, followed by around one-tenth of the respondents (9%) of the study use rickshaws. Therefore, around one-twentieth of the respondents (6.8%) of the study use CNG as their vehicle. Close to a fourth-fifth of the respondents (80.8%) of the study told about experiencing or witnessing accidents. Slightly less than one-fifth of the respondents (19.2%) of the study mentioned falling into or witnessing accidents.

Table 2: Road Traffic behavior of the respondents

Variables	Frequency	Percent
Use of Vehicle		
Bus	317	63.4
Private Car	13	2.6
Motor Cycle	84	15.2
Rickshaw	35	9.0
Cycle	7	1.4
Laguna	6	1.6
CNG	38	6.8
Experiencing or witnessing an Accident		
Yes	404	80.8
No	96	19.2

C. Nature and place of Road Accident

Table 3 illustrates that close to one-third of the respondents (34.8%) told about head-on collisions, while slightly more than one-fourth of the respondents (27.6%) mentioned back-on collisions. Followed by one-seventh of the respondents of the study (15.2%) told about capsize of the vehicle as to the accident type. A small portion of the respondents (5.4%) mentioned experiencing slip-away as the accident type. More than one-seventh of the respondents said that the accident took place on narrow roads (16.6%), while a similar portion of the respondents (15.6%) told about the bending road. Around one-seventh of the respondents (13.4%) of the study witnessed or fell into accidents at markets places, while slightly less than

one-fifth of the respondents mentioned the main road. Somewhat less than one-fifth of the respondents (12.2%) experienced accidents in the business area. More than half of the respondents (56%) told about highway roads where accidents occurred. Close to one-third of the respondents mentioned witnessing or experiencing road accidents on the local road. Around one-twentieth of the respondents (5.4%) of the study mentioned bypass roads. In comparison, the rest (4%) of the respondents talked about metropolitan roads.

Table 3: Nature and place of Road Accident (n=500)

Variables	Frequency	Percent
Types of Accident		
Head-on collision	174	34.8
Back collision	138	27.6
Side collision	32	6.4
Capsize	76	15.2
Hit object on the road	26	5.2
Hit a pedestrian	20	4.0
Slip away	27	5.4
The place where accident -place		
Hit object off-road	7	1.4
Market	67	13.4
Narrow road	83	16.6
Narrow bridge	16	3.2
Bend road	78	15.6
Circle	49	9.8
In front of School	19	3.8
Resident Area	30	6.0
Business Area	61	12.2
Main Road	97	19.4
The road where the accident took place is a road		
Highway road	280	56.0
Local road	173	34.6
Metropolitan road	20	4.0
Bypass road	27	5.4

D: Factors caused by road accidents

Table 4 illustrates that more than half (52.2%) of the incidents were caused by a bus, while close to one-seventh of the accidents (15%) were associated with private cars. However, somewhat less than one-tenth (9%) of the incidents were caused by laguna. This is followed by around one-tenth (9.8%) of the accidents related to the motorcycle. CNG vehicles also caused more than one-twentieth (6.5%) of accident incidents. However, a small portion (4.2%) of the incidents was also attributed to the rickshaw.

Above one-fifth of the respondents (21.4%) of the study attributed wrong driving of some drivers as the cause of road accidents. One-fifth of the respondents (20%) of the study mentioned that high speed is responsible for road accidents, while close to one-fifth of the respondents (19%) of the study informed about the drivers' lack of attention. Close to one-seventh of the respondents (19.4) of the study told about less sincerity of the drivers in driving. Slightly less than one-tenth of the respondents (9%) of the study also mentioned violation of the traffic rules as responsible factors for road accidents. The structural problems of roads also caused road accidents, according to about one-tenth of the respondents (9.8%) of the study. However, more than one-twentieth of the respondents (6.6%) of the study talked about technological problems of the vehicles. A small portion of the respondents (0.6%) mentioned less attention of the drivers due to talking over the mobile phone as the factor causing road accidents.

Table 4: Factors caused by road accidents (n=500)

Variable	Number	Percentage
Vehicles caused a road accident		
Bus	261	52.2
Private car	13	2.6
Motor cycle	49	9.8
Truck	75	15.0
Leguna	45	9.0
Rickshaw	21	4.2
CNG	31	6.5
Microbus	5	1.3
Reasons caused accident		
High speed	100	20.0
Talking over mobile	3	0.6
Inattentiveness	95	19.0
Violation of traffic rules	45	9.0
Less sincerity of drivers in driving	67	13.4
Wrong driving of other drivers	108	21.4
Structural problems of roads	49	9.8
The technological problem of vehicles	33	6.6

Discussion

Many of the factors that have contributed to escalating the road traffic crashes on the national and regional highways were detected in this study.About one-fifth of the respondents (20.0%) of the study indicated high speed as the cause of their vehicle falling into accidents. More than one-fifth of the respondents (21.4%) mentioned wrong driving of some drivers was responsible. The study also indicated some other factors that caused road accidents like less attention to driving, violation of the traffic rules, less sincerity of the drivers in driving, structural problems of roads, and technological problems of different vehicles. However, the study's findings are consistent with the findings of a study conducted by the Accidental Research Institute in 2011. 'Failure in the interaction of human, the vehicle and the road environment the three elements result in road traffic accidents' is traditionally achieved through systematic investigation and scientific research on the road traffic accidents.7

Another study on road traffic injuries and risk factors among Qatari drivers revealed that, of the injured drivers, 63.7% were involved in traffic infractions, particularly exceeding the speed limit (25.9%) and parking violation (18.1%). Drivers in Qatar suffered more injuries in overturn skid crashes (20.6%) and collisions with stationary objects (14.7%). More head injuries (33.3%) and neck injuries (44.7%) from light vehicle crashes were reported than from pickup and SUV crashes. In heavy vehicle crashes involving Qatari drivers, there were 43.5% reported severe injuries. The study's findings showed that young male drivers in Qatar between the ages of 25 and 34 had a particularly high risk of RTIs8.

However, the data of the present study show that the incidents mainly occur in a particular nature, including head-on collisions, back collisions, capsizing, and slipping away of the vehicles. However, some places of the roads are also found inclining towards road traffic crashes, including the main road, business area, narrow road, bending road, and bypass road. As the data suggest, the highways and the local roads are more prone to accidents. The study shows that some vehicles are also at high risk of falling in accidents like buses, trucks, laguna, and private cars. However, the systematic and structural limitations have resulted in the growing number of road traffic accidents in the country.

Conclusions

The road traffic accidents causing many casualties daily have become an existential threat to Bangladesh in recent days. The study has found some causal factors of the road traffic accidents, including wrong driving by some drivers, less attention and sincerity of the drivers in driving, lower implementation of the traffic rules, and some structural problems of roads. However, the study also shows some specific vehicles are at high risk of causing accidents like buses, trucks, motorcycles, and private cars. The high roads and the local roads are identified in this study as the risky places where accidents occur. The main road, narrow road, and the business area are found to be the places of most accidents. The study shows the usual nature of road accidents, including head-on, back-on, slip away, side, capsize, and hit objects on roads. Therefore, the study also figured out the road traffic behavior of general people as most of the respondents use the bus, then motorcycle, then CNG, and then other vehicles. The study also recommended strict measures and policies to ensure a valid license for all drivers, fitness of vehicles, and sufficient knowledge of the traffic rules among all road users. However, it suggested organizing a massive campaign nationwide to disseminate the traffic information and instructions to grow consciousness among general people about road safety and its essence.

Ethical statement

At the beginning of this study, the BMRC Ethical Review Committee, Dhaka, approved the research protocol. Before initiating the interview, the researcher took verbal consent from all the respondents. Then, the researcher read the consent letter before the respondent. After getting consent, the interview was started. However, the right to decline or withdraw from the research was accepted. All research data and information were kept confidential except used only for research purposes.

Acknowledgment

BMRC funded this research study. We gratefully acknowledge the efforts of the BMRC for such research.

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