JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

A Study on Road Safety Management System in Bangladesh

Engr. A. S. M. Mohsin, Ph. D.

Abstract

Road traffic severe accident and safety is a very important Global alarming present concept for the planning, designing, construction and restructuring of road infrastructures. There is need to establish the performance of road safety devices on roads to justify their installation or plan way installation on roads. According to different report it is evaluated that there are significant increase of accidents, fatalities, injuries and casualties have taken place in the last decade in Bangladesh in spite of increase of huge number of population, personal trips, vehicles (formal, informal; motorized, non-motorized), road network as well as increase of level of understanding on the necessity of accident reporting and recording particularly for the continuous monitoring of media personnel and introduction of formal accident reporting system. Road safety device are being installed on roads through Bangladesh and therefore, there is the need to address common problems associated with their provision of use. This research focuses on the contribution of road safety measures in reducing the road traffic severe accidents. Particularly the research activities wanted to find out main causes of road traffic accidents, establish the relationship between the increases in number of vehicle and also increases the road traffic accidents.

To improve road traffic safety, there is a choice from various categories of measures. Two of these categories, road infrastructure and driving assistance system are studied and compared in this research. However the present study has conducted to explore the factors affecting the road traffic accidents severity and to investigate the actual road safety problems. This study employed both quantitative and qualitative methods as a combined research approach (also called integrated approach). Here the research design of the present study is survey type. The study was conducted at 8 divisional head quarter districts; Dhaka, Chattogram, Rajshahi, Khulna, Sylhet, Barishal, Mymensingh, and Rangpur in Bangladesh. So it was easily access in the field, participate, observation and its interviews from the sample. Basically, randomly purposive sampling method was used in the study so as to get the best information to achieve the objectives of the study. From each district 50 respondents were selected. So, total respondents were 400. The respondents were Engineer, Policy makers, Road Users, Drivers, Vehicle owners, Members of Civil Society etc.

The present study is based on both primary and secondary sources of data. Primary data were collected from the respondents of the study area directly using different data collection techniques. On the other hand, the study has used different relevant publications, dissertations, books, journal articles, reports, and websites etc. as sources of secondary data. Primary data were collected by structured questionnaire from the particular areas in urban and rural areas in Bangladesh from the policy makers, administrators, education experts and founders. Secondary data and information were collected by reviewing secondary sources. Computer Program Statistical Package for the Social Sciences (SPSS) was used for data analysis. Data were analyzed according to the objectives of the study.

From the result of the study, some problems were identified such as driver's behaviors problems, pedestrian problems, multi diversified vehicles related hazards, roadside hazards, lack of coordination and integration, raising awareness of road users. From the result it was recommended that safe road infrastructure should be provided, road Safety Audit should be done properly, vehicle safety should be ensured, post-crash response should be improved, co-ordination should be established, legislative framework should be provided, black spot should be identified, pedestrian friendly intersection should be design, school zoning should be marked, driver's attitude should be tried to change, roadside hazard should not be allowed and automatic traffic sign should be established. From the result it can be concluded that the aforesaid problems are solved, if all the stakeholder of road user's become aware and they are abide by rules and regulations then the rate of accident will be decreased in Bangladesh.

Key Words: Road, Management, Safety, Accident, Driver, Pedestrian, Accident, Traffic management, Vehicle, People, Training, Driving, Awareness, Fatality, Transport system.

INTRODUCTION

Road Traffic Accident and Injuries (RTAI) are a "Global tragedy". Now a day it is a growing fierce problems and leading causes death, injury, disability and illness. Worldwide around 1.3 million people death and 50 million are injured or disable per year globally (WHO, report). Safety situation is very grievous in developing countries like Bangladesh, influence total economy and impact the social status as well. Road Traffic Incident (RTI) death rates are more than twice as high in low and middle-income countries; differentiate to high- income countries with almost 90% of all road traffic accident death occurring in low income and middle income countries. Low and middle-income countries road traffic accidents result in losses up to 5% of the GDP compared with 3% globally. Road transportation is the main mode of transport in Bangladesh, over 70% of passenger's travel and maximum goods carrying through road network system. The reason why this study was significant can be explained from three aspects, first this study added knowledge towards existing knowledge in road traffic accidents and road safety measures. Consequently, this research offered some empirical messages for the transport policy makers, road users and other stakeholders. Second the results demonstrate how to reduce road traffic accidents that can inspire the Government to take appropriate measures. Third it was hope that this study may help researcher to widen capacity of look at issues of public concern.

A traffic collision also called a motor vehicles collision (MV) among others terms, occurs when a vehicle collides with another vehicle, pedestrians, animal, road debris or other stationary obstruction such as a tree, pole or building. Traffic collision often results in injury, death and property damaged. A number of factors contribute to the risk of collision including vehicle design, speed of operation, road design, road environment and driver skills, alcohol or drug taking behavior, notably speeding and street racing worldwide motor vehicle collision lead to death and disability as well as financial loss to both society and the individual involved. In 2013, 54 million peoples sustained injured from traffic collision and death 1.4 million which is up from 1.1 million deaths in 1990. About 68000 of those occurred in children less than 5 years old. Almost all high-income countries have decreasing death rates, while the majority of low-income countries, middle-income countries have the height rate with 20 deaths per 100,000 inhabitants; 80% of all road fatalities by only 52% of all vehicles. The height rate in Africa with 24.1 deaths per100,000 inhabitants. The lowest rate is found in Europe 10.3 per 100,000 inhabitants.

There is no human/man or no traffic movement, there is no chance to road crash or fatalities, this is true but in Bangladesh the population density is high and per square kilometer 1265 person; total area-147570 square km, population 170 million, Land area-90%, water area-7%, Growth rate-1.01 (statistical bureau of Bangladesh). About 4 million motorized and could be over 3 million non-motorized vehicles. Motorized vehicles 62% are 2 and 3-wheeled vehicles and the rest are different categories such as car, jeep, bus, minibus, truck, pick-up, covered van, long-vehicle etc. Therefore, road crash mortality rate normally we don't expect low but not high/ medium which is not tolerable/ alarming problem of road accidents in Bangladesh. 70 deaths per 10,000 vehicles fatality rate in Bangladesh were most severe in Asia and 40 times that of industrialized countries in the period of 1997 (world bank 1999). 45 deaths per 10,000 vehicle fatalities in 2007, the trend is lowering but not satisfactory (Source; BRTA & RHD report).

The statistical reveals that Bangladesh has one of the highest fatality rates in road accidents—higher than 85 deaths per 10,000 register motor vehicles but in developed countries the number of register motorized vehicles is many times more, whereas the rate is below 5. A recent accident analysis shows that vulnerable road users are pedestrians, cyclist, motor cyclist and public vehicle passengers. Out of the total accident victims, 50% are pedestrians, one-third of the victims are adult males of age between 21-40 years, 50% accident occur on National Highways and 20% on city roads. Accident on National Highways are more severe, 48% fatal and in city roads 14% accidents are fatal (Source; NRSSAP 2011-2013)

RESEARCH OBJECTIVE

The objectives of the study are as follows:

1. To explore the factors affecting the road traffic accidents severity.
2. To investigate the actual road safety problems.

DEFINITION OF CONCEPTS

Severity of road Traffic Accidents:

Each year nearly 1.3 million people die in the world as a result of a road traffic collision and more than 3000 deaths each day, more than half of these people are not travelling in a car. 20-50 million people sustain non-fatal injuries from a collision, and these injuries are an important cause of disability worldwide. 90% ninety percent of road traffic deaths occurs in low income and middle-income countries, which claim less than half of the worlds registered vehicle fleet. Unless immediate and effective action is taken, road traffic injuries are predicted to become the 5th leading cause of death in the world, resulting in an estimated 2.4 million deaths each year. This is in part, a resulting in an in motorization without sufficient improvement in road safety strategies and land use planning. The economic

consequences of motor vehicle crashes have been estimated between 1% and 3% of the respective GNP of the world countries, reaching a total over $500 billion.

Road Transport Profile of Bangladesh

In past few decades road transport demand and Traffic volume of traffic flow has been increasing rapidly in Bangladesh. During last two decades causing a vast amount of socio-economic loss in terms of fatalities and property damages. The growing traffic volume hand over the problems of traffic overcrowding, delay the travel time cause of road accident and fatalities which is involved in high economic cost imposes to the road users. In addition to economic cost, traffic congestion and accident also has involved for the environment, quality of life and mobility. For the purpose of economic activities, it is imperative to facilitate movements. Transportation system provides the way for movements and medium for reaching destinations. Inadequate transportation system hampers economic activities and creates hindrances for development.

In most developing countries like Bangladesh, which are overburdening by huge population and extreme poverty. Increasing economic activities and opportunities in the cities result in quick increase in urban and consequent needs for transportation facilities. Authorities like this country often fail to cope with the pressure of increasing population growth/ traffic growth. Vehicles growth and economic activities in the cities, causing uncontrolled expansion of cities, urban sprawl, traffic congestion and environmental degradation fail the backbone of the countries activities.

Transportation network significant progress of crash reduction can be achieved a comprehensive information system about crashes. Some road safety initiative has taken in Bangladesh Government, Adaptation of National Land Transport Police (NLTP), Established National Road Safety Council (NRSC), Road Safety Cell and District Road Safety Committees, Accident Research Institute (ARI) at BUET, Highway Police cell, Road Safety Audit Report cell, Road Safety Voluntary & Advisory Group, National Road Safety Strategic Action Plan, including Training of Road Safety Professional, NGO initiative towards road safety, improved Geometric design standard and Established International, Regional Cooperation, Ensure treatment for accident victims and Ensure Justice for victims with compensation.

Dynamism of Urban and Rural Population in Bangladesh

Country- People's Republic of Bangladesh, Independence achieves through Liberation war in 1971, in exchange of 30, 00000 peoples killed and sacrifice their life and blood. Parliamentary system of Government, Total population-16,64,73,419, male-50.41%, Female-49.59%, Growth rate-1.01%, Population Density-1265 per square kilometer, Area-1,47,570 square kilometer, Land area-90%, Water area-7%, Population Rank-8, Country's shear of world population 2.18, Region-Asia, Sub- Region- Southern Asia, Capital Dhaka, Populatiom-1,44,00000, Density 36,997 per square kilometer Urban Area Population-25%, Literacy-71 percent GDP-annual growth rate-7.11percent, Urbanization Rate-8percent Registered Motorized Vehicles-32,17,792, Non-Motorized Vehicle Un-known, Accident rate 127 per 100 Vehicle, Growth rate 5.56 percent (BRTA 2018-worldometers), Bangladesh officially- The People's Republic of Bangladesh is a country in South Asia. It shares land borders with India, Myanmar; Nepal, Bhutan and China are located near Bangladesh.

Traffic and Transport System in Bangladesh:

Roads and Highways Department (RHD) under the Ministry of Road Transport and Bridges and Local Government Engineering Department (LGED) under the Ministry of Local Government & Rural Development (LGRD) are the responsible for Administration, planning, management and development of the traffic and transport system of Bangladesh. Road transportation is the major mode of transport in Bangladesh over 70% percent (BRTA annual report) of passenger travel and much of our goods movement occur over the road networks, but each year more than thousands of death and injuries occur on our road network. The Government of Bangladesh is seriously concerned about the growing road accident and safety problems and is committed to fight against the trauma on our roads.

Government Official Format for Road Transport Sectors

The Ministry of Road Transport and Bridge, functioning as policy maker and administrative authority for the transport sector of Bangladesh. The Ministry co-ordinate major Department Roads and Highways (RHD) and others Government funding organizations such as BRTA, LGRD, NRSC, ARI (BUET), NLTP, Road safety Cell and District Road Safety committee, Highway Police cell and International Donor Agencies as Aus. AID, world Bank, ADB, WHO, UN, ESCAP, ARRB, REAAA, GRSP, IRAP, ATWSS and some NGOs etc. All of the agency functioning some time individual or works in a body for the aims of lowering the rate of road accident crash to safe the living being, man, animal and property of the country.

Administrative Classification of Road Network

In Bangladesh the roads are classified as bellow:

1. National Highway- connecting National capital with Divisional HQ's or Sea Ports or Land Ports or Asian Highway.

2. Regional Highway- connecting District HQ's or main river or land ports with each other not connected by National Highways.
3. District Road- connecting District HQ's with Upazila HQ's or connecting one Upazila HQ to another Upazila HQ by a single main connection with National/ Regional Highways through shortest distance/route. Roads and Highways Department is responsible for above three categories Highway/Road which are under Ministry of Road Transport and Bridges.
4. Upazila Road- connecting Upazila HQ's with Growth Center or one Growth Center to another Growth Center by a single main connection or connecting Growth Center to Higher road System, through shortest distance/ route.
5. Union Road- connecting Union HQ's with Upazila HQ's, Growth Center or Local Market or with each other.
6. Village Road- (Type-A): connecting villages with Union HQ's, Local Market, farms and ghats or with each other; (Type-B): roads within a village. Local Government Engineering Department is responsible for above three categories Road which are under Ministry of Local Government and Rural Development. LGI is also responsible for village road Type-B; which length is less than 2.00 km. (Source, Bangladesh gazette 6 November 2003 and planning commission 2007).

An Overview of Transport Policies

A review of road transport polices in Bangladesh revealed "The National Road Safety Council (NRSC) was established in 1995. Initially it started with support of World Bank (WB) funded road improvement project of RHD; now a unit of BRTA. Preparation of The National Road Safety Action Plan drawn up list out 9 sub-sectors of road safety in 1996. (World Bank, Washington DC 1999) and also established Road Safety Cell and District road safety committee, according to local needs. Accident Research Institute (ARI) has been established at BUET within the top priority programs of the Government. In January 1999 with the technical assistance of DFID, RHD has established road safety Division with a view to deal with the safety aspect of national regional and feeder roads, then LGED has also created road safety unit. With the aim of increasing of the safety and improving traffic management and enforcement of traffic rules and regulation of the highways with patrolling to ensure road safety on road.

Non-Government Voluntary or advisory group have been formed at national, regional and local level of Bangladesh. Speed limit zoning & speed restriction rules have been developed for different highways in Bangladesh published in a gazette by BRTA in 2005. Training of road safety professionals, NGO initiative towards road safety, Geometric design improvement of roads & Established international and regional co-operation. The first Road Safety Action Plan for Bangladesh was approved by the National Road Safety Council (NRSC) meeting on 1st February, 1997 known as the "National Road Safety Strategic Action Plan 1997-99". The 2nd (2000-2002) National Road Safety Strategic Action Plan was drafted with the purpose of extending the time period of the on-going schemes from the 1st plan and taking up some new action to address road safety problems. Subsequently, the 3rd (2002-2004), 4th (2005-2007), 5th (2008-2010), 6th (2011-20130, 7th (2014-2016) National Road Safety Strategic Action Plan were approved by the NRSC.

The National Road Safety Strategic Action Plan 2017-2020 is the 8th (Prepared according to SDG) plan. This strategic action plan has also retained nine individual sectors to address the road safety issues in Bangladesh. The Goal of the 8th Road Safety Action Plan is to achieve the SDG (Sustainable Development Goals) target of reduction the number of road accident fatalities and injuries by 50% by 2020.

Road Transport Management in Bangladesh

Bangladesh has multi-modal infrastructure of road transport, which creates to the needs of intra-city and intra-Bangladesh passenger and freight traffic. Most of this traffic 95 percent is handled by road-based transport system. Rail, Water and Air transport system primarily cater to the inter travel segment. Many Agencies are involved providing operation and maintenance the infrastructure and services within each transport. Evidently Government Agencies have the main provider and operator of transport infrastructure and services. Two major factors have contributed to such a situation. The relatively high investment required and high risk involved in provision of management and infrastructure had hitherto discouraged the private entrepreneur entering into this area. But dramatically it has changed in the past two decades. In the case of services, government has felt that by controlling entry.

The Road Management System (RMS)

RMS is predominant in the highway construction industry with terms that may not be familiar to the business management audience. Additionally, RMS is a computerized tool and model used in the management, planning and managing of road maintenance, rehabilitation and reconstruction. The terms efficient RMS and effective RMS stem from the business management arena that require defining. The purpose of the following11 definitions of operational terms is to ensure consistency and understanding of terms and definitions used.

Effectiveness
The measure to which the reduced frequency for sections of the road to maintain, rehabilitate, and reconstruct, reducing vehicle operation costs, traffic accidents, traffic congestion, and passenger travel time (Hensher & Chung, 2011; Misra et. al., 2003).

Efficiency
The securing of the political leadership and existing road institutions' commitment, choosing of the appropriate planning, programming, processing of the data collected, and reporting to decision makers to fund the maintenance, rehabilitation, and reconstruction of the roads (Hensher & Chung, 2011, Misra et. al., 2003).

Road infrastructure
Road infrastructure consists of facilities and equipment, including the network, parking spaces, stopping places, draining system, bridges, and footpaths (Peden et. al., 2004).

Roadside furniture
The functional objects by the side of the road, such as lampposts, telegraph poles, and road signs (Peden et. al., 2004).

Road traffic accident
A collision involving at least one vehicle in motion on a public or private road resulting in at least one person being injured or killed is a road traffic accident (Peden et. al., 2004).

Road traffic crash
A collision or incident that may or may not lead to injury, occurring on a public road, and involving at least one moving vehicle is a road traffic crash (Peden et. al., 2004).

Road traffic fatality
A death occurring within 30 days of the road traffic crash is a road traffic fatality (Peden et. al., 2004).

Road traffic injury
A fatal or nonfatal injury incurring because of road traffic crash is a road traffic injury (Peden et al., 2004).

Road user
A person using any part of the road system as a Non-motorized or Motorized Transport User is a road user (Peden et. al., 2004).

Traffic management
Traffic management involves the planning, coordinating, controlling and organizing of traffic to achieve efficiency and effectiveness of the existing road capacity (Peden et. al., 2004).

Vulnerable road users
Road users most at risk in traffic, such as pedestrians, cyclists, motorcyclists, horse riders, and public transport passengers are regarded as vulnerable road users. Children, older people, and disabled people may also be included in this category (Department for Transport U.K., 2007; Ministry of Works, Housing &Communications [MOWHC], 2004; Peden et. al., 2004).

METHODOLOGY OF THE STUDY

Research Methods
This study employed both quantitative and qualitative methods as a combined research approach (also called integrated approach).

Research Design of the study
Here the research design of the present study is survey type.

Study Area
In Bangladesh, there are eight divisions. The study was conducted at 8 divisional districts; Dhaka, Chattogram, Rajshahi, Khulna, Sylhet, Barishal, Mymensingh, and Rangpur districts of 8 divisions in Bangladesh. So it was easily access in the field, participate, observation and its interviews from the sample. However, in the field of urban and rural, the study has tried to understand the Road Safety Policy and Management System in Bangladesh.

Sampling Method

Basically, randomly purposive sampling method was used in the study so as to get the best information to achieve the objectives of the study. In this study a combination of quantitative and qualitative methods were used.

Sample Size

From each district 50 respondents were selected. So, total respondents were 400. The respondents were Engineer, Policy makers, Road Users, Drivers, Vehicle owners, Members of Civil Society etc.

Sources of Data

The present study is based on both primary and secondary sources of data. Primary data were collected from the respondents of the study area directly using different data collection techniques. On the other hand, the study has used different relevant publications, dissertations, books, journal articles, reports, and websites etc. as sources of secondary data. Primary data were collected from the particular areas in urban and rural areas in Bangladesh.

Data Collection Method

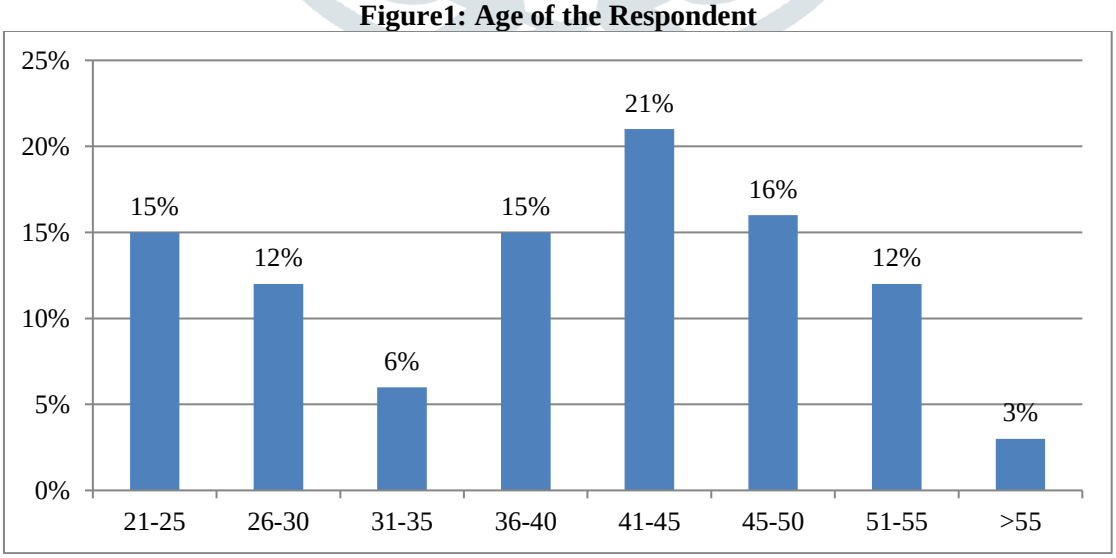
The study conducted based on both primary and secondary data. Primary data were collected through interviews and Questionnaire survey. Structured questionnaire containing both open and closed ended to be used. A survey through a standardized questionnaire was conducted to collect both quantitative and qualitative information form. One questionnaire was used for collecting primary data. The semi-structured interviews have to be used for conducting with the policy makers, administrators, education experts and founders. Secondary data and information were collected besides the primary sources side by side secondary data were gathered from journal articles, published books, government documents, policies, reports of various committees related to higher education etc. At the same time the present study has collected qualitative data through face to face interview.

Data Processing and Analysis

In qualitative study the researcher has the freedom to marshal gathered data to meet the desired objectives of the study (Creswell 2009). Partial data of questionnaire survey was processed using simple statistics. The rest of the data were explained carefully to meet the aim of the study and research question and also attempted to establish relation among the variables. Some important and strong statements were referred in the analysis part to add value to the findings. Endeavor was make firstly to unleash the potential Road Safety Policy and Management System in Bangladesh, secondly to detect the challenges, prospects and finally to put some light on to overcome the barriers. Computer Program Statistical Package for the Social Sciences (SPSS) was used for data analysis. Data were analyzed according to the objectives of the study. Tables, graphs and statistical analysis were done by Computer Program Statistical Package for the Social Sciences.

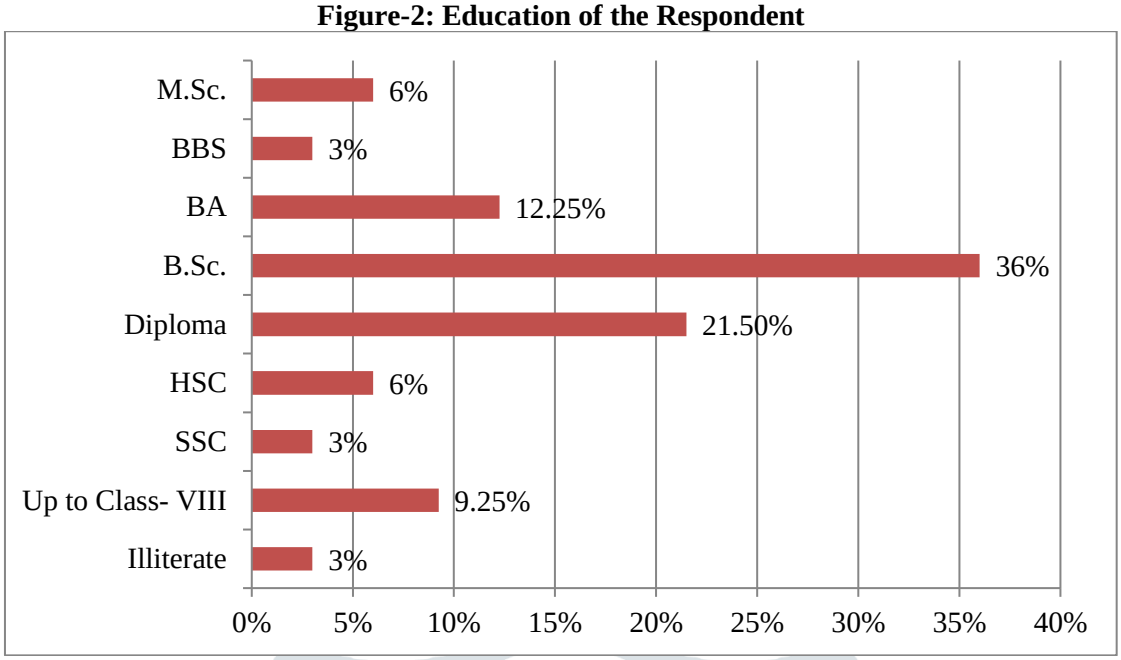
RESULTS AND DISCUSSION

Figure1: Age of the Respondent



Age of the Respondent has shown in the above table and graph. From the table it was found that 21% respondents were age group 41-45 years which was maximum and 3% respondents were age group more than 55 years which was minimum. On the other hand 15% respondents were age group 21-25 years, 12% respondents were age group 26-30 years, 6% respondents were age group 31-35 years, 15% respondents were age group 36-40 years, 16% respondents were age group 45-50 years and 12% respondents were age group 45-50 years.

Figure-2: Education of the Respondent



From the table it was found that 57% respondents educational qualification were graduation and above, 30% respondents were Secondary and Higher Secondary level and the remaining were illiterate and up to Junior secondary school level.

Table-1: Gender of Respondent

Gender	Frequency	Percent	Cumulative Percent
Female	24	6.0	6.0
Male	376	94.0	100.0
Total	400	100.0	

Gender of Respondent has shown in the above table and graph. From the table it was found that 94% respondents were male whereas 6% respondents were female.

Table- 2: Over speeding is the cause of road accident

Respondent's opinion	Frequency	Percent	Cumulative Percent
Disagreed	6	1.50	1.50
Agreed	290	72.50	74.00
Neutral	6	1.50	75.50
Strongly agreed	98	24.50	100.00
Total	400	100.0	

From the result it was found that 97% respondents replied that over speeding is the cause of road traffic accident which was maximum and1.50% respondents were disagreed which was minimum.

Table- 3: Careless driving is the cause of road traffic accident

Respondents' opinion	Frequency	Percent	Cumulative Percent
Strongly agreed	237	59.2	59.2
Agreed	145	36.2	95.4
Neutral	12	3.0	98.4
Disagreed	6	1.5	100.0
Total	400	100.0	

From the result it was found that 95% respondents replied that careless driving is the cause of road traffic accident which was maximum and 1.5% respondents were disagreed which was minimum.

Table- 4: Driver's Fatigue is the cause of road accident

Respondents' opinion	Frequency	Percent	Cumulative Percent
Agreed	265	66.2	66.2
Disagreed	12	3.0	69.2
Strongly agreed	123	30.8	100.0

Respondents' opinion	Frequency	Percent	Cumulative Percent
Agreed	265	66.2	66.2
Disagreed	12	3.0	69.2
Strongly agreed	123	30.8	100.0
Total	400	100.0	

From the result it was found that 97% respondents replied that driver's fatigue is the cause of road traffic accident which was maximum and 3% respondents were disagreed which was minimum.

Table- 5: Driving too close is the cause of road traffic accident

Respondents' opinion	Frequency	Percent	Cumulative Percent
Agreed	243	60.8	60.8
Strongly agreed	145	36.2	97.0
Neutral	12	3.0	100.0
Total	400	100.0	

From the result it was found that 97% respondents replied that driving too close is the cause of road traffic accident which was maximum and 3% respondents were neutral which was minimum.

Table-6: Bad driving signal is the cause of road traffic accident

Respondents' opinion	Frequency	Percent	Cumulative Percent
Strongly disagreed	6	1.5	1.5
Disagreed	12	3.0	4.5
Strongly Agreed	340	85.0	89.5
Neutral	12	3.0	92.5
Agreed	30	7.5	100.0
Total	400	100.0	

From the result it was found that 92% respondents replied that bad driving signal is the cause of road traffic accident which was maximum and 3% respondents were disagreed which was minimum.

Table-7: Careless turning

Respondent's opinion	Frequency	Percent
Agreed	121	30.2
Strongly agreed	279	69.8
Total	400	100.0

Whether Careless turning is the cause of road traffic accident has shown in the above table and graph. From the result it was found that almost every respondent replied that bad driving signal is the cause of road traffic accident.

Table-8: Over taking tendency is the cause of road traffic accident

Respondents opinion	Frequency	Percent
Agreed	108	27.0
Strongly agreed	292	73.0
Total	400	100.0

Whether over taking tendency is the cause of road traffic accident has shown in the above table and graph. From the result it was found that almost every respondent replied that bad overtaking tendency is the cause of road traffic accident.

Table-9: Drunk driver is the cause of road traffic accident

Respondents opinion	Frequency	Percent
Strongly agreed	126	31.5
Agreed	72	18.0
Disagreed	202	50.5
Total	400	100.0

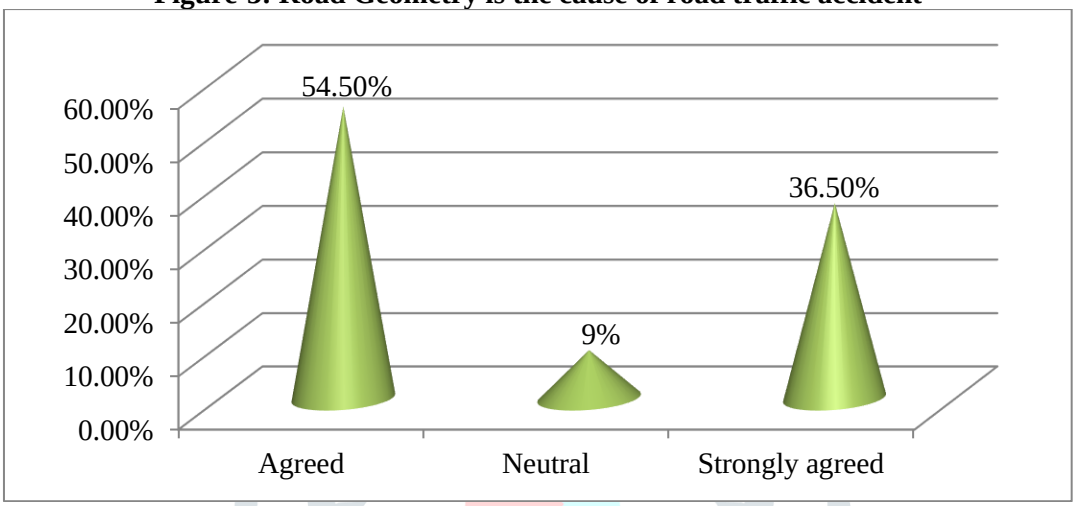
From the result it was found that 49% respondents replied that drunk driver is the cause of road traffic accident which was minimum and 51% respondents were disagreed which was maximum.

Table-10: Competitive driving is the cause of road traffic accident

Respondents opinion	Frequency	Percent
Agreed	84	21.0
Neutral	12	3.0
Strongly agreed	304	76.0
Total	400	100.0

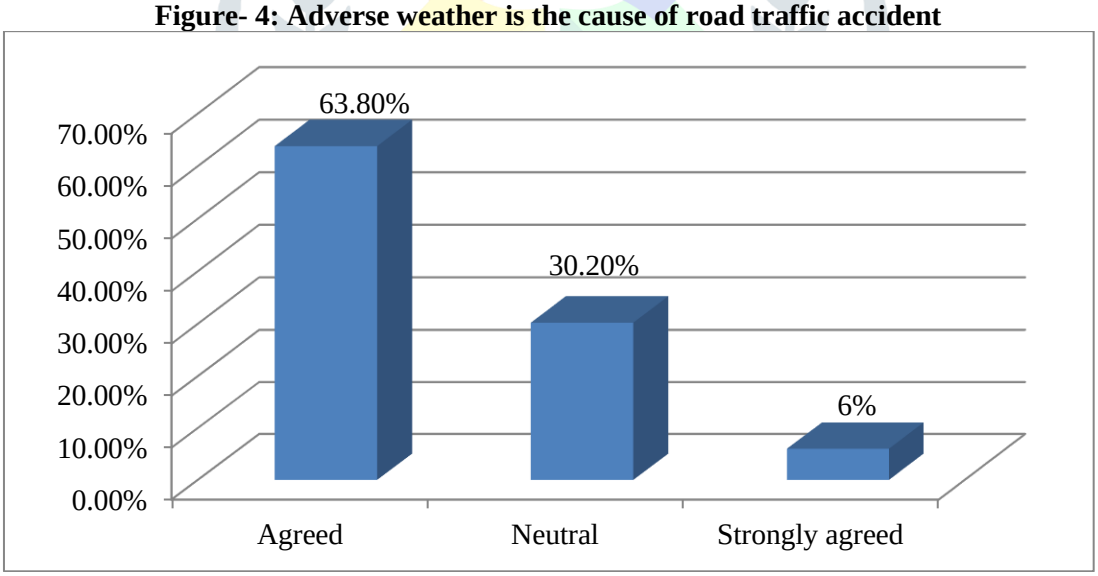
From the result it was found that 97% respondents replied that competitive driving is the cause of road traffic accident which was maximum and 3% respondents were disagreed which was minimum.

Figure-3: Road Geometry is the cause of road traffic accident



From the result it was found that 91% respondents replied that road geometry is the cause of road traffic accident which was maximum and 3% respondents were disagreed which was minimum.

Figure- 4: Adverse weather is the cause of road traffic accident



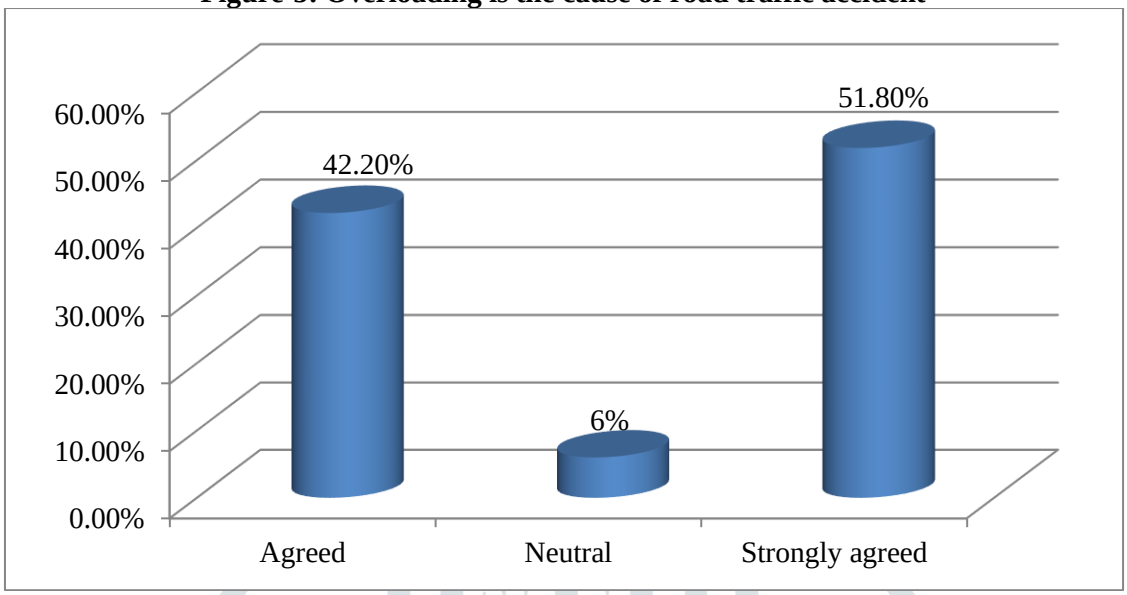
From the result it was found that 70% respondents replied that adverse weather is the cause of road traffic accident which was maximum and 30% respondents were neutral.

Table-11: Vehicle defect is the cause of road traffic accident

Respondents opinion	Frequency	Percent	Cumulative Percent
Agreed	316	79.0	79.0
Disagreed	12	3.0	82.0
Neutral	24	6.0	88.0
Strongly agreed	48	12.0	100.0
Total	400	100.0	

From the result it was found that 91% respondents replied that vehicle defect is the cause of road traffic accident which was maximum and 3% respondents were disagreed which was minimum.

Figure-5: Overloading is the cause of road traffic accident



From the result it was found that 94% respondents replied that overloading is the cause of road traffic accident which was maximum and 6% respondents were neutral which was minimum.

Table-12: Road surface condition is the cause of road traffic accident

Respondents opinion	Frequency	Percent	Cumulative Percent
Neutral	6	1.5	1.5
Agreed	164	41.0	42.5
Disagreed	230	57.5	100.0
Total	400	100.0	

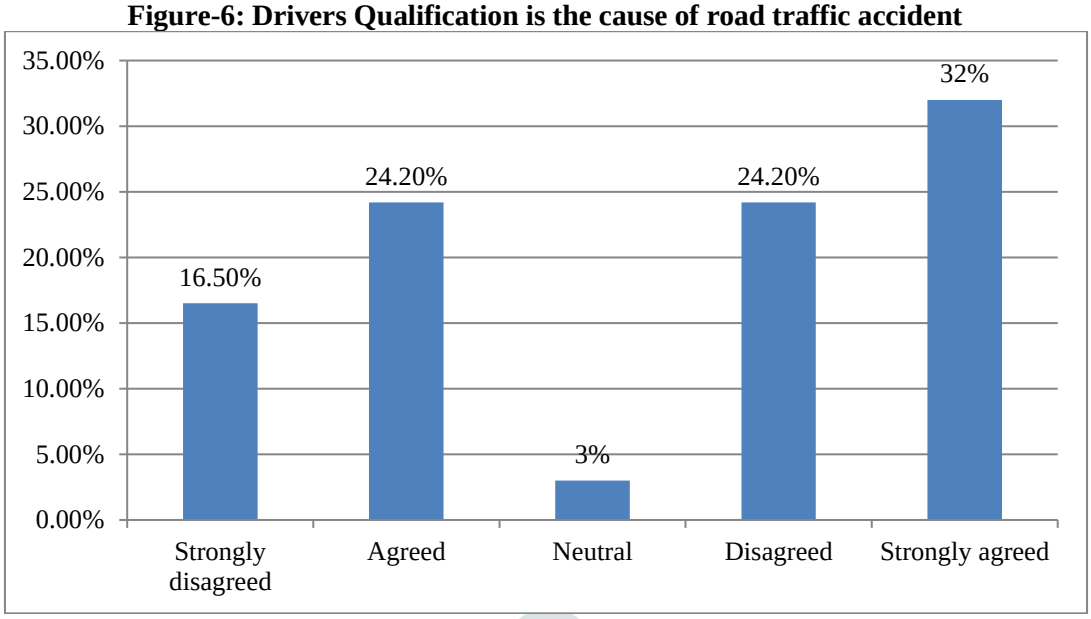
From the result it was found that 41% respondents replied that road surface condition is the cause of road traffic accident whereas 57% respondents were disagreed.

Table-13: Driver's Mobile Phone is the cause of road traffic accident

Respondents opinion	Frequency	Percent
Agreed	24	6.0
Neutral	12	3.0
Strongly agreed	364	91.0
Total	400	100.0

From the result it was found that 97% respondents replied that driver's mobile phone use during driving is the cause of road traffic accident which was maximum and 3% respondents were neutral which was minimum.

Figure-6: Drivers Qualification is the cause of road traffic accident



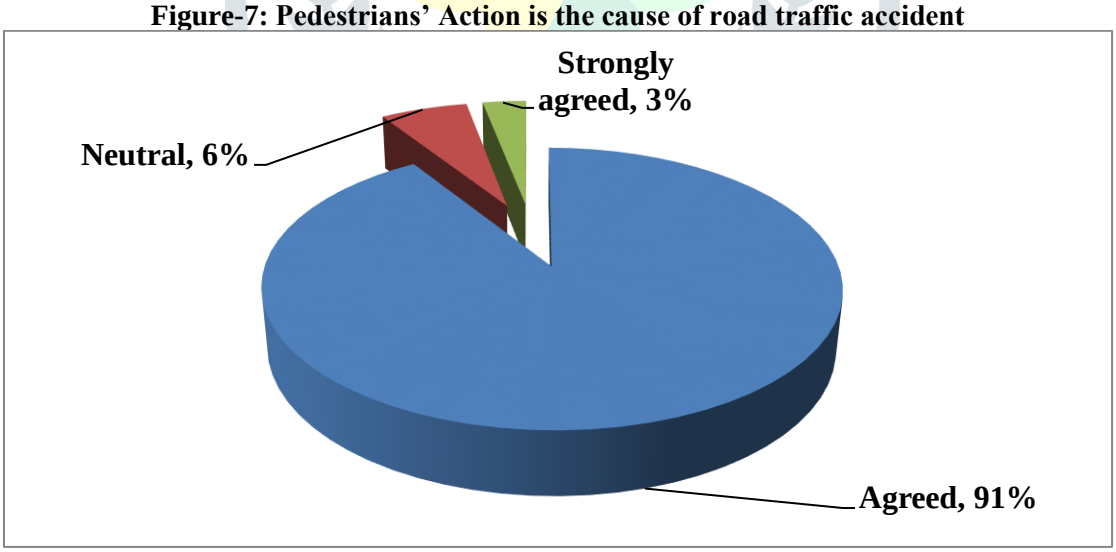
From the result it was found that 58% respondents replied that driver's qualification is the cause of road traffic accident whereas 41% respondents were disagreed and 3% were neutral.

Table-14: Unconscious Movement of Pedestrians is the cause of road traffic accident

Respondents' opinion	Frequency	Percent	Cumulative Percent
Neutral	6	1.5	1.5
Strongly agreed	6	1.5	3.0
Agreed	322	80.5	83.5
Disagreed	66	16.5	100.0
Total	400	100.0	

From the result it was found that 82% respondents replied that unconscious movement is the cause of road traffic accident which was maximum and 1.5% respondents were neutral which was minimum.

Figure-7: Pedestrians' Action is the cause of road traffic accident



From the result it was found that 94% respondents replied that pedestrian's action is the cause of road traffic accident which was maximum and 6% respondents were neutral which was minimum.

Table-15: Passenger's Action is the cause of road traffic accident

Respondents' opinion	Frequency	Percent
Neutral	6	1.5
Agreed	231	56.2
Disagreed	36	9.0
Strongly disagreed	133	33.2
Total	400	100.0

Passenger's Action is the cause of road traffic accident has shown in the above table. From the result it was found that 56% respondents replied that passenger's action is the cause of road traffic accident whereas 42% respondents were disagreed.

Table-16: Lacking of Road Safety item is the cause of road traffic accident

Respondents opinion	Frequency	Percent
Strongly disagreed	6	1.5
Strongly Agreed	193	48.2
Agreed	183	45.8
Disagreed	18	4.5
Total	400	100.0

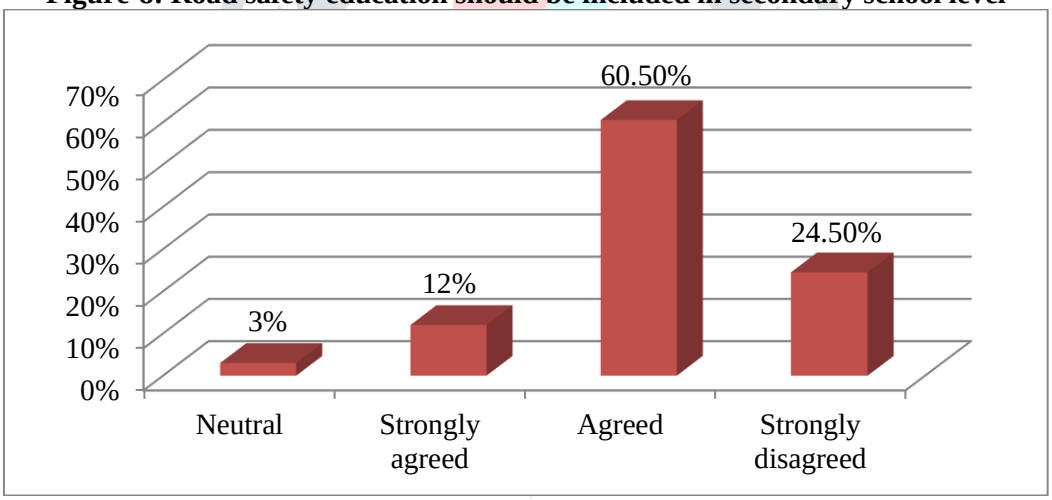
From the result it was found that 94% respondents replied that lacking of road safety item is the cause of road traffic accident which was maximum and 6% respondents were disagreed which was minimum.

Table-17: Disobey the traffic signal is the cause of road traffic accident

Respondents opinion	Frequency	Percent	Cumulative Percent
Neutral	6	1.5	1.5
Strongly agreed	12	3.0	4.5
Agreed	358	89.5	94.0
Strongly disagreed	24	6.0	100.0
Total	400	100.0	

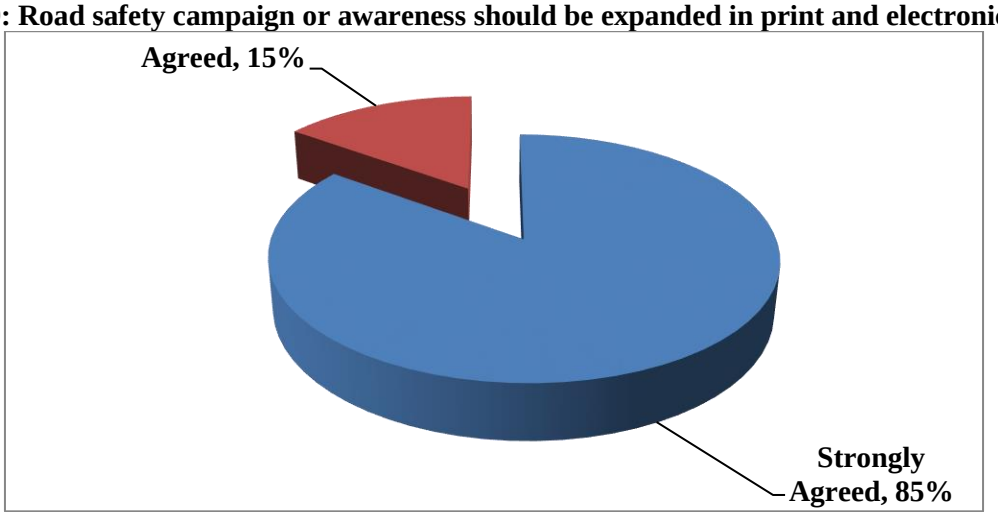
From the result it was found that 92% respondents replied that disobey the traffic signal is the cause of road traffic accident which was maximum and 1.5% respondents were neutral which was minimum.

Figure-8: Road safety education should be included in secondary school level



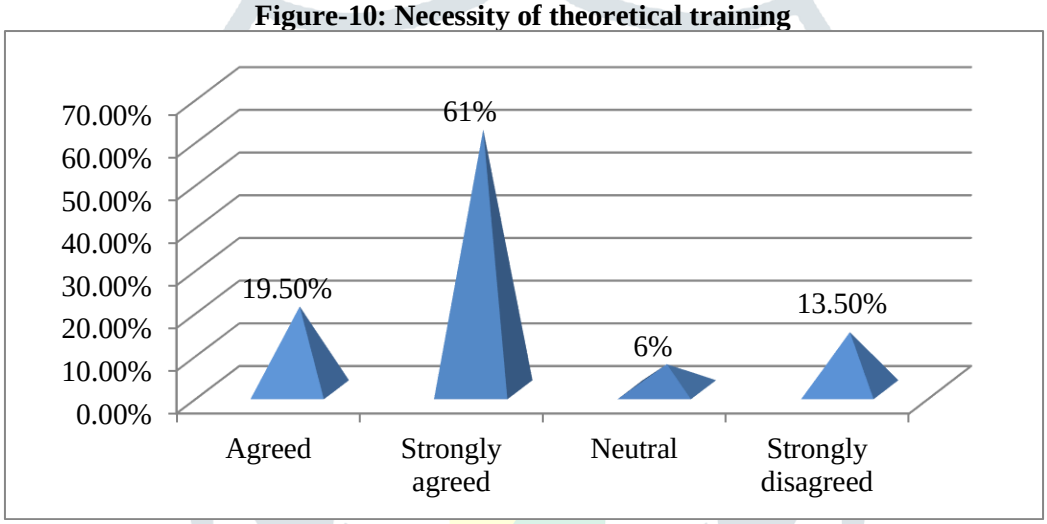
Whether road safety education should be included in secondary school level has shown in the above table and graph. From the result it was found that 72% respondents replied that road safety education is the cause of road traffic accident whereas 24% respondents were disagreed.

Figure-9: Road safety campaign or awareness should be expanded in print and electronic media



Whether road safety campaign or awareness should be expanded in print and electronic media has shown in the above table and graph. From the result it was found that every respondent replied that road safety campaign or awareness should be expanded in print and electronic media.

Figure-10: Necessity of theoretical training



Necessity of theoretical training of the drivers has shown in the above table and graph. From the result it was found that 81% respondents replied that theoretical training is the cause of road traffic accident which was maximum and 6% respondents were neutral which was minimum.

Table-18: Knowledge about road safety policy

Respondents opinion	Frequency	Percent
No	218	54.5
Yes	182	45.5
Total	400	100.0

Whether knowledge about road safety policy is needed or not has shown in the above table and graph. From the result it was found that 54.5% respondents replied that they have no knowledge about road safety policy.

CONCLUSION

Road traffic accidents have now become a great social concern in Bangladesh and the situation is deteriorating. The annual economic wastage occasioned by traffic accidents is estimated to be in the order of 2 to 3 percent of the GDP. Each year, there are at least 3,000 fatalities and 3,000 grievous and simple injuries from around 3,500 police reported accidents on Bangladesh roads. Other sources estimated the fatalities as high as from 12,000 to 20,000 per year. Thus, the safety problem is very severe by international standards with some 60 to 150 fatalities per 10,000 motor vehicles in Bangladesh compared to around 25, 16, 2 and 1.4 in India, Sri Lanka, the USA and UK respectively. (ARI, 2013)The Government of People's Republic of Bangladesh has undertaken actions to implement Sustainable Development Goals (SDG) program. It has three pillars named Safety, Engineering and Economy & Environment. Safety is the first pillar under this policy which is to be ensured properly to achieve the output from this program. Considering this, the concern agencies have also planned to ensure safety in the roads of Bangladesh. Bangladesh Government has taken some road safety initiatives; Adaptation of National Land Transport Policy (NLTP), Established National Road Safety Council (NRSC), Road Safety Cell and District Road Safety Committees, Accident Research Institute (ARI) at BUET, Highway Police cell, Road Safety Audit Report cell, Road Safety

Voluntary & Advisory Group, National Road Safety Strategic Action Plan, including Training of Road Safety Professional, NGO initiative towards road safety, improved Geometric design standard and Established International, Regional Cooperation, Ensure treatment for accident victims and Ensure Justice for victims with compensation. The government has formed a taskforce to implement the 111-point recommendation of the National Road Safety Council to restore discipline on roads. The Government also formed Dhaka Transport Coordination Authority (DTCA) for coordination of road safety activities within greater Dhaka district.

RECOMMENDATION

In the basis of receiving information of the respondents, study of the Policies and the result of the research following recommendations for the Road Safety Management System in Bangladesh presented below:

1. Global Plan should be implemented: It should be taken initiative by the Government to involve NGOs, Road User's, Vehicle Owners Association, Labor Welfare Association, Representative of Print & Electronic media etc. for implementation of 'Decade of action for Road Safety 2021-2030' that targets to reduce road casualties by at least 50 percent by 2030.
2. Target of Sustainable Development Goal (SDG) should be fulfilled: Ensure the fund for implementing the target. Concern department should do the work according to target 3.6 & 11.2. National Road Safety Council regularly monitors the progress and coordinate.
3. National Road Safety Strategic Action Plan should be monitored: Regularly monitor the progress of action plan and immediate action should be taken if coordination needed with inter-ministry.
4. Multimodal transport and land-use planning should be used: Implement policies that promote compact urban design, lower speed of vehicles and prioritize the needs of pedestrians, cyclists and public transport users. Discourage the use of private vehicle in high density urban areas by putting restrictions on motor vehicle users. Provide alternatives that are accessible, safe and easy to use, such as walking, cycling and buses.
5. Safe road infrastructure should be provided: Review and update legislation and design standard that consider road function, desired safety performance standard and the needs of all road users, and for specific zones.
6. Road Safety Audit should be done properly: Undertake Road Safety Audit on all sections of new roads and complete assessments using independent and accredited experts to ensure a minimum standard for all road users.
7. Vehicle safety should be ensured: Require high-quality harmonized safety standards for new and used motor vehicles, safety belts, child restraint systems and motorcycle helmets etc.
8. Actions should be done to ensure safe road use:
   - Use road sign, road marking, road divider, road barrier etc. where applicable.
   - Set maximum speed limits considering the type and function of roads.
   - Mandate the use of protective equipment (safety belts, child restraints and helmets)
   - Restrict the use of handheld electronic devices while driving.
   - Establish a dedicated enforcement agency, provide training and ensure adequate equipment for enforcement activities.
   - Set out and regularly update traffic rules and code of conduct for road users.
   - Provide information and education on traffic rules.
   - Set minimum age and vision requirements for drivers.
   - Ensure minimum standards for driver competence through improved driver training and testing procedure.
   - Set limits for maximum driving time and minimum rest periods for professional drivers.
   - Make liability insurance mandatory for drivers of motorized vehicles.
   - Clear road signage and road markings that are intuitive.
   - Educating all level pedestrians and mass people for safe walking.
   - Awareness and capacity building for the drivers community for safe driving.
   - Developing community traffic policing system.
9. Post-crash response should be improved: Rapid actions to be taken to improve the post-crash response and provide a unique emergency telephone number with national coverage and strengthen professional medical care. Provide recovery and rehabilitation services to prevent permanent disability.
10. Co-ordination should be established: Establish coordination mechanisms for post-crash investigation and sharing of data by relevant sectors.
11. Legislative framework should be provided: Providing a legislative framework for road safety and legal mandate for the work of different agencies within and outside government.
12. Black spot should be identified: By analyzing accident data it has been needed to identify black spots and take safety engineering measure.
13. Pedestrian friendly Intersection should be design: For easy and safe movement of pedestrians, engineers should design the road intersections safely; specially in Dhaka and Chattagram city.
14. School zoning should be marked: Providing speed controlling devices in school zone area and marking the road for safe movement of students.
15. Booklet should be prepared: To buildup awareness among the school children it is recommended to prepare a booklet about traffic rule and safe road uses.

16. Maintenance of Utility services guide lines should be prepared: In city area different agencies works at different time. There is no coordination among them. Water & sanitation, Gas, Electricity, Internet cable, Telephone line maintenance work create traffic congestion and unsafe movement of pedestrian. So, it should be prepare a guide line for coordination of inter-ministry.
17. Public transport guide line should be prepared: It should be prepare a guide line for public transport about safety of passengers.
18. Special segments should be design for safety: Sometimes the level of the level crossing found elevated than the approaching road. In that case, the adjacent road of the level crossing becomes tattered. To address this it is recommended to design the adjacent approach road with a combination of sag and summit curve.
19. Driver's attitude should be tried to change: By proper training and motivation, driver's behavior try to change for over speed driving, competitive driving, risky over taking and overloading.
20. Roadside Hazard should not be allowed: Stacking different types of construction materials, road side dwellers and other hazards should be free from road site in Highway's.
21. Accident database should be preserved: To prepare safe design, policy making, research or revision of design accident database should be strong and authentic.
22. Automatic traffic sign should be established: By proper survey and design automatic traffic sign should be apply.
23. Lane speed marking should be provided: To avoid traffic congestion and easy passing of vehicle, lane wise speed marking should apply in city area like Dhaka Cantonment area.
24. Motor Cycle import and registration should be controlled: It is strongly recommended to control import high speedy motor cycle and prepare regulation for its use.
25. Foot over bridge should be user friendly: It should be design to easy and safe use for pedestrians; if necessary it should construct escalator in city area.
26. Road Safety unit should be strengthened: Strengthening the road safety unit of RHD and LGED.
27. Landscaping should be provided: Landscaping may be used in conjunction with other traffic calming measures such as roadway narrowing, traffic islands, and sidewalk improvements to improve the pedestrian environment, define pedestrian and vehicle areas, and provide horizontal separation between motor vehicles and pedestrians.

REFERENCES

1. Ahsan, H.M. (1990). "A Study of Mass Transit in Metropolitan Dhaka", M.Sc. Thesis, Department of Civil Engineering, BUET, Dhaka.
2. Ahmed, K.A. (1980). "Traffic Problems in Dacca City." Local Government Institute, Dhaka.
3. Ahmed, S.M. and Hoque, M.M. (1988). "Transportation and Traffic in Dhaka- Review of the Past, Present and Outlook for the Future." Proceedings, Seminar on Dhaka 2000 Ad, IEB.
4. Alam, J.B. (1992), "Traffic Assignment Model for Simulation and Optimization of Road Network" M.Sc. Thesis, Department Of Civil Engineering, BUET, Dhaka.
5. Alam, J.B., Jaigirdar, M. A. and Rahman, M.H. (2000), "Level of NOx, SOx, CO and SPM Pollution in Dhaka City and Their Possible Consequences", Bangladesh Environment 2000, an Outcome of ICBEN, BAPA (Bangladesh PoribeshAndolon)
6. Alam, J.B., Jaigirdar, M. A. and Rahman, M.H. (2000), "Air Quality in Dhaka City", Journal of Pollution Research, Enviromedia.
7. Alam, J.B., Jaigirdar, M. A. and Rahman, M.H. (1999), "Analysis of Behavioral Value of Travel Attributes and Their Implications on Urban Transport Policies", Journal of Civil Engineering, I.E.B., Vol. CE 27, No. 1, 1999.
8. Ara, H. (1983). "Socio-Economic Correlates of Urban Travel Pattern: A Study in Dhaka City." M.Sc. Thesis, URP, BUET.
9. Bangladesh Bureau of Statistics (BBS) (1991, 1996, 1999), Statistical Year Book of Bangladesh, Dhaka Reproduction Documentation and Publication Wing, BBS.
10. Bartone, E; Branstein, J; Eigen, J. (1994) "Urban Management Program toward Environmental Strategies for Cities", World Bank Technical Report.
11. Bates et al, (1989) "Building a Strategic Model for Edinburgh"; PTRC Summer Annual Meeting, Summer C, 1989.
12. Barwell, I. (1978). "Review of Appropriate Technologies for Road Transport in Bangladesh." Bangladesh Planning Commission.
13. Baquee, L. (1979). "A Study of Traffic in Old Dacca City." An MURP. Thesis, Department of Urban and Regional Planning, BUET.
14. Ben Akiva, M.E. and Lerman S.R. (1985), Discrete Choice Modeling: Theory and Application to Travel Demand, MIT Press, Mass., USA.

15. Bhuiyan, A.A., (2001), "Urban Environment and Automobile Pollution- an Overview" Workshop on Urban Transport Development Strategy for Dhaka Metropolitan Area, January, 2001, GDTPCB, Dhaka City Corporation, Dhaka.
16. Bruton, M.J. (1974). "The Spirit and Purpose of Planning." First Edition. Hutchingson& Co. London, U.K.
17. Case, D.J., Latchford, J.C.R. (1981). "A Comparison of Public Transport in Cities in South East Asia." Study Report. World Bank.
18. DCC (2001), "Ward Details", Annual Report of Dhaka City Corporation.
19. "Dhaka Metropolitan Development Plan" (DMDP, 1995-2015)", RAJUK (RajdhaniUnnoyonKotripokho), 1997.
20. DITS (Greater Dhaka Metropolitan Area Integrated Transport Study), (1993), Mid Term Report, Prepared by PPK Consultants, Delcan International and Development Design Consultant (DDC), Dhaka.
21. DSM, (2001), "Urban Transport Development Strategy", Workshop on Urban Transport Development Strategy for Dhaka Metropolitan Area, January, 2001, GDTPCB, Dhaka City Corporation, Dhaka.
22. DUTP (Dhaka Urban Transport Project), Phase II (1998), Draft Final Report, Prepared by PPK, Mot MacDonald and Development Design Consultant (DDC), Dhaka.
23. FHA, "Highway Performance Monitoring System; Mobility Goal in Performance Plan", (http://www.fhwa.dot.gov/policy/fhwapprt.htm#mobility)
24. Fielding, G.J. and Anderson, S.C. (1983). "Public Transit Performance Evaluation-Application to Section 15 Data." Transport Research Record 947.
25. Firdous, G.M. (1984). "A Study on the Problems of Bus Transport in Dhaka City." An MURP Thesis, Department of Urban and Regional Planning, BUET, Dhaka.
26. Flavin and Christopher (1994), "Storm Warning: Climate Change Hits the Insurance Industry," World Watch. November/December 1994, p.11.
27. Gallaghar, R. (1992), "Rickshaws of Bangladesh", University Press Limited, ISBN 9840511823.
28. Greenstein, J., Berger, L. And Strulov, A. (1988). "Public Transport Problems and Solutions in the Historical Center Of Quito." Proceedings of the International Conference on Road and Road Transport Problems. Icort-88, New-Delhi, India.
29. Gupta, T.K.D. (1980). "The Role of Rickshaw in the Economy of Dhaka City." An MURP Thesis, Department of Urban and Regional Planning, BUET, Dhaka.
30. Hafiz, K.G., (2001) "Urban Planning Strategies and Transport Programs in Dhaka Metropolitan Areas." Workshop on Urban Transport Development Strategy for Dhaka Metropolitan Area, January, 2001, GDTPCB, Dhaka City Corporation, Dhaka.
31. Hearty, M.J. (1980). "Public Transport in Kingston, Jamaica and its Relation to Low Income Households." TRRL Supplementary Report- 546.
32. Herur, A, (2001) "Operation and Management of Urban Transport Systems", Workshop on Urban Transport Development Strategy for Dhaka Metropolitan Area, January, 2001, GDTPCB, Dhaka City Corporation, Dhaka.
33. HGAC (1998), "Congestion Management System", Houston-Galveston Area Council (HGAC), May 1998.
34. Highway Capacity Manual (HCM), (1994), Special Report 209, Third Edition, Transportation Research Board, National Research Council, Washington, D.C. 1994.
35. Hossain, A. B. (1996), "Effect of Non-Motorized Transport on the Performance of Road Traffic in Metropolitan Dhaka, Department of Civil Engineering, BUET.
36. Hoque, M.M. (1981). "Traffic Accidents in Dacca- A Study on Road Safety." Department of Civil Engineering, BUET, Dhaka.
37. Hoque, M.M. (1986). "Traffic Accidents in Dhaka." Proceedings of 13th ARRB/5th REAA Conference In Australia, Vol. 13, No.2.
38. Hoque, M.M. and Alam, J.B. (2002), "Strategies for Sustainable Transportation in Bangladesh", KODATU-X, LOME
39. ICF (1997), "Opportunities to Improve Air Quality through Transportation Pricing Program", ICF Incorporated, 9300 Lee highway, Fairfax, Virginia, September 1997.
40. Jadaan, K.S. (1988). "Operation and Performance of Public Transport in a Rich Developing Country." Proceedings Of 14th ARRB Conference, Vol. 14, Part 3.