ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
THE ORGANISATION OF ISLAMIC COOPERATION (OIC)

Effectiveness of Driving License in Bangladesh from Road Safety Perspective

By

RABBANI RASH-HA WAHI (085425)

NAFIZ UL AHSAN (085409)

A Dissertation
Submitted in Partial Fulfillment of the Requirement for the
Bachelor of Science in Civil and Environmental Engineering
Academic Year: 2011-2012

Department of Civil and Environmental Engineering.
Islamic University of Technology (IUT)
A Subsidiary Organ of OIC.
Gazipur, Bangladesh.

DECLARATION

We hereby declare that this submission is our own work towards the B.Sc and that, to the best of our knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

_____   _____
NAFIZ UL AHSAN (085409)   RABBANI RASH-HA WAHI (085425)

Approved By

_____
Dr. A.K.M. Sadrul Islam
Professor & Head of the
Department of CEE, IUT.

_____
Dr. Shakil Mohammad Rifaat
Thesis Supervisor
Assistant Professor
Department of CEE, IUT

PREFACE

The undergraduate thesis, "Effectiveness of Driving License in Bangladesh from Road Safety Perspective" has been written for the completion of Bachelor of Science degree at Islamic University of Technology, Bangladesh. This thesis work and writing has been done during the year 2012 under the supervision of Dr. Shakil Mohammad Rifaat, Asst. Professor of the department of Civil and Environmental Engineering.

We express our profound and deepest gratitude to Asst. Professor Dr. Shakil Mohammad Rifaat, for the excellent guidance, thorough supervision and positive criticism that has engineered the production of this work. For his guidance, patience and long hours he put into reading and commenting on our work.

We would like to acknowledge the many transport companies Bus and Truck drivers who gave up their time to take part in the project. A special thank you goes to MD.Moklesur Rahman who helped encourage the participation of the transport companies for efforts and inputs during the data collection for this work.

Finally we would like to take this opportunity to express my gratitude to the people who helped us with the various aspects of conducting research and the writing of this thesis.

ABSTRACT

Road traffic accidents and injuries have now emerged as a serious man-made epidemic with an estimated 1.3 million people killed and as many as 50 million injured worldwide each year. It is a rear event that road accidents accrue from a single cause. There are usually a myriad of causative factors that might have caused a road accident at any given point of time. Researchers estimated that around 90% of all causative factors involve road users of which drivers are the principal controlling elements. Accidents are particularly prevalent in low and middle income countries- around 85 percent of the world's deaths occur in developing countries like Bangladesh. Traffic accidents in Bangladesh have been increasing rapidly causing a huge amount of economic burden in terms of death, injury, lost productivity and property damage. Pedestrian-vehicle conflicts are clearly the greatest problem with significant involvement of Trucks and Buses. Licensed driving remains a serious problem for road safety, despite ongoing improvements in traffic law enforcement practice and technology. While it does not play a direct causative role in road crashes, licensed driving undermines the integrity of the driver licensing system and is associated with high risk behavior. Drivers are classified into three groups: (a) took no test; (b) took some tests; (c) took all tests. This thesis documents three groups that were undertaken to explore the scope and nature of licensed driving, in order to develop more effective countermeasures to the behavior and attitude. The need for more systemic behavioral studies seems apparent, particularly to develop a factual and comprehensive database for devising effective accident countermeasure. In order to gather factual information to serve as a basis for this study, a well-conceived questionnaire survey was conducted on the attitude and behavior of heavy vehicles drivers. The research also investigates the knowledge of the drivers about the Traffic rules and inspects the condition of the vehicles. Considering all the facts of involvement of heavy vehicles (buses and trucks) driver and compare among the heavy vehicle drivers to explain the attitude, behaviors of license drivers; discusses the possible solutions to improve the continuously deteriorating situation. The study focuses on the striking findings of the research with a view to assessing the need for taking appropriate countermeasures for improving driver behavior and hence reducing road accidents in Bangladesh.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

1.1 The current situation of driver's license in the Bangladesh

Each year more than 500000 people die in road accidents around the world (Mannan and Karim, 1998). The majority of these deaths (about 70%) occur in developing countries, 65% of deaths involve pedestrians and 35% of pedestrian deaths are children. About 15-20 million people suffer severe injuries (Hossain et al., 2005). The "Study Global Burden of Disease" undertaken by the World Health Organization (WHO), Harvard University, and World Bank, showed that traffic accidents were the world's ninth biggest cause of deaths during 1990. The study forecasts that by the year 2020, road accidents would move up to third place in the table of major causes of death and disability (Pedan et al., 2004). Around the world, about 1.2 million people are killed every year in traffic collisions and the problem is expected to get worse, especially in developing low and middle income countries (WHO, 2004). This problem draws significant attention in Bangladesh where road accidents are extremely high and still increasing.

Bangladesh, a country having an area of 1,47,570 sq.k.m and a population of 142 million, has about 1.5million motorized and could be over 3 million non-motorized vehicles. Of the motorized vehicles about 65% 2 and 3 wheeler vehicles and the rest are vehicles of different categories such as car, jeep, bus, truck, pick-up etc (National Road Safety Strategic Action Plan 20011 – 2013). The number of vehicles is steadily increasing along with the increase of road mileage. Simultaneously number of road accidents is also soaring high. Road accidents in Bangladesh claim, on an average, about 4000 lives and injure another 5000 every year (National Road Safety Strategic Action Plan 20011 – 2013). Road transport is increasingly playing an important role in Bangladesh. The number of registered motor vehicles on road increased steadily by 85 percent within the last decade from 3,39,448 in 1990 to 6,29,488 in 2000 (Hoque 2004).

In Bangladesh fatality rates per 10,000 vehicles are about 86 persons (Ross, 1998), which is 33% higher than India and over three times greater than Thailand. Accident death rates in developing countries are much higher (at least 50 times) than in developed countries (Hoque, M., M., 2008). In Bangladesh Drivers and pedestrian are significant parts of road accident. Major Factors Contribute Accidents come from Road user errors which is about

90% (Hoque, M., M., 2008). This situation is very dangerous particularly in metropolitan cities.

Table 1.1 Growths of Motor Vehicles and Road Accident Casualties

Year	Registered vehicles	Deaths	Injury	Total casualties
1995	44004	1653	2864	4517
1996	46457	2041	3301	5342
1997	32283	3162	5076	8238
1098	32481	3085	3997	7082
1999	31503	3314	3453	6767
2000	28764	3430	3211	6641
2001	42510	3109	3172	6281
2002	54877	3398	3770	7168
2003	59248	3289	3818	7107
2004	49202	2748	1080	5621
2005	65878	3187	2754	5941
2006	80305	3193	2409	5602
2007	121272	3749	3273	7022
2008	144419	3765	3284	7049
2009	145243	2958	2686	5644
2010	161178	2827	1803	4449

Source: National Road Safety Strategic Action Plan, 2011 – 2013

About 20 percent of road accident occurred in metropolitan cities viz. Dhaka, Chittagong, Khulna and Rajshahi (Hoque, 1991). A number of obstacles have hindered research into the issue of licensed driving and the development of related countermeasures. Firstly licensed driver are not necessarily a homogeneous group, a wide variety of people drive without a valid license, including those who: have let their license expire have had their license suspended; drive a vehicle without an appropriate license; have never held a license. As such, the motives for a person being unlicensed and the associated driving behaviors and attitude may vary greatly Overall, the literature suggests that formal driver training programs did not significantly reduce the crash risks of the drivers compared to informal training. Hence, there is insufficient evidence to support any recommendations to make formal driver training mandatory. Current efforts should thus be devoted to developing better driver training programs that focus on improving drivers' attitudes and

higher-order-skills. More than just campaigns and frightening statistics, alternatives for driver education, training, evaluation, and licensing are continually needed. In Bangladesh, for example, it is widely believed that over half of the drivers of the roads possess an illegal or unauthentic driver's license (The Daily Star, 2004).

1.2 Research objective

Based on the foregoing, the objectives set to be achieved by this study are;

1. provide an overview of the range of the existing driver testing and assessment arrangements used throughout Bangladesh;

2. investigate whether there are any systematic difference between licensed driver sub group in terms of their psychosocial characteristics or on-road driving behavior

3. this study are to understand the behavioral habits, attitudes and other physio-psychological and personal characteristics of drivers in order to evaluate their driving habits, to ascertain their role in traffic accidents as well as to assess drivers understanding of traffic control devices and their level of driving skill in various driving situations that are thought to cause road accidents. In Bangladesh as a whole, Buses and Trucks are major involved in road accidents. That's why our study based on heavy vehicle driver.

4. Considering all the facts of involvement of heavy vehicles (Buses and Trucks) driver and compare among the heavy vehicle drivers to explain the attitude, behaviors of license drivers ;discusses the possible solutions to improve the continuously deteriorating situation

1.3 Organization of thesis

This thesis is organized into five (5) chapters. Chapter one was devoted to background and the need for the research, objectives. The second chapter focuses on the review of the studies which involved driving Attitude, driving Behavior and traffic incident. Important information and finding from these studies are also documented. Chapter three is devoted to the methodology applied in the study. Chapter four describes the analysis and interpretation of the data. Chapter five contains the conclusions and this chapter draws final conclusion based on the findings of driver attitude, behavior and traffic incident. Some directions for future exploration of research in this area are also mentioned.

CHAPTER TWO: LITERATURE REVIEW

Over the years, many countries around the world have conducted studies to evaluate their licensing policies and components and their effect on attitudes, behaviors and traffic accidents. Some research has been conducted to examine the overall efficiency of driver testing and licensing in developing country like Bangladesh because now a days it is believed that the licensing system is not effective enough. Hence, most studies tend to assess only the different components of the various licensing systems in order to refine the system. The main role any effective driver testing and licensing system is to screen out drivers who have not acquired the minimum level of knowledge and skills required to operate the vehicle safety. However, a more important role of the driver testing and licensing system is to encourage learner drivers to acquire these knowledge and skills before attempting to obtain a license. It is this learning that produces a safe driver and not the testing and licensing system itself.

2.1 Licensing and driver testing standards and procedures

A driver's license or driving license is an official document which states that a person may operate a motorized vehicle, such as a Motorcycle, Car, Truck or a Bus, on a public roadway (Bangladesh Road Transport Authority, Motor Vehicles Ordinance 1983). The laws relating to the licensing of drivers vary between jurisdictions. In some jurisdictions, a license is issued after the recipient has passed a driving test, while in others; a person acquires a license before beginning to drive (Bangladesh Road Transport Authority, Motor Vehicles Ordinance 1983). Different categories of license often exist for different types of motor vehicles, particularly large trucks and passenger vehicles. The difficulty of the driving test varies considerably between jurisdictions, as do factors such as age and the required level of practice (Driver's license from Wikipedia). In Bangladesh the vehicles are set into seven categories like H (heavy), M (medium), L (light), C (motorcycles), T (three-wheelers), P (PSV) and X (others) (Bangladesh Road Transport Authority, Motor Vehicles Ordinance 1983). If a driver wants to be a good driver he/she should possess the capability and skill of vehicle handling and maneuvering as well as be able to understand the condition of proper driving. The procedure of achieving a driving license includes with tests is fixed by Bangladesh Road Transport Authority. First a candidate has to apply for a learner's license. A learner's license is with what he or she can get in touch with an instructor and drive a motor vehicle solely for learning purpose.

The learner's license declares a date for the candidate to sit in the driving test to be held by BRTA. The candidate has to report to the BRTA station where he will be through a thorough driving test (Bangladesh Road Transport Authority, BRTA: national road safety strategic action plan (20011 – 2013). The test includes with viva and practical tests. The instructor may ask questions on basic issues of a generic vehicle or traffic regulations. The practical test includes with driving through marked areas without any deviation, in more than one gear. Some tests also include with driving in a slope and emphasizes on driving in reverse gear (Bangladesh Road Transport Authority, BRTA: national road safety strategic action plan (20011 – 2013). Scores in viva and practical test are announced and the instructor decides whether the candidate deservers a license or not. A result if officially published in other date. If the candidate passes in the test, is given an official authorization to drive a vehicle until he receives the license card in another announced date some months after the declaration of results (Bangladesh Road Transport Authority, BRTA: national road safety strategic action plan (20011 – 2013). If the candidate fails, the learner's license still does not expire and he or she is given a new date to sit for another series of tests (Bangladesh Road Transport Authority, BRTA: national road safety strategic action plan (20011 – 2013).

2.2 Attitude towards driving

2.2.1 Drinking and Driving

Alcohol is a powerful depressant drug and, like a tranquillizer or sedative, it slows down body and brain functions (Alcohol and Driving Book, Department of Transport, The Govt. of Western Australia). Alcohol is absorbed quickly into the blood stream and rapidly travels to all parts of the body, including the brain. Alcohol also affects brain's ability to make judgments and process information (Alcohol and Driving Book, Department of Transport, The Govt. of Western Australia). It also impairs consciousness and vision. By drinking alcohol and drive the vehicle, one are likely to find difficulties to: judge the speed of the vehicle; judge the distance between one bus to other bus; notice traffic lights, pedestrians and other hazards; concentrate on the task of driving; keep vehicle balance, especially if you are riding on a motorcycle; stay awake when driving; and react appropriately to things going on around the driver, particularly if an unexpected hazard should suddenly appear (Alcohol and Driving Book, Department of Transport, The Govt. of Western Australia). In Bangladesh due to religious believes drinking is less

and it is consider as serious problem. Our research shows that public education may increase the awareness about alcohol and traffic crashes.

2.2.2 Speeding and Risk Taking

Speeding is a well known risk factor for crashing and subsequent injury severity for all drivers and in particular, young drivers (Khaled, 2012). The discourse on speeding behavior has involved a variety of disciplines and has considered the effect of external and situational factors (e.g. road type and layout, traffic volume and speed, car characteristics, time of day, levels and type of police enforcement, trip purpose) and driver characteristics (e.g. age, gender, personal motivations, behavioral traits, beliefs and attitudes toward Speeding) on the choice of travel speeds (Türker, 2006). For speeding, it is suggested that concentrate more on pre licensing system (Leema, 2008). It is mostly observed that drivers without permit or license drove a considerable amount (once a week or more) and those with learner's permit, frequently drove without the required supervision. Also, many of these drivers speed. Speeding and other risk taking behaviors are not restricted to novice drivers although the consequences of such behaviors tend to be more severe among the young drivers (Leema, 2008).

2.2.3 Following-too-Closely

Following too close or "tailgating" is considered an aggressive driving behavior (U.S. Department of Transport) [2]. Following too closely may be defined as, "situations in which one vehicle is following another vehicle so closely that even if the following driver is attentive to the actions of the vehicle ahead he/she could not avoid a collision in the circumstance when the driver in front brakes suddenly (U.S. Department of Transport) [2]. It is dangerous in all weather and road conditions and can have tragic consequences (Türker, 2006). But in Bangladesh a little thought is given for the vehicle that follows too closely. Short gaps between one vehicle and the next are very common in ordinary driving: on busy motorways (Leema, 2008). Because of the possibility of a disturbance in flow being amplified as it passes from one vehicle to another, drivers bear a collective responsibility to vehicles behind them to try to dampen rather than amplify disturbances. Potential measures to counter Following too closely can be advisory signs, markings on the road surface, enforcement by the police, a futuristic proposal for enforcement by the

public, and improvements to the vehicle (Following Too Close , Department of police, The municipality of anchorage, Alaska)[1].

2.3 Aging of the driving population:

Bangladesh Road Transport Authority, widely known as BRTA, is the authority to issue driver's licenses in Bangladesh (Bangladesh Road Transport Authority, Motor Vehicles Ordinance 1983). To drive a motor vehicle in a public place every one must have driving license. To obtain a driving license one should hold a learner driving license before appearing the driving test. The minimum age to apply for a non-professional license is 18 and a person has to be 20 to apply of a professional license. Thus nobody of under 18-years of age can drive a motor vehicle in Bangladesh and nobody under 20-years age can have it as a profession (Bangladesh Road Transport Authority, according to Section-3 of Motor Vehicles Ordinance 1983).

2.4 Driving Behavior of driver:

All drivers have habits behind the wheel. Different drivers vary in how they hit the gas and brake pedals, how they turn the steering wheel, and how much following distance they keep to follow a vehicle safely and comfortably (Miyajima, 2006). It is very important to know about driver performance and driver behavior. The two concepts are: Driver performance - what the driver CAN do. Driver behavior - what the driver DOES do. Driver performance relates to the driver's knowledge, skill, perceptual and cognitive abilities and driver behavior is what the driver chooses to do with these attributes (Driver behavior, science serving society) [3]. It is found in our thesis that drivers over 50 years of age have a higher tendency of making errors and lapses while driving whereas younger drivers usually violate laws at a higher rate. Aggressive driving behavior is known as behavior performed while driving that is intended to cause physical or psychological harm to any sentient being (Dula & Geller, 2003). This can involve tailgating, horn blowing, ashing headlights, cutting in and out, swearing and hostile gestures, as well as Threatening and assaulting other drivers. Such behaviors are increasingly present on our roads.

2.5 Effect of Experience

One of the purposes of this study is to evaluate the effects of experience on various driving performance under various driving conditions. Experience plays a vital role in traffic accident, behaviors and attitudes. An overwhelming amount of data shows that young drivers are overrepresented in crashes nationally and in divisions (David W. Eby, May 1995). That is, as a group, young drivers have a higher crash rate than other age groups. Frequently, the higher crash rate is ascribed to factors associated with being young and reckless (David W. Eby, May 1995). Young drivers have a propensity to take risks while driving, frequently manifested by speeding and drunk driving. In addition, it is pointed out that young drivers tend to make poor decisions about their driving and are influenced adversely by certain social situations, such as pressure from peers (David W. Eby, May 1995).

2.6 Traffic Incidents

Statistics from the Road Safety Cell (RSC) of the Bangladesh Road Transport Authority (BRTA) show the annual fatality rate in road accident in Bangladesh is 85.6 per 10,000 vehicles which compares to rates of below 3 per 10,000 vehicles in most developed countries. According to police statistics, there are about 4,000 deaths and many more serious injuries each year on roads in Bangladesh. Studies of road accidents revealed that heavy vehicles such as trucks and buses including minibuses are major contributors to road accidents (bus/minibus 33%, trucks 27%) and in fatal accidents their shares are 35% and 29% respectively. This group of vehicles is particularly over involved in pedestrian accidents accounting for about 68 percent (bus/minibus 38%, trucks 30%). For the case of road death, the share of buses and trucks are nearly 70 percent (bus/minibus 36%, trucks 24%) and for pedestrian about 72 percent (bus/minibus 40%, trucks 32%), (Road safety problems in Bangladesh).

---

[1] http://www.muni.org/Departments/police/traffic/Pages/FollowingTooClosely.aspx

[2] http://www.fmcsa.dot.gov/about/outreach/education/driverTips/Following-Too-Closely.htm

[3] http://www.scienceservingsociety.com/ts/text/ch09.htm

CHAPTER THREE: METHODOLOGY

The objective of this study is to provide an overview of the range of the existing driver testing and assessment arrangements used throughout Bangladesh. In fact, the growth of population, the increased number of vehicles, travelers and freight carriers as well as the pace of globalization have affected travel demand and licensing system in most of the countries of the world and subsequently have reshaped the travel patterns of commuters and freight carriers in many different ways (Giuliano & Wachs, 1992). Like many developing countries, Bangladesh has a large number of drivers with a valid license but had never taken any driving tests. The only possible way to gather valid information on the types of driving test taken by a driver is to conduct a driver survey because there is no reliable official record of the types of tests taken by drivers.

3.1 Survey Methods and Practices

According to "Survey Methods and Practices", published by Statistics Canada in 2003. "A survey is any activity that collects information in an organized and methodical manner about characteristics of interest from some or all units of a population using well-defined concepts, methods and procedures, and compiles such information into a useful summary form". A survey can be thought to consist of several interconnected steps which include: defining the objectives, selecting a survey frame, determining the sample design, designing the questionnaire, collecting and processing the data, analyzing and disseminating the data and documenting the survey. However, a survey must be carried out step by step, following precise procedures and formulas, if the results are to yield accurate and meaningful information. In order to understand the entire process it is necessary to understand the individual tasks and how they are interconnected and related. The steps of a survey are:

- ➢ Formulation of the Statement of Objectives;
- ➢ Selection of a survey frame;
- ➢ Determination of the sample design;
- ➢ Questionnaire design;
- ➢ Data collection;
- ➢ Data capture and coding;
- ➢ Editing and imputation;
- ➢ Estimation;

- ➢ Data analysis;
- ➢ Data dissemination;
- ➢ Documentation.

This chapter will focus on the steps that are directly relevant to this research. Also, since this study involves a simple driver survey and not a population census, some of the steps are combined to facilitate discussion and presentation while others have been simplified or omitted.

3.2 Selection of Survey Frame

According to Statistics Canada (2003), the survey frame provides the means of identifying and contacting the units of the survey population. Survey methodology depends on some factors those are:

- Survey errors (sampling and non-sampling error)
- Cost
- Timeliness
- Size of the population
- Small area estimation
- Prevalence of attributes
- Specialized needs
- Other factors

In a sample survey, data are collected for only a fraction (typically a very small fraction) of units of the population. One of the ways to identify and contact the units of survey population is a survey frame which is called sample frame for a sample survey (Statistics Canada, 2003). Ultimately, it defines the survey population through a set of information. A frame should include some or all items which are listed below:

- Identification data (name, address, identification number)
- Contact data (mailing address, telephone number)
- Classification data
- Maintenance data
- Linkage data

In this study, the target population consists of drivers in Dhaka and Rajshahi. The location for collecting data:

- o Rajshahi truck terminal
- o Shalbagan truck depot
- o Kalyanpur bus depot
- o Saidabad bus stand

3.3 Sampling

Sampling is the process of gathering the required information for each selected unit in the survey. Survey sampling is the process of selecting a probability-based sample from a finite population according to a sample design (Cochran, W.G. 1977).

A sample design encompasses the rules and operations by which one select sampling unit from the population and the computation of sample statistics, which are estimates of the population values of interest. The objective of your survey often determines appropriate sample designs and valid data collection methodology.

Sampling can be done in two ways: non-probability (quota sampling) and probability sampling (Stratified sampling). Stratified sampling is a method of sampling from a population and quota sampling is a method for selecting survey participants. For this study we selected Stratified sampling because of

- Increasing precision of estimates and keeping sampling strategy efficient
- Providing important subgroups (domains of interest) and efficient domain estimators.
- Operationally or administratively convenient
- Restricting samples to less extreme
- Allowing different sample frames and procedures applied to different strata

Having the minimum size helps to measure attributes and variables accurately, keep reasonable relationship of degree of variability, and allow sufficient numbers in each sub groups (Dixon and Leach, 1978, p 7-11). Considering all these factors, it is decided that a total of 100 questionnaires have to be completed for this survey with a sample of 50 for each type of drivers.

3.4 Questionnaire Design

According to Statistics Canada (2003), a questionnaire (or form) is a group or sequence of questions designed to obtain information on a subject from a respondent. Questionnaires play a central role in the data collection process since they have a major impact on data quality and influence the image that the statistical agency projects to the public. Questionnaires can either be in paper or computerized format.

3.4.1 Design Process

Questionnaire design follows some steps described in Statistics Canada, 2003:
First, consulting with data users and respondents is important. Data user consultation starts from formulation of objective. It is extensive and important especially for surveys not conducted by agencies.

Second, review of previous questionnaires may help in all aspects. Careful examination of questions and their same or similar answer makes question designing easier. It is an efficient approach too.

The third step involves the drafting the questionnaire. As the whole survey process is affected by the questionnaire drafted, some factors have to be considered for preparing the questionnaire. The way data will be collected will affect wording and placement of questions. Questions should sound natural and more answer categories should be provided in interviews.

The fourth step is reviewing and revising the questionnaire. It is helpful in identifying mistakes in spelling and grammar or in wording. People who are not related to survey and experts may review questionnaire and their comments will help to make questionnaires understandable and efficient.

The last step in the design process is finalizing the questionnaire. Designing is basically an iterative process and through several iterations, questionnaire is finalized. Final questionnaire is then either printed or programmed based on which data collection method will be used.

3.4.2 Question types

It is important to know question types because information expected will depend on it. Questions can be of two types such as open and closed questions. An open-ended question is designed to encourage a full, meaningful answer using the subject's own knowledge and/or feelings. It is the opposite of a closed-ended question, which encourages a short or single-word answer. Open-ended questions also tend to be more objective and less leading than closed-ended questions. Open-ended and close-ended questions differ in several characteristics, especially as regards the role of respondents when answering such questions. Close-ended questions limit the respondent to the set of alternatives being offered, while open-ended questions allow the respondent to express an opinion without being influenced by the researcher (Foddy, 1993). This has several consequences for the quality of survey data. The advantages of the open-ended questions include the possibility of discovering the responses that individuals give spontaneously, and thus avoiding the bias that may result from suggesting responses to individuals, a bias which may occur in the case of close-ended questions. However, open-ended questions also have disadvantages in comparison to close-ended, such as the need for extensive coding and larger item non-response. Usually a compromise as regards the use of open- and close-ended questions is reached. Decades ago, Lazarsfeld (1944) already suggested using open-ended questions at the initial stage of questionnaire design in order to identify adequate answer categories for the close-ended questions. In the later stages of the questionnaire design, open-ended questions can be used to explore deviant responses to the close-ended questions.

The questionnaire used in this study has both open and closed questions. Most questions are multiple choices and a few are dichotomous. Open questions are included to gather additional information about driving tests and those responses are not coded or analyzed statistically.

3.5 Data Collection

Data collection is typically the greatest single expense in a survey. Because of this problems arising during collection can be very expensive to fix – and could result in overall failure of the project (Statistics Canada, 2003). In this study, we have targeted

population consists of drivers in Dhaka and Rajshahi. The location for collecting data: Rajshahi truck terminal, Shalbagan truck depot, Kalyanpur bus depot, Saidabad bus stand. These locations are also chosen for their availability of target groups. The approach taken is cost-effective in a sense it keeps the number of locations limited which greatly facilitate personal interviews.
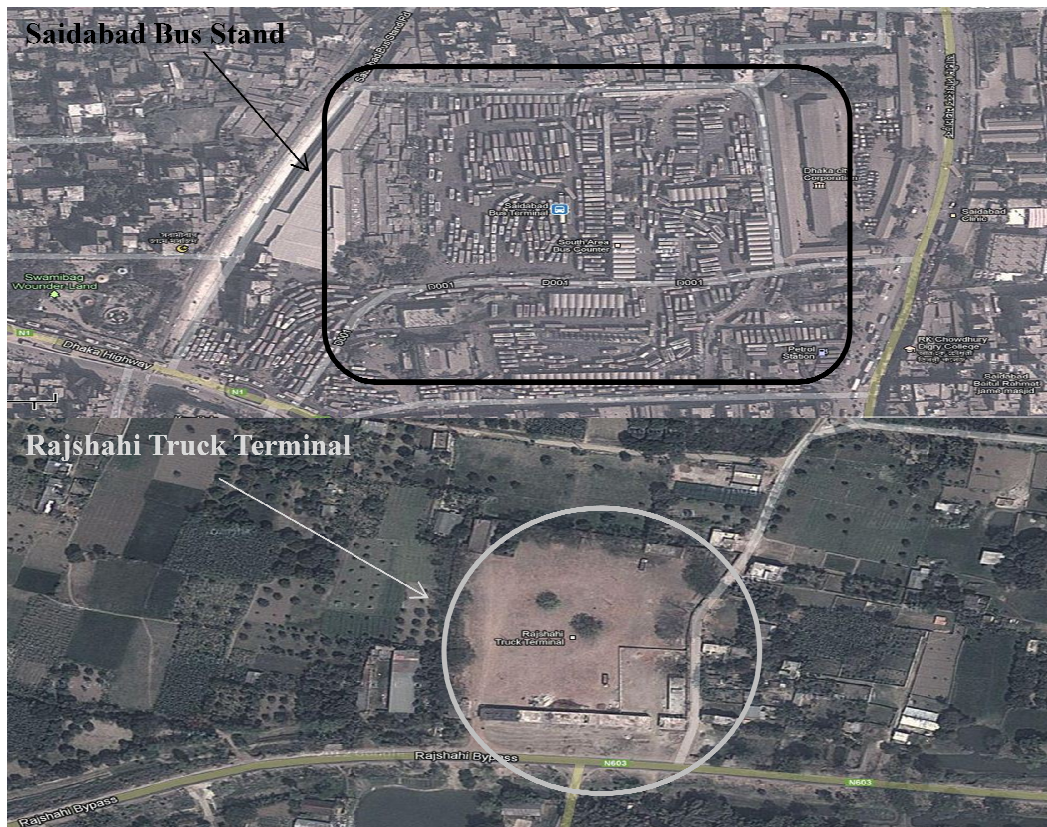
Figure 3.1 The Location Map of the Study Area (Source: Google Map)

3.5.1 Available methods:

Data collection is the process of gathering the required information for each selected unit in the survey. According to Statistics Canada, 2003, the basic methods of data collection are:

- Self-Enumeration
- Interviewer-assisted (Personal Interviews or Telephone Interviews)

Self-enumeration by mail is usually the cheapest form of data collection. Unfortunately, self-enumeration surveys often have the lowest response rates and can take the most time

to conduct, particularly if the questionnaire is delivered and returned by mail. Personal interviews usually yield the highest response rates but can also be the most expensive. They are often used for surveys with complex or extensive questions, when the sample requires a personal visit to locate or select respondents, when there is poor coverage of the target population with telephones or when the population has a low literacy rate.

3.5.2 Major Issues in choosing a method

There are several major issues that have to be considered in choosing a data collection method (Fowler, 1993; Dixon and Leach, 1976):

- Sampling issue
- Population issue
- Question form
- Question content
- Response rates
- Administrative issue
- Bias issue

After looking in to the available methods and major issues, this study selected the personal interview or face-to-face interview as the best technique for data collection.

3.6 Data Coding and Capture

Coding is the process of assigning a numerical value to responses to facilitate data capture and processing in general (Statistics Canada, 2003). Coding entails either assigning a code to a given response or comparing the response to a set of codes and selecting the one that best which describes the response. In the case of closed questions, the response categories are determined before collection, with the numerical code usually appearing on the questionnaire beside each response category. For open questions, coding occurs after collection and may be either manual or automated. Manual coding requires interpretation and judgment on the part of the coder, and may vary between coders.

3.7 Data Analysis

According to Statistics Canada, 2003, Data analysis involves summarizing the data and interpreting their meaning in a way that provides clear answers to questions that initiated the survey. Data analysis is one of the most crucial steps of a survey, since the quality of the analysis and how well it is communicated can substantially affect the usefulness of the whole survey. Data analysis should relate the survey results to the questions and issues identified during the first step of the survey. Data analysis may be restricted to the survey data alone or it may involve comparing the survey results with results obtained from other surveys or data sources. Often, it consists of examining tables and charts of various summary measures such as frequency distributions, means and ranges. More sophisticated types of data analysis may also be performed – statistical inference may be applied in order to verify hypotheses or study the relationships between characteristics.
Depending on the data we have performed One-way Analysis of Variance (ANOVA).

One-way Analysis of Variance (ANOVA)

The most widely used statistical tests for the equality of means is the one-way analysis of variance (ANOVA). Analysis of variance makes certain assumptions about data being investigated. Three major assumptions are (Berebson and Levine, 1992):

- Normality
- Homogeneity of variance
- Independence of errors

Normality states that the values in each group are normally distributed. This test is robust in a sense that the level of significance is not greatly affected by the lack of normality, especially for larger samples when distributions are not extremely different from normal distribution. Second assumption is needed to combine or pool the variances within the groups into a single within group source of variation (denoted as SSW). If sample sizes are equal, inferences based on F distribution may not be seriously affected by unequal variances. However, unequal samples can have serious effects on drawing such inferences and adjustments have to be made to test if the variances are not equal. For simplicity, there should be equal sized samples if possible. Independence of errors requires that the error from one observation should not be related to the error from any other observation.

In general, whether several groups (c = 3 or more) have same population average, the null and alternative hypotheses would be stated as follows:

$$Ho: \mu1 = \mu2 = \mu3 = \ldots..= \mu c$$

$$H1: \text{not all the means are equal}$$

Since the null hypothesis presumes equal population means for the three groups, a measure of total variation or sum of squares (SST) can be obtained by summing up the squared differences between each observation and overall mean X based upon all the observations. Total variation would be computed as:

$$SST = \sum_{j=1}^{c} \sum_{i=}^{nj} (Xij - X)^2$$

Where $X = \frac{\sum_{j=1}^{c} \sum_{i=1}^{nj} Xij}{n}$ is called grand mean

- Xij = ith observation in group j
- nj = number of observations in group j
- n = total number of observations
- c = number of groups

The SST can be divided into two parts: within-group variation (SSW) and between-group variation (SSB). The variability within group can occur because of different effect on each group or natural variation among people. Similarly, part of SSB is due to the effect of being in different groups and also, variability of each observation makes simple means different because they are different samples. If null hypothesis is true, then SSB will estimate population variability as well as SSW. If null hypothesis is false, then SSB will be larger. But it is always true that SST = SSB + SSW. Sum of the squared differences between the sample mean of each group X} and the grand mean X, weighted by the sample size nj in each group calculate SSB.

$$SSB = \sum_{j=1}^{c} nj (Xi - X)^2$$

Within group variation, SSW measures the difference between each value and the mean of its own group and cumulates the squares of these differences over all groups.

$$SSW = \sum_{j=1}^{c} \sum_{i=1}^{nj} (Xij - Xj)^2$$

Where Xij is the ith observation in group j

Based on these two SSB and SSW, two different estimates of population variance can be examined. As variance is estimated by diving sum of squared deviations by its appropriate degrees of freedom, it is calculated as an average squared deviation and hence, called as mean square. Two mean squares are associated with SSB and SSW and they are mean square within, MS W and mean square between, MSB. Degrees of freedom and mean square equations to estimate are:

$$dfw = n - c$$

$$dfb = c - 1$$

$$MSB = \frac{SSB}{dfb} = \frac{\sum_{j=1}^{c} nj\, (Xi - X)^2}{c - 1}$$

$$MSW = \frac{SSW}{dfw} = \frac{\sum_{j=1}^{c} \sum_{i=1}^{nj} (Xij - Xj)^2}{n - c}$$

The test statistic is based on the ratio of these two variances and it should be near 1 if null hypothesis is true. Otherwise, the ratio will be greater than 1. The decision rule is to reject the null hypothesis of no difference between the groups if:

$$F(c - 1), (n - c) = \frac{MSB}{MSW} > F\alpha, (c - 1), (n - c)$$

Where, $F\alpha, (c - 1), (n - c)$ the critical value of F distribution with c-1 and n-c degrees of freedom.

The following is an example for the ANOVA test, where three groups of truck drivers' behavior are listed:

1	0	1
2	1	0
3	1	0
1	0	1
1	2	2
2	0	0
3	0	1
5	0	1
5	1	2
3	3	2
0	2	0

. .

. .

. .

Ho: mean of group "no test" = mean of "all test" = mean of "some test"

H1: not all means are equal

The one way analysis of variance procedure can be performed using the program Microsoft Excel. The output of the test is shown below:

ANOVA: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	11	24	2.181818	2.163636
Column 2	14	10	0.714286	1.142857
Column 3	25	28	1.12	2.11

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	13.98649	2	6.993247	3.772172	0.030247	3.195056
Within Groups	87.13351	47	1.853904			
Total	101.12	49				

CHAPTER FOUR: RESULTS

Preliminary studies identify that examine the effects driver testing, over speeding, and unreasonable Competitive and aggressive attitudes of heavy vehicles drivers are a few of the most prevalent causes of road accidents in Bangladesh. The required information is collected by a driver questionnaire survey administered to two groups of drivers for different types of vehicles: Buses and Trucks.

4.1 Driver Licensing and Testing Groups

The drivers driving trucks and buses throughout the country form a community and also because of their job they have turned themselves to a distinct culture group – deserving an ethnographic investigation. A very high rate of involvement of bus and truck made it desirable knowing the life style of drivers behind the steering wheel of the vehicle. In Bangladesh, there are four main types of driver tests required in the official licensing process: written, verbal, practical and medical. In Bangladesh most of the people are not rely on the process to get the driving license. Since most drivers possess a driver license issued by the proper authorities (irrespective of driving test participation), there is no way to examine the effect of driver licensing on road safety. A major percentage did not even take any driving test while the rest took the test but passed the test by offering money to corrupt personnel of the license issuing authority So the drivers without attending any viva and practical tests maintaining proper channel, they obtained their driving license.

Before apply for driving license, Most of the drivers they didn't show any physicians. As a result driver might have some physiological problem which is not addressed. Lastly they will not learn about the Traffic Signs, rules of driving in a conflicting situation, rules for overtaking and other important rules. Those who attend some test like verbal and written tests examine, they are in one category. Respondents of the surveys are then assigned into one of the following three groups depending on their participation in the knowledge tests and practical test:

• Took no tests [group 1]

• Took some tests (mostly road test) [group 2]

• Took all tests (both written and practical test) [group 3]
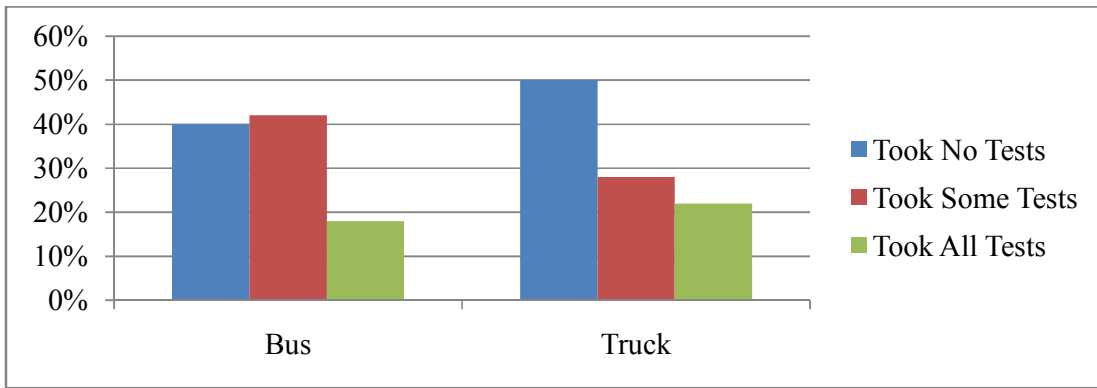
Figure 4.1 Group Distributions among Driver Types

The percentages of drivers for bus and truck are shown in Figure 4.1. It is clear from the figure that a relatively large percentage of the drivers on the roads in Bangladesh had not taken any driver test or had taken only some of the tests and only a fairly small percentage of the drivers took all the tests. Among the truck drivers it is observed that they do not want to take test and they give the experience more value than the test.
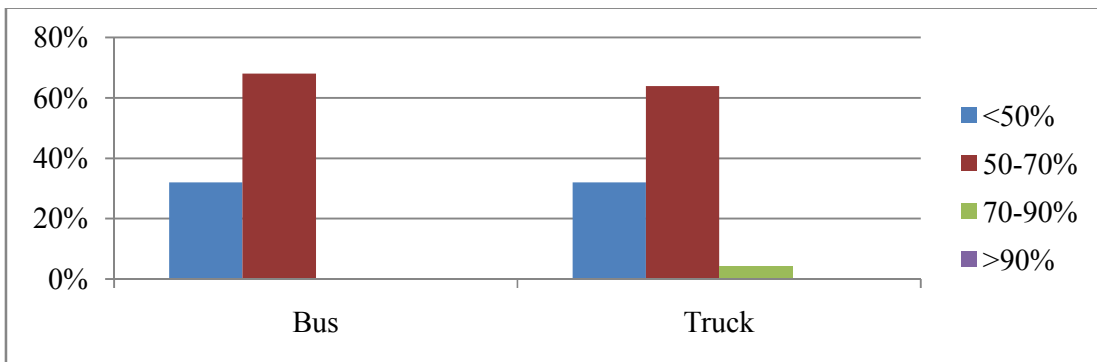
Figure 4.2 Respondents' Estimate of Share of Unauthentic Licenses

The practice of having an unauthentic driving license is quite overwhelming. Moreover, this practice is a common knowledge in Bangladesh and no one is concern about it. Figure 4.2 shows the percentages of drivers on the roads who are driving without an authentic license which are estimated by the respondents. In general, most of the driver holds duplicate license and the government and the drivers themselves are not aware of its consequences.

4.2 Respondents' Characteristics by Groups

A detailed questionnaire was prepared to collect data related to the divers' demographic and personal information, level of training and experience as well as owning of driving

license. The driver profiles for each group are shown in Table 4.1. Note that all the respondents in the survey are male because very few females drive in Bangladesh. Therefore, this variable is excluded from our analyses.

Table 4.1 Driver Profile by Group

	Took No Tests	Took Some Tests	Took All Tests
Truck Drivers			
Sample size	25	14	11
Age (years; % in each age group)			
Below 25	0	0	0
25-34	4	7	18
35-44	20	42	37
45-54	48	28	36
55 and above	28	23	9
Education (% in each education level)			
No education	52	35	27
Primary	36	58	55
Secondary	8	7	9
Post-secondary	4	0	9
income (BDT per month; % in each income group)			
Less than 10,000	0	0	0
11,000-15,000	16	21	46
16,000-20,000	60	58	27
More than 20,000	24	21	27
Driving Experience (years)			
Mean	19.36	19.1	19.25
Standard deviation	6.21	6.10	6.43
Held a License (years)			
Mean	14.79	14.40	14.42
Standard deviation	5.32	5.0	5.21
Bus Drivers			
Sample size	20	21	9

Age (years; % in each age group)			
Below 25	0	0	0
25-34	0	4	33
35-44	20	43	44
45-54	65	43	23
55 and above	15	10	0
Education (% in each education level)			
No education	25	0	0
Primary	60	38	22
Secondary	15	62	45
Post-secondary	0	0	33
income (BDT per month; % in each income group)			
Less than 10,000	0	0	0
11,000-15,000	5	28	11
16,000-20,000	25	24	55
More than 20,000	70	48	34
Driving Experience (years)			
Mean	22.2	21.7442	21.6818
Standard deviation	8.08646	7.8288	7.75429
Held a License (years)			
Mean	20.022	19.5581	19.5227
Standard deviation	7.8086	7.58539	7.49104

Drivers we have surveyed possess many years of driving experience and have held a driver license for many years as well. However, it is noted that the mean number of years the respondents have held a driver license is generally less than the mean number of years the respondents have been driving. These results indicate that a large percentage of the drivers have driven without a license for a significant period of time. It is noted that the standard deviations for the number of years a driver has been driving and the number of years a driver has held a license are relatively large compared to the means and it should be considered in result.

4.2.1 Drivers' Age:

Drivers' age is found to be a significant factor, bus and truck drivers, among this licensing groups bus driver are more experienced.
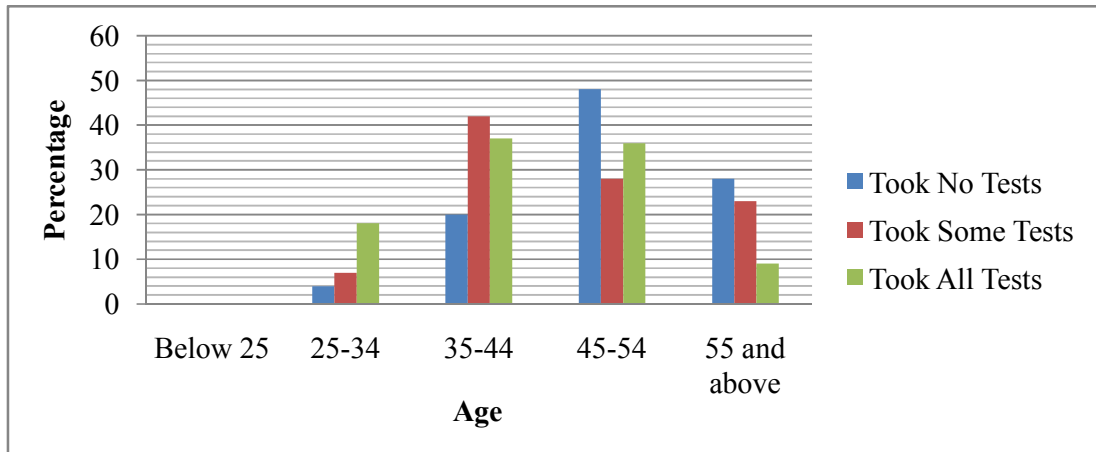
Figure 4.3 Age Distribution of Truck Drivers

Drivers having experience from five year to more than thirty years were interviewed in the survey. Among the truck drivers who took no tests, the largest group is one between ages of 45and 54(figure 4.3). Whereas the age group with the largest share of truck drivers who took all the tests and took some test is the 35-44 years old. As the time progress the young drivers are more interested to get the license by giving tests.
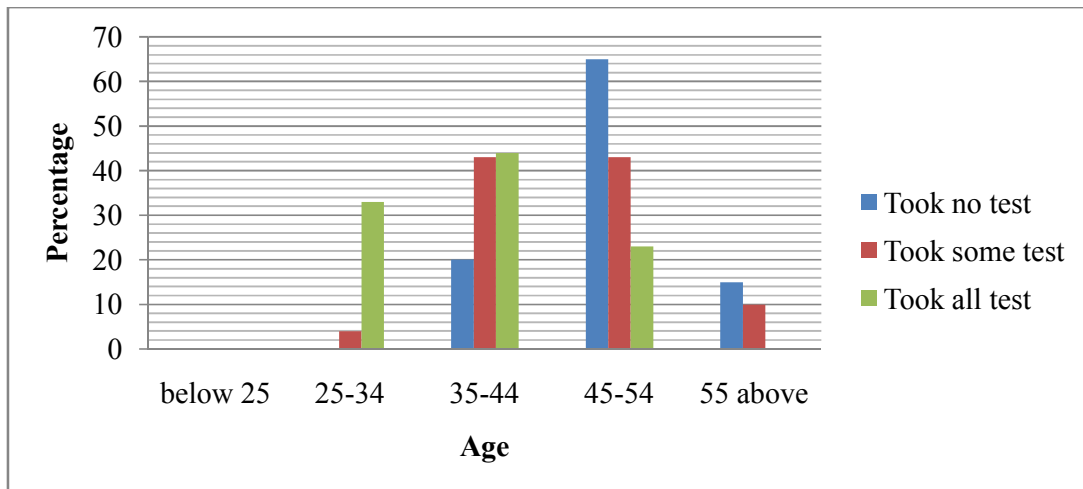
Figure 4.4 Age Distribution of Bus Drivers

Drivers having experience from 5 year to 30 years were interviewed in the survey. The study was designed to reflect the opinion of all classes of drivers. Among the bus drivers who did not take any tests, the largest group is one between ages of 45and 54 whereas the

age group with the largest share of bus drivers who took all the tests is the 35-44 years old.

4.2.2 Education:

Due to the questionnaire survey, it is observed that about 40 % of the interviewed driver's have no education. Whereas among drivers who did not take any test, with no education form the largest category. Only a few have had the opportunity to pass the post-Secondary School Certificate examination.
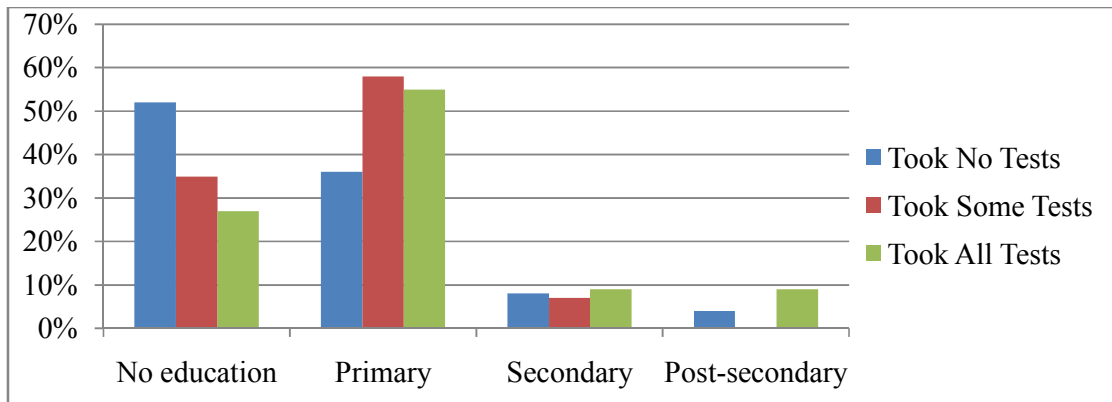
Figure 4.5 Education Distributions of Truck Drivers

Among the truck drivers who took some the tests, drivers with primary education form the largest category (figure 4.5). On the other hand, among the truck drivers who did not take any of the tests, drivers with no education form the largest category. So education plays a vital role in licensing, through proper education it is possible to encourage the drivers to take the test for licensing. As the education range changes to primary the percentage of driver who took all the test rises significantly (figure 4.5).
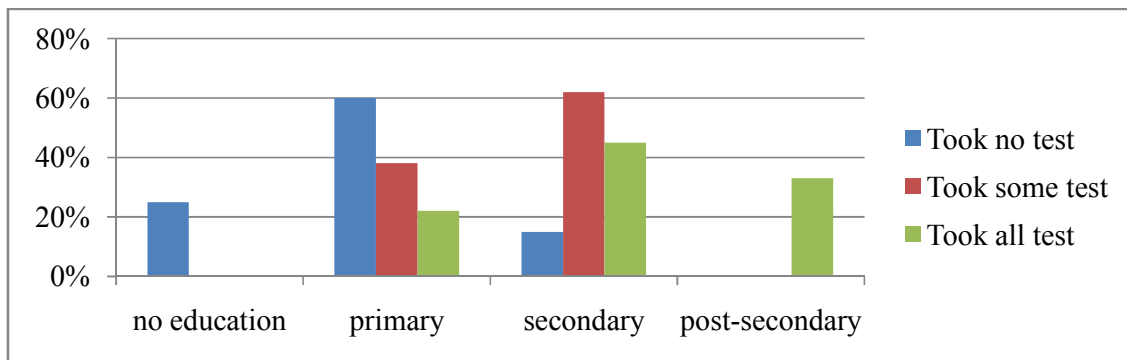
Figure 4.6 Education Distributions of Bus Drivers

According to findings of the questionnaire survey, about 40 % of the interviewed driver's studies Class V level of primary school .Whereas among drivers who did not take any of

the test, drivers with primary education form the largest category .those who take some test they continued up to secondary school. Only a few have had the opportunity to pass the post-Secondary School Certificate examination.

4.2.3 Income:

Drivers' income is found to be a significant factor; among the licensing groups for bus and truck drivers it is found to be significant. As shown in Figure 4.7, the largest income group of truck drivers earns in a range from 16000 to 20,000 BDT per month, followed by bus drivers (figure 4.8).
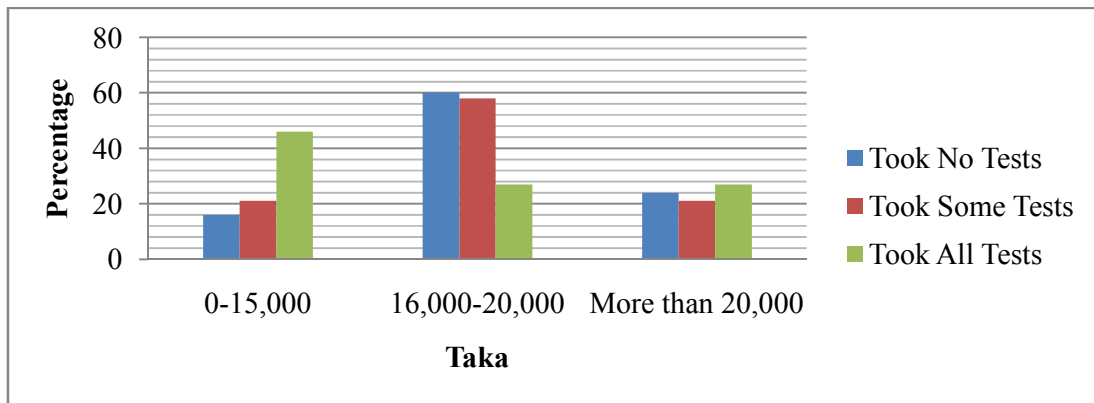
Figure 4.7 Income Distributions of Truck Drivers

A small proportion of the drivers were found to get salary on a regular monthly basis. Most of them receive their wages on trip basis and therefore their jobs were temporary. In the absence of any formal document specifying their job, conditions, basic salary and
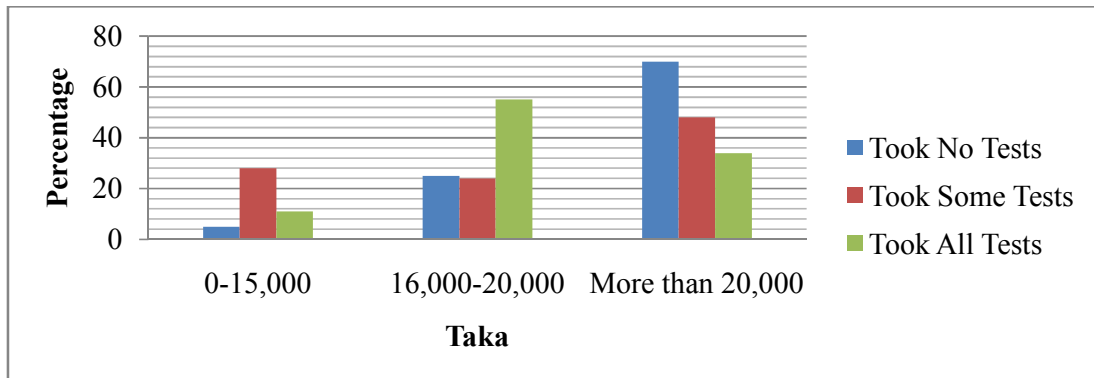
Figure 4.8 Income Distributions of Bus Drivers

fringe benefits, they were obviously in a state of job insecurity and social dissatisfaction. The largest income group of all three licensing groups earns in a range from more than

20,000 BDT per month. Bus drivers in this income range as some or all test takers earn less than those drivers who did not take any tests. Cause most of the drivers those who did not take any tests they are highly experienced, based on their experienced they paid monthly or trip basis.

4.2.4 Years Held a License
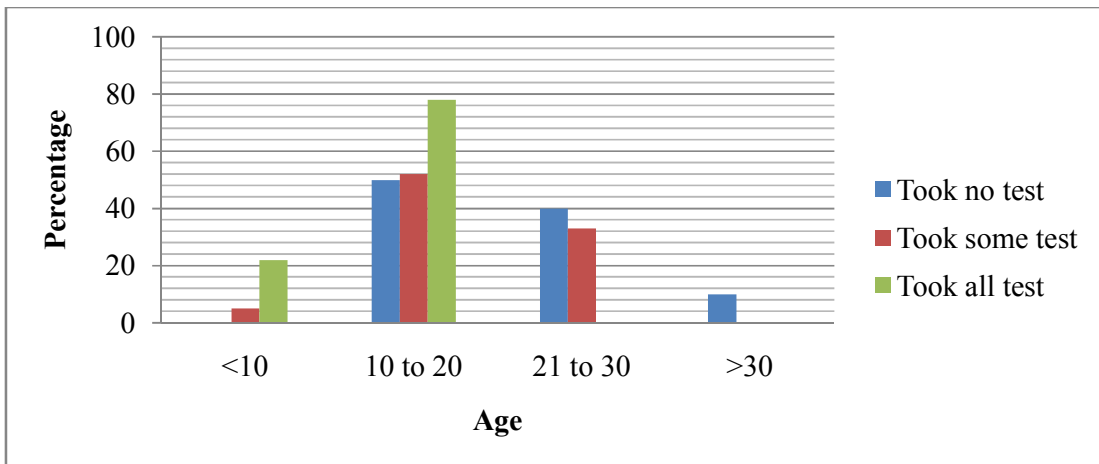
Figure 4.9 License Age Distributions among Bus Drivers

A heavy vehicle driver license carries special responsibilities. A professional driver must maintain certain conditions and rules that apply only to drivers of heavy vehicles. As shown in Figure 4.9, bus drivers who took all tests form largest group of drivers holding license for 10-20 years whereas more non-test takers have held a license for 10-20 years.
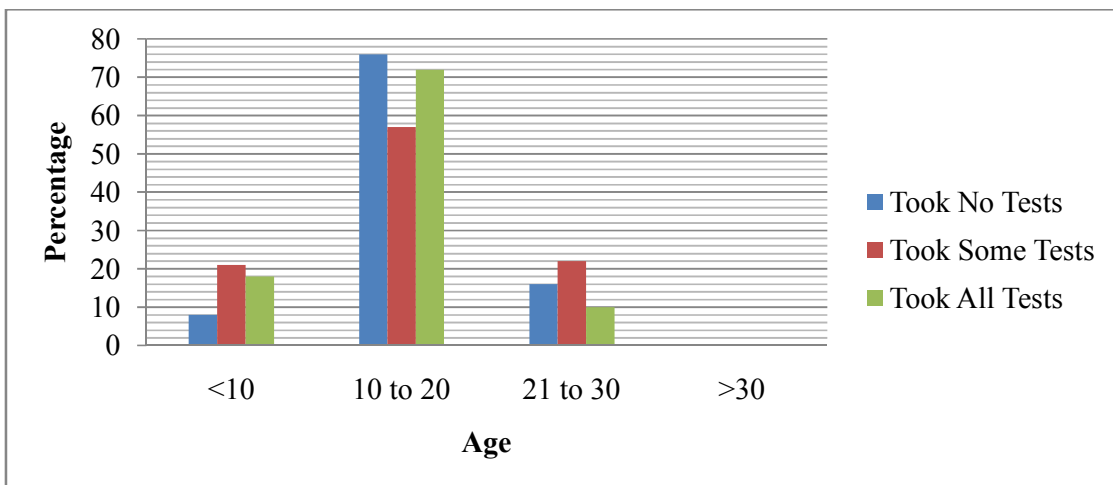
Figure 4.10 License Age Distributions among Truck Drivers

The number of years each driver has held a license is found to be significant among truck and bus drivers. As shown in Figure 4.10, truck drivers who took no tests form largest group of drivers holding license for 10-20 years.

4.2.5 Years of Driving Experience
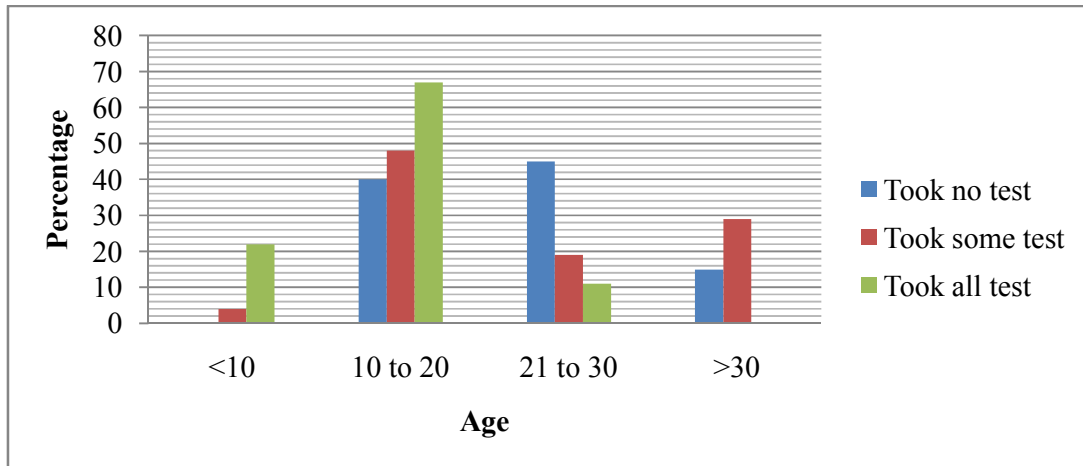
Figure 4.11 Driving Age Distribution among Bus Drivers

The driver profile was prepared through a questioner survey. As a figure 4.11 shown that Drivers having experience from 5 year to 30 years were interviewed in the survey. Significant amount of drivers found those who did not take any test from 21-30.A comparison of Figures 4.10 and 4.11 showed that bus drivers who did not take any tests have been driving for more years than they have been holding licenses.
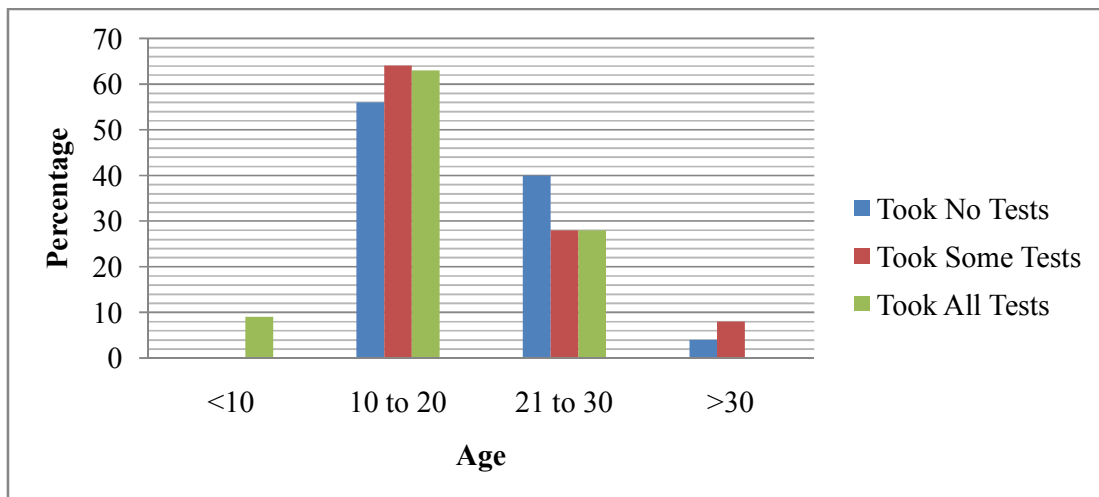
Figure 4.12 Driving Age Distribution among Truck Drivers

As a figure 4.12 shown that driving age ranges from ten to twenty holds the largest section of the interviewed drivers. In this section drivers who took some tests are the largest category followed by took the entire test and took no test. Those drivers who are young are more interested to take the test but drivers having driving experience more than thirty years they are not interested in taking any kind of tests.

4.3 Driving Attitudes

Attitudes represent our values and beliefs about situations based on past experience. A person's belief is not always reflected in their behavior. Behavior is sometimes inconsistent with attitudes. Attitudes are often rationalizations of past behavior and there is little evidence that attitudes will be a predictor of future behavior. Many drivers have the belief that they are good drivers and are reluctant to review their behavior. Changing driving behavior through attitude change is unlikely (Murcotts). Drivers express attitudes in line with road safety information and laws but given an opportunity to demonstrate that attitude through their skills behind the wheel and there is usually a significant mismatch.

4.3.1 Drinking and Driving

In Bangladesh generally most of the bus and truck drivers have relatively safe attitudes toward drinking and driving. In table 4.2 the average scores for the positive attitudes both in bus and truck are greater than the 3 and close to 4. This phenomenon is mainly due to the religious believes that prohibits drinking. The result shows us that most of the drivers they have a neutral opinion or they agree with the question.

Table 4.2 Summary Statistics of Drinking and Driving Items

	Took no tests		Took some tests		Took all tests	
Drinking and Driving Items	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers						
Sample size	25		14		11	
After drinking there is a possibility of accident.	3.85	1.09	3.80	1.09	3.78	1.22

After drinking do you feel any drowsiness?	3.79	1.03	3.76	1.01	3.69	1.12
Do you think drinking hampers concentration and prompt driving behavior?	3.71	1.09	3.69	1.10	3.61	1.15
Sub Scale	3.78		3.75		3.69	
Bus Drivers						
Sample size	20		21		9	
After drinking there is a possibility of accident.	4.24	0.53	4.27	0.55	4.25	0.53
After drinking do you feel any drowsiness?	3.58	0.72	3.53	0.74	3.56	0.70
Do you think drinking hampers concentration and prompt driving behavior?	4.09	0.70	4.16	0.72	4.06	0.73
Sub Scale	3.97		3.99		3.96	

Table 4.3 P-values of Hypothesis Tests of Drinking and Driving Items

Drinking And Driving	Truck	Bus
After drinking there is a possibility of accident.	0.56	0.44
After drinking do you feel any drowsiness?	0.19	<0.01
Do you think drinking hampers concentration and prompt driving behavior?	0.10	0.29

In Table 4.3, while exploring it is observed that among the three licensing groups for bus and truck are statistically significant for only two of the six cases. So, only for these two cases the answers of the three driving groups varies among them.

4.3.2 Following-too-closely

The means and standard deviations of following-too-closely for each test taken group are shown in Table 4.4. The results show that most drivers do not consider following-too-closely as a serious problem. Because in Bangladesh the roads are too narrow and small comparing the population it holds and there are always vehicle which exceeds the design limits of the road, so it is very common that the vehicle follow each other very closely. But the drivers also think that following-too-closely is more prone to accident and that the law against following-too-closely should be more strictly followed.

Table 4.4 Summary Statistics of Following Too Closely Items

	Took no tests		Took some tests		Took all tests	
Following-too-closely	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers						
Sample size	25		14		11	
People stopped by the police for close following are unlucky because lots of people do it	2.91	1.08	2.86	1.11	2.80	1.14
Following- too-closely is one of the main causes of accident.	3.31	1.20	3.22	1.24	3.31	1.21
In a rush condition following-too-closely situation may be permitted.	3.40	1.32	3.47	1.31	3.28	1.34
Some people can	3.08	1.06	3.16	1.08	2.91	1.05

drive perfectly safely even when they only leave a small gap behind the vehicle in front						
Close following isn't really a serious problem at the moment.	3.40	1.18	3.43	1.34	3.25	1.24
Sub Scale	3.22		3.92		3.11	
Bus Drivers						
Sample size	20		21		9	
People stopped by the police for close following are unlucky because lots of people do it	2.56	0.76	2.51	0.77	2.5	0.73
Following- too-closely is one of the main causes of accident.	3.31	1.02	3.35	1.07	3.34	1.01
In a rush condition following-too-closely situation may be permitted.	2.91	1.14	2.77	1.11	2.91	1.16
Some people can drive perfectly safely even when they only leave a small gap behind the vehicle in front	3.36	0.83	3.23	0.89	3.32	0.86
Close following isn't really a serious	3.86	0.79	3.77	0.72	3.84	0.78

problem at the moment.					
Sub Scale	3.20		3.13		3.18	

Table 4.5 P-values of Hypothesis Tests of Following-Too-Closely Items

Following-too-closely	Truck	Bus
People stopped by the police for close following are unlucky because lots of people do it	0.75	0.23
Following- too- closely is one of the main causes of accident.	0.81	<0.01
In a rush condition following-too-closely situation may be permitted.	0.25	0.50
Some people can drive perfectly safely even when they only leave a small gap behind the vehicle in front	<0.01	0.14
Close following isn't really a serious problem at the moment.	0.37	<0.01

The test results for the items for following-too-closely are reported in Table 4.5. In an urban condition like Dhaka, close following is very common but in case of divisional town like Rajshahi following too closely is not vary common. In the Dhaka city heavy vehicles can enter only in the night time so it becomes very congested and drivers want to reach destination as early as possible so following too closely does not matter. Bus drivers who have taken all the tests care less about following-too-closely than those who did not take any test. On the other hand, truck drivers who have taken all the tests are generally more concerned about following-too-closely. Since they are not as used to having other vehicles close to them and they are only allowed into the city at night.

4.3.3 Speeding

Table 4.6 shows the means and standard deviations of speeding items in each licensing groups by driver types. The mean for each group lies between 3 to 4, which indicates that the drivers are more or less agree with the question that are set for speeding. Most of the

drivers think that speeding more than speed limit can be the cause of more severe accidents. Among bus and truck drivers, the truck drivers are more cautious of speeding because they carry heavy loads and over speed can easily turn over a truck.

Table 4.6 Summary Statistics of Speeding Items

	Took no tests		Took some tests		Took all tests	
Speeding Items	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers						
Sample size	25		14		11	
Speed breaker is helpful for reducing speed.	3.67	1.15	3.69	1.16	3.61	1.22
More fine should be imposed to discourage speeding on highway	3.98	0.97	3.91	0.97	3.86	0.96
Stricter enforcement of speed limits on 60 kmph roads would be effective in reducing the occurrence of road accidents	3.81	1.00	3.87	1.01	3.75	1.05
Speeding is one of the main causes of road accidents	3.79	1.05	3.80	1.06	3.69	1.16
Speeding at day time is safer comparing with night time for crash occurrence perspective	3.31	0.99	3.32	1.00	3.19	0.98
Sub Scale	3.71		3.72		3.62	

Bus Drivers						
Sample size	20		21		9	
Speed breaker is helpful for reducing speed.	4.67	0.48	4.67	0.47	4.68	0.47
More fine should be imposed to discourage speeding on highway	3.18	0.91	3.21	0.94	3.16	0.91
Stricter enforcement of speed limits on 60 kmph roads would be effective in reducing the occurrence of road accidents	3.44	0.76	3.40	0.82	3.47	0.73
Speeding is one of the main causes of road accidents	4.64	0.64	4.60	0.85	4.65	0.65
Speeding at day time is safer comparing with night time for crash occurrence perspective	3.53	1.14	3.53	1.14	3.55	1.11
Sub Scale	3.89		3.88		3.90	

Table 4.7 P-values of Hypothesis Tests of Speeding Items

Speeding Items	Truck	Bus
Speed breaker is helpful for reducing speed.	0.62	0.87
More fine should be imposed to discourage speeding on highway	0.97	0.89

Stricter enforcement of speed limits on 60 kmph roads would be effective in reducing the occurrence of road accidents	0.40	<0.01
Speeding is one of the main causes of road accidents	0.38	0.45
Speeding at day time is safer comparing with night time for crash occurrence perspective	<0.01	<0.01

According to Table 4.7 data the differences in driver attitudes for speeding among the three licensing groups for bus and truck are statistically significant for only three of the ten cases. This seems to reflect a vehicle division among drivers because according to measurements, Bus drivers are less attentive to speeding than the truck driver. There is a big difference in the proportion of driving bus and truck by areas with different speed limits.

4.3.4 Overtaking

Overtaking or passing is the act of one vehicle going past another slower moving vehicle, travelling in the same direction, on a road. The mean for each group lies between 2 to 3, which indicates that the drivers are disagree or shear a neutral opinion with the question that are set for overtaking.

Table 4.8 Summary Statistics of Overtaking Items

	Took no tests		Took some tests		Took all tests	
Overtaking Items	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers						
Sample size	25		14		11	
Presence of proper road marking would be helpful for safe overtaking.	3.18	1.14	3.20	1.13	3.00	1.12
Do you think overtaking is a	3.20	1.20	3.22	1.19	3.08	1.25

serious problem for crush occurrence						
Overtaking at curve is safer if you are capable.	2.94	1.08	2.88	1.12	2.89	1.06
I think it is OK to overtake in risky circumstances as long as you drive within your own capabilities	2.95	0.92	2.90	0.96	2.81	0.96
Sub Scale	3.07		3.05		2.95	
Bus Drivers						
Sample size	20		21		9	
Presence of proper road marking would be helpful for safe overtaking.	4.6	0.72	4.60	0.73	4.59	0.73
Do you think overtaking is a serious problem for crush occurrence	4.53	0.63	4.56	0.73	4.55	0.63
Overtaking at curve is safer if you are capable.	1.31	0.51	1.26	0.44	1.30	0.51
I think it is OK to overtake in risky circumstances as long as you drive within your own capabilities	1.51	0.55	1.48	0.55	1.52	0.55
Sub Scale	2.99		2.98		2.99	

Table 4.9 P-values of Hypothesis Tests of Overtaking Items

Overtaking Items	Truck	Bus
Presence of proper road marking would be helpful for safe overtaking.	0.45	0.38
Do you think overtaking is a serious problem for crush occurrence	<0.01	0.47
Overtaking at curve is safer if you are capable.	0.53	<0.01
I think it is OK to overtake in risky circumstances as long as you drive within your own capabilities	0.48	<0.01

According to Table 4.9 data the differences in driver attitudes for overtaking among the three licensing groups for bus and truck are statistically significant for three of the eight cases. This seems to reflect a vehicle division among drivers because according to measurements, Bus drivers are less attentive to overtaking than the truck driver. Because trucks carry heavy loads and bus does not have the load so, they overtake more.

4.4 Driver Behaviors

The road safety domain is lacking in predictive models of driver behavior to discern causality and association that is cause and effect relationship with the myriad of factors which are in general involved in a traffic accidents situation. Understanding driver behavior to achieve enhanced road safety provides as a basic platform for the development and installation of new, innovative and cost-effective traffic accident countermeasures. The widely used Driver Behavior Questionnaire was included in the survey and the responses are recorded using six-point scale from 0 = "Never" to 5 = "Nearly all the time" as designed by the original researchers (Lajunen et al., 2003). All item scale is often clustered into four major subscales: Aggressive Violations, Ordinary Violations, Errors and Lapses (Lajunen et al., 2003) and these clusters will be used to analyze the data in this study. Since all the items included in the questionnaire are unsafe behavior, scores that are closer to zero indicate safe driving behaviors whereas score closer to five indicate unsafe driving behaviors.

4.4.1 Aggressive Violations

In a study of aggressive driving, Hauber (1980) defined aggression on the road as actual or intended behavior which the offender supposes will do physical or psychological harm to the victim and which the victim experiences as such. This definition states that the aggressors must have the expectation that their behavior will cause victims to experience physical or psychological harm. Hauber, however, does not provide a list of driving behaviors he would include or exclude from this definition. Four aggressive violation items are included in the Driver Behavior Questionnaire and the participants' responses to these items are tabulated in Table 4.10.

Table 4.10 Summary Statistics of Aggressive Violation Items

	Took no tests		Took some tests		Took all tests	
Aggressive Violation	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers						
Sample size	25		14		11	
Horn from other drivers make you impulse and provoke you to take risk which you don't do generally.	1.27	1.45	1.24	1.45	1.53	1.52
Presence of slower moving vehicle ahead provokes you risky lane changing.	1.30	1.35	1.39	1.30	1.56	1.38
Angered by another driver's behavior, you give chase with the intention of giving him/her a piece of your mind	1.42	1.23	1.41	1.22	1.64	1.31
Sub Scale	1.33		1.35		1.58	

Bus Drivers						
Sample size	20		21		9	
Horn from other drivers make you impulse and provoke you to take risk which you don't do generally.	2.707	.7498	2.774	.80456	2.6785	.7723
Presence of slower moving vehicle ahead provokes you risky lane changing.	3.55	.867	3.534	.8823	2.55	1.13
Angered by another driver's behavior, you give chase with the intention of giving him/her a piece of your mind	2.288	.81526	2.32	.8376	2.29	.823
Sub Scale	2.84		2.87		2.50	

Table 4.11 P-Values of Hypothesis Tests of Aggressive Violation items

Aggressive Violations	Truck	Bus
Horn from other drivers make you impulse and provoke you to take risk which you don't do generally.	<0.01	0.29
Presence of slower moving vehicle ahead provokes you risky lane changing.	<0.01	<0.01
Angered by another driver's behavior, you give chase with the intention of giving him/her a piece of your mind	0.38	0.78

It is very clear from Table 4.10 that most drivers in Bangladesh do not think that they are aggressive drivers. This result is not surprising since the items measure mainly hostile and

illegal behaviors and the milder version of aggressive driving. Moreover, behaviors like illegal racing are very difficult to do in the extremely congested environment in Dhaka City. Furthermore, the economic conditions in Bangladesh do not encourage this sort of behaviors.

As reported in table 4.11, a statistical significance in the difference in the mean responses the three different license groups. Compared to Truck drivers who have not taken any test, those who have taken all the tests reported Horn from other drivers make you impulse and provoke you to take risk which you don't do generally. Also compared to Bus and Truck drivers who have not taken any test, those who have taken all the tests reported lower frequencies Presence of slower moving vehicle ahead provokes you risky lane changing.

4.4.2 Ordinary Violations

Aggressive violations are proposed to be associated with an interpersonally aggressive component while "ordinary" violations do not have an aggressive aim, but are still deliberate violations (Lajunen et al., 2003). More specifically, the scale distinguishes two classes of violations that are Highway code violations which consist of behaviors such as speeding and running red lights compared to Interpersonal aggressive violations such as sounding one's horn or chasing another motorist when angered (Lawton et al., 1997). Tables 4.12 list the ordinary violation items in the Driver Behavior Questionnaire together with their means and standard deviations of the responses from the participants.

Table 4.12 Summary Statistics of Ordinary Violation items

Ordinary Violations	Took no tests		Took some tests		Took all tests	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers	25		14		11	
Sample size						
Do not maintain lane because others don't maintain.	1.46	1.56	1.45	1.54	1.72	1.60

On undivided roads, don't give space to the smaller vehicle	1.54	1.65	1.53	1.63	1.78	1.66
Park the vehicle on the road which is not legal and take passengers and goods	1.08	1.16	1.12	1.15	1.25	1.18
Cross a junction knowing that the traffic lights have already turned against you	1.02	0.96	1.06	0.97	1.11	0.95
Disregard the speed limits late at night or very early in the morning	1.27	1.50	1.36	1.52	1.42	1.63
Sub scale	1.27		1.30		1.46	
Bus Drivers						
Sample size	20		21		9	
Do not maintain lane because others don't maintain.	2.755	.883	2.7907	.8897	2.818	.842
On undivided roads, don't give space to the smaller vehicle	1.711	.7268	1.767	.7507	1.704	.733
Park the vehicle on the road which is not legal and take passengers and goods	2.733	1.03	2.86	.965	2.75	1.03

Cross a junction knowing that the traffic lights have already turned against you	2.355	.71209	1.66	.79582	1.22	.4409
Disregard the speed limits late at night or very early in the morning	3.266	.962	3.302	1.035	2.11	1.26
Sub scale	2.564		2.47		2.12	

Table 4.12 reports the overall mean scores for the three categories, revealing that participants reported a similar frequency for each of the driving categories; it is clear from table 4.13 that Truck drivers' behavior differs significantly among the three license groups for most of the items. Relative to Bus passenger drivers who have not taken any test, those who have taken all the tests are less likely to cross the junction knowing that the lights have turned against them, regard the speed limit late at night or early in the morning but are more likely to park in forbidden area, push in at the last minute, and speed motorway as well as in residential areas. With reference to truck passenger drivers who have not taken any test, those who have taken all the tests are less likely to not maintain lane because others don't maintain, and lower frequency in disregard the speed limit at night or early in the morning.

Table 4.13 P-Values of Hypothesis Tests of Ordinary Violation Items

Ordinary Violations	Truck	Bus
Do not maintain lane because others don't maintain.	<0.01	0.70
On undivided roads, don't give space to the smaller vehicle	0.64	0.37
Park the vehicle on the road which is not legal and take passengers and goods	0.44	0.58
Cross a junction knowing that the traffic lights have already turned against you	0.65	<0.01

	Took no tests		Took some tests		Took all tests	
Disregard the speed limits late at night or very early in the morning	0.10		<0.01			

4.4.3 Errors

In addition, Table 4.14 reports the mean and standard deviation scores for the three group category of Truck driver, which were: Took no tests (M =1.29,); Took some tests(M =1.33,); and Take some test (M = 1.45). Whereas for the Bus driver which were: Took no tests (M =2.95,); Took some tests *(M =2.83,)*; and Take some test (M = 2.78). The results indicate that error is the most common form of aberrant behavior for Bus driver.

Table 4.14 Summary Statistics of Error Items

	Took no tests		Took some tests		Took all tests	
Error Items	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers						
Sample size	25		14		11	
Attempt to overtake someone that you hadn't noticed to be signaling a right turn	1.38	1.18	1.43	1.15	1.61	1.18
Fail to notice that pedestrians are crossing when turning into a side street from a main road	1.69	1.61	1.73	1.59	1.94	1.60
On turning left nearly hit a vehicle who has come up on your inside	1.16	1.10	1.16	1.08	1.25	1.18
Fail to check your rear-view mirror before pulling out,	1.31	1.26	1.36	1.24	1.41	1.36

changing lanes, etc.						
Underestimate the speed of an oncoming vehicle when overtaking	0.92	0.87	0.98	0.97	1.02	0.91
Sub Scale	1.29		1.33		1.45	
Bus Drivers						
Sample size	20		21		9	
Attempt to overtake someone that you hadn't noticed to be signaling a right turn	2.955	.928	2.9534	.950	2.9455	.938
Fail to notice that pedestrians are crossing when turning into a side street from a main road	4.155	.9524	4.25581	1.025	4.159	.9631
On turning left nearly hit a vehicle who has come up on your inside	2.044	.638	1.53	.6015	1.22	.4409
Fail to check your rear-view mirror before pulling out, changing lanes, etc.	2.75	.9084	2.744	.978	2.75	.9182
Underestimate the speed of an oncoming vehicle when overtaking	2.88	.8587	2.744	.9535	2.86	.8515
Sub scale	2.95		2.838		2.78	

Table 4.15 shows the statistical tests for items that have been found to be significantly different among the licensing groups. Compared to Bus drivers who did not take any test, those who took all the tests reported a higher frequency of hit a vehicle who has come up on your inside. With reference to Truck drivers who have not taken any test, those who have taken all the tests reported a lower frequency of hadn't noticed to be signaling a right turn and hit a vehicle who has come up.

Table 4.15 P-Values of Hypothesis Tests of Error Items

Errors	Truck	Bus
Attempt to overtake someone that you hadn't noticed to be signaling a right turn	<0.01	0.57
Fail to notice that pedestrians are crossing when turning into a side street from a main road	0.75	0.50
On turning left nearly hit a vehicle who has come up on your inside	<0.01	<0.01
Fail to check your rear-view mirror before pulling out, changing lanes, etc.	0.63	0.47
Underestimate the speed of an oncoming vehicle when overtaking	<0.01	0.011

4.4.4 Lapses

Lapses in driver attention can be assumed to be a significant contributory factor in traffic accidents. They cite estimates from 15 to 90 percent as the proportion of traffic accidents related to inattention. This great range can, to a large extent, be attributed to differences in definitions of attention-related problems. Average responses (table 4.16) have shown that Truck drivers who took tests to get a license are less involved in lapses. But Bus drivers are more involved.

Table 4.16 Summary Statistics of Lapses Items

	Took no tests		Took some tests		Took all tests	
Lapses Items	Mean	S.D.	Mean	S.D.	Mean	S.D.
Truck Drivers						

	25		14		11	
Sample size						
Get into the wrong lane when approaching a roundabout or a junction	1.52	1.47	1.51	1.46	1.75	1.46
Hit something when reversing that you had not previously seen	1.25	1.34	1.31	1.36	1.38	1.25
Switch on one thing, such as the headlights, when you meant to switch on something else, such as the wipers	1.02	1.21	1.08	1.22	1.13	1.27
Intending to drive to destination A, you 'wake up' to find yourself on the road to destination B, perhaps because the latter is your more usual destination	0.81	1.06	0.81	1.05	1.00	1.12
Sub Scale	1.15		0.95		1.32	
Bus Drivers						
Sample size	20		21		9	
Get into the wrong lane when approaching a roundabout or a junction	2.266	.6875	2.348	.7522	2.25	.686
Hit something when	1.955	.9924	1.744	.978	1.909	1.007

reversing that you had not previously seen					
Switch on one thing, such as the headlights, when you meant to switch on something else, such as the wipers	2.911	.900	2.93	.9101	2.93	.8995
Intending to drive to destination A, you 'wake up' to find yourself on the road to destination B, perhaps because the latter is your more usual destination	1.75	.8569	1.37	.6542	1.34	.6800
Sub scale	2.21		2.09		2.10	

P-values of these items are listed in table 4.17.Compared to Bus drivers who have not taken any test, those who have taken all the tests reported a higher frequency of hitting something while reversing, switching on the wrong. But a lower frequency of intending to drive to destination A, you 'wake up' to find yourself on the road to destination B, perhaps because the latter is your more usual destination. Finally, with reference to Truck drivers who have not taken any test, those who have taken all the tests reported a lower frequency of getting into the wrong lane when entering or exiting a roundabout, switching on the wrong thing, but a higher frequency of hitting something while reversing.

Table 4.17 P-Values of Hypothesis Tests of Lapse Items

Lapses	Truck	Bus
Get into the wrong lane when approaching a roundabout or a junction	<0.01	0.93
Hit something when reversing that you had not previously seen	0.32	0.78

Switch on one thing, such as the headlights, when you meant to switch on something else, such as the wipers	0.12	0.68
Intending to drive to destination A, you 'wake up' to find yourself on the road to destination B, perhaps because the latter is your more usual destination	0.40	<0.01

4.5 Traffic Incidents

Table 4.18 provides a summary of the drivers' self report traffic incidents. Traffic crashes in first two years indicate involvement in crashes within two years from getting a full license while accident in last two years also indicates involvement in traffic crashes during the last two years from the date of the survey. It also contains data about Paid fines for crashes, Reported any accident to police, pay any bribe to police etc.

Table 4.18 Driver Involvements in Traffic Incidents by Group

	Took No Tests	Took Some Tests	Took All Tests
Truck Drivers			
Sample size	25	14	11
Accidents in First 2 years			
None	0 %	7 %	9 %
One	8 %	0 %	9 %
Two	36 %	65 %	18 %
Three or more	4 %	0 %	9 %
Can't remember	52 %	28 %	55 %
Accidents in Last 2 years			
None	0 %	7 %	27 %
One	28 %	28 %	36 %
Two	44 %	50 %	27 %
Three or more	28 %	15 %	10 %
Most Severe Accident			
Fatal	12 %	7 %	18 %

Injury	40 %	35 %	36 %
property Damage only	48 %	58 %	46 %
Paid fines for crashes			
Yes	84 %	93 %	27 %
No	16 %	7 %	73 %
Reported any accident to police			
Yes	44 %	58 %	27 %
No	56 %	42 %	73 %
pay a bribe to police			
Yes	72 %	85 %	45 %
No	28 %	15 %	55 %
Bus Drivers			
Sample size	20	21	9
Accidents in First 2 years			
None	15 **%**	38 **%**	44 **%**
One	35 **%**	29 **%**	23 **%**
Two	20 **%**	19 **%**	22 **%**
Three or more	15 **%**	4 **%**	0 **%**
Can't remember	15 **%**	10 **%**	11 **%**
Accidents in Last 2 years			
None	70 **%**	72 **%**	77 **%**
One	25 **%**	23 **%**	23 **%**
Two	5 **%**	5 **%**	0 **%**
Three or more	0 **%**	0 **%**	0 **%**
Most Severe Accident			
Fatal	10 **%**	5 **%**	0 **%**
Injury	30 **%**	24 **%**	23 **%**
property Damage only	60 **%**	71 **%**	77 **%**
Paid fines for crashes			

Yes	25 **%**	29 **%**	33 **%**
No	75 **%**	71 **%**	67 **%**
Reported any accident to police			
Yes	20 **%**	24 **%**	34 **%**
No	80 **%**	76 **%**	66 **%**
pay a bribe to police			
Yes	85 %	81 %	78 %
No	15 %	19 %	22 %

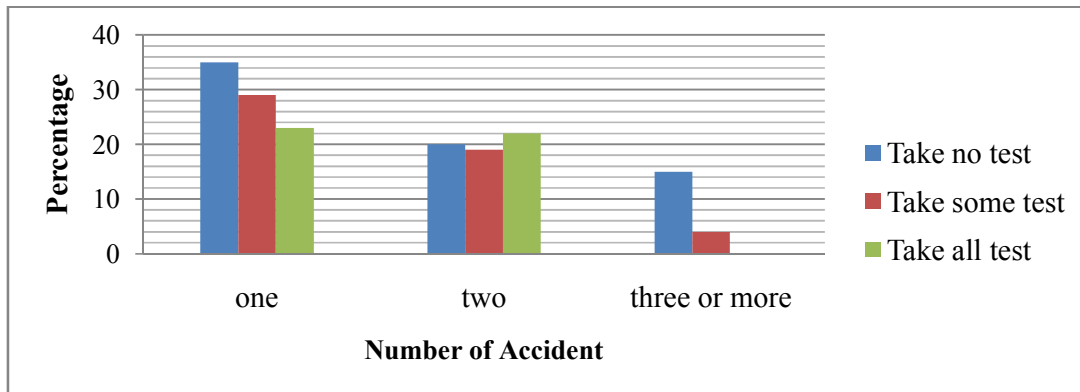*4.5.1 Accident Involvement in First 2 Years*

Figure 4.13 Accident Involvement in First 2 years of Licensing among Bus Drivers

It is found from the survey results that those who took no tests for receiving driving license are the major group involved in an accident. This is because of their lack of knowledge and availability of duplicate license in the market. Those who took the entire test are less vulnerable to accident.
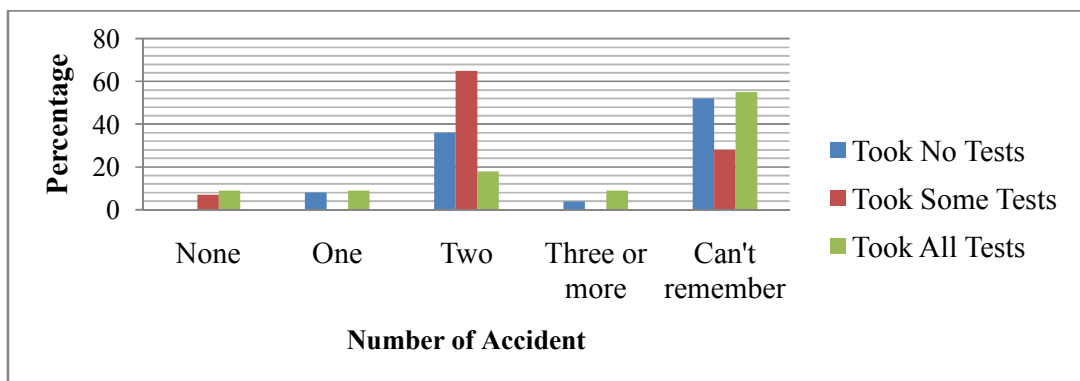

Figure 4.14 Accident Involvement in First 2 years of Licensing among Truck Drivers

As shown in Figure 4.14, For Trucks most of the drivers cannot properly remember how many times they involved in an accident in the first two years of licensing. But it is observed that those drivers who took some tests are the largest group involved two times in accident in their first two year of licensing.
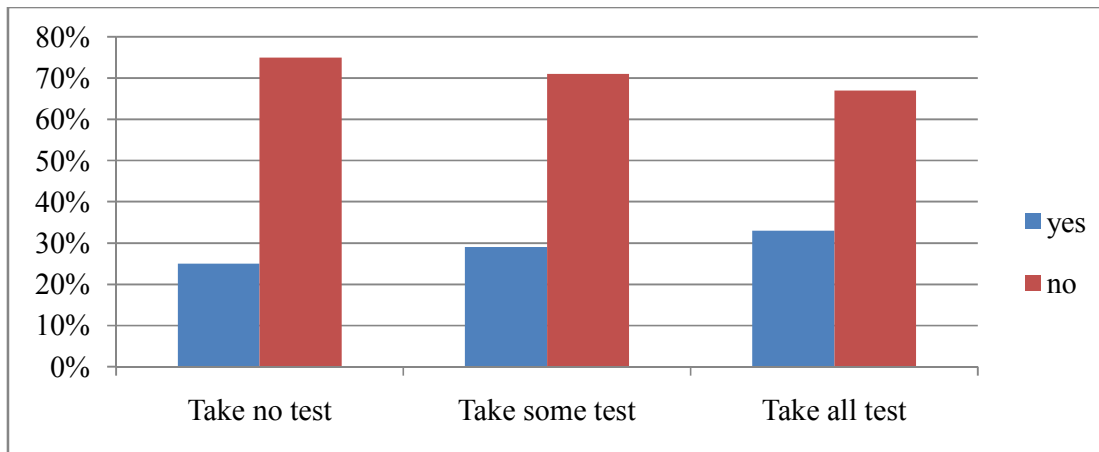
4.5.2 Paid Fines

Figure 4.15 Percentage of Bus Drivers who have Paid Fines for Crashes

As shown in Figure 4.15, it was found that, immediately after any accident almost all the drivers tend to leave the place of accident as early as possible in fear of Public wrath and police which unfortunately results in even more casualty. So all the licensing groups of bus driver most of them do not pay any fine for crashes.
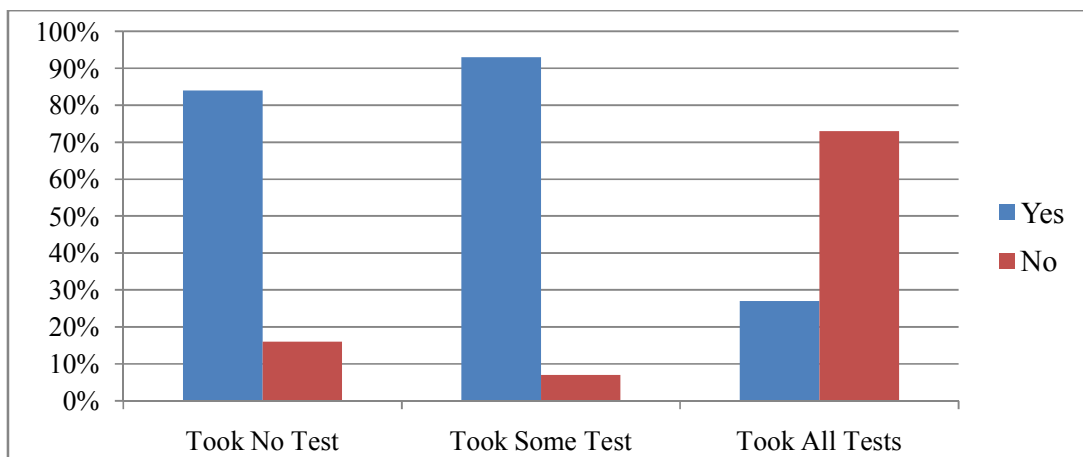

Figure 4.16 Percentage of Truck Drivers who have Paid Fines for Crashes

For trucks the results of figure 4.16 shows that more drivers who did not take any test have the experience of paying fines for crashes compared to drivers who have taken all the tests. Because most all the truck transport companies are private and they pay any fine for crashes.

4.5.3 Severity of Accidents
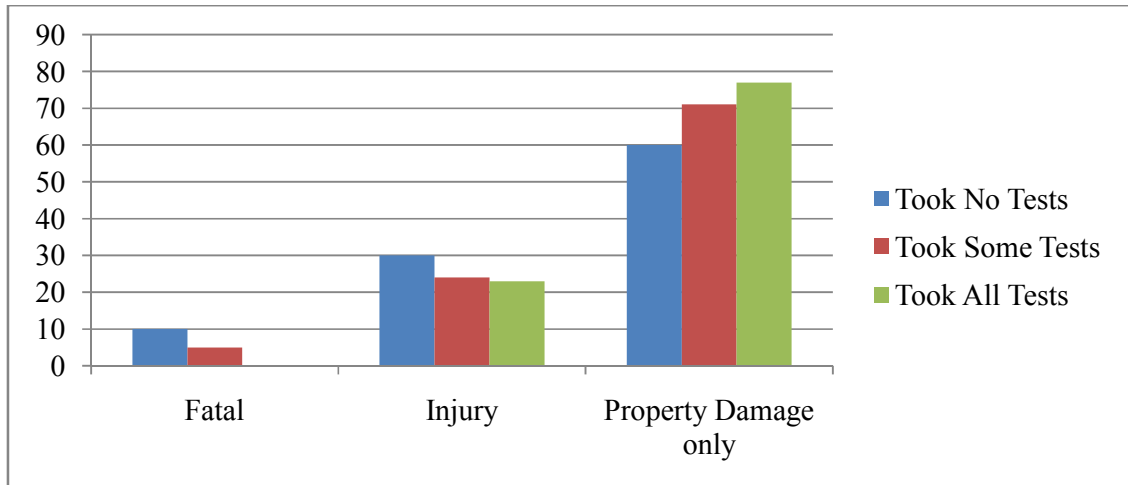
Figure 4.17 Accident Severity Levels for Bus Drivers

It is clear shown Figure 4.17 from the survey that the severity of the most severe crash like fatal crashes, that the respondent has been involved is generally higher for drivers who did not take any test compared to drivers who took all the tests. Drivers who took no test reported more crashes of all severity level whereas drivers who took all the tests were involved in the lowest share of fatal crashes they are more vulnerable to property damages and injuries.

Figure 4.18 Accident Severity Levels for Truck Drivers

As shown Figure 4.18 in the upper Figure almost all of the Truck drivers who have not taken any test to take all the tests have been involved in at least one fatal accident whereas the majority of the Truck drivers who have taken all the tests have only experienced non injury crash as the most severe crash and property damage only.

4.5.4 Reported any accident
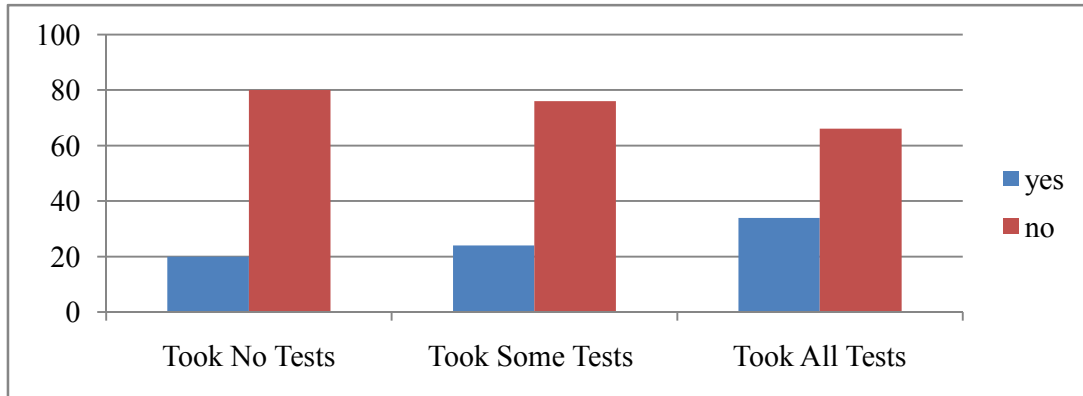
Figure 4.19 Percentages of Bus Drivers Who have Reported Any Accident to Police

In general, passenger Bus drivers who took all the tests to take no test do not report any accident to police which is shown figure 4.19. Some of the drivers report accident to police among them took all tests are the largest group.

Figure 4.20 Percentages of Truck Drivers Who have Reported any Accident to Police

From the figure 4.20, we observed that a larger percentage of all types of drivers who did take some test reported having accident before compared to drivers who have taken all the tests. This difference is statistically significant for drivers of Truck.

4.6 Summary and Discussion

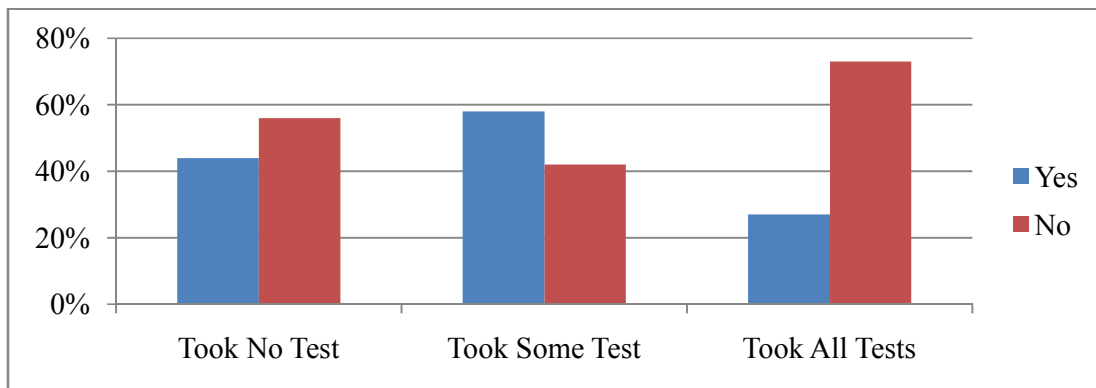A significant proportion of the drivers on the roads were found not to have obtained their driver licensing through the proper channels because they have not taken all the tests that are required to legally obtain a driver license. The purpose of the present research was to examine the relationship between license giving policies and driving behavior of the heavy vehicle drivers.

In this section, the demographic characteristics of the participants as presented in Table 4.1 provides information on the age, marital status, religion, income and level of education of the incumbent drivers who have been interviewed. The sample comprised of 50 Bus drivers and 50 Truck drivers. About 50% of Truck drivers they did not take any test which is more than the bus drivers. Of these, the highest proportion i.e. 37% Truck drivers belong to 45-54 years age group and there are only a few drivers whose ages exceed 55 years. In Bus drivers those who did not take any test they are about 65% which is more than the Truck drivers in a range of 45-54 years.

Our survey that we found most of the truck drivers are less educated than the Bus drivers. From the figure 4.5 and 4.6 it can clearly be seen that nearly 38% of Truck driver do not have any formal education and the level of illiteracy is more in case of Truck drivers than Bus drivers. Among drivers who did not take any of the tests, drivers with no education form the largest category. Responses of the bus drivers interviewed regarding the level of education shows that the majority i.e. 40% of the drivers had education level up to class eight of secondary school. Secondary school level significant amount of Bus drivers take some test. In Truck drivers only 7% attend at secondary school level which very less than Bus drivers. With the development of the skill the helper was allowed to drive in part of the route considered to be safe to drive by a learner and with further development of the skill they were given the scope for driving the whole route. This way Truck driver become graduated as driver from helper that's why they have less education.

Moreover further analysis of data shows that only 6% of Truck drivers get monthly payment and 94% drivers are paid trip or daily basis. Compare to Truck drivers, about 32% Bus drivers are get monthly payment where it depends on the vehicle owner. Other 68% Bus drivers are paid trip basis. Largest group of Truck drivers holding license for

10-20 years where the take no test range is higher than the Bus drivers. Currently Bus driver are more alert about the processing of driving license. That's why the rate of take no test less than the Truck driver. Similarly for license data, older drivers had less the share of licenses (10%) compared to younger drivers who accounted for 90% of the total licenses.

For assessing drivers' attitudes towards over speeding, the drivers were asked about the operational speed they usually maintain while driving in free roads and highways in Bangladesh. In case of speeding in free road approximately 70% drivers responded that they do it sometimes. But in relation to other driving habits such as "Not obeying speed limit"; "Wrong side driving"; "Competitive attitude"; and "Following slow leader" most of the drivers respond that they are never involved in such activities. It should however be borne in mind that driver's responses appears as somewhat conservative while describing their habitual activities in various driving situations.

In Bangladesh, there are four main types of driver tests required in the official licensing process: written, verbal, practical and medical and most of the people are not rely on the process to get the driving license. Our results revealed that drivers who took all the tests to get a full license are relatively better behaved and possess a more positive attitude towards safer driving. In case of behavioral items, heavy vehicle drivers reported a higher frequency of erroneous driving. Finally, drivers who have not taken any test were found to be involved in more traffic incidents than test takers. In terms of the effect of driver participation in the licensing tests on their attitudes, behavior and self-reported traffic incidents, the overall results suggest that those took all the tests are safer than those who did not take any test.

More importantly, a larger percentage of drivers who have not taken any test also reported being involved in a crash during the first two years of licensing as well as the recent two years compared to those who took all the tests. In addition, they also reported being involved in more severe crashes. Again, these differences are only statistically significant for some subgroups of drivers. Majority of drivers, particularly bus drivers opined that unhealthy competition attitude among vehicles of same destination induces both aggressive over speeding and over taking behavior. Besides, according to the drivers' opinion defective vehicles, faulty design of roads, lack of experience and training of drivers also contribute immensely to road traffic accidents in Bangladesh.

CHAPTER FIVE: CONCLUSION

5.1 Summary of Research

5.1.1 Background Rationale

Road traffic accidents are a large problem everywhere in the world. However, regional differences in traffic safety between countries are considerable. For example, traffic safety records are much worse in Bangladesh and the Middle Asia than in Northern and Western Europe. In Bangladesh fatality rates per 10,000 vehicles are about 86 persons (Ross, 1998), which is 33% higher than India and over three times greater than Thailand. This number might increase as Bangladesh does not have a well established system for reporting traffic accidents, actual deaths may be much higher than officially declared. There are many factors that contribute to road crashes. Among them driver related factors in general and the role of driver testing in particular is the most severe. In Bangladesh it is found very common that a wide variety of people drive without a valid license, including those who: have let their license expire have had their license suspended; drive a vehicle without an appropriate license; have never held a license. To know proper criteria further research into the attitudes, behavior and crash involvements of licensed drivers and unlicensed drivers are essential. In particular, there is a need to better understand the extent and nature of unlicensed driving and the factors contribute to the behavior and whether differences exist among different groups of offenders.

5.1.2 Objective and Scope of Research

The objectives are set to take initiatives and to achieve the goals by providing an overview of the range of the existing driver testing and assessment arrangements used throughout Bangladesh. Investigate whether there are any systematic differences between licensed driver sub group in terms of their psychosocial characteristics or on-road driving behavior. This study will help to understand the behavioral habits, attitudes and other physio-psychological and personal characteristics of heavy vehicle (buses and trucks) drivers in order to evaluate their driving habits, to ascertain their role in traffic accidents as well as to assess drivers understanding of traffic control devices and their level of driving skill in various driving situations that are thought to cause road accidents. Bangladesh as a whole, buses and trucks are major involved in road accidents. That's why

our study based on heavy vehicle driver. Considering all the facts of involvement of heavy vehicles (Buses and Trucks) driver and compare among the heavy vehicle drivers to explain the attitude, behaviors of license drivers; discusses the possible solutions to improve the continuously deteriorating situation

5.1.3 Methodology

 To achieve the objective of the study, a questionnaire survey is carried out to gather data because database system in Bangladesh does not provide many of the basic information on drivers' involvement in accidents that are available in most developed countries. Interviewers are conducted by the authors face to face and responses were gathered on paper format. Answers of each question are coded for easiness and recorded electronically for analysis. Drivers of two types of vehicles are target in this study: bus and truck. A sample of 50 for each type of vehicles is interviewed, giving a total sample of 100 drivers. Depending on their participation in the various driving tests, drivers are assigned to one of the three following groups: took all tests, took some tests and took no test. To determine the effectiveness of the licensing system, differences in drivers' attitudes, behaviors and traffic incidents among the three groups are statistically tested using the One-way Analysis of Variance (ANOVA).

5.1.4 Discussion of Main Results

Overall, Bus drivers have the highest level of education than truck drivers. It is observed that about 40 % of the interviewed driver's of truck have no education. Drivers' age is found to be a significant factor, Bus and Truck drivers, among this licensing groups bus driver are more experienced. The largest income group of Truck drivers earns in a range from 16000 to 20,000 BDT per month, a small proportion of the drivers were found to get salary on a regular monthly basis. Most of them receive their wages on trip basis and therefore their jobs were temporary. Bus drivers who took all tests form largest group of drivers holding license for 10-20 years and Truck drivers who took no tests form largest group of drivers holding license for 10-20 years. In Bangladesh generally most of the bus and truck drivers have relatively safe attitudes toward drinking and driving. Our results show that most drivers do not consider following-too-closely as a serious problem. Because in Bangladesh the roads are too narrow and small comparing the population it holds and there are always vehicle which exceeds the design limits of the road, so it is

very common that the vehicle follow each other very closely. Most of the drivers think that speeding more than speed limit can be the cause of more severe accidents. Among Bus and Truck Drivers, the Truck drivers are more cautious of speeding because they carry heavy loads and over speed can easily turn over a truck. Most drivers in Bangladesh do not think that they are aggressive drivers. This result is not surprising since the items measure mainly hostile and illegal behaviors and the milder version of aggressive driving. Lapses in driver attention can be assumed to be a significant contributory factor in traffic accidents. They cite estimates from 15 to 90 percent as the proportion of traffic accidents related to inattention. It is found from the survey results that those who took no tests for receiving driving license are the major group involved in an accident. For Trucks most of the drivers cannot properly remember how many times they involved in an accident in the first two years of licensing. But it is observed that those drivers who took some tests are the largest group involved two times in accident in their first two year of licensing. It is found from the survey that for all the licensing groups of Bus driver most of them do not pay any fine for crashes. Drivers who took no test reported more crashes of all severity level whereas drivers who took all the tests were involved in the lowest share of fatal crashes they are more vulnerable to property damages and injuries.

5.1.5 Recommendations

There is a large share of uneducated, unlicensed and inexperienced drivers driving on roads in Bangladesh with lots of unfit vehicles. Hence, some of the findings of this research need further verifications through more intensive field work by observing actual behavior and attitude while driving. Therefore, a key implication of this research is the need to reduce or at least, offset some of the perceived benefits of driving license for work purpose. There currently appears to be two key ways in which this could be achieved.

1. Reducing the perceived benefits associated with driving for works purpose by encouraging employers to more regularly check the licenses of their workers and taken action against those who are driving illegally.
2. Providing opportunities for offenders to drive legally for work purpose only, through the use of restricted license

This has the potential to increase the road level of unlicensed driving and reduce the integrity of license loss as a road safety measure. Hence, research is required to examine

to impact of these practice on driver perception and the level of licensed driving. Consequently, strong argument for the national adoption of compulsory carriage of license and for the police to conduct more widespread, random checking driving license. Without this initiatives, it will remain difficult meaningfully improve the detection of unlicensed driving and hence to heighten drivers perceived risk of apprehension.

It has been found to be beneficial to register driving training institute separately from driving instructors, but it is not essential. It will encourage driving training institute to meet criteria, such as having registered instructors, adequate numbers of training vehicles, and lecture rooms for theory training. Driving training institute can also be involved in the training and rehabilitation of offenders, especially if the government organizations such as the police do not have the necessary resources. In order to induce cooperative mentality among the driver population, forming large Bus and Truck Company and involving drivers in profit sharing with the company could be a solution of reducing aggressive driving behavior and attitude. In this way a scheduled service will also be ensured and therefore drivers will not be compelled to drive faster. Extensive further research on human factors is necessary to identify the gaps and deficiencies in the perceived traffic safety knowledge of drivers

5.2 Strength and Limitations of the Research

This program of research featured a number of strengths that enhanced the quality of the information obtained. The locations are also chosen for their availability of target subgroups. The approach taken is cost-effective in a sense it keeps the number of locations limited which greatly facilitate personal interviews. The sample is representative of urban drivers and rural drivers. That's the main difference between the existing study on driving license and the present study. The questioner survey design used in these studies made it possible to examine the behavior and attitude of more general sample of different license group. From the analysis of data provide important information, it remains clear that whether driver only involved for the crushes or not.

It is quite clear that heavy vehicle drivers' are involved in most severe accidents and a huge life loss is encountered with this studies will help us to take the initiatives required

to make them understand the scenario. Due to design of the study, it is possible to directly compare people who had driven unlicensed with those who had not.

In addition, each of the study featured specific limitations that need to be acknowledged. From the data base, only one methods of analysis is used to evaluate data analysis. More analysis helps to accurately quantify the crash risk with the behavior and attitude of the driver. Sample of different vehicle of driver was not taking for this study.

5.3. Suggestions for future Research

This research is required to better explain aspects of different license group of driving behavior and attitude, to establish the impact of various policies or countermeasures on the behavior and attitude and to inform the design of new countermeasures. The study need to better method of estimating the exposure of different licensing group of drivers.

5.4. Concluding remarks

Overall, the research evidence suggests that driver training of a conventional nature contributes little to reductions in accident involvement or risk among drivers of all ages and experience groups. Improving driver knowledge and skill does not always lead to a change in on-road behavior or reduced crash risk among trainees. While skill and knowledge are important, they have little influence on the driving environment or conditions under which driving behavior occurs post training. Conventional driver training is also unlikely to undo firmly established past learning nor durably alter motivation or modify underlying personal values. It is of concern that the provision of conventional driver training beyond that required to gain an initial driver license often leads to increased accident risk among novice drivers. Research suggests that this is due to encouragement of earlier licensing, increased exposure- to- risk and/or unduly increasing the confidence of novices about their driving abilities. As severe road traffic accidents lead to economic loss and more importantly loss of lives, it is a serious issue in Bangladesh. Considering the over involvement of heavy vehicles in road traffic accidents and the overall scenario of multiple vehicle accidents efforts should be taken to ensure road safety to protect the lives of road users and to reduce accidents.

REFERENCES

Alcohol and Driving Book, Department of Transport, the Govt. of Western Australia.

Berenson, Mark L., Levine, David M., 1992. Basic business statistics concepts and applications, 5 editions, Prentice-Hall, Inc.

Cochran, W.G. 1977. Sampling Techniques. John Wiley and Sons, New York.

Chowdhury M., T., I., The Status paper on road safety problems in Bangladesh: the Bangladesh country paper.

David W. E., May 1995, an Analysis of Crash Likelihood: Age versus Driving Experience. The University of Michigan Transportation Research Institute 2901 Baxter Road Ann Arbor, MI 48109.

Dixon, C, Leach, B., 1978. Sampling methods for geographical research. CATMOG 17, (Geo Abstracts, Norwich), p 7-11.

Driver's license : Available at: http://en.wikipedia.org/wiki/Driver%27s_license

Driver behavior, science serving society, Available at: http://www.scienceservingsociety.com/ts/text/ch09.htm

Dula, C. S., & Geller, E. S. (2003). Risky, aggressive, or emotional driving: Addressing the need for consistent communication in research. Journal of Safety Research, 34, 599–666.

Elliot b (1992) achieving high levels of compliance with road safety laws: a review users behavior modification .Brisbane: legislative assembly of Queensland parliament travel safe committee

Foddy, W. (1993): Constructing Questions for Interviews and Questionnaires: Theory and Practice in Social Research. Cambridge: Cambridge University Press.

Fowler, Floyd J. Jr., 1993. Survey research methods. Applied social research methods series, 2nd edition, volume 1, SAGE publication, California, p 82-83, 132-136.

Following Too Close, the municipality of anchorage, Alaska. Available at: http://www.muni.org/Departments/police/traffic/Pages/FollowingTooClosely.aspx

Frederick L. Philippe and Robert J. Vallerand , Passion for Driving and Aggressive Driving Behavior: A Look at Their Relationship.

Giuliano, G., & Wachs, M. (1992). Transportation Demand Management as Part of Growth Management. In J. M. Stein (Ed.), Growth Management: The Planning Challenge Of The 1990s. London: Sage Publications.

Global status report on road safety 2009, World Health OrganizationDepartment of Violence & injury Prevention & Disability (VIP) 20 Avenue Appia, Geneva 27, and Switzerland.

Government of the people's republic of Bangladesh ministry of law and land reforms Law and Parliamentary Affairs Division: the motor vehicles ordinance, 1983 (Ordinance No. LV Of 1983) (Modified Up To The 29th November, 1990)

Government of the people' republic of Bangladesh ministry of communication Bangladesh road transport authority: national road safety strategic action plan (20011 – 2013).

Hauber, Albert R., (1980) The social psychology of driving behaviour and the traffic environment: research on aggressive behavior in traffic, International Review of Applied Psychology, Vol. 29, pp. 461-474

Harano R.M. and Hubert D.E (1974). An evolution of California's 'good driver' incentive. Sacramento: California department of motor vehicles.

Hoque M.M. (1991). Accident investigation for the safety improvement of Dhaka-Aricha highway: A section of Asian highway. Final Report, Department of Civil Engineering, Bangladesh University of Engineering & Technology, Dhaka, Bangladesh.

Hossain Q.,Z., Adhikary S.,Z., Ibrahim W.,H.,W., Rezaur R.B. (2005). Road Traffic Accident Situation in Khulna City, Bangladesh. Proceedings of the Eastern Asia Society for Transportation Studies, Vol. 5, pp. 65 – 74.

Hoque Md. Mazharul (2004), the Road and Road Safety: Issues and Initiatives in Bangladesh. Regional Health Forum. Volume 8, No. 1: 39-51

Hoque, M., M.,2008 'Road Safety In Bangladesh And Some Recent Advances' Accident Research Institute (ARI) report , (BUET)

Job R.F.S., lee V.S.H and prabhakar T. (1994). Unauthorized driving in New South Wales. DLR. Sydney: road and traffic authority of New South Wales.

Lajunen, T., Parker, D., & Summala, H. (2003). The Manchester Driver Behaviors Questionnaire: a cross-cultural study. *Accident Analysis and Prevention, 942,* 1-8.

Lawton, R., Parker, D., Stradling, S., & Manstead, A. (1997). The role of affect in predicting social behaviours: the vase of road traffic violations. *Journal of Applied Social Psychology, 27,* 1258 – 1276.

Lazarsfeld, P.F. (1944): The controversy over detailed interviews - an offer for negotiation. Public Opinion Quarterly, 8, 38-60.

Leema F., 2008, Efficacy of Driver Licensing in Bangladesh, department of civil engineering Calgary, Alberta.

Miyajima C., Nishiwaki Y., Ozawa K., Wakita T., Itou K.,Takeda K., and Itakura F., (June 17, 2006) Analysis of car-pedal use and car-following habits may allow the help offered by intelligent driver assistance systems to be customized for individual drivers.

Mannan, M.S. and Karim, M. (1999). Road accidents in metropolitan Dhaka, Bangladesh. IATSS Research, Vol. 23, No. 2, pp. 90-98.

Margie P., Richard S., David S., Dinesh M., Adnan A H., Eva J., ColinM., 2004.World Report on Road Traffic Injury Prevention. Geneva: World Health Organization.

Mahmud K., Gope K., & Chowdhury S., M., R., May 24, 2012, Possible Causes & Solutions of Traffic Jam and their Impact on the Economy of Dhaka City.

Özkan T., 27th of October 2006, The regional differences between countries in traffic safety: A cross-cultural study and Turkish Case, Faculty of Behavioural Sciences at the University of Helsinki, in Auditorium XV (4072), Fabianinkatu 33, Helsinki, University of Helsinki Helsingin Yliopiston.

Peter G. Palamara and Mark R. Stevenson, November 2003, A longitudinal investigation of psychosocial risk factors for speeding offences among young motor car drivers RR128.

Reja U., Manfreda K., L., Hlebec, V., and   Vehovar V.,(2003): Open-ended vs. Close-ended Questions in Web Questionnaires, FDV, 2003.

Road Safety Cell (RSC) of the Bangladesh Road Transport Authority (BRTA).

Ross, A. (1998). Road safety in developing countries, Highways and Transportation, April, pp.26-28.

Scopatz R.A., hatch C.E., delucia B.H and tays K.A. (2003). Unlicensed to kill: the sequel .Washington, DC: AAA foundation for traffic safety.

Statistics Canada. Survey methods and practices, Social Survey Methods Division, Statistics Canada, 2003, ISBN 0-660-19050-8, CS 12-587-XPE.

Smith D.I. (1976). Survey of riding by unlicensed motorcyclist. Report no.3. Perth: research and statistics division, road traffic authority.

TP Hutchinson, Tailgating, Centre for Automotive Safety Research http://casr.adelaide.edu.au/publications/researchreports

U.S. Department Of Transport. Available at:
http://www.fmcsa.dot.gov/about/outreach/education/driverTips/Following-Too-Closely.htm

Watson B. (1997), the crash involvement of unlicensed drivers in Queensland. Proceedings of the 1997 road safety research and enforcement conference (session2.3, paper 3). Hobart department of transport.

Watson B. (1998a), factors contributing of unlicensed driving. Proceedings of the 1998 local government road safety conference (paper 13). Sydney: local government association of New South Wales.

Watson B., Fresta J., Whan H., Mcdonald J., Dray R., Bauermann C., and churchward r. (1996). Enhancing driver management in Queensland .Brisbane: land transport and safety division, Queensland transport.

Wild G.J.S. (1985). The Use of Incentives for the promotion of accident free driving journal of studies on alcohol, supplement, 10, 161-167.

APPENDIX

Appendix A: Questionnaire and Data Coding

QUESTIONNAIRE

Section 1: Socio-Economic Information

1. Gender:

   M

   F

2. Age:

   Below 25

   25-34

   35-44

   45-54

   55 +

3. Marital Status:

   Married

   Single

   Others (divorced/widowed/etc)

4. Children:

   None

   1-2

   3 or more

5. Religion:

   Islam

   Hinduism

   Buddhism

   Christianity

6. Education Level:

   None

   Primary

   Secondary

   Post-secondary

7. Vehicle Ownership:

   None

   One

   More than one

8. Income (approx) ………………………………….tk

9. How are you paid by employer?

   Monthly

   daily

   trip basis

   Contract (please mention duration)…………

   Not applicable

10. What type of vehicle are you driving now??

   Bus

   Truck

11. How frequently do you drive in a week?

   Everyday

   Most days

   1 -2 days

   Rarely

Section 2: Please indicate whether you disagree or agree with the following statements. For each item please put a tick in the appropriate column.

1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

<u>Driving Attitudes</u>

		0	1	2	3	4	5
Drinking And Driving	After drinking there is a possibility of accident.						
	After drinking do you feel any drowsiness?						
	Do you think drinking hampers concentration and prompt driving behavior?						
Following-too-closely	People stopped by the police for close following are unlucky because lots of people do it						
	Following- too- closely is one of the main causes of accident.						
	In a rush condition following-too-closely situation may be permitted.						
	Some people can drive perfectly safely even when they only leave a small gap behind the vehicle in front						
	Close following isn't really a serious problem at the moment.						
Speeding Items	Speed breaker is helpful for reducing speed.						
	More fine should be imposed to discourage speeding on highway						
	Stricter enforcement of speed limits on 60 kmph roads would be effective in reducing the occurrence of road accidents						
	Speeding is one of the main causes of road accidents						
	Speeding at day time is safer comparing with night time for crash occurrence perspective						
Overtaking Items	Presence of proper road marking would be helpful for safe overtaking.						
	Do you think overtaking is a serious problem for crush occurrence						
	Overtaking at curve is safer if you are capable.						
	I think it is OK to overtake in risky circumstances as long as you drive within your own capabilities						

Section 3: Licensing & Driving Experience

1. How long have you been driving?   _____ Years
2. How did you learn to drive?
   took class
   someone else taught me who isn't fully licensed
   someone else taught me who is fully licensed
3. Do you have a driving license?
   Yes
   No
4. What class of license do you have?   _____ Class
5. How many years ago did you get your license?   _____ Years
6. How did you get this license?
   took exams and passed
   I found a bypass way (through association, agent etc)
7. Did you take any test to get your license?
   Yes
   No
8. Did you take a written test to get your license?
   Yes
   No
9. What were you asked to do during the written examination? (Please describe)
   _____

10. Did you take an oral test to get your license?
    Yes
    No
11. What were you asked to do during the oral examination? (Please describe)
    _____
    _
12. Did you take a road test to get your license?
    Yes
    No
13. What were you asked to do during the road test? (Please describe)
    _____
    _
14. Did you take a medical examination to get your license?
    Yes
    No
15. What were you asked to do during the medical examination? (Please describe)
    _____
16. Have the police ever checked your license before?
    Yes
    No
17. Why did the police check your license?
    Had an accident
    Given a fine

Routine check

Others

18. How many times was your license suspended?

None

1

2

3 or more

19. Why was it suspended last time? (Please describe)

_____

20. Have you ever driven without a valid license?

Yes

No

21. According to you, what is the percentage of drivers driving without original license?

< 50%

50% to 70%

70% to 90%

> 90%

22. How many accidents did you have in first 2 years of licensing?

None

1

2

3 or more

Can't Remember

23. How many accidents did you have within last 2 years?

None

1

2

3 or more

24. What is the highest level of severity in these accidents?

Fatal

Injury

Property

Damage Only

25. Had you ever reported any accident to police?

Yes

No

26. Had you paid any monetary fines to police for those crashes?

Yes

No

Section 4: For each item below you are asked to indicate how often, if at all, this kind of thing has happened to you. Base your judgments on what you remember of your driving over the last year. Please indicate your judgments by checking one of the columns in the grid next to each item. These columns are headed by numbers between 0 and 5. These mean the following:

0 = Never; 1 = Hardly Ever; 2 = Occasionally; 3 = Quite Often; 4 = Frequently; 5 =nearly all time

DRIVER BEHAVIOURS

		Never				Nearly all the time	
		0	1	2	3	4	5
Aggressive Violations	Horn from other drivers make you impulse and provoke you to take risk which you don't do generally.						
	Presence of slower moving vehicle ahead provokes you risky lane changing.						
	Angered by another driver's behavior, you give chase with the intention of giving him/her a piece of your mind						
Ordinary Violations	Do not maintain lane because others don't maintain.						
	On undivided roads, don't give space to the smaller vehicle						
	Park the vehicle on the road which is not legal and take passengers and goods						
	Cross a junction knowing that the traffic lights have already turned against you						
	Disregard the speed limits late at night or very early in the morning						
Errors	Attempt to overtake someone that you hadn't noticed to be signaling a right turn						
	Fail to notice that pedestrians are crossing when turning into a side street from a main road						
	On turning left nearly hit a vehicle who has come up on your inside						
	Fail to check your rear-view mirror before pulling out, changing lanes, etc.						
	Underestimate the speed of an oncoming vehicle when overtaking						
Lapses	Get into the wrong lane when approaching a roundabout or a junction						
	Hit something when reversing that you had not previously seen						
	Switch on one thing, such as the headlights, when you meant to switch on something else, such as the wipers						
	Intending to drive to destination A, you 'wake up' to find yourself on the road to destination B, perhaps because the latter is your more usual destination						