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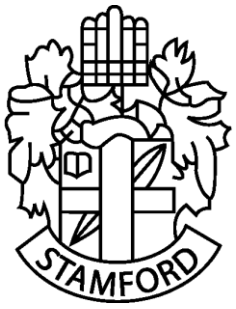
DEPARTMENT OF CIVIL ENGINEERING



A STUDY ON PEDESTRIAN FACILTIES AT HATIR-JHEEL AND FARM GATE.

A PROJECT AND THESIS BY

Md. Azharul Islam

ID - CEN 060 09247

Batch No. 60 – C.

Sourav Mazumder

ID - CEN 060 09288

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Batch No. 60 – C.

SUPERVISED BY

Mrs. Anika Nowshin Mowrin.

Assistant Professor

Department of Civil Engineering

Stamford University Bangladesh

In partial fulfillment of the requirements for the degree of Bachelor of Science (B.Sc.) in Civil Engineering.

November 2020

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The project and thesis title "**A STUDY ON PEDESTRIAN FACILTIES AT HATIR-JHEEL AND FARM GATE.**" submitted by Md. Azharul Islam – ID: CEN 060 09247 of 60 – C and Sourav Mazumder – ID: CEN 060 09288 of 60 – C of Department of Civil Engineering has been satisfactorily accepted in partial fulfillment of the requirements for the degree of Bachelor of Science (B.Sc.) in Civil Engineering on 2020.

_____

Anika Nowshin Mowrin

Supervisor, Project and Thesis, and

Assistant professor; Department of Civil Engineering.

Stamford University Bangladesh.

DECLARATION

We, Md. Azharul Islam and Sourav Mazumder the student of B.Sc. in Civil Engineering hereby solemnly declare that, the works presented in this thesis & project has been carried out by us and has not previously been submitted to any other University/College/Organization for any academic qualification/ certificate/ degree/diploma.

We warrant that the present work does not breach any copyright.

We further undertake to indemnify the University against any loss or damage arising from breach of the foregoing obligations.

Md. Azharul Islam

Sourav Mazumder

DEDICATION

We would like to dedicate this project and thesis work to our parents, our mentor Anika Nowshin Mowrin, Assistant Professor of Civil Engineering department and all of our respected teachers of Civil Engineering department.

ACKNOWLEDGEMENT

We are starting the thesis with the name of almighty God who created and empowered us to do all the works.

It is the broadness of the Bangladesh government to pass the Private University Act 1993 for making scope of education for all. It would not be possible from our part to earn the Bachelor degree in Civil Engineering, if a private university like Stamford University Bangladesh would not be established and arranged classes. We are grateful to Prof. Dr. M. A. Hannan Feroz the Honorable President of the Stamford University Bangladesh for creating such opportunity.

It is our greatest pleasure to acknowledgement our deepest gratitude to our supervisor Anika Nowshin Mowrin, assistant professor, Department of Civil Engineering, Stamford University Bangladesh for his constant guidance, suggestion and care to attain the research objectives and editing the thesis. We wish to express our sincere thanks for her timely and valuable suggestions and providing us the scope and necessary support to undertake and complete this thesis.

We want to express our gratitude to Dr. B.C. Basak, Chairman of Department of Civil Engineering and respected teachers of the department who helped in many ways unlimitedly not only in preparation of this thesis and project but also to fulfill the requirements for earning the degree of B.Sc. in Civil Engineering.

Lastly, we are also grateful to all the officers and staffs of the University for their cooperation for the achievement of the degree of B. Sc. in Civil Engineering.

ABSTRACT

In Dhaka, a rapidly urbanizing mega city, different people use these places Hatir-Jheel & Farmgate for traveling. A comfortable environment makes a journey by walking pleasant and enjoyable. However, in Dhaka city, about 60% of people favor prefers walking rather than using any vehicle trips are by walking everyday but they are facing many problems while using the walkways. A lot of research works are going on for assessing the pedestrian's facilities in the developed nations but in developing countries like Bangladesh, it is not a significant one for the transport planners. For instance, this study tries to emphasize the problems of pedestrians and to explore the qualitative level of comfort of the pedestrians in selected locations in Dhaka City by a questionnaire survey. The specific objectives of the study were to assess the overall quality of pedestrian facilities in the Hatir-Jheel and Farmgate area, to assess the overall responses from the users of the study area, to study the variation pedestrian facility existing in the study area, to identify the pedestrian facilities problems existing in the study area and to provide some suggestions to mitigate the existing problems.

TABLE OF CONTENT

CHAPTER ONE

INTRODUCTION

CHAPTER 1

INTORDUCTION

1.1 GENERAL

Dhaka as the capital of Bangladesh has a major role to play in an era of regional and sub-regional cooperation. The urban hierarchy of Bangladesh is strongly dominated by Dhaka, which are the largest and most industrialized city and also the administrative, commercial and cultural capital. Dhaka also serves as the traditional centre of wholesale trade for the country. It is also a fast growing metropolitan city with highly dense and increasing population. Haphazard urban expansion with minimum attention to the living environment has been the most common scenario here and existing transportation system has become hazardous for the entire city system due to its inherent system deficiencies.

1.2 Background

However, in Dhaka city, about 60% trips are making on foot but the pedestrians are facing many problems while using the walkways (Rahman, 2005). A lot of research works are going on for assessing the pedestrian's level of services in the developed nations but in developing countries like Bangladesh, it is not a significant one for the transport planners. It is because; the transport planners or researchers are always emphasizing the problems of the motorized vehicles. Besides, budget allocation is not sufficient to continue research in the field of pedestrians.

Pedestrians are the most vulnerable users of the road space but lack of safety promotions or measures also offer the walkers very dangerous situation. For example, discontinuation of the walkway alignment provides inconvenience for the older walkers and lack of separation of the walkways from the road-space offers threat to accident for the school going children, Disabled person. As a result, to know the *Level of service (LOS)* of the walkers is an important part so

that the policy makers or the transport planners can understand the extent of problems that the pedestrians are facing in their daily life.

1.3 Objectives

This study has been aimed at achieving the following objectives:

- To evaluate the existing situation of demand and supply of pedestrian way in the study area.
- To investigate the prevailing problems in the current situation of the study area and to identify the reason behind it.
- To recommend some measures regarding the demand and supply of pedestrian way in the study area.

1.4 Scope of the study

- To find the present condition of the selected study area.
- To find the opinion from pedestrians by a questionnaire survey.
- To find the suggestions & recommendations for the existing condition of the study area.

1.5 Thesis layout

Chapter One: It discusses about the problems of pedestrian facilities and objectives of the study.

Chapter Two: It discusses about the review of literatures.

Chapter Three: It discusses describes the procedures that have been followed to operationalize the research.

Chapter Four: It describes about the data collection, summary of data and data analysis.

Chapter Five: It discusses about the suggestions and recommendations of the study area.

1.6 Summary

In this chapter there are short discussion about the background of the study, objectives of the study, scope of the study and thesis layout.

CHAPTER TWO

LITERATURE REVIEW

CHAPTER 2

LITERATURE REVIEW

2.1 GENERAL

This chapter deals with the general understanding of the pedestrian characteristics. It also includes general discussion of different types of facilities available for safe pedestrian walking and crossing and also discuss about previously reviewed literature.

2.2 Review of literature

Few studies have so far been conducted in Bangladesh regarding pedestrians. These studies are mainly focused on overview of the generalized problems related with pedestrians. But none of them has measured the state of pedestrians at intersections. To have better understanding on the conceptualization on the issue, information related to the research were collected from different available existing books/journals, unpublished thesis, seminar paper, magazine, newspapers etc. The study also used recommendations of different study reports related with the research. It was useful to collect opinions of different researchers in this matter. Some literatures on the issue are as follows:

The Highway Capacity Manual, TRB, National Research Council, Washington, D.C. focused on different Pedestrian capacity terminology, principles of pedestrian flow, pedestrian speed-density relationships, level of service which were studied for conceptual development on this issue.

Md. Abdul Waresh (2001) pointed out in his thesis “Effect of Pedestrian Underpasses on Traffic Flow Characteristics: Metropolitan Dhaka” pedestrian crossing behavior in particular relation to the grade separated pedestrian facilities. He also assessed the effect of underpasses on traffic flow characteristics.

Chowdhury et all (2010) in thesis "A study on Pedestrian Walking Speed" provided of pedestrian crossing speed in different locations of Dhaka city. They observed pedestrian walking speed between different road facilities like zebra crossing, signal compliance, road mid-section and roadside footpath.

Mannering Fred L et.al (2005) in his book "Principles of Highway Engineering and Traffic Analysis" provided guidelines on Intersection and signal control characteristics, analysis of traffic at signalized intersection, signalized intersection analysis for level of service, traffic signal phasing and timing plan which are relevant to get information to conduct this study.

Md. Hadiuzzaman (2008) pointed out in his thesis "Development of Saturation Flow and Delay Models for Signalized Intersection in Dhaka City" provided standard terminology, saturation model which has been studied to acquire secondary information. He also calculated delay following HCM 2000 delay model which was used as secondary information. He developed saturation flow model and delay model for some selected intersection of Dhaka city which was used as secondary information.

Ganesh J Karkee (2009) in his paper "Statistical Analysis of Pedestrian Crossing Behavior on Streets" suggested that several factors influence a pedestrian's decision to use or not to use a crosswalk to cross a street. The presence of a crosswalk and its proximity to the pedestrian's trip origin or destination, and traffic volume on the street, play a key role in this decision making process.

JP Pitaksringkarn (2005) in his paper "Implementation of the First Pedestrian Scramble in Downtown San Diego, California" published in the Journal of the Eastern Asia Society for Transportation Studies, Vol. 5, pp. 2504-2515 suggested that the result from the Synchro traffic signal analysis is that the proposed pedestrian scramble signal has no significant impact to the current vehicular traffic operation at the intersection which inspired the study to introduce EPP in Dhaka city.

Xu Hao et all (2005) in paper " Pedestrian Crossing Behavior At Signalised Crossings" published in the Journal of Association for European Transport and contributors suggested in order to identify

junctions where priority should be shifted to pedestrians it is necessary to understand the crossing behavior of pedestrians and their perceptions of different crossing types.

Bijan Vaziri (1996) in his paper " Exclusive Pedestrian Phase for the Business District Signals in Beverly Hills, 10 Years Later: City of Beverly Hills, California, 1996" published in the Journal of City of Beverly Hills Engineering Department 455 N. Rexford showed that the addition of an exclusive pedestrian signal phase to the signal timing considering to clear the intersection of pedestrians during the vehicular phase, allows better movement of vehicles and permitting pedestrians to cross without vehicle interference. This also improves the safety of pedestrians and reduces the potential for auto/pedestrian conflicts and accidents.

Bissessar, R. et all (2010) in paper "Pedestrian Scramble Crossings – A Tale of Two Cities" presented analysis on public response after introduction of pedestrian scramble phase in Toronto. They mentioned that a survey was conducted on 462 pedestrians three months later over a two-day period at the Yonge Street/Dundas Street intersection to assess their reaction to the pedestrian scramble operations. Results from the survey show 89% of pedestrians thought it was a good idea to have this type of operation at the Yonge Street/Dundas Street intersection. When asked what the purpose of the walking trip was, 32% of the pedestrians surveyed indicated that they were travelling to/from work and 31% were travelling to/from school. 57% of the pedestrians surveyed indicated that they cross this intersection more than once a day. 78% indicated that they have crossed this intersection diagonally.

There are few studies on pedestrian behavior in Dhaka City. Rahman, Afrin and Alum tries to measures the level of service (LOS) of walkways in Dhaka city. The study explores the qualitative level of comfort of the pedestrian in Dhaka city by offering six broad categories of roadside walking environment in terms of "1) safety, 2) security, 3) convenience and comfort, 4) continuity of walkways, 5) system coherence and 6) attractiveness" facilities.

This literature shows that lots of studies have been done to model pedestrian behavior in different sections of roadway in different cities of the world. Unfortunately, no such study was conducted in Dhaka City which elaborated the behavior and preferences of pedestrian while using these roads. This study will focus to fulfil these knowledge gaps. Limitation facing while

conduction the survey and some recommendation for creating pedestrian friendly environment based on pedestrian perception are discussed in the last portion of this research paper.

2.3 Study of the area

i) Hatir-Jheel

The Hatirjheel Interconnected System, an interconnected hydrological unit consisting of Hatir-jheel detention area, Banani lake and Gulshan lake, has been selected as the study area (Fig 1). This system is the largest storm water detention area in the Dhaka city.

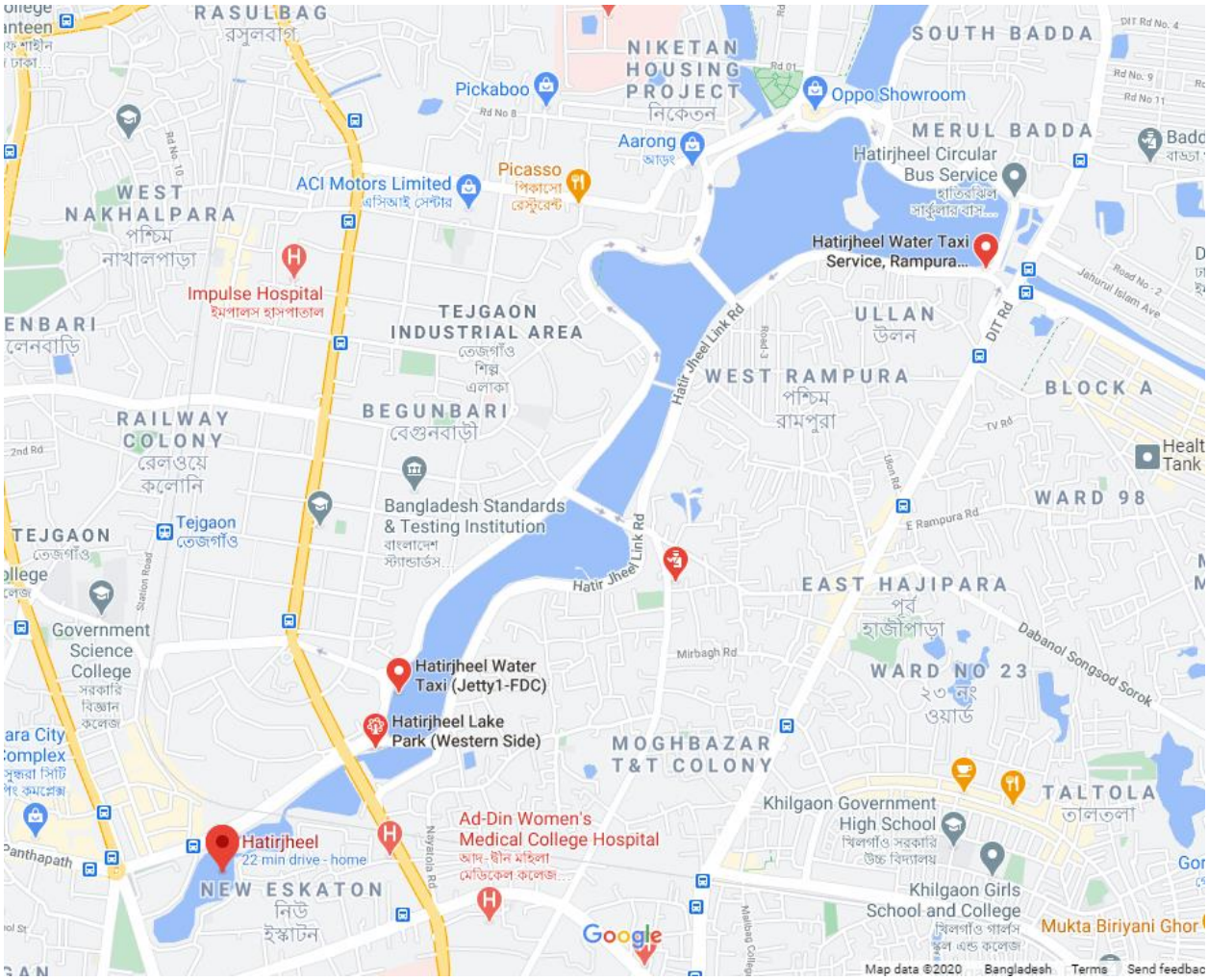


Figure 2.3.1: Study Area of Hatir-Jheel.

ii) Farmgate

Farmgate is an important place in Dhaka, the capital of Bangladesh. It is named so because there used to be a big farm in the area and the gate of the farm was located on the Mymensingh Road (now known as Old Airport Road). This is one of the busiest and most crowded areas of Dhaka city. From the early 1990s, the area has seen massive building and construction boom. Consequently, the area has gained commercial importance and has become one of the major transportation hubs of Dhaka from where anyone can travel to all other parts of the city as well as throughout the country. Line 6 of the Dhaka Metro Rail has a station there. Today Farmgate has become more of a commercial area than a residential area. Neighboring places of Farmgate are Kawran Bazar, Pantapath, National Parliament, Rajabazar etc.

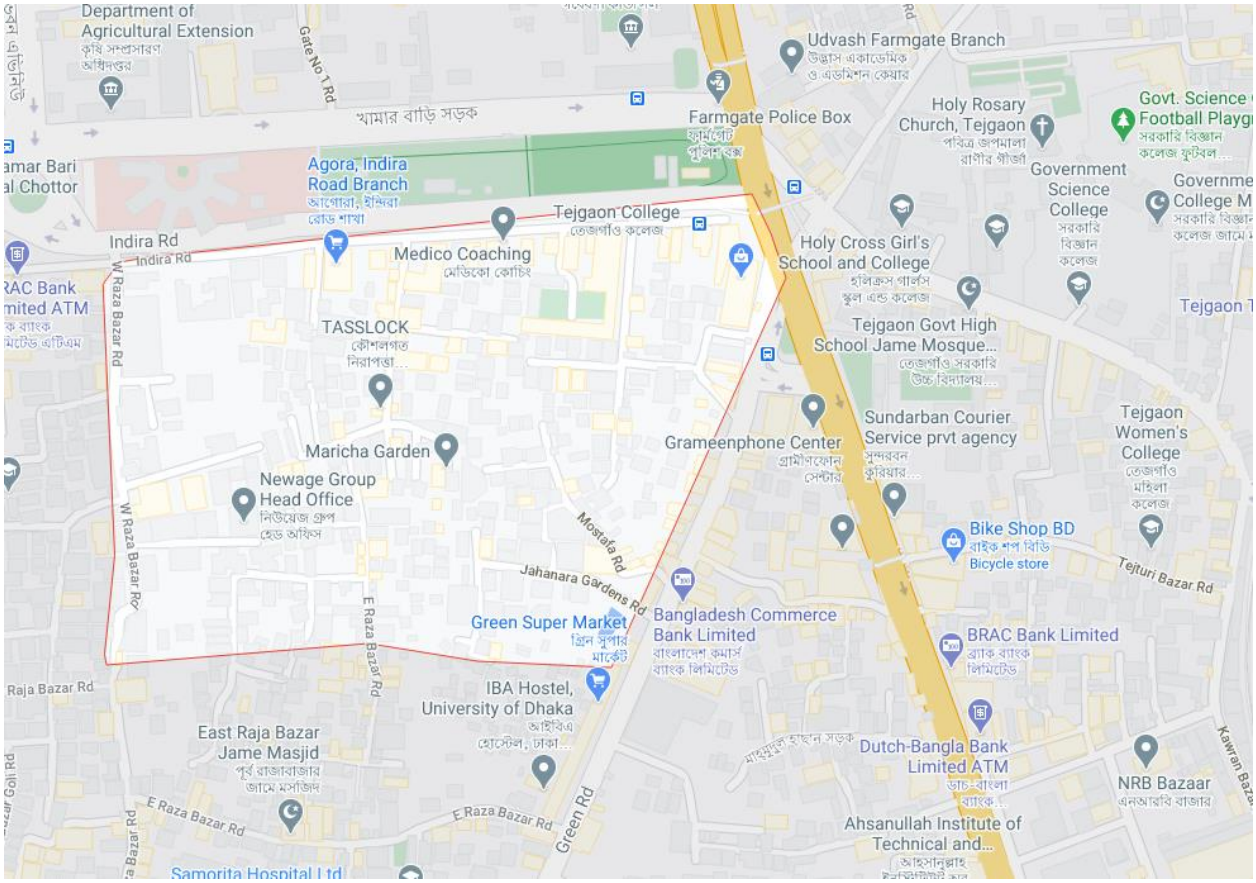


Figure 2.3.2: Study Area of Farmgate.

2.4 Standard Terminology

Following terms are used for pedestrian facilities. Such as:

i) Footpath

Footpaths are those parts of a road or street that are intended for pedestrian use. Pedestrians include people on foot, in wheel chairs, on mobility scooters, or pushing a pram. It is therefore important that footpaths are wide enough for unhindered, unobstructed use by all user groups – including disabled users. Footpaths should be provided on at least one side of the road over the full length of urban roads. However, in areas with a significant number of pedestrians such as bus routes, commercial centres, school routes, and those with a high public profile, footpaths should be provided on both sides of the road. Similar selection criteria are applicable to determining the need for footpaths in rural areas.

Figure 2.4.1: Footpath at Farmgate

ii) Zebra crossing

Zebra crossings are formal crossings where the pedestrian is given legal priority over vehicles without the use of traffic signal controls. They are a relatively low cost option compared with signal-controlled crossings. A Zebra crossing is marked on the carriageway with alternate black and white stripes. Studs and `Give Way' markings outline the crossing, and zig-zags replace centre and kerb side markings on either side of the crossing. These highlight the crossing and prohibit parking to ensure good visibility. Flashing yellow beacons are placed at each end of the crossing.

Figure 2.4.2: Zebra Crossing at Hatir-Jheel.

iii) Foot over bridge

A **foot over bridge** (also a **pedestrian bridge**, **pedestrian overpass**, or **pedestrian overcrossing**) is a bridge designed solely for pedestrians. While the primary meaning for a bridge is a structure which links "two points at a height above the ground", a footbridge can also be a lower structure, such as a boardwalk, that enables pedestrians to cross wet, fragile, or marshy land. Bridges range from stepping stones–possibly the earliest man-made structure to "bridge" water–to elaborate steel structures. Another early bridge would have been simply a fallen tree. In some cases a footbridge can be both functional and artistic.

Figure 2.4.3: Foot over bridge of Farmgate.

Figure 2.4.4: Foot over bridge at Hatir-Jheel.

iv) Traffic signals

Traffic lights (or **traffic signals**) are lights used to control the movement of traffic. They are placed on roads at intersections and crossings. The different colors of lights tell drivers what to do.

Traffic lights change their colors in the same order every time. In most English-speaking countries, traffic lights usually change in this order:

1. Red light on: This tells drivers to stop.
2. Green light on: This means the driver can start driving or keep driving.
3. Yellow light on: This tells drivers to stop when it is safe to, because the light is about to turn red.

Figure 2.4.5: Traffic Signal at Farmgate.

2.5 Summary

In this chapter there are discussion about the previously reviewed literatures and the details and the terminologies of the study area. The terminologies are: footpath, zebra crossing, foot overbridge and traffic signals. There are discussion about these terminologies of the study area and details with photographs.

CHAPTER THREE

METHODOLOGY

CHAPTER 3

METHODOLOGY

3.1 General

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. Data from both primary and secondary sources has been used for this study. This study also maintains the following methodology for the achievement and successful accomplishment of the dissertation work. Field survey has been conducted to identify the existing pedestrian crossing facilities are present at major intersection in Dhaka city at the selected study area. Existing pedestrian crossing facilities has been collected manually. Pedestrian movement data has been collected where traffic demand and pedestrian activities are very high. Data analysis has been performed by MS Excel & Google Spreadsheet. Pedestrian behavior studies have been done by questionnaire survey.

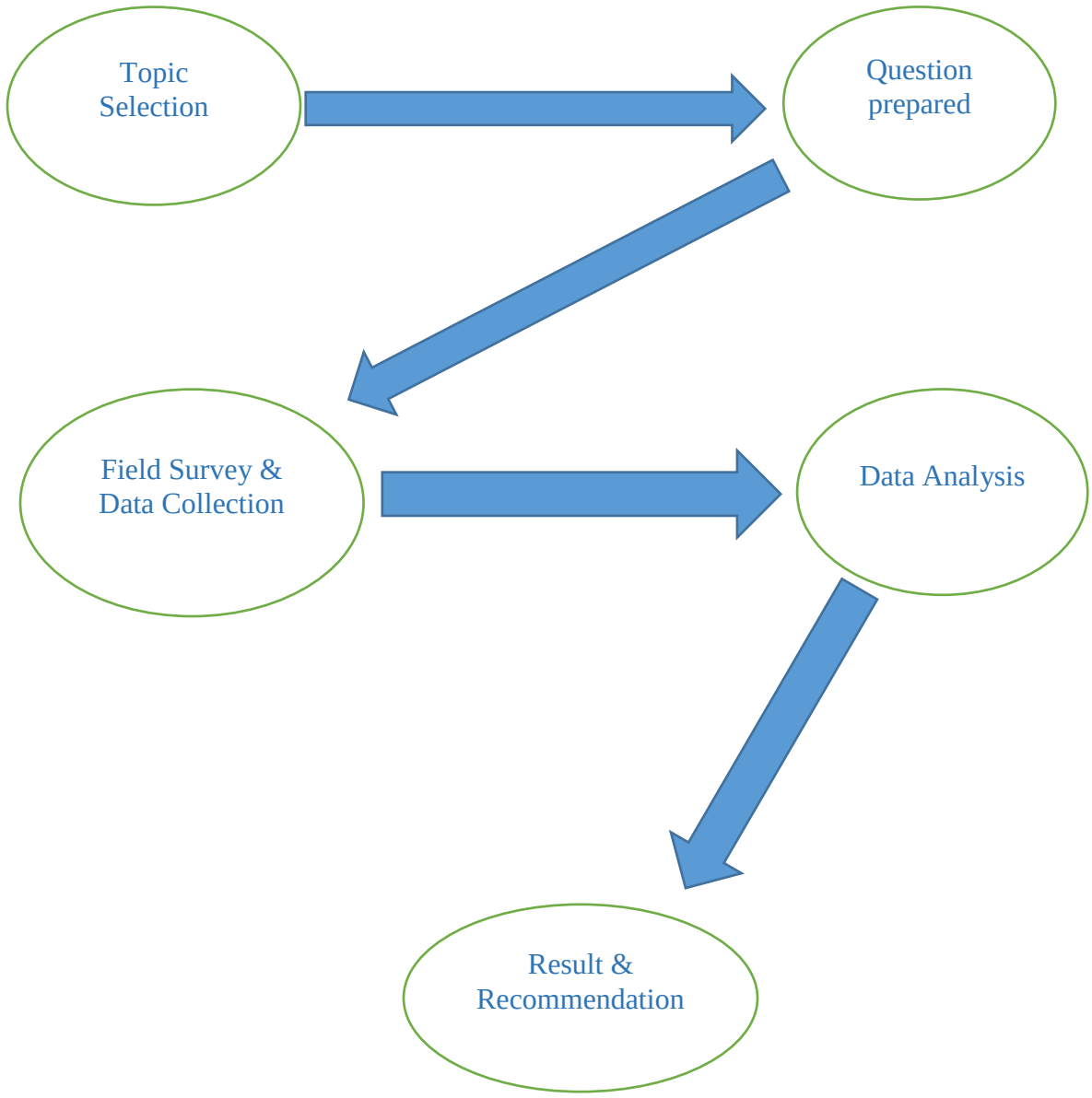
3.2 Data Collection

Primary source of data has been used by the study. But as the study of pedestrian situation in the study area is comparatively a new one, the study mostly depended on primary sources for data and information.

3.3 Methodology of the study

Methodology is the systematic procedure to conduct the study in a scientific and concise manner. To conduct the present study the mentioned steps were followed:

Flow chart showing the methodology of the study is given in below figure:



3.4 Selection of the area

Selection of the study area is very important for any kind of dissertation and research study. According to the title and objectives a part of the main arterial thoroughfare of Dhaka city was taken for study which extends from Hatir-Jheel (near madhubag area) & Farmgate Road, because the adverse effect of parking was prominent in this part of the road.

3.5 Field observation and Reconnaissance

Reconnaissance was a process to observe the study area at a glance for preliminary data collection. Several on-spot visit and in formal data were collected for clear conceptualization and to develop a strategy to conduct the study.

3.6 Preparation of questionnaire

Based on the field observation and reconnaissance several draft questionnaires were prepared. These questionnaires were tested, verified and cross-checked for its efficiency, and final questionnaires were prepared after wards Two types of questionnaires were prepared; one for the general traffic and the other for the parked vehicle driver of the study area.

3.7 Summary

In this chapter there are discussion about the topic selection, study area selection, preparation of questions for the questionnaire survey.

CHAPTER FOUR

DATA COLLECTION AND ANALYSIS

CHAPTER FOUR

DATA COLLECTION AND ANALYSIS

4.1 Introduction

Some questions were prepared and put them those questions for survey and asked those question survey to the survey area. This question asked through 100 people for both at Hatir-Jheel and Farmgate. With this survey question prepared a pie chart.

4.2 Study area

For any research study area section is one of the main criteria. We select our study area Hatir-Jheel (near Madhubag area) and Farmgate road. In this two road we try to understand current on-street and off-street parking situation.

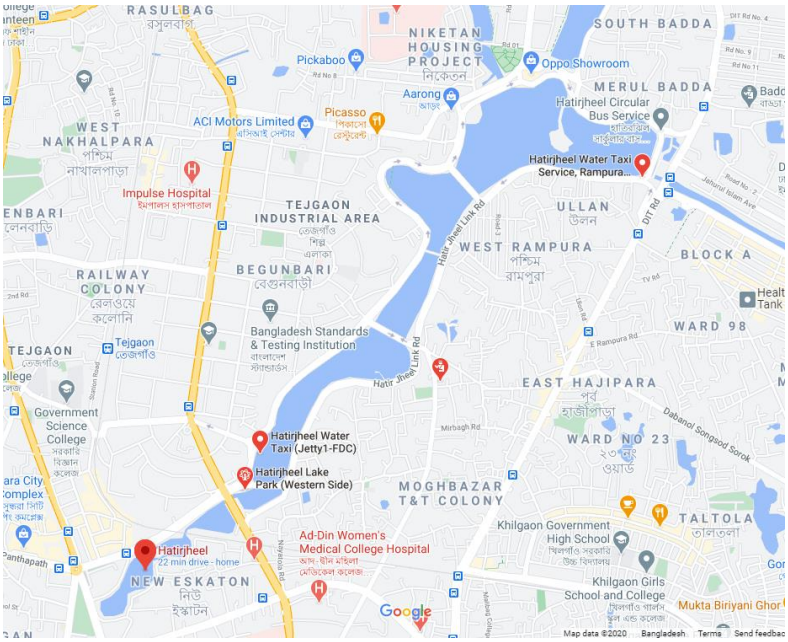


Figure 4.2.1: Study area of hatir-jheel.

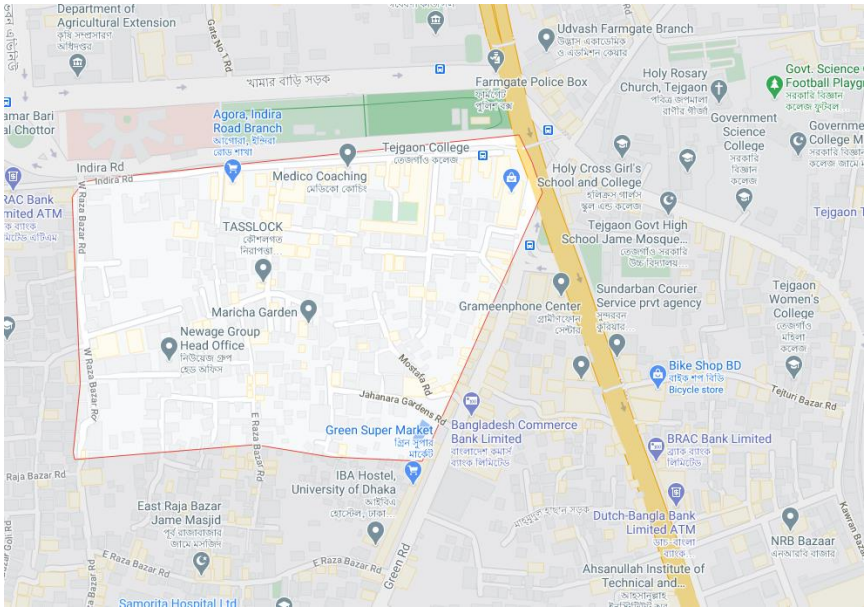


Figure 4.2.2: Study area of Farmgate.

4.3 Photographic Survey of the study area

Figure 4.3.1: Study area of Hatir-Jheel (near Madhubag area).

Figure 4.3.2: Narrow footpath for pedestrian which need to be widen.

Figure 4.3.3: Limited space for pedestrian at bus stoppage which need to be increased.

Figure 4.3.4: Unusable dustbin at Hatir-Jheel which need to be repaired.

Figure 4.3.5 & Figure 4.3.6: Street lights at Hatir-Jheel area.

Figure 4.3.7: Footover bridge at Hatir-Jheel area.

Figure 4.3.8: Study area of Farmgate.

4.3.9: Footover Bridge at Farmgate.

Figure: 4.3.10: Footpath is blocked in maximum portions by hawkers.

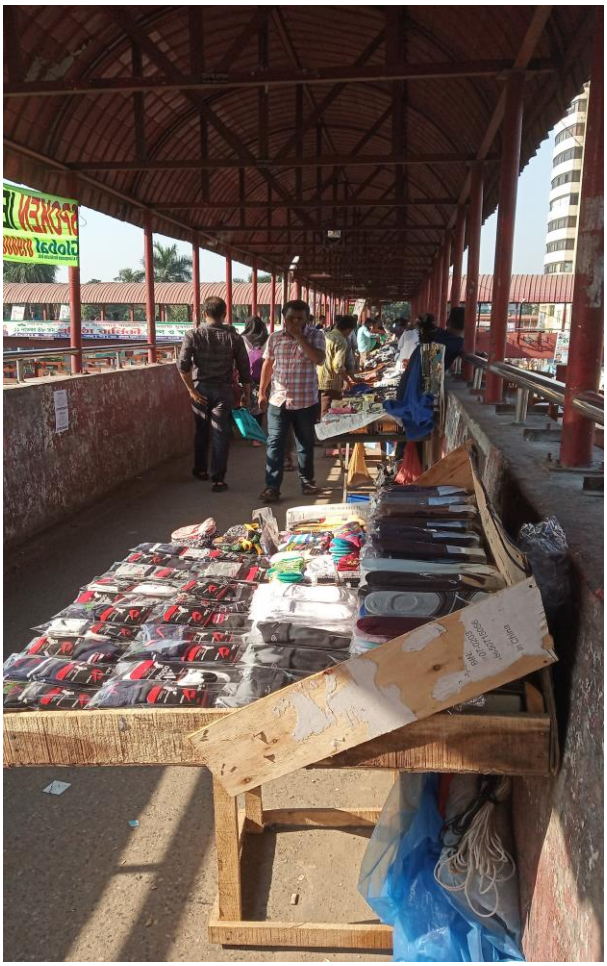
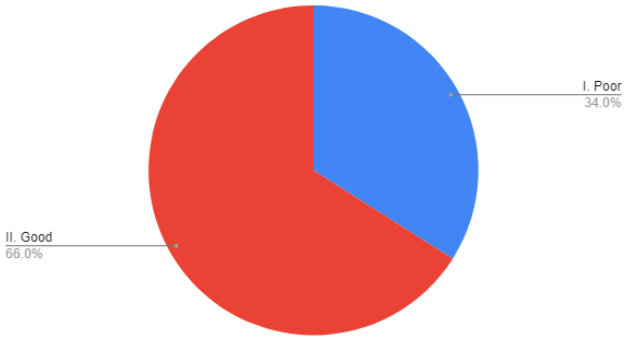


Figure 4.3.11 & Figure 4.3.12: Footover bridge and footpath blocled by hawkers.

4.4 Questionnaire Survey at Hatir-Jheel (Near Madhubag Area)

Q. 1 – Is it safe to cross roads in this area?

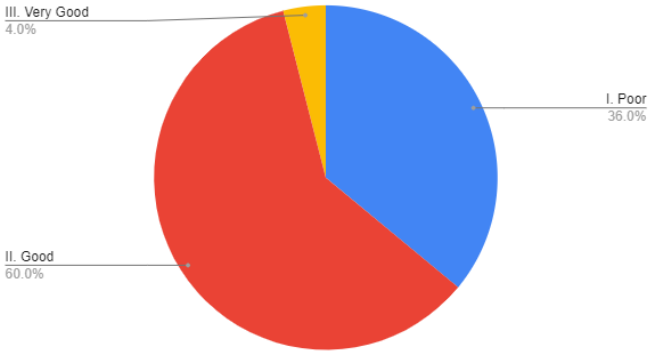
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 66% people think it is safe to cross roads in this area. Because the people think that there are well conditioned and safe way to cross the roads. The rest of responses are 34% in poor.

Q. 2 – Do your think provided facilities are enough?

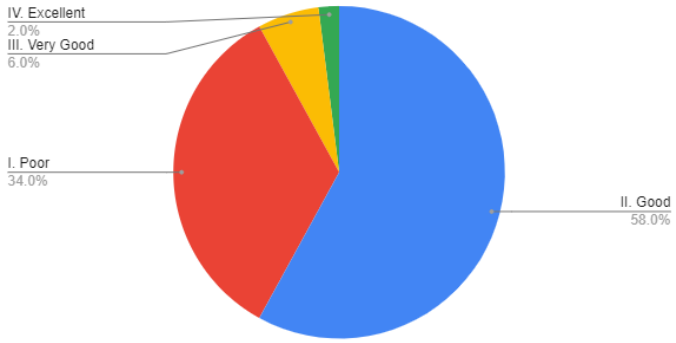
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 60% people think that the provided facilities are good enough. Because there are proper dustbins, amount of walkways and sitting arrangements at bus stoppage. The rest responses are 36% in poor and 4% in very good.

Q. 3 – Are you satisfied with the present condition of footpath?

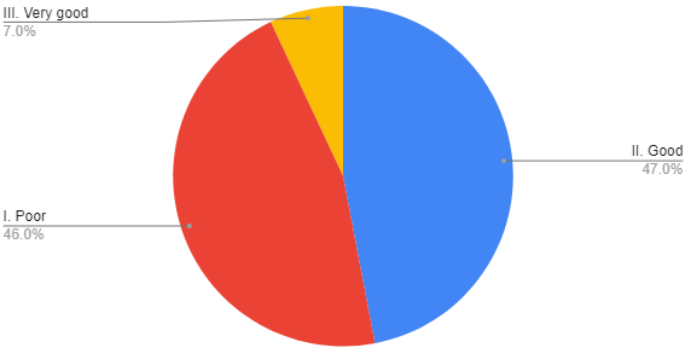
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 58% people think that the present condition of footpath is good. Because the positions of the footpath is good enough to walk freely and its always free to walk because of less hawkers. The rest responses are 34% in poor, 6% in very good and 2% in excellent.

Q. 4 – Do you think that footpath width is enough for current volume of pedestrian?

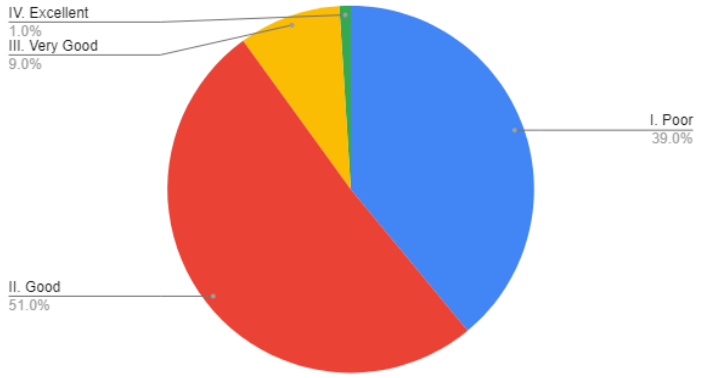
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 46% people think that the footpath width is poor because they think that the pedestrian flow is a bit more in this area and the width is not enough and another 47% people think it's good enough for current volume of pedestrian because they think that the pedestrian flow is okay with the present condition of footpath width. The rest response is 7% in excellent.

Q. 5 – Is it secure to use this footpath at night?

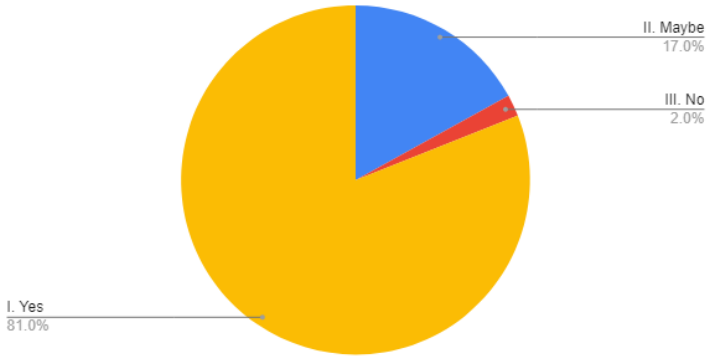
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 51% people has rated good in security for using the footpath at night because they think that the security level is average and its secured to use the footpath at night. The rest responses are 39% in poor, 9% in very good and 1% in excellent.

Q. 6 – Do you think improvement of this existing facility is needed in this footpath?

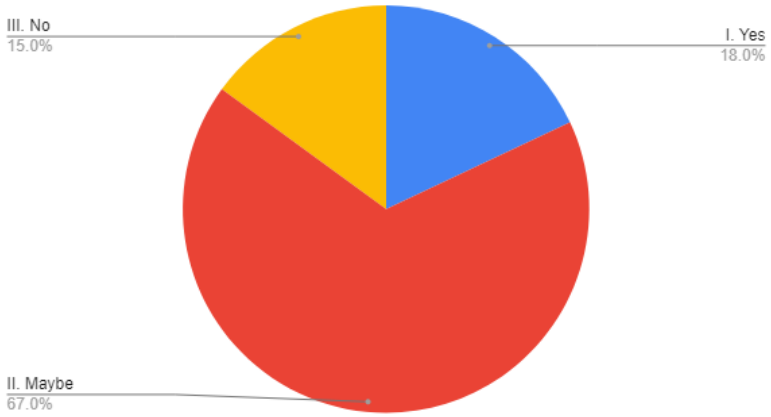
i) Yes
ii) Maybe
iii) No



Summary: Here 81% people think that existing facility is needed to be improved in this footpath. Because they think that the walkway condition of this footpath need to be repaired and there should be more steps to recover the damaged dustbins and sitting arrangements in this area. The rest responses are 17% in maybe and 2% in no.

Q. 7 – Is this footpath is continuous?

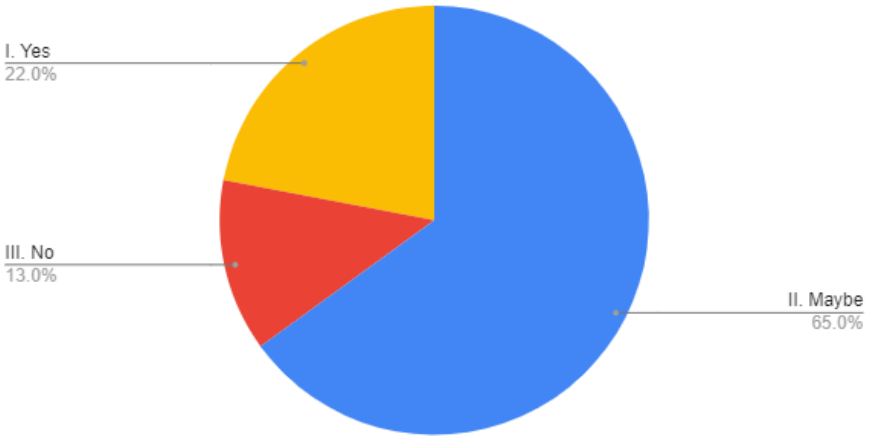
i) Yes
ii) Maybe
iii) No



Summary: Here 67% people don't know that the footpath is continuous or not so they responded in maybe. The rest responses are 15% in no and 18% in yes.

Q. 8 – Is there any zebra crossing in this area or zebra crossing maintained or not?

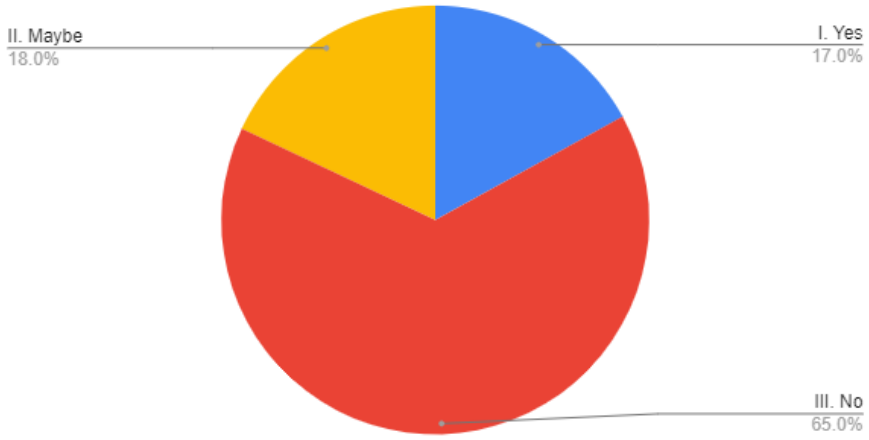
i) Yes
ii) Maybe
iii) No



Summary: Here 65% people don't know that if there is any zebra crossing exist or not, that's why they have responded in maybe. As they don't know about any existing zebra crossing so they also don't know about their maintenance. The rest responses are 22% in yes and 13% in no.

Q. 9 – At the bus stoppage is there enough space for pedestrian to stop or get into the bus?

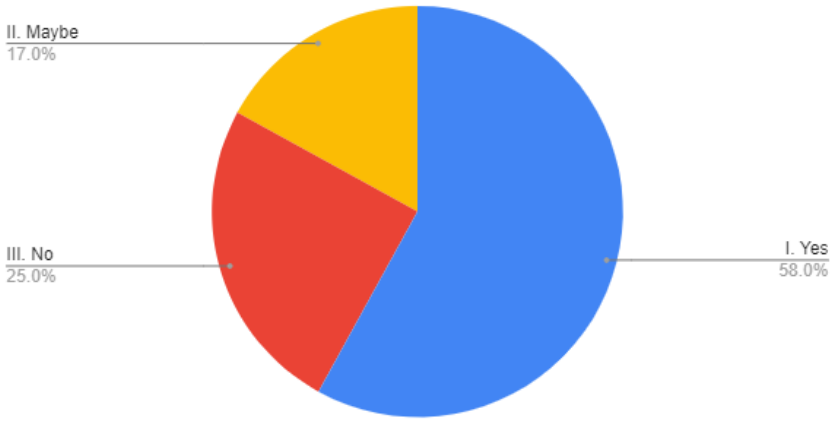
i) Yes
ii) Maybe
iii) No



Summary: Here 65% people think that there is not enough space for pedestrian to stop and get into the bus at bus stoppage. Cause there are so many people to take journey by bus at this area and it becomes congested. The rest responses are 17% in yes and 18% in maybe.

Q. 10 – Enough street light is provided in the footpath at night?

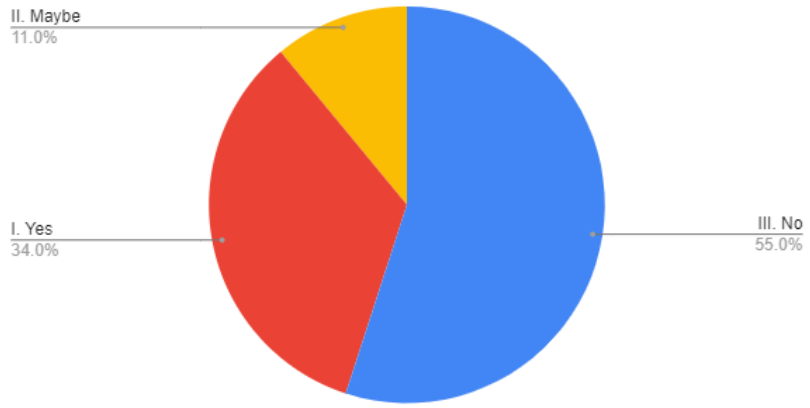
i) Yes
ii) Maybe
iii) No



Summary: Here 58% people think that street lights are enough provided in the footpath at night. The rest responses are 17% in maybe and 25% in no.

Q. 11 – Do you feel any problem associated with the lamp post while walking in the road?

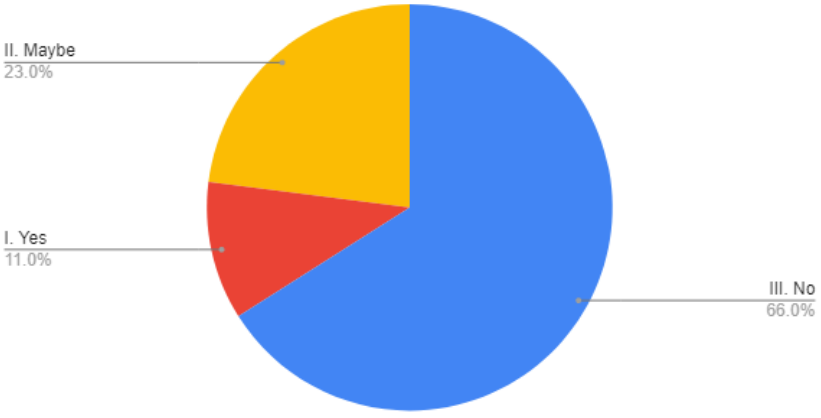
i) Yes
ii) Maybe
iii) No



Summary: Here 55% people think that they don't face any problem associated with the lamp post while walking in the road. Because the situation of the lamp posts are well oriented in this area. The rest responses are 11% in may be and 34% is yes.

Q. 12 – Is there any dustbin in the footpath and is it properly used by the pedestrian?

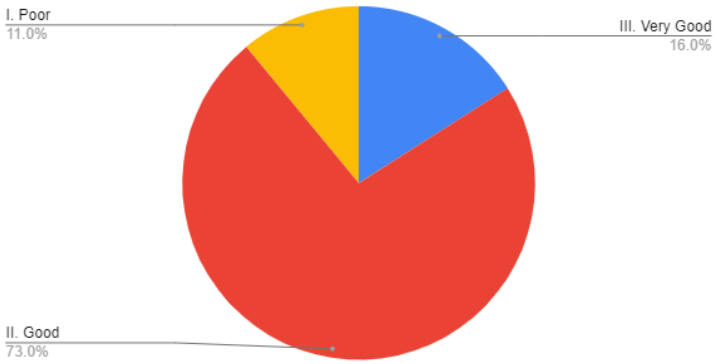
i) Yes
ii) Maybe
iii) No



Summary: People think that there are no dustbin in the footpath and it's not used by the pedestrian properly that's why the 66% of people has answered in no. The rest responses are 23% in maybe and 11% in yes.

Q. 13 – Overall rate this pedestrian facilities of this area

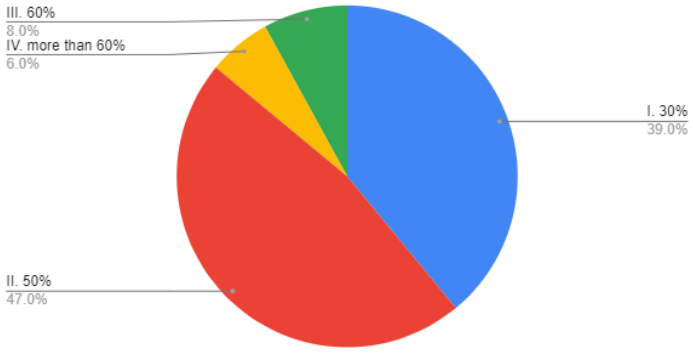
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 73% people think that the pedestrian facilities of this area is good. Because they think that the conditions of footpath, the availability of lamp post and enough foot overbridge and the presence of hawkers is less in this area. The rest responses are 11% in poor and 16% in very good.

Q. 14 – How will you rate the footpath according to the blockage by the hawkers?

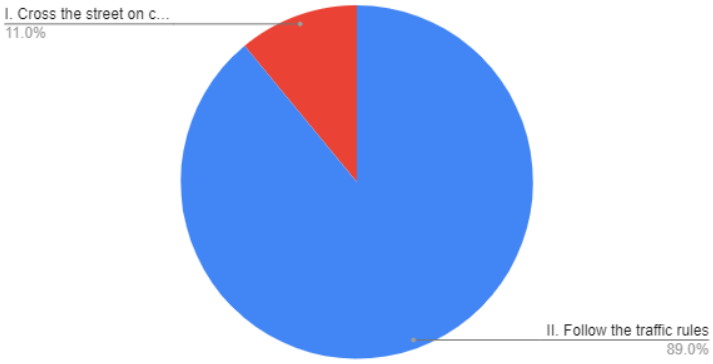
i) 30%
ii) 50%
iii) 60%
iv) more than 60%



Summary: Here 47% people think that 50% of the footpath is blocked by the hawkers. The rest responses are 39% in 30% blockage, 8% in 60% blockage and 6% blockage in more than 60%.

Q. 15 – What are your responsibilities as a pedestrian?

i) Cross street in crossing
ii) Follow the traffic rules
iii) No responsibilities

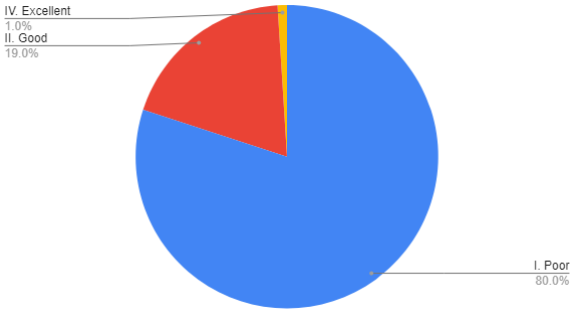


Summary: Here 89% people think that they should follow the traffic rules and 11% people think they should cross the street on crossing.

4.5 Questionnaire Survey at Farmgate

Q. 1 – Is it safe to cross roads in this area?

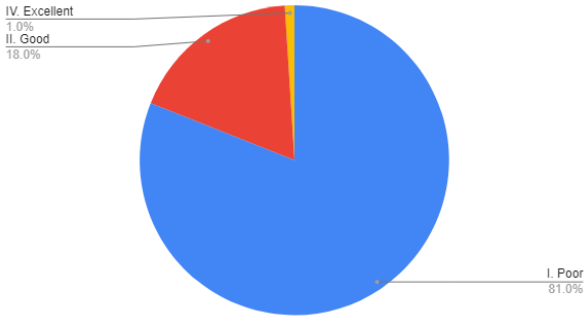
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 80% people think that it's poor condition and not safe to cross roads in this area. Because there are so many people traveling in this with and without vehicle and it becomes congested and risky and the drivers are also reckless sometimes. The rest responses are 19% in good and 1% in excellent.

Q. 2 – Do your think provided facilities are enough?

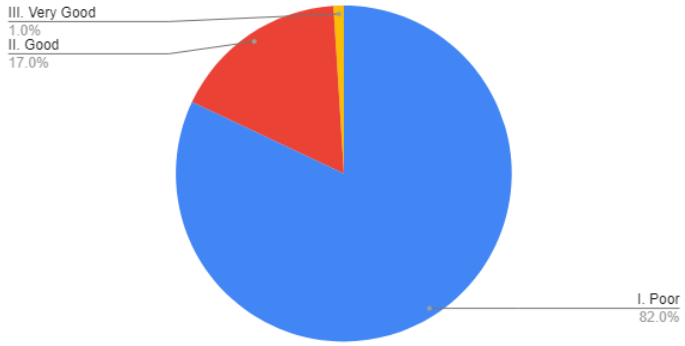
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: People think that provided facilities are not enough and poor because there are less available place for pedestrian flow and the roadside dustbins are not situated at proper places so that the 80% people answered in poor. The rest responses are 18% in good and 1% in excellent.

Q. 3 – Are you satisfied with the present condition of footpath?

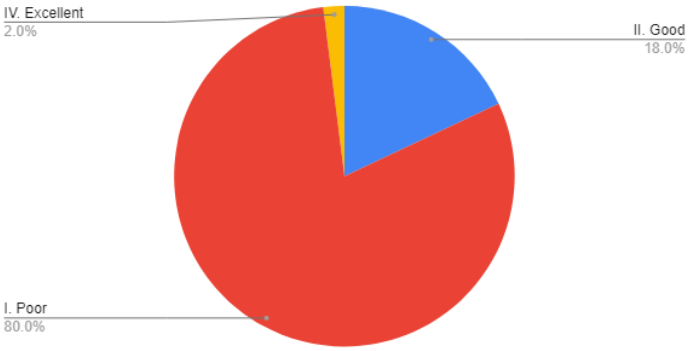
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 82% people think that present condition of footpath is poor and they are not satisfied because the maximum portions of the footpath is blocked by the hawkers and they can't find any good pedestrian flow. The rest responses are 17% in good and 1% in very good.

Q. 4 – Do you think that footpath width is enough for current volume of pedestrian?

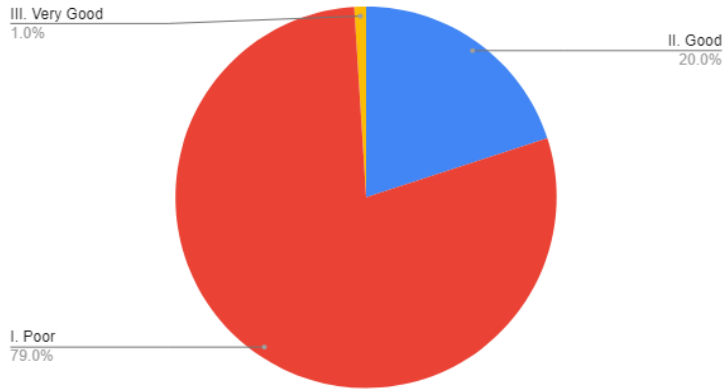
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: People think that footpath width is not enough for the current volume of pedestrian because there are less available space for a good pedestrian flow in this footpath and the movement of pedestrian in this area is vast in the ratio of footpath width that's why the 80% people responded in poor. The rest responses are 18% in good and 2% in excellent.

Q. 5 – Is it secure to use this footpath at night?

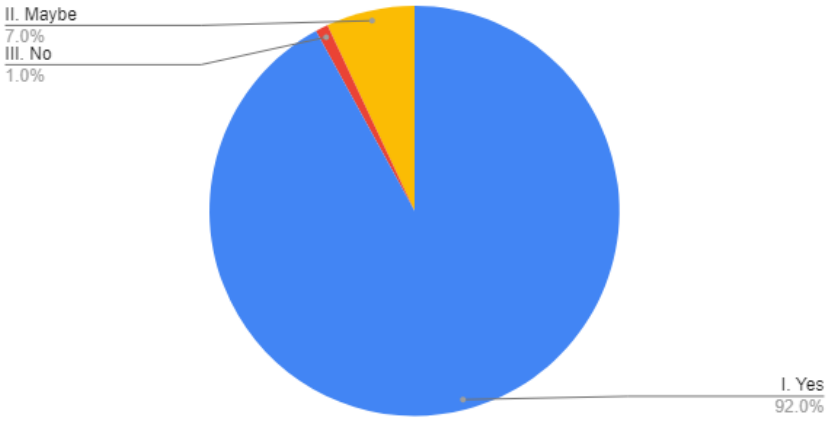
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 79% people think that its not secure to use this footpath at night and its poor because there are so many occurrence of crimes at night and the street lights do not work properly. The rest responses are 20% in good and 1% in very good.

Q. 6 – Do you think improvement of this existing facility is needed in this footpath?

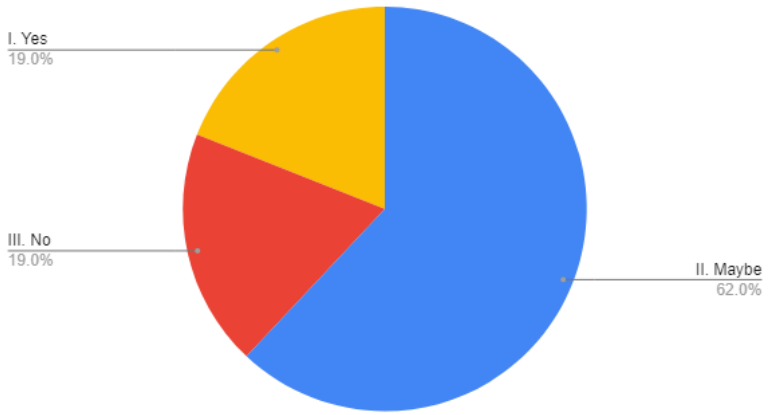
i) Yes
ii) Maybe
iii) No



Summary: Here 92% people think that the existing facility is needed to be improved in this footpath because the road condition of footpath is not well maintained and it need to be repaired at so many places. The rest responses are 7% in maybe and 1% in no.

Q. 7 – Is this footpath is continuous?

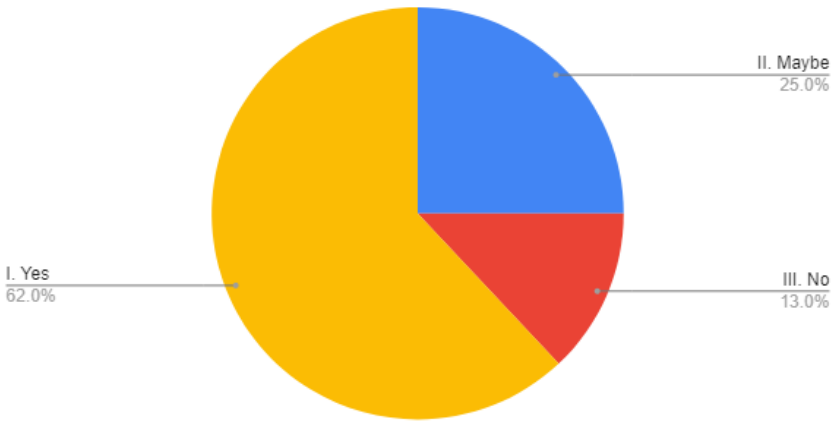
i) Yes
ii) Maybe
iii) No



Summary: Here 62% people don't know that the footpath is continuous or not so they responded in maybe. The rest responses are both 19% in no and in yes.

Q. 8 – Is there any zebra crossing in this area or zebra crossing maintained or not?

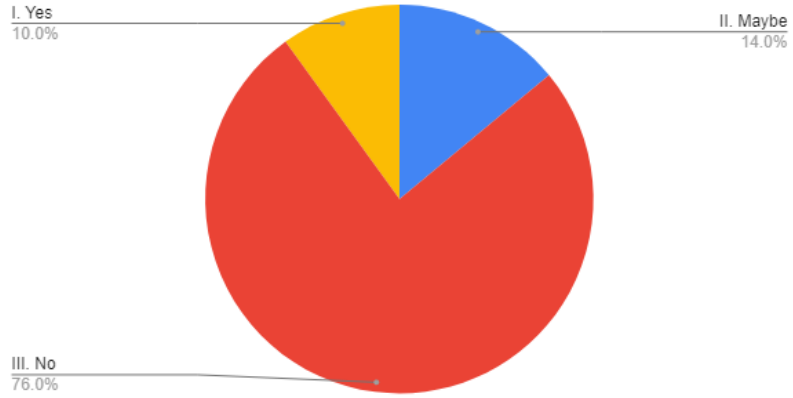
i) Yes
ii) Maybe
iii) No



Summary: Here 62% people think that zebra crossing exist there and it is maintained. The rest responses are 25% in maybe and 13% in no.

Q. 9 – At the bus stoppage is there enough space for pedestrian to stop or get into the bus?

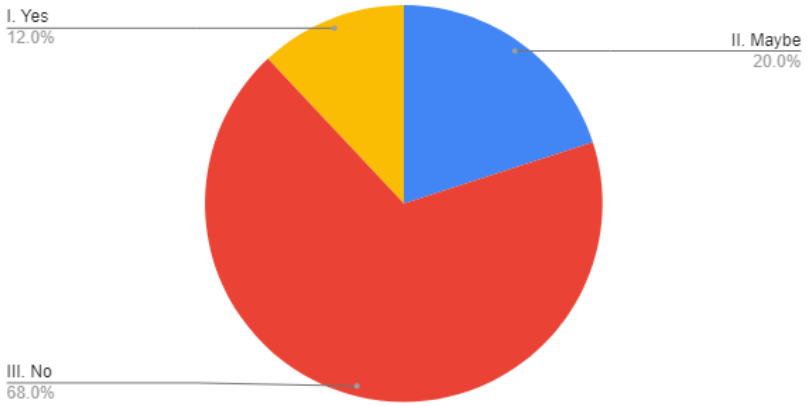
i) Yes
ii) Maybe
iii) No



Summary: Here 76% people think that there is not enough space for pedestrian to stop and get into the bus at bus stoppage. Cause there are so many people to take journey by bus at this area and it becomes congested. The rest responses are 10% in yes and 14% in maybe.

Q. 10 – Enough street light is provided in the footpath at night?

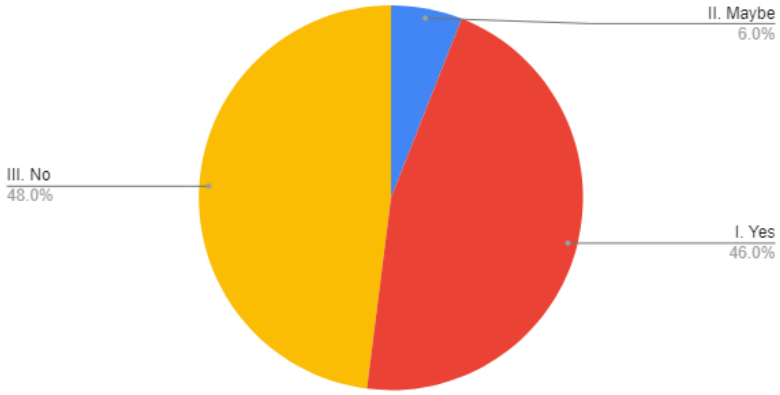
i) Yes
ii) Maybe
iii) No



Summary: Here 68% people think that street light in the footpath is not provided enough at night and though there are some street lights but they are not working. The rest responses are 12% in yes and 20% in maybe.

Q. 11 – Do you feel any problem associated with the lamp post while walking in the road?

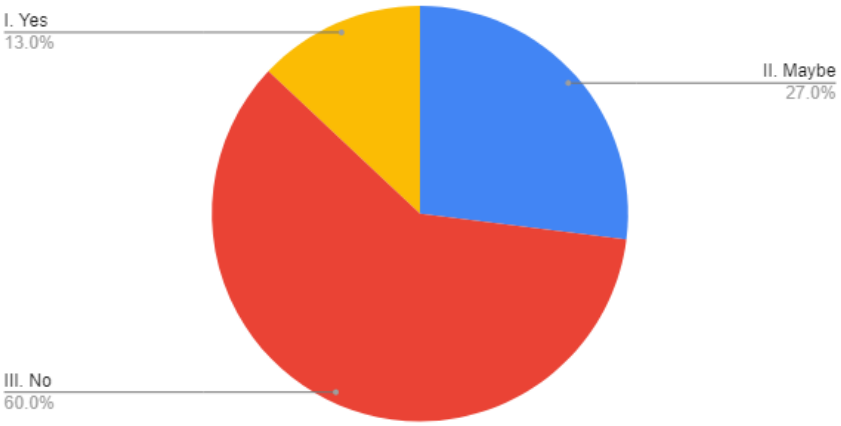
i) Yes
ii) Maybe
iii) No



Summary: Here 48% people don't face any problem associated with the lamp post while walking in the road because they think that the lamp posts are well oriented but the other 46% people are facing problems while walking in the road because they think that the lamp posts are not situated at right places. The rest response is 6% in maybe.

Q. 12 – Is there any dustbin in the footpath and is it properly used by the pedestrian?

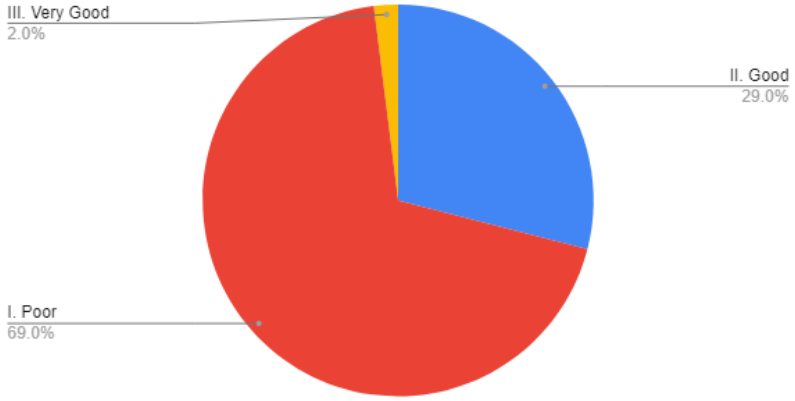
i) Yes
ii) Maybe
iii) No



Summary: Here 60% people think that there is no dustbin in the footpath and its not used properly. The rest responses are 27% in maybe and 13% in yes.

Q. 13 – Overall rate this pedestrian facilities of this area

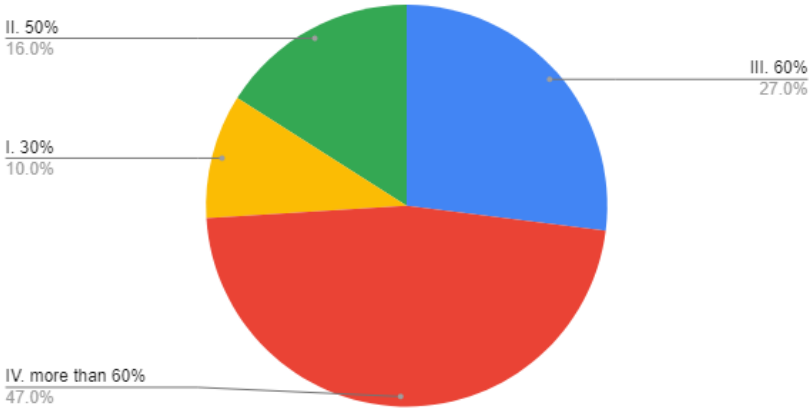
i) Poor
ii) Good
iii) Very Good
iv) Excellent



Summary: Here 69% people think that the pedestrian facility in this area is poor because there are lots of walkway blockage by hawkers, less availability of lamp posts, less availability of spaces for good pedestrian flow. The rest responses are 29% in good and 2% in very good.

Q. 14 – How will you rate the footpath according to the blockage by the hawkers?

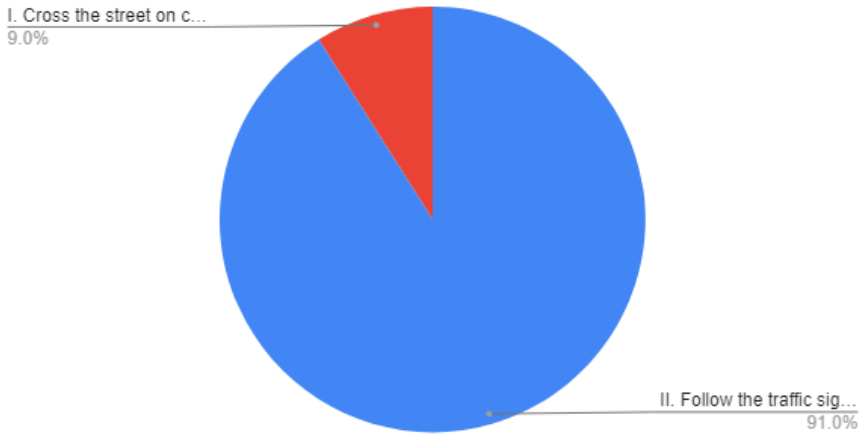
i) 30%
ii) 50%
iii) 60%
iv) more than 60%



Summary: Here 47% people think that the footpath is blocked more than 60% by the hawkers. The rest responses are 10% in 30% blockage, 16% in 50% blockage and 27% in 60% blockage.

Q. 15 – What are your responsibilities as a pedestrian?

i) Cross street in crossing
ii) Follow the traffic signals
iii) No responsibilities



Summary: Here 91% people think that they should follow the traffic signal and 9% people think they should cross the roads on crossing.

4.6 Summary table on the questionnaire survey at Hatir-Jheel (Near Madhubag area)

Question Topics	Poor	Good	Very Good	Excellent
1. Crossing safety	i) 34%	ii) 66%	iii) 0%	iv) 0%
2. Provided facilities	i) 36%	ii) 60%	iii) 4%	iv) 0%
3. Footpath condition	i) 34%	ii) 58%	iii) 6%	iv) 2%
4. Footpath width	i) 46%	ii) 47%	iii) 7%	iv) 0%
5. Footpath security	i) 39%	ii) 51%	iii) 9%	iv) 1%
6. Pedestrian facilities rating	i) 11%	ii) 73%	iii) 16%	iv) 0%
7. Footpath blockage rating	i) 6%	ii) 8%	iii) 47%	iv) 39%
	Yes	Maybe	No	
8. Facility improvement	i) 81%	ii) 17%	iii) 2%	
9. Footpath continuity	i) 18%	ii) 67%	iii) 15%	
10. Zebra crossing	i) 22%	ii) 65%	iii) 13%	
11. Space in bus stoppage	i) 17%	ii) 18%	iii) 65%	
12. Street lights in footpath	i) 58%	ii) 17%	iii) 25%	
13. Lamp post problem	i) 34%	ii) 11%	iii) 55%	
14. Footpath dustbin	i) 11%	ii) 23%	iii) 66%	
15. Pedestrian responsibilities	i) Cross street in crossing: 11%	ii) Follow the traffic rules: 89%	iii) No responsibilities: 0%	

4.7 Summary table on the questionnaire survey at Farmgate

Question Topics	Poor	Good	Very Good	Excellent
1. Crossing safety	i) 80%	ii) 19%	iii) 0%	iv) 1%
2. Provided facilities	i) 81%	ii) 18%	iii) 0%	iv) 1%
3. Footpath condition	i) 82%	ii) 17%	iii) 1%	iv) 0%
4. Footpath width	i) 80%	ii) 18%	iii) 0%	iv) 2%
5. Footpath security	i) 79%	ii) 20%	iii) 1%	iv) 0%
6. Pedestrian facilities rating	i) 69%	ii) 29%	iii) 2%	iv) 0%
7. Footpath blockage rating	i) 47%	ii) 27%	iii) 16%	iv) 10%
	Yes	Maybe	No	
8. Facility improvement	i) 92%	ii) 7%	iii) 1%	
9. Footpath continuity	i) 19%	ii) 62%	iii) 19%	
10. Zebra crossing	i) 62%	ii) 25%	iii) 13%	
11. Space in bus stoppage	i) 10%	ii) 14%	iii) 76%	
12. Street lights in footpath	i) 12%	ii) 20%	iii) 68%	
13. Lamp post problem	i) 46%	ii) 6%	iii) 48%	
14. Footpath dustbin	i) 13%	ii) 27%	iii) 60%	
15. Pedestrian responsibilities	i) Cross street in crossing: 9%	ii) Follow the traffic signals: 91%	iii) No responsibilities: 0%	

In Hatir-Jheel area people has responded the most in the footpath width, facility improvements and street lights in footpath because they think that the footpath should be more wide than the present condition, the facilities should be more improved than present condition and street lights should be more usable because they are not working properly. In Farmgate area people has responded the most in facility improvement, footpath condition and provided facilities because they think that the provided facilities such as sitting area of bus stoppage, the roadside dustbins, the roadside drainage ways need to be improved, walkway condition of this area need to be improved because most of the portions of walkways are damaged.

4.8 Summary

In the following chapter, the collection and analysis of data according to the method and technique proposed in this chapter are presented. There are details of responses of the questionnaire survey with the suitable pie charts and the summarization of the responses through table with the details of the most three problematic things need to be repaired.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 General

Pedestrian crossing behavior depends on the destination, age, education, physical condition and overall awareness of the pedestrian. The issues associated with pedestrian crossing activities generally create considerable emotional concern within the community, especially when the community is reacting to an incident involving pedestrian injury. Pedestrian crossing safety relies on the judgment exercised by pedestrians and drivers. To interact safely requires an exchange of information between the pedestrian and the motorist. Although traffic control devices can help to promote an exchange of information, educating pedestrians and drivers is paramount to providing for a safe operation. Provision of visible cross marking must be installed in all the intersections. Considering the high density of pedestrian traffic all over the city, it should be provided to ensure safe pedestrian crossing. Median Island with median barrier must be provided in all the intersections to ensure safe pedestrian crossing. Street lighting around the crossing should be adequate so that cross marks are easily captured by the vehicle drivers to have stopping sight distance to avoid collision. Management of existing physical infrastructure must be enhanced to enable more effective use of crosswalks. It is provided with better road markings, signs, traffic signals, canalization at intersections, turn restrictions and separation barriers, space for bus stops, and parking or waiting areas for public transport vehicles (buses, rickshaws, auto-rickshaws, taxis, etc.). Pedestrian crossing should be considered carefully in traffic engineering and planning of the intersections and mid blocks.

5.2 Observation

- Pedestrians don't follow the traffic rules properly.
- Sometimes the foot overbridge is blocked not as regular time so the pedestrians just ignore the foot overbridge and cross the road anyhow.
- Maximum times the portions of the footpath and foot overbridge is blocked by hawkers.
- Less availability of electric lamp post.
- Parking vehicles by not maintain proper place or rules.
- Pedestrians face problems when they use footpath for walking because of not maintained manhole and drainage works.
- Less availability of roadside dustbin.

5.3 Recommendation of the study

- More street light need to be provided.
- More security need to be provided by the security squads at night time.
- Hawkers should be removed from the foot overbridge and footpath for a well maintained pedestrian flow.
- Traffic police should be strict to the vehicle owners or drivers because of unwanted parking at anyplace and create fine system.

5.4 Limitations

Data's were collected from the questionnaire survey by google form because of the pandemic COVID-19. It was unable to go to the practical field to do live survey that's why the survey was done by using google form system. That's why the accuracy of the collected datas are not so good.

5.5 Recommendations

- Considering a large proportion of pedestrian population in our country are poor, illiterate and lacking basic road sense and perception, a sustained road safety and educational campaign is very essential to aware, motivate, educate and above all to change mindset of our people regarding inhibition of not using grade-separated facilities.
- Proper road behavior instructions, with focused messages should be broadcast through mass median. Exclusive pedestrian Phase (EPP) may be introduced which will reduce

vehicular delay in the intersections. Intersections such as in and around shopping areas, institutional zones are rushed with higher volume of pedestrian traffic and vehicle green time is affected due to haphazard crossing making cordon may be provided with EPP.

- Illegal parking near the cross marks which obstacles pedestrian crossing and should be stopped.
- Pedestrians intended to avoid grade separated means of crossing for saving time and physical labour should be prohibited through legal actions against them.
- At grade crossing among the pedestrians should not be allowed randomly due to heavy traffic rush in most of the intersections because of high population density and increased volume of traffic in Dhaka city.
- Engineers should use the research for the well features of the selected areas which need to be improved.

5.6 Summary

Walking should be recognized as one of the dominant means of travel all over Dhaka city and facilities should be provided for the pedestrians on priority basis. Pedestrian crossing safety should be ensured based on traffic management, intersections and midblock design considerations, intersection geometry, signal designing, pedestrian facilities as signs, visible cross marking, existence of grade separated crossing facilities like over pass, underpass and many other factors. Pedestrian walkways that are either non-existent or in poor physical condition should be improved so that it is not blocked by various obstacles and pedestrians are not forced to walk on the road. It is necessary to remove inappropriate and illegal non-transport related activities from the public right-of-way to reclaim the full potential capacity of the existing road. In some cases this may involve the need to help relocate or establish alternative sites for such activities. Initiatives should be taken to improve the ability of road users (motorists and pedestrians alike) to adopt behavioral patterns which lead to more efficient and safer transport services. Programs should be taken to alter community attitudes and invoke a greater willingness to accept better discipline by all users and providers of the transport services. Enforcement of traffic rules is needed to ensure a greater compliance with community desired road user behavior. Enforcement actions can involve formal policing as well as informal pressure on individuals to adopt community norms of behavior and

should include the involvement of community leaders. During pedestrian crossing vehicles are found to run with full speed which is a dangerous threat to pedestrian safety must be stopped. All the vehicles should be enforced properly to reduce speed at the zebra crossing in the entire semi-automated signalized intersections.