

STUDY ON MOTORIST'S UNDERSTANDING OF TRAFFIC SIGNS IN DHAKA CITY

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A thesis submitted to the Department of Civil Engineering in partial fulfillment for the degree of Bachelor of Science in Civil Engineering



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Section: (15D)

Semester :(Spring-2022)

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Dedicated

to

“Our Beloved Parent’s”

ACKNOWLEDGEMENTS

Thanks to Almighty for his Graciousness Unlimited Kindness and with the blessings of whom the good deeds are fulfilled. We would like to express our deepest sincere gratitude to our thesis supervisor **Md. Abu Saleh Sagor**, Lecturer, Department of Civil Engineering, Sonargaon University, for giving us a unique opportunity to work on such an important topic. His continuous guidance, invaluable suggestions, affectionate encouragement, generous help, and invaluable acumen are greatly acknowledged. His keen interest in the topic and enthusiastic support to us and effort was a source of inspiration to carry out the study. Without his regular mentoring, direction, and inspection this research work would have been impossible. We consider it fortunate to work under his supervision.

We also thank him from the deepest of our hearts for his sincere cooperation, precious advice, and motivation. And we have got the previous as well as the present data from survey and supervisor which helped us to make thesis paper successfully at last.

We would like to express their deepest gratitude to Dhaka City Motorist's for their various suggestions and generous support of necessary data.

And we are really grateful to every member of our team for their friendly and sacrificing attitudes.

ABSTRACT

Knowledge and awareness of drivers in Dhaka city about traffic Signs especially road signs carry a dynamic role for a convenient city which became an important topic to be studied. Driver understanding of some selected regulatory, warning, and informatory signs was assessed through a driver survey. The survey was conducted among 160 Dhaka city drivers. Forty-two (42) Traffic signs were evaluated. Of these 42 traffic signs, there were twenty regulatory signs, seventeen warning signs, and five informatory signs. The results indicated a medium level of comprehension of the meaning of traffic signs among the drivers. The overall understanding level, measured in terms of the percentage of correct responses, was about 73%. Only 17 traffic signs- 11 regulatory, 3 warning and 3 informatory - were understood by more than 80 percent of the respondents. The percentage of drivers who correctly identified the regulatory signs, warning signs, and informatory signs were 78%, 66.44%, and 76%, respectively. According to our analysis, only 12% of the 100 drivers in Dhaka city of have proper driving education. Through our collected field data and research analysis, we have reached the stage where the highest number of drivers aged 35-44 is 35%. According to our survey, Institutional education is very low among the drivers of Dhaka city who have 31% certificates up to class 1-5 and 25% certificates up to class 6-8. According to our survey, Motorist's in Dhaka city drive continuously throughout the week which is 40% of the total survey. This is one of the reasons for the tragedy. The study results indicated that efforts are needed to educate the drivers on the proper meaning and response to traffic signs.

LIST OF ABBREVIATION

SU	: Sonargaon University
CE	: Civil Engineering
TCD	: Traffic control devices
ANSI	: American National Standard Institute
ISO	: International Organization for Standardization
BUET	: Bangladesh university of Engineering Technology
IEB	: Institution of Engineers, Bangladesh
MUTCD	: Manual on Uniform Traffic Control Devices
FHA	: Federal Housing Administration
AAA	: American Automobile Association
USA	: United States of America
SUV	: Sport Utility Vehicles
TS	: Traffic signs
SSC	: Secondary School Certificate
HSC	: Higher Secondary School Certificate
BSc	: Bachelor of Science

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CHAPTER 1

INTRODUCTION

1.1 GENERAL

Traffic Control Devices (TCD) -traffic signs, signals and marking are a vital part of the highway system. This is at present use in road marking and used as a means of controlling and guiding traffic. Consequently, this study clear and effective traffic signs, signals and marking are essential for the efficient operation of the road network, for the enforcement of traffic regulations and for road safety.

The growth of traffic congestion in the road network of large cities in developing countries like Bangladesh is a serious concern in case of urban areas. The traffic congestion at the road intersections is most crucial because the performance of intersections affects the overall productivity of the whole road network most significantly. To reduce conflicts and ensure orderly movement of traffic at the intersections, it is a common practice to introduce different types of traffic control devices among which traffic signal is one of the most popular and effective controlling tool.

The literature review revealed that Very few study to access the drivers understanding of traffic control device in Bangladesh has been reported to date. There is a general public perception that the city drivers do not have a satisfactory level of understanding of traffic signs, and often this is thought to be a major cause of road accidents. Consequently, this study was undertaken to assess the drivers, pedestrians and road users understanding of certain traffic signs, signal marking in Dhaka, the Capital City of Bangladesh. (Al-Madani and Al-Janahi, 2000a); Wolff and woolgather, 1998).

1.2 BACKGROUND OF THE STUDY

A thorough study of traffic signs among drivers will give drivers an idea of their mental outlook and knowledge of traffic signs.

In fact, the American National Standard Institute (ANSI Z535.3) and the Organization for International Standardization (ISO 3864) advise that symbols must meet a criterion of at least 85% or 67% correct, respectively, in a comprehension test to be considered acceptable. Traffic signs have been a topic of considerable interest to researchers during the past few decades. They covered a wide range of aspects related to engineering, traffic safety, education, and human physical capabilities. Studies on driver's conception of traffic signs from the psychological and demographical points of view are still scarce. While a lot of research effort

was undertaken in the western world, especially in the United States, the literature review revealed that Very few studies to assess the driver's understanding of traffic control devices in Bangladesh has been reported to date. (Abdur Razzak and Tanweer Hasan, BUET In 2009).

There were Forty-two (42) traffic signs were evaluated. Of these 42 traffic signs, there were twenty regulatory signs, seventeen warning signs, and five informatory signs. The results indicated that the drivers had a very poor level of comprehension of the meaning of the traffic signs. The overall understanding level, measured in terms of the percentage of correct responses, was only about 50%. Only four traffic signs- two regulatory and two warnings- were understood by more than 80 percent of the respondents. The percentage of drivers who correctly identified the regulatory signs, warning signs and informatory signs were 49%, 52% and 55%, respectively and only 11% of drivers in Dhaka city have proper driving education. a study was conducted on 2002 drivers in Dhaka city which was published in Journal of Civil Engineering (IEB), 38 (1) (2010) 17-29. (FHA - Federal Highway Administration 2000).

1.3 OBJECTIVE OF THE STUDY

This study is aimed at understanding the different types of Vehicle Motorist's Personal characteristics & knowledge about traffic signs.

Therefore, in summing up the major objectives of this thesis:

- ✓ To operate a survey for getting different type of vehicle Motorist experiences in Dhaka city.
- ✓ To determine Motorist Personal characteristics.
- ✓ To determine the knowledge of drivers in Dhaka city about traffic signs.

1.4 OUTLINE OF THE METHODOLOGY

Forty-two (42) traffic signs of the driver were evaluated in a survey conducted among 160160 Dhaka city drivers. Of these 42 traffic signs, there were 20 control signs, seventeen warning signs, and five informative signs. Evaluation of vehicle Motorists from different areas has been included for data analysis by field survey research. The survey was originally conducted in the Dhaka metropolitan area; Emphasis has been placed on the city.

1.5 ORGANIZATION OF THE THESIS

The research consists of five chapters. The first chapter contains the introduction of the thesis, background of the study, objective of the study, outline of the methodology, and organization of the thesis. Chapter two incorporates a literature review related to the traffic signal system and also describes the existing classification of traffic signs. Chapter three describes the methodology and study area, and the procedures applied for the execution of the study. Chapter four deals with the identification of physical and operational deficiency of traffic signal and photo graphics evidence, data collection, and analysis in Dhaka city. Chapter five includes the conclusion of the entire study. Recommendations to overcome the deficiencies and improving the signal system are also discussed and the future scope is presented in this chapter.

1.5.1 STRUCTURE OF THE THESIS

INTRODUCTION



LITERATURE REVIEW



STUDY AREA AND METHODOLOGY



DATA COLLECTION AND ANALYSIS



CONCLUSIONS AND RECOMMENDATION

CHAPTER 2

LITERATURE REVIEW

2.1 GENERAL

A detailed literature review is discussed in this chapter to get a basic understanding of the overall traffic signs. This chapter also contains a description of former research works on the Motorist's understanding of traffic signs in Dhaka city.

A brief review of historical and present development traffic signs in Dhaka and policies in Bangladesh are also provided.

2.2 TRAFFIC SIGNS

Traffic signs or road signs are signs erected at the side of or above roads to give instructions or provide information to road users.

2.2.1 DEFINITION

A sign conveying information, an instruction, or a warning to drivers. Traffic signs are essential to highway safety. South Carolina's traffic signs, signal and marking conform to the nationally recommended standard, in many cases the signs use easily recognized symbols or picture rather than words.

With traffic volumes increasing since the 1930s, many countries have adopted pictorial signs or otherwise simplified and standardized their signs to overcome language barriers, and enhance traffic safety. Such pictorial signs use symbols in place of words and are usually based on international protocols. Such signs were first developed in Europe, and have been adopted by most countries to varying degrees for example the fingerposts in the United Kingdom.

2.2.2 CLASSIFICATION OF TRAFFIC SIGNS

There are several hundreds of traffic signs available covering wide variety of traffic situations. They can be classified into three main categories.

- ❖ **Regulatory signs:** These signs require the driver to obey the signs for the safety of other road users.
- ❖ **Warning signs:** These signs are for the safety of oneself who is driving and advice the drivers to obey these signs.
- ❖ **Informative signs:** These signs provide information to the driver about the facilities available ahead, and the route and distance to reach the specific destinations

In addition, special type of traffic sign namely work zone signs are also available. These types of signs are used to give warning to the road users when some construction work is going on the road. They are placed only for short duration and will be removed soon after the work is over and when the road is brought back to its normal condition. The first three signs will be discussed in detail below.

2.2.2.1 REGULATORY SIGNS

These signs are also called mandatory signs because it is mandatory that the drivers must obey these signs. If the driver fails to obey them, the control agency has the right to take legal action against the driver. These signs are primarily meant for the safety of other road users. These signs have generally black legend on a white background. They are circular in shape with red borders. The regulatory signs can be further classified into:

- i. **Right of way series:** These include two unique signs that assign the right of way to the selected approaches of an intersection. They are the STOP sign and GIVE WAY sign for example, when one minor road and major road meets at an inter section, preference should be given to the vehicles passing through the major road. Hence the give way sign board will be placed on the minor road to inform the driver on the minor road that he should give way for the vehicles on the major road. In case two major roads are meeting, then the traffic engineer decides based on the traffic on which approach the sign board has to be placed. Stop sign is another example of regulatory signs that comes in right of way series which requires the driver to stop the vehicle at the stop line.
- ii. **Speed series:** Number of speed signs may be used to limit the speed of the vehicle on

the road. They include typical speed limit signs, truck speed, minimum speed signs etc. Speed limit signs are placed to limit the speed of the vehicle to a particular speed for many reasons. Separate truck speed limits are applied on high speed roadways where heavy commercial vehicles must be limited to slower speeds than passenger cars for safety reasons. Minimum speed limits are applied on high speed roads like expressways, freeways etc. where safety is again a predominant reason. Very slow vehicles may present hazard to themselves and other vehicles also.

- iii. Movement series:** They contain a number of signs that affect specific vehicle maneuvers. These include turn signs, alignment signs, exclusion signs, one way signs etc. Turn signs include turn prohibitions and lane use control signs. Lane use signs make use of arrows to specify the movements which all vehicles in the lane must take. Turn signs are used to safely accommodate turns in un-signalized intersections.
- iv. Parking series:** They include parking signs which indicate not only parking prohibitions or restrictions, but also indicate places where parking is permitted, the type of vehicle to be parked, duration for parking etc.
- v. Pedestrian series:** They include both legend and symbol signs. These signs are meant for the safety of pedestrians and include signs indicating pedestrian only roads, pedestrian crossing sites etc.
- vi. Miscellaneous:** Wide variety of signs that are included in this category are: a "KEEP OF MEDIAN" sign, signs indicating road closures, signs restricting vehicles carrying hazardous cargo or substances, signs indicating vehicle weight limitations etc.

Some examples of the regulatory signs are shown in fig: 2.1. They include a stop sign, give way sign, signs for no entry, sign indicating prohibition for right turn, vehicle width limit sign, speed limit sign etc.

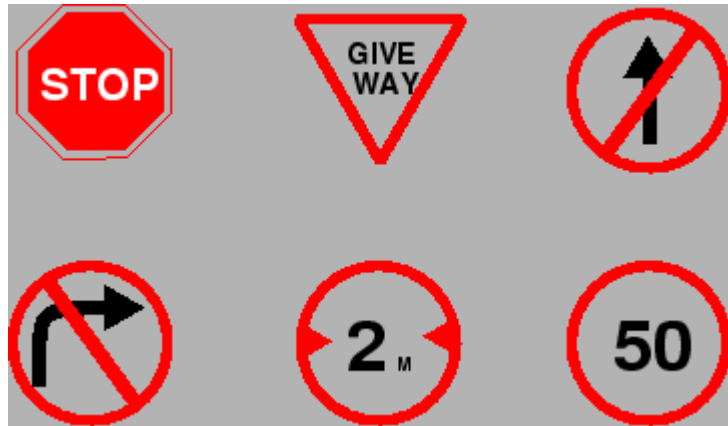


Figure 2. 1: Examples of regulatory signs (stop sign, give way sign, signs for no entry, sign indicating prohibition for right turn, vehicle width limit sign, and speed limit sign)

2.2.2.2 WARNING SIGNS

Warning signs or cautionary signs give information to the driver about the impending road condition. They advise the driver to obey the rules. These signs are meant for the own safety of drivers. They call for extra vigilance from the part of drivers. The color convention used for this type of signs is that the legend will be black in color with a white background. The shape used is upward triangular or diamond shape with red borders. Some of the examples for this type of signs are given in fig 2.2 and includes right hand curve sign board, signs for narrow road, sign indicating railway track ahead etc.

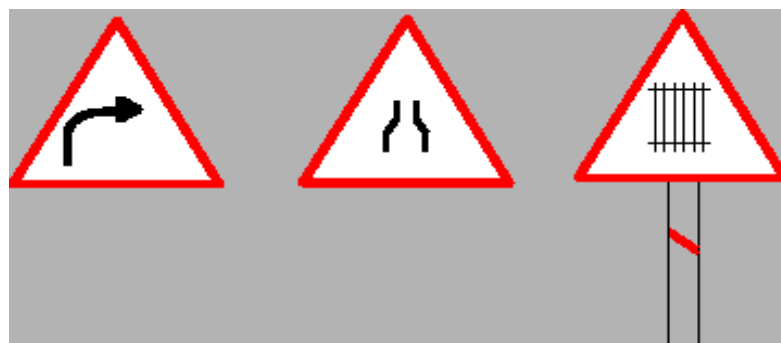


Figure 2.2: Examples of cautionary signs (right hand curve sign board, signs for narrow road, sign indicating railway track ahead)

2.2.2.3 INFORMATIVE SIGNS

Informative signs also called guide signs are provided to assist the drivers to reach their desired destinations. These are predominantly meant for the drivers who are unfamiliar to the place. The guide signs are redundant for the users who are accustomed to the location. Some of the examples for these types of signs are route markers, destination signs, mile posts, service information, recreational and cultural interest area signing etc. Route markers are used to identify numbered highways. They have designs that are distinctive and unique. They are written black letters on yellow background. Destination signs are used to indicate the direction to the critical destination points, and to mark important intersections. Distance in kilometers is sometimes marked to the right side of the destination. They are, in general, rectangular with the long dimension in the horizontal direction. They are color coded as white letters with green background.

Mile posts are provided to inform the driver about the progress along a route to reach his destination. Service guide signs give information to the driver regarding various services such as food, fuel, medical assistance etc. They are written with white letters on blue background. Information on historic, recreational and other cultural area is given on white letters with brown background. In the figure 3 we can see some examples for informative signs which include route markers, destination signs, mile posts, service Centre information etc.

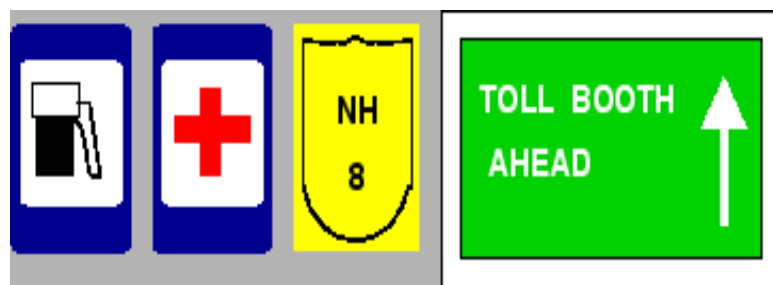


Figure 2.3: Examples of informative signs (route markers, destination signs, mile posts, service center information etc.)

Traffic signs are means for exercising control on or passing information to the road users. They may be regulatory, warning, or informative. Among the design aspects of the signs, the size, shape, color and location matters.

2.3 PAST STUDIES

The Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways (FHA, 2000) provides the basic principles for the design and use of signs, signals, and pavement markings for all public roadways in the United States. Several countries in the World have also developed their own traffic control device manuals which are very much similar to the MUTCD in the USA. Shapiro et al. (1987) identified seventeen MUTCD standards as having a significant need for additional research. It was concluded that many traffic control devices (particularly signs) and warrants are likely to benefit from further evaluation, improved design, or better understanding of driver capabilities and behavior. One of the more extensive studies of driver understanding of TCDs was conducted for the American Automobile Association (Hulbert, S., Beers, J. and Flower, P. 1979).

Hulbert and his associates assessed driver comprehension of several traffic sign symbols, traffic signals and pavement markings in a sample of over 3100 drivers from across the United States. Comprehension levels reported by Hulbert et al. were generally poor, with overall percentages of correct responses to signs, signals, and pavement markings being 74%, 68%, and 45%, respectively. They also found that old drivers were more likely to misunderstand certain TCDs than were younger drivers. Knoblauch and Pietrucha (1986) examined potential deficiencies in approximately 30 U.S. sign symbols and formulated recommendations for their improvement. Certain families of signs were found to be particularly confusing; these Included CURVE vs TURN signs, and pedestrian vs school crosswalk signs. The 1981 Texas study (Womack et al. 1981) evaluated 63 traffic control Devices. 19 of the 63 devices were identified as needing improvements. The Texas study surveyed drivers by presenting pictures of highway scenes in a test booklet. Subjects were instructed to select the correct meaning of each device from a list of multiple choice answers

The 1995 Kansas study (Stokes et al. 1995) evaluated 43 traffic control devices in terms of driver's understanding of the meaning of the information encoded in the signs and pavement markings. Both multiple choice questionnaire and open ended questionnaire were used as survey instruments. The study identified some warning and regulatory signs and pavement markings that were misunderstood by the Kansas drivers and proposed some general recommendations for improving driver's understanding of certain TCDs. Parham et al. (2003) studied driver understanding of the current U.S. system of yellow– white pavement markings through a driver survey. The survey was used to evaluate driver's ability to describe the

pavement marking color code, driver's reliance on pavement marking patterns when interpreting marking messages, and driver's reliance on pavement marking color when interpreting marking messages. Researchers surveyed 851 drivers in 5 states, with respondents representing 47 states, the District of Columbia, and Puerto Rico. The survey results indicate that drivers tend to use signs and other traffic as the primary cue to determine whether a road is one-way or two-way. A substantial proportion of respondents had an understanding of the use of marking color to differentiate between one-way and two-way roads. Approximately 75% of the drivers surveyed understood the basic concept that a single broken yellow line separates opposing traffic on a two-lane road. The presence of a solid line (either double solid or solid and broken) in the centerline increases comprehension of directional flow to approximately 85%; more than 90% of the drivers surveyed understood that a solid line (either double solid or solid and broken) prohibits passing. Almost 95% of drivers indicated that passing is permitted with a broken line. The survey results indicate that the yellow-white pavement marking system is better understood than previously believe.

Relatively fewer studies have analyzed comprehension of traffic signs by age (Dewar et al. 1994) and other safety related characteristics found that most of the teenage drivers participating in the survey had some degree of difficulty in understanding the traffic control devices that were evaluated. Out of 53 questions, only nine traffic control devices were understood, in terms of rates of correct response, by more than 80 percent of the respondents. Twenty of the traffic control devices evaluated were understood by more than 60 percent of the respondents. The remaining traffic control devices were understood by less than 60 percent of the teenagers who participated in the survey. (Ford, G. L. and Picha, D. L. 2000).

Investigated the influence of driver's comprehension of signs on accident involvement, citations received and seat belt usage. While knowledge of signs was increasing with seat belt usage, no significant association with accident involvement was observed; even when age was incorporated with the accidents. Similarly, no significant difference with number of citations received was observed. Furthermore, those with no speed citations, or low number of speed citations, were not significantly better than those with high number of speed citations.

The sample included 85 color slides of standard US sign symbols. Older drivers had poorer understanding than younger ones in 39% of the symbols examined; for the remainder there were no differences with respect to age. In another study, Luoma and Rama (1998) found recall

of speed signs not to be affected by driver's age and sex. Dewar et al. (1994) evaluated age differences in comprehension of traffic sign symbols using 480 volunteer licensed drivers in the USA and Canada. (Dewar, R.E., Kline, D. W. and Swanson, H. A. 1994).

Examined the influence of drivers' accident involvement and personal characteristics on their understanding of 28 traffic regulatory and warning signs. A sample of 9000 drivers who were residents of Bahrain, Kuwait, Oman, Qatar and United Arab Emirates was used. Results showed that on average, drivers fully understood only 56% of all signs. The Gulf States, Asian and Arab drivers understood the signs less well, and were not much helped by the use of pictograms rather than written instructions. Male drivers scored higher than female drivers. Age, marital status, experience and accident rates had no obvious bearing on comprehension of signs. The overall conclusion was that personal characteristics, rather than accident involvement rates, are most clearly associated with comprehension capabilities. (Al-Madani and Al-Janahi, 2002a.b)

There were Forty-two (42) traffic signs were evaluated. Of these 42 traffic signs, there were twenty regulatory signs, seventeen warning signs, and five informatory signs. The results indicated that the drivers had a very poor level of comprehension of the meaning of the traffic signs. The overall understanding level, measured in terms of the percentage of correct responses, was only about 50%. Only four traffic signs- two regulatory and two warnings- were understood by more than 80 percent of the respondents. The percentage of drivers who correctly identified the regulatory signs, warning signs and informatory signs were 49%, 52% and 55%, respectively and only 11% of drivers in Dhaka city have proper driving education. a study was conducted on 202 drivers in Dhaka city which was published in Journal of Civil Engineering (IEB), 38 (1) (2010) 17-29 (Abdur Razzak and Tanweer Hasan, BUET. In 2009).

CHAPTER 3

METHODOLOGY AND STUDY AREA

3.1 GENERAL

The word method has been originated from the Latin word methods which means systematic course or study. Method can be defined as a procedure, technique or way of doing something especially in accordance with a definite plan. In other words, method may be defined as a manner or mode of procedure, especially an orderly, logical or systematic way of instruction, inquiry, investigation, experiment, presentation etc.

Driver's understandings of traffic signs were evaluated by conducting a survey among the drivers in the Dhaka city. In this study, understanding was assessed in terms of how well drivers correctly identify the safety-related messages encoded in certain traffic signs. A multiple-choice type questionnaire for each traffic sign evaluated was prepared. In addition to the multiple-choice type questionnaire, the survey form contained a brief introduction about the purpose of the study, and some specific queries regarding the respondents' demographic and driving characteristics. Statistical analyses were also performed to determine if there are any causal relationships between the respondents' understanding of traffic signs and their demographic and driving characteristics.

3.2 WORKING PROCEDURE

Methodology describes the procedures that have been followed to operationalize the research design for the collection and analysis of the information and data in confirmation with the research. The study approach involved various data collection techniques conducted at different levels of the research work. Most of the data are collected by conducting field survey carried out directly by the researcher.

Keeping in mind the objective of the thesis the work procedure has been divided into the following steps:

Firstly, a personal survey of 160 drivers from different areas in Dhaka city was conducted to record data on their personal characteristics such as: gender, age, educational qualifications, driver's motives, weekly work, experience, type of license, etc.

Secondly, drivers whose personal information was first stored were interviewed of some selected regulatory, warning, and informatory signs was assessed the survey. Forty-two (42) Traffic signs were evaluated. Of these 42 traffic signs, there were twenty regulatory signs, seventeen warning signs, and five informatory signs.

Finally, the interview method didn't contain any specific questions rather the subjects were just asked to speak freely on what they think on the Traffic signs in Dhaka City.

3.1.1 DATA COLLECTION

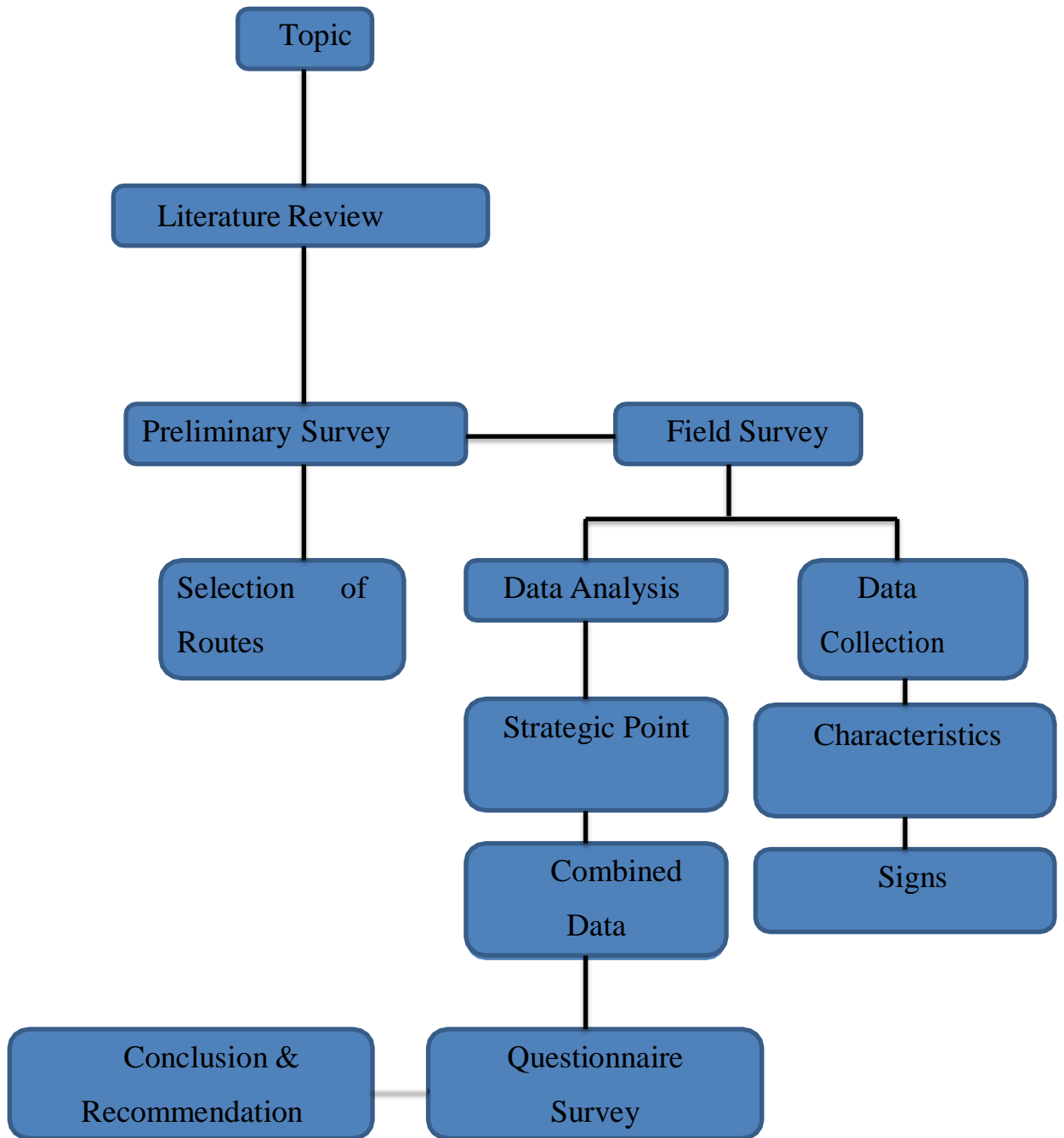
Data collection is very constitutive to make the thesis more reliable. The data was collected in various steps using various Tools by Field survey method. The study approach involved various data collection techniques conducted at different levels of the research work Most of the data were collected by conducting field survey carried out directly by the researcher. This thesis data was collected through field survey was conducted among 160 Dhaka city drivers. The objectives of the research and importance of data collection were explained to them so that they give their consent.

3.1.2 DATA ANALYSIS

Data analysis is one of the major parts of any research work. Success depends on the accuracy of the analysis. Some basic features of data analysis are following:

- ❖ Then data analysis was done in MS EXCEL.
- ❖ Graph and pie diagrams were plotted by the survey data in MS EXCEL.
- ❖ For field data analysis, all the collected data at different place were arranged separately in MS EXCEL.
- ❖ Data analysis for evaluate the efficiency of the Motorist Characteristics and knowledge about traffic signs separately in MS EXCEL.
- ❖ Necessary charts, pie diagrams were plotted and relative comparison of the data.

3.2.3 METHODOLOGY FLOW CHART



3.1 STUDY AREA

Dhaka is one of the busiest cities in Bangladesh, with a lot of different types of mixed vehicles. Here is the presence of many drivers of different ignorance. Therefore, Dhaka city (Dhanmondi, Dhanmondi-32, phanthopath, Asadgate, framgate) has been considered as the ideal for this research.



Figure 3.1: Dhaka City map



Figure 3.2: Photography of Dhaka City real seen.

3.2 CHARACTERISTICS OF DATA SOURCES

Locations of data sources should be such that it satisfies the following criteria:

- ❖ The source has to provide some indications for the data to be accurate.
- ❖ The location of the source should be such that it can be linked with the service for which the data is searched so that no question of validity appears.
- ❖ The selection of source should be as per provided guidance from any past study of past research in order it being reliable.
- ❖ Source should be such that data can be obtained as quickly as possible after an event.
- ❖ The source should provide data relevant to the purpose.

An ideal source should be able to provide the complete data required. Derived from characteristics of quality data by Audit commission.

CHAPTER 4

DATA COLLECTION AND ANALYSIS

4.1 GENERAL

The method of conducting study and the detail data analysis and result discussed in this chapter. In this chapter the overall analysis and result that have been followed to achieve the objectives. Data analysis and result the outline of the study are described. The survey Tools had two parts- the first part contained images of the signs evaluated and the corresponding questions related to each sign. A total of 42 signs were evaluated. The signs were selected based on a) driver's familiarity of the sign, and b) importance the sign so far safety is concerned. Of these 42 traffic signs evaluated, 20 were regulatory signs (Figure 4.1), 17 were warning signs (Figure 4.2) and 5 were informatory signs (Figure 4.3). The second part of the survey form had 13 questions regarding the respondents' demographic and driving characteristics. The survey questionnaires were written in Bengali, the national language of Bangladesh and English. The survey forms were printed in true color. As noted earlier, the survey questions were designed to test understanding of specific aspects of the safety related messages encoded in certain signs. Often the reckless driving of bus drivers is thought to be the primary contributing factors of road accidents. The survey was conducted among both professional and non-professional drivers. Considering the time and opportunities to interview the drivers, a sample of 200 drivers was thought to be sufficient for meaningful statistical analyses.



Figure 4.1: twenty regulatory signs evaluated (shown with the sign designation by Roads and Highways Department, Govt. of Bangladesh).

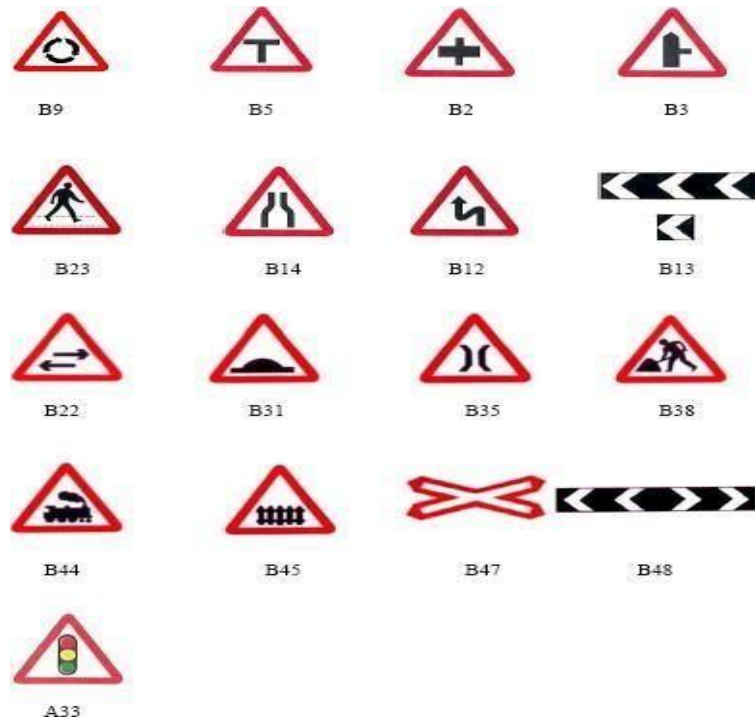


Figure 4.2: Seventeen warning signs evaluated (shown with the sign designation by Roads and Highways Department, Govt. of Bangladesh).



Figure 4.3: five informatory signs evaluated (shown with the sign designation by Roads and Highways Department, Govt. of Bangladesh).

4.2 DATA COLLECTION TIME

For this study, data has been collected from different places of Dhaka city during the day for the convenience of the driver. The time range of data collection is as follows:

Area	Date	Time
Dhaka city	26 Nov- 1 Dec 2021	10:00 am to 5:00 pm

4.3 PERSONAL CHARACTERISTICS OF SURVEY RESPONDENTS

Table summarizes the personal characteristic drivers of the 160 surveys all are male. Even though there is no restriction on females driving vehicles, seldom can see a female driver in the city. The age distribution shows that maximum drivers were young 47% of the respondents were below the age 35 years and 82% of the respondents were below the age 45 years. The educational background of the drivers shows that uneducated 15%, 31% of the drivers have 1-5 certificate, 26% of them with 6-8 certificate, 25% of the drivers possess S.S.C certificate 12%, H.S.C certificate 10% and graduation 7%. overall only 12% of drivers in Dhaka city have proper driving education. More information is analyzed in the table below.

Table 4.3: Driving Characteristics of the Survey Respondents

Characteristics of Total Sample		Sample No	Percentage %	Total (%)
Gender	Male	160	100	100
	Female	0	0	
Drive For Job	Yes	134	84	100
	No	26	16	
Age	Below 18		0	100
	18 - 24	27	17	
	25 - 34	48	30	
	35 - 44	56	35	
	45 - 54	26	16	
	55 and Above	3	2	
Education	Uneducated	24	15	100
	Class 1-5	50	31	
	Class 6-8	40	25	
	S.S.C	19	12	
	H.S.C	16	10	
	Graduation and More	11	7	

License Type	Professional	122	76	100
	Non-Professional	16	10	
	Motorcycle	19	12	
	No License	3	2	
Years Licensed	No License	3	2	100
	Less Than 1	30	19	
	1-5	40	25	
	6-10	50	31	
	More Than 10	37	23	

Driving Distance (km/Day)	Below 30	23	14	100
	31 - 50	44	28	
	51 - 100	49	31	
	101 - 200	21	13	
	More then 200	23	14	
Driving Days Per week	One Day	4	3	100
	Two Day	6	4	
	Three Day	13	8	
	Four Day	21	13	
	Five Day	19	12	
	Six Day	32	20	
	Seven Day	65	40	
Vehicle Type	Bus	37	23	100
	Microbus, SUV, Van	21	13	
	Passenger Car (Tax)	18	11	
	Pickup	13	8	
	Truck	14	9	
	Three Wheeler	35	22	
	Motorcycle	22	14	
	Within City	105	66	

Driving Area	Outside City	19	12	100
	Both	36	22	
Age	Below 18		0	100
	18 - 24	27	17	
	25 - 34	48	30	
	35 - 44	56	35	
	45 - 54	26	16	
	55 and Above	3	2	
Education	Uneducated	24	15	100
	Class 1-5	50	31	
	Class 6-8	40	25	
	S.S.C	19	12	
	H.S.C	16	10	
	Graduation and More	11	7	
License Type	Professional	122	76	100
	Non-Professional	16	10	

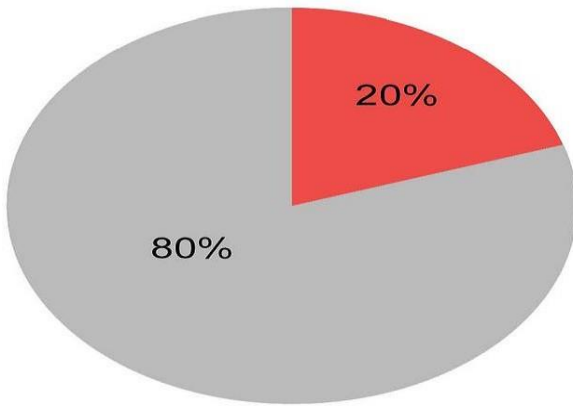
4.4 DRIVER'S COMPREHENSION OF TRAFFIC SIGNS

The survey was administered to a total of 160 drivers who used to driver in Dhaka, the capital city of Bangladesh. Three types of traffic signs- regulatory, warning, and informatory- were tested. The driver understanding of these three types of traffic signs was evaluated based on the average response rates. The results of the evaluation are summarized in this section.

4.4.1 REGULATORY SIGNS

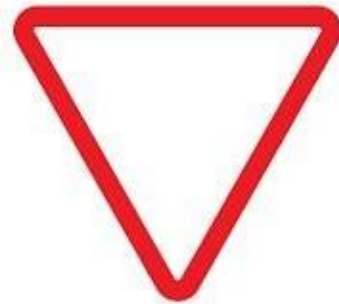
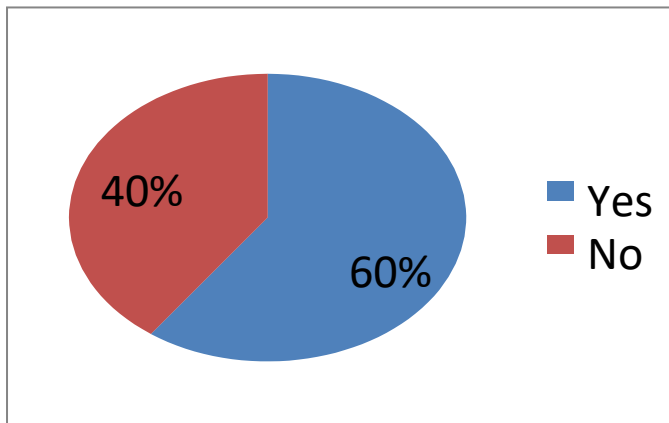
A total of 20 regulatory signs were evaluated in this study. The average percentage of correct answers of these signs was 78% which indicates that the comprehension was moderate level. The signs that were well understood by drivers were -Stop 80%, -No Entry 70%, -No Rickshaws 90%, -No Parking 90%, -No Stopping 60%, -No Overtaking 70%, -No Left Turn 100%, -No U-Turn 100%, -No Use of Horn 100%

1. Stop



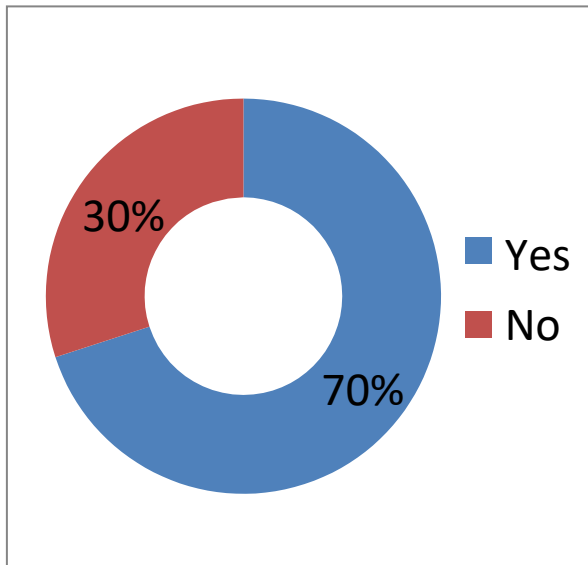
80% of respondents know about this traffic sign.

2. Give way to traffic on major road or at roundabout



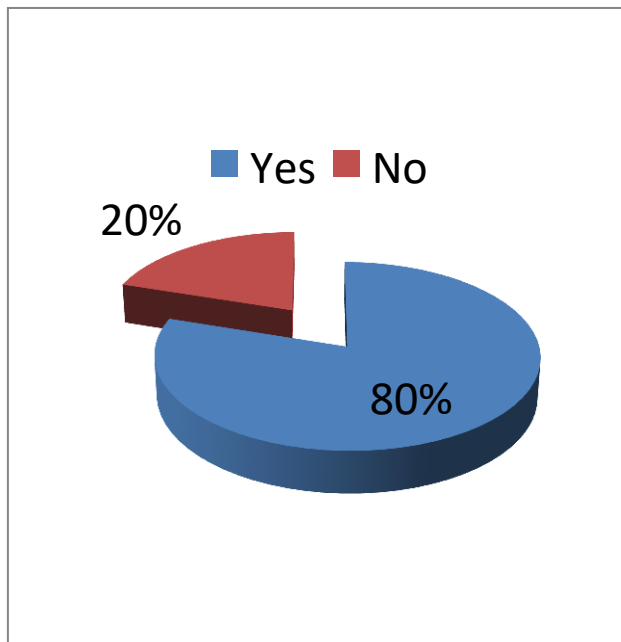
60% of respondents know about this traffic sign.

3. No entry for vehicles



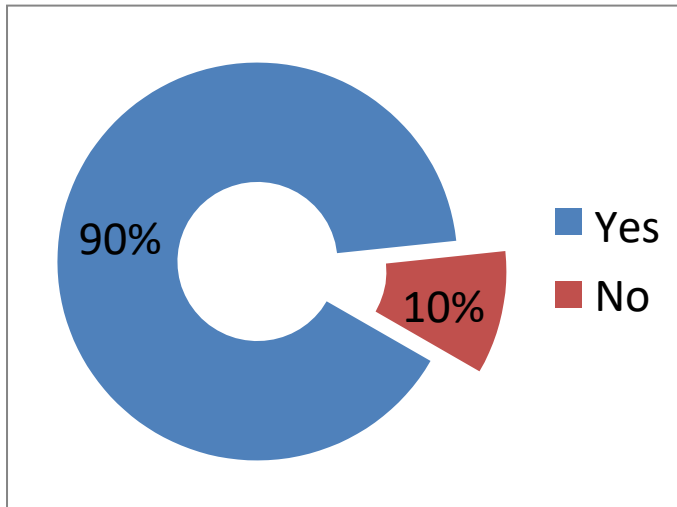
70% of respondents know about this traffic sign.

4. No trucks



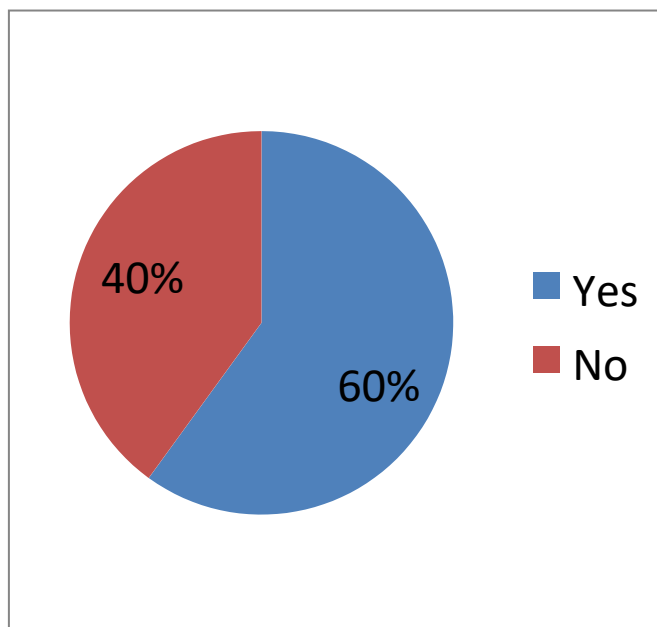
60% of respondents know about this traffic sign.

5. No rickshaws



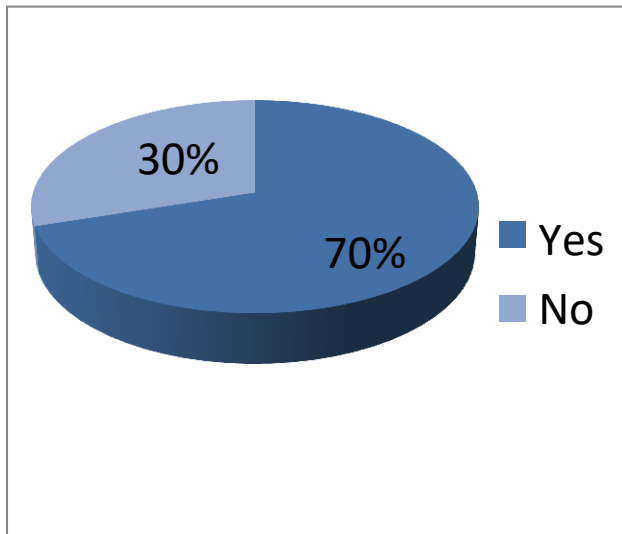
90% of respondents know about this traffic sign.

6. No vehicles over height shown



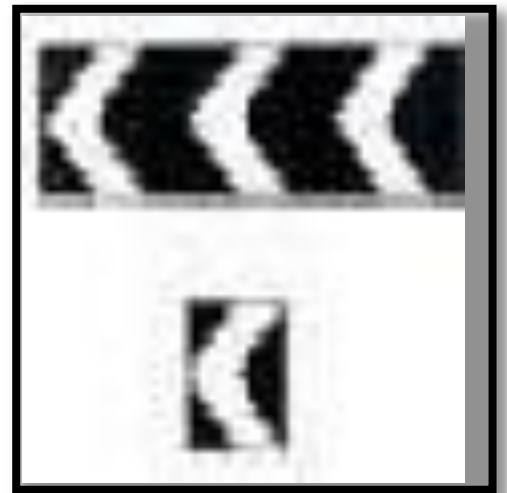
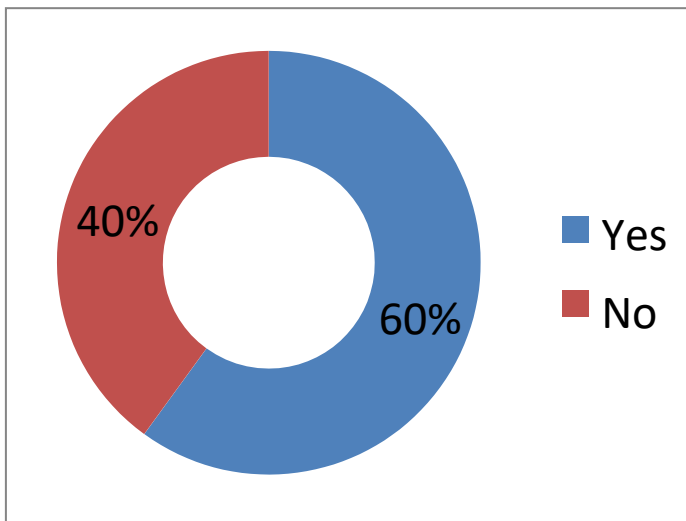
60% of respondents know about this traffic sign.

7. Double bend first left



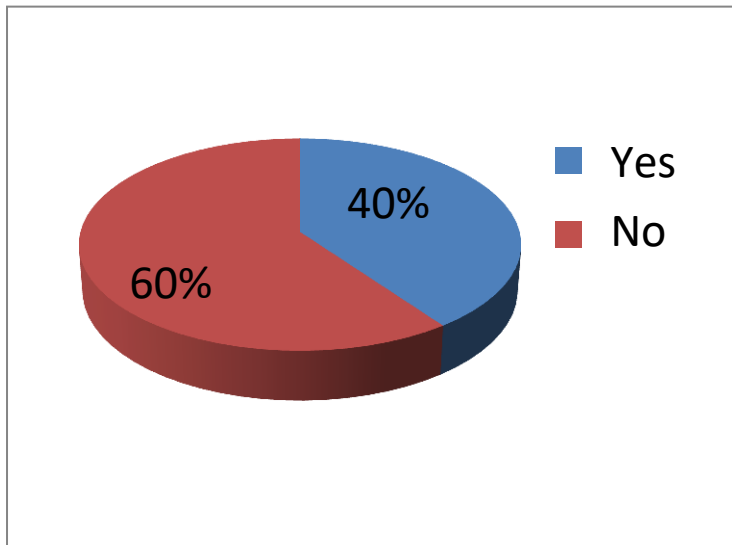
70% of respondents know about this traffic sign.

8. Sharp change of direction to the left



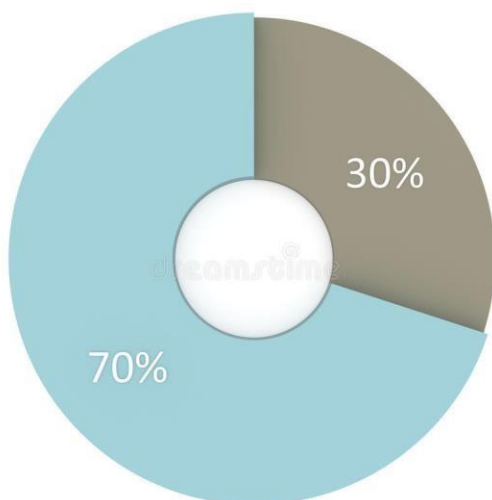
60% of respondents know about this traffic sign.

9. Two-way traffic crosses one-way road



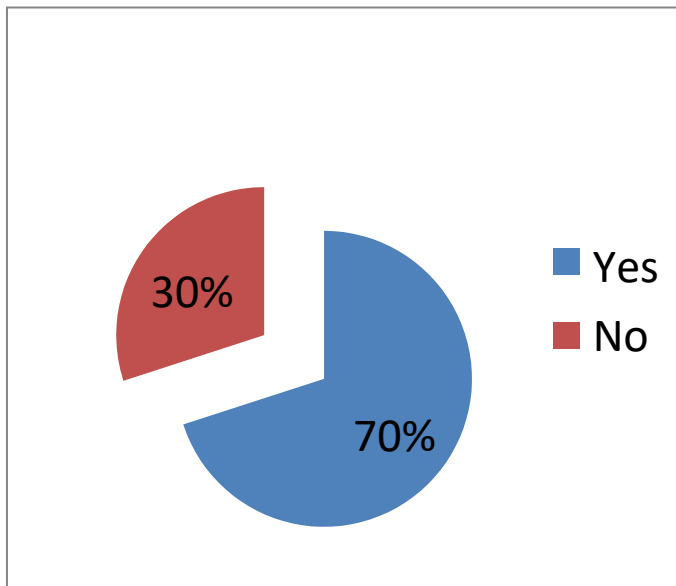
40% of respondents know about this traffic sign.

10. Road hump



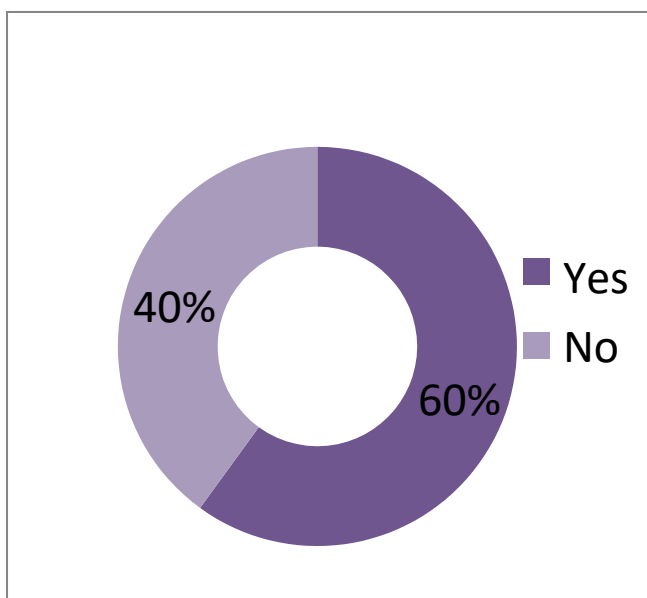
70% of respondents know about this traffic sign.

11. Narrow bridge



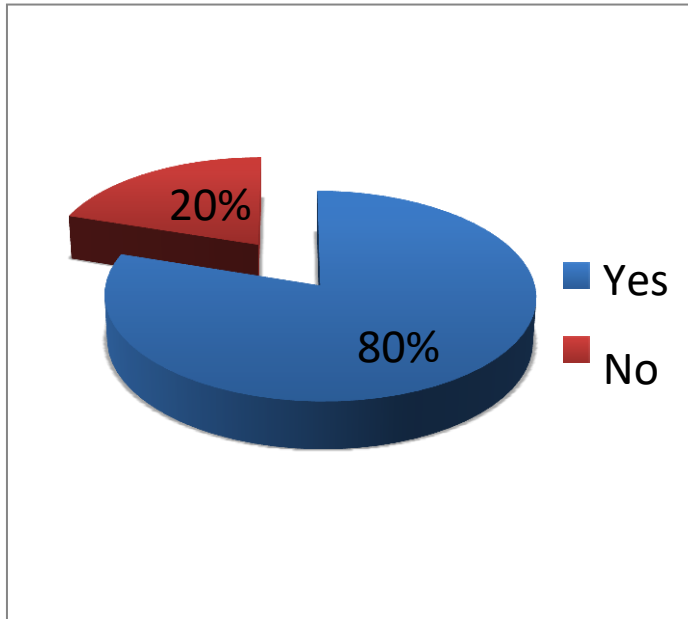
70% of respondents know about this traffic sign.

12. Road works



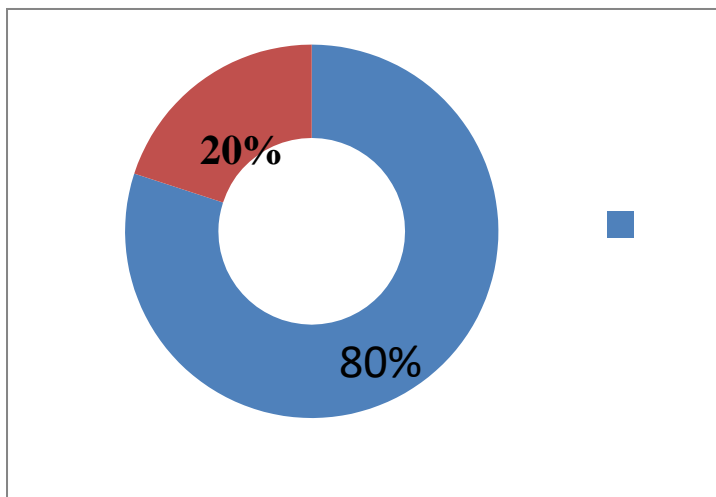
60% of respondents know about this traffic sign.

13. Railway level crossing without gate



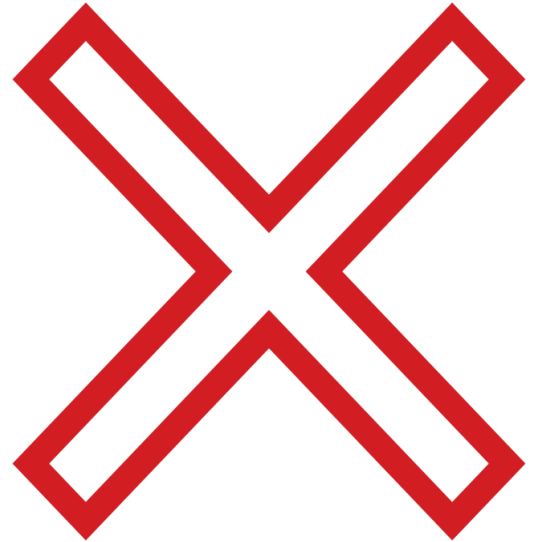
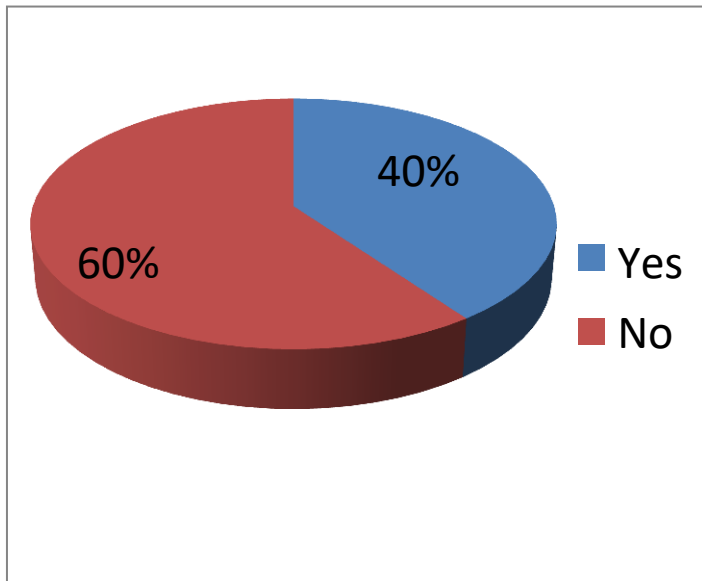
80% of respondents know about this traffic sign.

14. Railway level crossing with gate



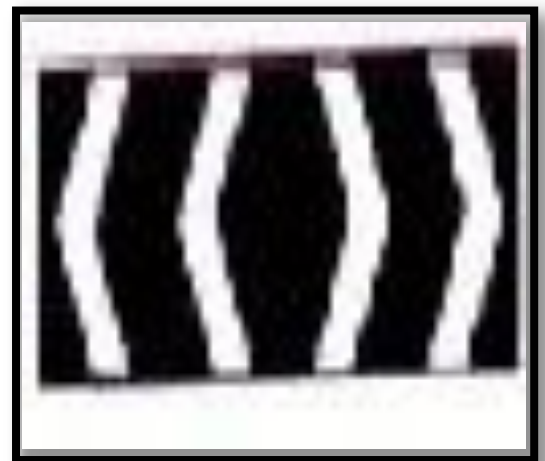
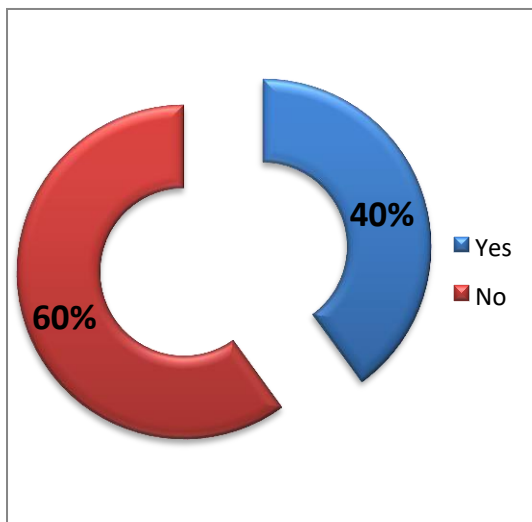
80% of respondents know about this traffic sign.

15. Location of railway crossing



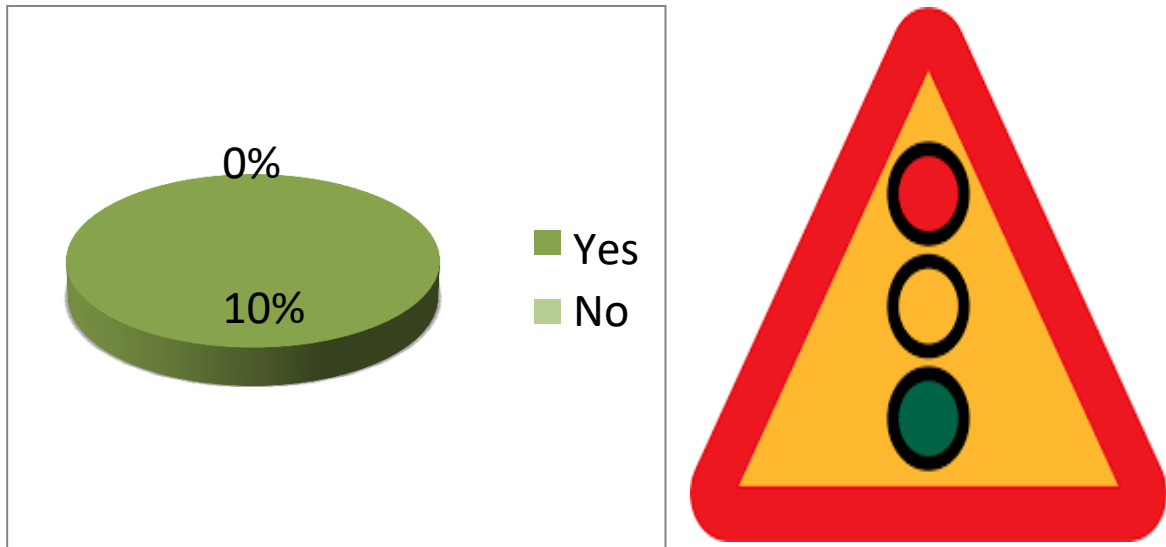
40% of respondents know about this traffic sign.

16. T junction (Turn left or right only)



40% of respondents know about this traffic sign.

17. Traffic signals ahead



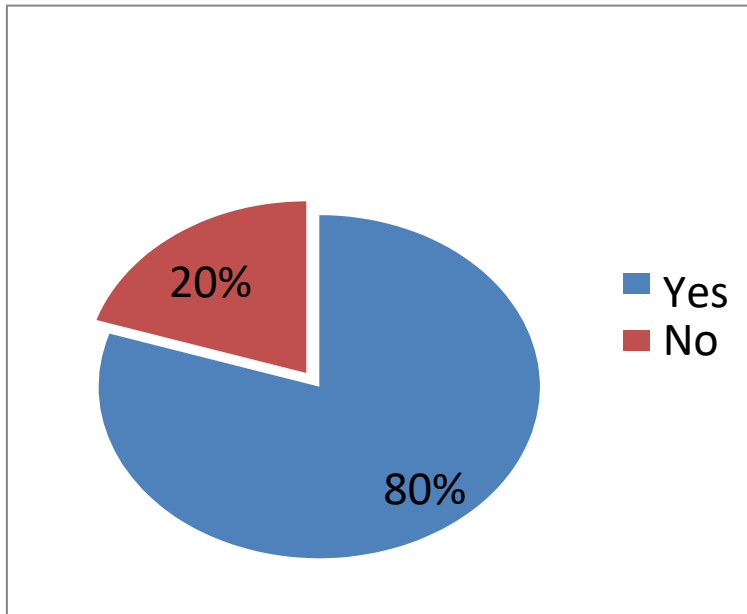
100% of respondents know about this traffic sign.

4.4.2 INFORMATION SIGNS

A total of 5 information signs were evaluated in this study. The average percentage of correct answers of these signs was 76% which indicates that the comprehension was moderate level.

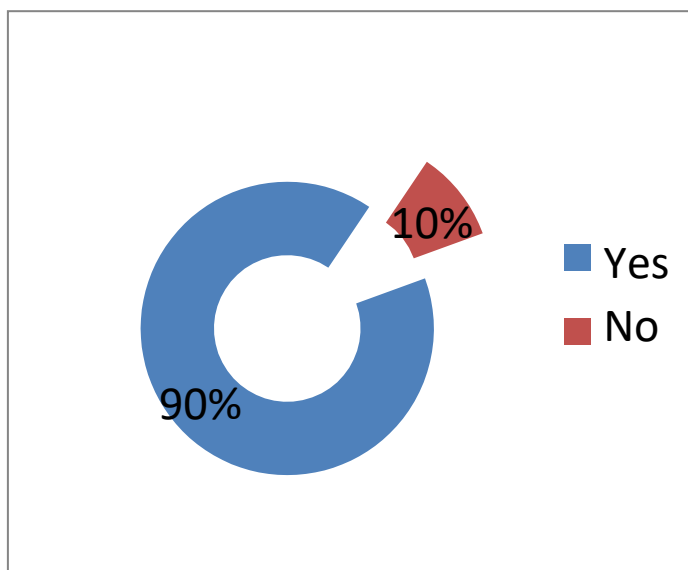
The signs that were well understood by drivers were Parking place 80%, Hospital 90%, Fire Station 60%, and Bus Stop 80%

1. Parking place



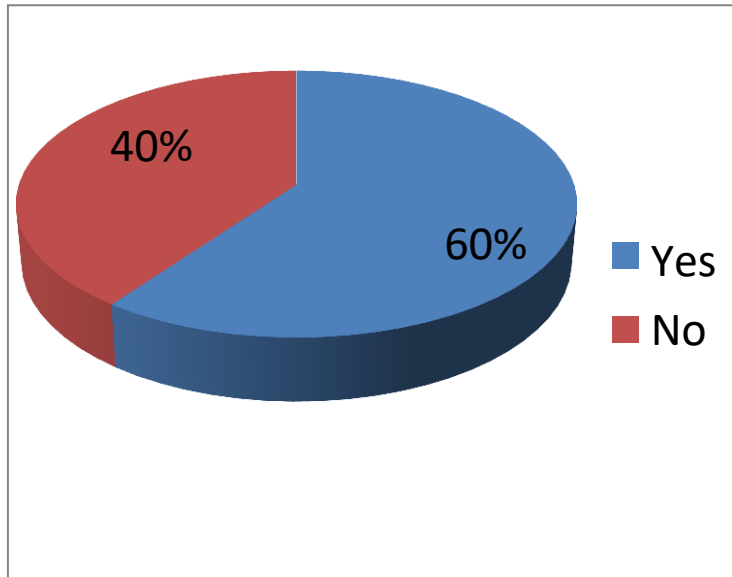
80% of respondents know about this traffic sign.

2. Hospital



90% of respondents know about this traffic sign.

3. Fire station



60% of respondents know about this traffic sign.

4.1 PHOTOGRAPHIC

Traffic signs directions should be consistent with the direction of traffic flow so that it is easily visible to drivers and they can take decisions quickly. Pictures of some traffic signs in different parts of Dhaka city during our research are explained below:



Photo: Dhanmondi



Photo: Panthopat-Dhanmondi-32

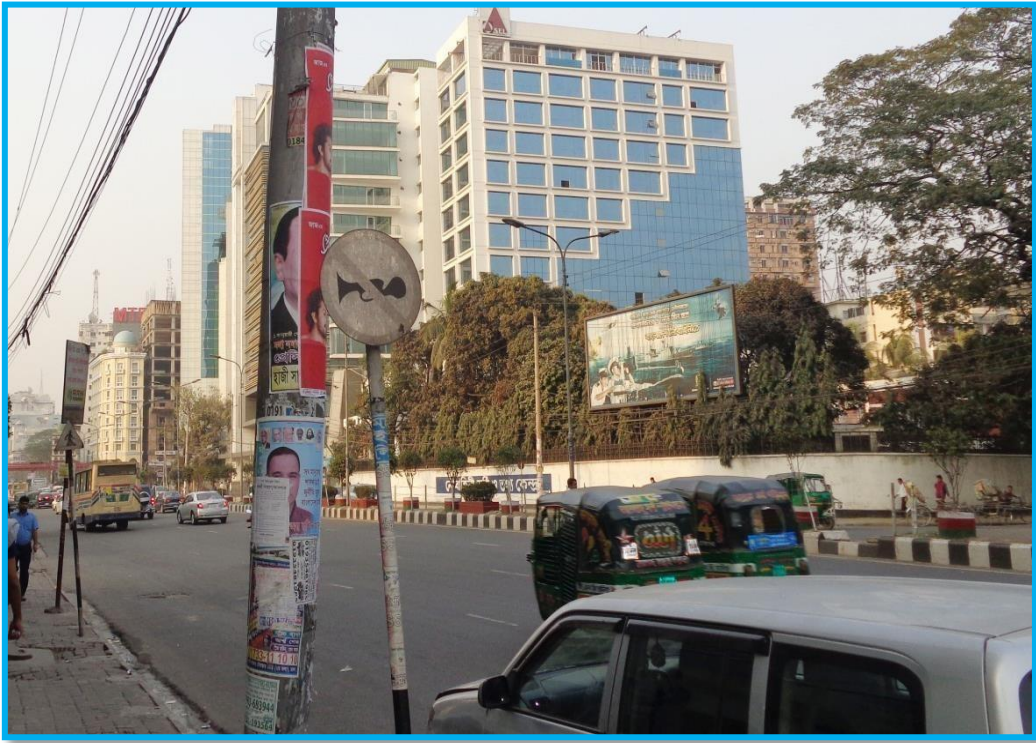


Photo: Dhanmondi 32



Photo: Asadgate



Photo: Rickshaw No Entry at Panthopath



Photo: No parking sign at Panthopath



Photo: Information sign

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The main objective of this study was to assess the driver's understanding of some selected traffic signs. A total of 42 traffic signs- 20 regulatory, 17 warning, and 5 informatory- were evaluated. The understanding was assessed in terms of how well drivers correctly identified the safety- related messages encoded in certain traffic signs. A questionnaire- type survey Tools was developed for use in this study. The survey form had two parts responses for each of the 42 traffic signs evaluated and respondents' background information. The results indicated a Medium level of comprehension of traffic signs among the drivers. The percentage of correct responses for all signs combined was only around 73%- 78% for regulatory signs, 66.44% for warning signs, and 76% for informatory signs. Out of the 42 signs evaluated, only our traffic signs were understood by more than 80 percent of the respondents. These signs are, "Stop ", "No trucks", "No rickshaws", "No rickshaws", "No left turn", "No U-turn", "Special (restricted) Speed limit", "No use of horn", "Turn left (right if arrow reversed), one-way movement", "Turn left ahead (right if arrow reversed)", "Pass either side", "Pedestrian crossing", "Road narrows on both sides", "Railway level crossing without gate", "Railway levelcrossing with gate", "Traffic signals ahead", "Parking place", "Hospital", "Hospitall. Based on analyses of demographic and driving characteristics of the respondents, it would be reasonable to assume that the results of the understanding of traffic signs presented here are applicable to male professional drivers of ages between 25 and 44 years. Statistical analyses to test the degree of association of demographic and driving characteristics of the respondents with their responses were performed. The results indicated that only respondents' age and academic qualification had some meaningful effects on their responses.

After all, we can keep a comment that the results indicated a Medium level of comprehension of traffic signs among the drivers in Dhaka city. Besides Authority have to take some necessary steps to make these projects more effective.

5.2 RECOMMENDATION

The study results indicated that efforts are needed to educate the drivers on the proper meaning and response to traffic signs. Other educational programs could include outreach materials such as brochures and videos, campaigns, or through public media like radio and television or informational internet websites.

The following are some recommendations provided considering the previous discussion of policymaking:

- ❖ Since a large number of drivers lack formal education, we advise the appropriate authorities to take appropriate action in the case of a license.
- ❖ If possible we recommend to Efforts are required to educate the drivers about traffic signs and laws through various training and follow-up from the appropriate authorities.
- ❖ During the study, it was found that driver education and use of a driver's handbook can be the primary ways to teach the meaning of traffic signs. The government organization that has the responsibility for driver's licensing should be adequately supported; because traffic signs fulfill other driving navigational needs. Other educational programs could include outreach materials such as brochures and videos, campaigns, or through public media like radio and television or informational Internet websites. These recommendations should be implemented or pursued through the collaboration of traffic safety officials, law enforcement agencies, and transportation professionals.

5.3 LIMITATIONS

As it's the pandemic moment of our time we had a lot of limitations for collecting various data from different places despite our wishes.

Due to the COVID-19 pandemic, we had a lot of limitation for collecting various data from different places. So, some of our data can vary with exact info.

For this pandemic situation, we cannot take actual data information collect which happens at normal times

5.4 APPENDICES

A. Personal characteristic

B. Table:1. summarizes the personal characteristic of the 160 surveys (all are male). The survey was conducted by asking about Traffic Signs from Bus 37, Microbus, SUV, Van 21, Passenger Car (Tax) 18, Pickup 13, Truck 14, Three Wheeler 35, Motorcycle 22.

Name:		Gender:
		Male
Drive For Job	Yes	No
		Female

Driving Education	Yes	No
--------------------------	-----	----

Age

Below 18	
18 - 24	
25 - 34	
35 - 44	
45 - 54	
55 and Above	

Education

Uneducated	
Class 1-5	
Class 6-8	
S.S.C	
H.S.C	
Graduation and More	

Professional	
Non-Professional	
Motorcycle	
No License	

A. License Type

Less Than 1	
1-5	
6-10	
More Than 10	

Years Licensed

Driving Distance (km/Day)

Below 30	
31 - 50	
51 - 100	
101 - 200	
More than 200	

Driving Days Per week

One Day	
Two Day	
Three Day	
Four Day	
Five Day	
Six Day	
Seven Day	






B. Vehicle Type

Bus	
Microbus, SUV, Van	
Passenger Car (Tax)	
Pickup	
Truck	
Three Wheeler	
Motorcycle	






Driving Area






Within City	
Outside City	
Both	

➤ REGULATORY SIGNS






Signs Meaning of Sign		Sample No													
Stop															
Give way to traffic on major road or at roundabout															
No entry for vehicles															
No trucks															
No rickshaws															






Signs Meaning of Sign		Sample No																					
No vehicles over height shown																							
No vehicles over maximum gross weight shown																							
No parking																							
No stopping																							
No overtaking																							








Signs Meaning of Sign		Sample No																	
No left turn																			
No U-turn																			
Special (restricted) Speed limit																			
No use of horn																			
National speed limits apply																			

Signs Meaning of Sign	Sample No												
Turn left (right if arrow reversed), one way movement													
Keep left (right if arrow reversed)													
Turn left ahead (right if arrow reversed)													
Pass either side													
One way traffic													






➤ **WARNING SIGNS**

Signs Meaning of Sign		Sample No																
Roundabout																		
T junction																		
Major road ahead (crossroads)																		
Side road right (left if symbol reversed)																		
Pedestrian crossing																		

Signs Meaning of Sign		Sample No											
Road narrows on both sides													
Double bend first left													
Sharp change of direction to the left													
Two way traffic crosses one way road													
Road hump													

Signs Meaning of Sign		Sample No																				
Narrow bridge																						
Road works																						
Railway level crossing without gate																						
Railway level crossing with gate																						
Location of railway crossing																						
T junction (Turn left or right only)																						
Traffic signals ahead																						

➤ **INFORMATION SIGNS**

Signs Meaning of Sign		Sample No																	
Parking place																			
Hospital																			
Fire station																			
Recommend route for pedestrians, cycles and rickshaws.																			
Bus stop																			

5.5 QUESTIONNAIRE SURVEY FOR MOTORIST'S UNDERSTANDING OF TRAFFIC SIGNS IN DHAKA CITY

S. L	Characteristics of Total Sample	Sample No	Percentage %	Total (%)
1	Gender	Male		
		Female		
2	Drive For Job	Yes		
		No		
3	Age	Below 18		
		18 - 24		
		25 - 34		
		35 - 44		
		45 - 54		
		55 and Above		
4	Education	Uneducated		
		Class 1-5		
		Class 6-8		
		S.S.C		
		H.S.C		
		Graduation and More		
5	License Type	Professional		
		Non-Professional		
		Motorcycle		
		No License		
6	Years Licensed	No License		
		Less Than 1		
		1-5		
		6-10		
		More Than 10		
	Driving Distance	Below 30		
		31 - 50		
		51 - 100		
		101 - 200		

		More than 200			
8	Driving Days Perweek	One Day			
		Two Day			
		Three Day			
		Four Day			
		Five Day			
		Six Day			
		Seven Day			
9	Vehicle Type	Bus			
		Microbus, SUV, Van			
		Passenger Car (Tax)			
		Pickup			
		Truck			
		Three Wheeler			
		Motorcycle			
		Within City			
10	Driving Aria	Outside City			
		Both			
11	Age	Below 18			
		18 - 24			
		25 - 34			
		35 - 44			
		45 - 54			
		55 and Above			
	Education	Uneducated			
		Class 1-5			
		Class 6-8			

12		S.S.C			
		H.S.C			
		Graduation and More			
13	License Type	Professional			
		Non-Professional			

5.6 QUESTIONNAIRE SURVEY FOR MOTORIST'S UNDERSTANDING OF TRAFFIC SIGNS IN DHAKA CITY

SI No	Question	Yes	No
1	What is the function of stop sign?		
2	Do you know Give way to traffic on major road or at roundabout sign?		
3	What is the function of No entry for vehicle sign?		
4	What is the function of No trucks sign ?		
5	Do you know No rickshaws sign?		
6	What is the function of No vehicles over height shown sign ?		
7	Do you know No vehicles over maximum gross weight Shown sign ?		
8	Do you maintain the no parking sign properly ?		
9	Do you agree with the no stopping sign?		
10	What is the function of No overtaking sign?		
11	Do you know No left turn sign ?		
12	What is the function of No U-turn sign		
13	Do you know Special (restricted) Speed limit sign?		
14	Do you maintain the No use of horn sign properly?		
15	What is the function of National speed limits apply sign?		
16	Do you know Turn left (right if arrow reversed), one way movement sign?		
17	Do you know Keep left (right if arrow reversed) sign?		
18	What is the function of Turn left ahead (right if arrow reversed) sign ?		
19	What is the function of Pass either side sign ?		
20	Do you know One way traffic sign ?		
21	Do you know Roundabout sign?		
22	Do you maintain the T junction sign properly?		
23	What is the function of Major road ahead (crossroads) sign?		
24	Do you know Side road right (left if symbol reversed) sign ?		
25	Do you know Pedestrian crossing sign?		
26	Do you know Road narrows on both sides sign?		
27	What is the function of Double bend first left sign?		
28	Do you know Sharp change of direction to the left sign?		

29	What is the function of Two way traffic crosses one way road sign?		
30	Do you know Road hump sign?		
31	What is the function of Narrow bridge sign?		
32	What is the function of Road works sign?		
33	What is the function of Railway level crossing without Gate sign?		
34	What is the function of Railway level crossing with gate sign ?		
35	Do you know Location of railway? Crossing sign?		
36	Do you maintain the T junction (Turn left or right only) sign properly?		
37	Do you know Traffic signals ahead sign?		
38	What is the function of Parking place sign?		
39	Do you know the Hospital sign ?		
40	Do you know the Fire station sign?		
41	What is the function of Recommend route for pedestrians, cycles and rickshaws sign?		
42	Do you know the Bus stop sign?		

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