

STAMFORD UNIVERSITY BANGLADESH
DEPARTMENT OF CIVIL ENGINEERING



**A CASE STUDY ON ANALYZING THE TRAFFIC
CONDITION OF KAWRAN BAZAR IN DHAKA CITY**

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A CASE STUDY ON ANALYZING THE TRAFFIC CONDITION OF KAWRAN BAZAR IN DHAKA CITY

A Project and Thesis Presented by

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The project and thesis titled ‘**A Case Study on Analyzing the Traffic Condition of Kawran Bazar in Dhaka City**’ submitted by MD Jahidul Islam Mahin (ID: CEN 070 10558, Batch No. 70-C. Department of Civil Engineering has been examined thoroughly and accepted in partial fulfillment of the requirements for the degree of Bachelor of Science in Civil Engineering.

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DECLARATION

This is hereby declared that this research work ‘**A Case Study on Analyzing the Traffic Condition of Kawran Bazar in Dhaka City**’ has been prepared in the fulfillment of the requirements for the Degree of bachelor of science in Civil Engineering under the supervision of Md. Hasnul Habib, Lecturer, Department of Civil Engineering, Stamford University Bangladesh.

Neither the thesis nor any part therefore is submitted or is being concurrently submitted in candidature for any degree at any other institution.

I further undertake to indemnify the University against any loss or damage arising from breach and obligations.

Md Jahidul Islam Mahin

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DEDICATION

I am honored to dedicate my thesis report to the most important person in my life, my mother. She has been our rock and my biggest supporter throughout my academic journey.

Without her unwavering love, guidance, and encouragement, I would not be where I am today. She has instilled in me a strong work ethic and a passion for learning that has led me to this moment. I am forever grateful for her sacrifices and the countless hours of support she has given me. This thesis report is a testament to her love and devotion, and I hope to make her proud.

Thank you, Mother, for everything you have done for me. This achievement is as much yours as it is mine.

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The research work ‘**A Case Study on Analyzing the Traffic Condition of Kawran Bazar in Dhaka City**’ has been conducted in partial fulfillment of the requirements for the degree of Bachelor of Science (B.Sc.) in Civil Engineering.

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ABSTRACT

The research is about to analyze the Kawran Bazar Condition in Dhaka, Bangladesh. One big problem was traffic jams, which have a bad impact on society, the environment, the economy, and daily life. The Kawran Bazar intersection in Dhaka, Bangladesh, is one of the most congested in the city, experiencing high traffic volumes throughout the day. This thesis aims to analyze the efficiency of the current traffic condition system at the intersection and propose modifications to enhance traffic flow and reduce congestion. Day by day the vehicle and population number is increasing and most of Dhaka is badly affected by massive traffic jam. Faulty traffic signaling systems, inadequate human resources, narrow and broken road spaces, and the overtaking tendency of drivers create pro-longed traffic congestion. Due to traffic jams a substantial portion of working hours have to be left on streets which indirectly has an adverse impact on economy. It causes serious air pollution and noise pollution and thus worsens the overall environmental condition. To reduce traffic jam, the government can consider the construction of roads through east-west connection of Dhaka city, construction of circular embankment-cum-road along the periphery of Dhaka city, a grade-separated road network system, bus Rapid Transit (BRT) system, and Metro-Rail system. By reducing traffic jams, this city can play a very important role by ensuring a healthy environment free from noise and pollution.

Keywords: Traffic Condition, Traffic Jam, Kawran Bazar, Dhaka City, Bangladesh.



CHAPTER 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 General

Dhaka City, the capital city of Bangladesh, is known for its vibrant culture, heritage, and economic importance. However, the city is facing a severe traffic jam problem that has significantly affected the daily lives of its residents. The growing number of vehicles, poor road infrastructure, inadequate traffic management, and population growth have all contributed to the traffic jams in Dhaka City. The traffic congestion problem in Dhaka City is not only a nuisance to commuters but also has far-reaching impacts on the environment, economy, and health of its residents. Traffic congestion is a significant issue in developing countries, particularly in densely populated cities like Dhaka, the capital of Bangladesh. The rapid urbanization and population growth have resulted in an increase in the number of vehicles on the road, leading to worsening traffic congestion, air pollution, and a decline in the quality of life. According to the World Bank, traffic congestion in Dhaka costs the city around \$4.6 billion per year, equivalent to 3.5% of the country's GDP (World Bank, 2020). Therefore, traffic congestion has become a major concern for policymakers, transportation planners, and researchers in Dhaka city.

One of the critical areas of traffic congestion in Dhaka city is the Kawran Bazar Condition, which is a major thoroughfare in the city. This signal connects several important commercial and residential areas in the city. The signal connects Banglamotor, Shahbag, Rampura, Farmgate, Katabon, Dhanmondi-32 and the city's central business district. This signal is also a significant connector between eastern and western parts of the city.

Several studies have been conducted on traffic congestion in Dhaka city, including studies on the factors causing traffic congestion and the impact of traffic congestion on the environment and the economy. However, very few studies have focused on the Kawran Bazar traffic congestion. This study aims to analyze the traffic congestion on this specific signal and identify the contributing factors that cause congestion. Additionally, this study will explore potential solutions to mitigate

traffic congestion on the route. The analysis will be conducted using both descriptive and inferential statistical methods. The findings of the study will contribute to the existing literature on traffic congestion and provide valuable insights for policymakers and transportation planners in Dhaka city.

1.2 Organization of the Thesis

The outline of the thesis structure is presented in the following flow chart.

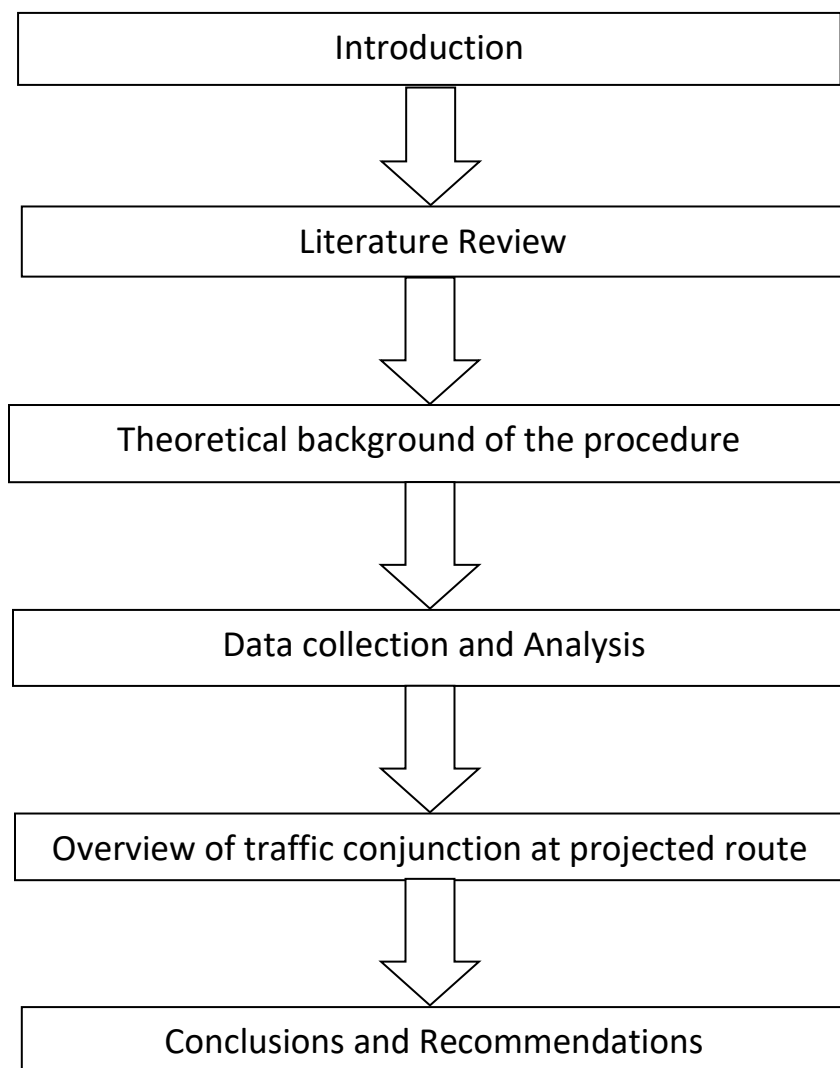


Figure 1.1 Structure of working schedule

1.3 Background

Dhaka, the capital of Bangladesh, is one of the most densely populated cities in the world. With a population of over 21 million people, it faces various challenges, including severe traffic congestion. The inadequate road network, limited public transportation facilities, and a lack of effective traffic management are some of the key reasons for the city's traffic congestion.

The Kawran Bazar is a vital transportation signalized intersection in Dhaka city. This signal connects the eastern part of the city with the central business district and is used by a significant number of commuters every day. Due to the high volume of traffic, the signal experiences severe traffic congestion during peak hours, causing delays, frustration, and economic losses.

Previous studies have highlighted the traffic congestion problem in Dhaka city and its adverse effects on the quality of life of the residents and the city's economy. According to a study by the World Bank (2018), traffic congestion in Dhaka city results in a significant economic loss of around 3.8 billion USD per year, equivalent to 1.8% of Bangladesh's GDP. Another study by the Asian Development Bank (ADB) (2019) estimated that the average travel speed in Dhaka city during peak hours is only 7 km/h, resulting in an additional travel time of 1.5 hours per day for commuters.

Various efforts have been made to address the traffic congestion problem in Dhaka city, such as the introduction of Bus Rapid Transit (BRT) and the expansion of the metro rail network. However, these efforts have been slow to materialize, and the traffic congestion problem remains a significant challenge for the city's residents and policymakers.

Therefore, it is crucial to analyze the traffic congestion problem on the Kawran Bazar Condition to understand the factors contributing to it and suggest appropriate solutions to alleviate it. This research will contribute to the existing literature on traffic congestion in Dhaka city and provide valuable insights for policymakers to address the city's traffic congestion problem.

1.4 Scope of the Study

The scope of this study is limited to analyzing the Kawran Bazar traffic condition in Dhaka City. The study will focus on the traffic jams and the reasons for the traffic congestion on this signal. It will also investigate the impact of traffic congestion on the economy, environment, and public health.

The study will be conducted through various methods, including literature review, traffic jams, and field surveys. The literature review will provide an overview of the existing literature on traffic congestion, its causes, and its effects on the economy, environment, and public health. The traffic jams analysis will involve collecting data on the volume of traffic on the Kawran Bazar Signal, including the number of vehicles, their types.

The field surveys will involve collecting data on the opinions of commuters, pedestrians, drivers, traffic police and business owners on the traffic congestion on this signal. The study will also investigate possible solutions to the traffic congestion problem on the Kawran Bazar Condition. This will involve identifying the most effective strategies for reducing traffic congestion, such as improving public transportation, expanding road networks, and implementing traffic management measures.

The findings of this study will provide valuable insights into the causes and effects of traffic congestion on the Kawran Bazar Signal and will inform policymakers and planners on the most effective strategies for reducing traffic congestion in Dhaka City.

1.5 Objective of the Study

The objective of this study is to analyze the traffic congestion on the Kawran Bazar Condition in Dhaka City. Specifically, the study aims to achieve the following objectives:

1. To identify the causes of traffic congestion on the Kawran Bazar Signal in Dhaka City.
2. To evaluate the impact of traffic congestion on the environment and the economy.
3. To propose recommendations for improving traffic flow and reducing congestion on the Kawran Bazar Signal.

To achieve these objectives, the study will employ a mixed-methods approach that includes both quantitative and qualitative data collection and analysis methods. The quantitative data will be collected through traffic surveys, GPS tracking, and traffic jams, while the qualitative data will be gathered through interviews, focus group discussions, and expert opinions.

The findings of this study will contribute to a better understanding of the traffic congestion problem on the Kawran Bazar Condition in Dhaka City and will provide insights into the potential solutions to this problem. The results of this study may also be useful for policymakers and transportation planners who are working to improve traffic flow and reduce congestion in Dhaka City.



CHAPTER 2

LITERATURE REVIEW

CHAPTER 2

LITERATURE REVIEW

2.1 General

Traffic jam is a critical problem that plagues many cities around the world, and Dhaka, the capital city of Bangladesh, is no exception. The literature on traffic jam in Dhaka City is extensive and provides insight into the causes, effects, and potential solutions to this problem.

Several studies have identified the primary causes of traffic jam in Dhaka City. These include the increasing number of private cars, inadequate road infrastructure, poor traffic management, and an insufficient public transportation system. For example, one study found that the number of private cars in Dhaka has been increasing at an alarming rate, leading to an increase in traffic congestion. Another study identified poor traffic management as a significant contributor to the traffic jam in Dhaka City, as the traffic police are often not well-equipped to handle the volume of traffic on the city's roads.

The effects of traffic jam in Dhaka City are also well-documented. Studies have shown that traffic congestion leads to significant economic losses due to increased travel time and decreased productivity. Traffic jam also has adverse effects on public health due to increased air pollution and noise levels, which can lead to respiratory problems and stress-related illnesses.

Various strategies have been proposed to mitigate traffic jam in Dhaka City. These include the development of an efficient public transportation system, road expansion and improvement, the promotion of non-motorized transportation, and the use of intelligent transportation systems. For example, some studies have suggested the implementation of a Bus Rapid Transit (BRT) system, which has been successful in other cities around the world. Others have proposed the construction of elevated expressways and flyovers to alleviate congestion.

In conclusion, the literature on traffic jam in Dhaka City provides valuable insights into the causes, effects, and potential solutions to this pressing issue. The studies reviewed highlight the need for a comprehensive approach to address the problem, which includes the development of an efficient public transportation system, road infrastructure improvement, and the use of innovative

technologies. Further research is needed to evaluate the effectiveness of these strategies and their potential impact on the lives of residents in Dhaka City.

One of the most congested areas in Dhaka is the Kawran Bazar Signal. This route connects several major residential areas and commercial centers in the city, including Shahbag, Rampura, Farmgate, Dhanmondi-32, Katabon and Banglamotor route. The congestion on this route has been the subject of numerous studies and reports over the years.

In their study on traffic congestion in Dhaka found that the average travel speed on the Kawran Bazar Signal was only 10-15 km/h, which is significantly lower than the recommended speed limit of 40 km/h for urban roads. This slow speed is due to a combination of factors, including the narrowness of the road, the presence of numerous intersections, and the heavy volume of vehicles on the road.

One of the main causes of congestion on this route is the high volume of private cars and motorcycles. According to a report by the Dhaka Transport Coordination Authority (DTCA) (2018), private cars and motorcycles account for over 45% of the total vehicle volume on the Kawran Bazar Signal. This high volume of private vehicles is partly due to the lack of adequate public transport options in the area.

The DTCA report also identified several other factors contributing to congestion on the route, including inadequate parking facilities, illegal parking, and the presence of roadside vendors. These factors contribute to the narrowness of the road and make it difficult for vehicles to maneuver, leading to further congestion.

In summary, the Kawran Bazar Signal in Dhaka is a highly congested area due to a combination of factors, including the high volume of private vehicles, inadequate road infrastructure, and a lack of public transport options. Addressing these factors will be essential to reduce congestion and improve traffic flow in the area.

2.2 Policy of Dhaka North City Corporation

Dhaka North City Corporation (DNCC) is one of the two city corporations in Dhaka city, responsible for maintaining civic amenities and providing services to the citizens. DNCC has implemented several policies and initiatives to tackle the problem of traffic congestion in Dhaka city. In this subsection, I review some of the important policies and initiatives taken by DNCC to reduce traffic congestion on the Kawran Bazar Signal.

2.2.1 Road network development

DNCC has developed a road network plan to improve the traffic flow in the city. The plan includes the construction of new roads, widening of existing roads, and improvement of intersections. The aim is to provide better access to various parts of the city and reduce traffic congestion. The road network development plan also includes the implementation of a Bus Rapid Transit (BRT) system and Metro Rail to provide a fast and efficient public transportation system.

2.2.2 Parking management

Parking is a significant issue in Dhaka city, and DNCC has implemented several parking management policies to reduce the problem. DNCC has developed parking zones, including on-street parking and multi-level parking facilities. DNCC has also introduced a parking management system to regulate parking and reduce illegal parking.

2.2.3 Public transportation system

DNCC has taken several initiatives to improve the public transportation system in Dhaka city. One of the significant initiatives is the introduction of a BRT system. The BRT system will have dedicated bus lanes, which will help reduce traffic congestion and provide faster transportation. DNCC has also introduced a ride-sharing system to encourage people to share rides and reduce the number of vehicles on the road.

2.2.4 Traffic signal management

DNCC has introduced a modern traffic signal system to manage the traffic flow in the city. The system includes the installation of new traffic signals, upgrading existing signals, and synchronizing signals to improve the traffic flow. The modern traffic signal system has also reduced the waiting time at intersections, which has led to a reduction in traffic congestion.

2.2.5 Pedestrian facilities

DNCC has developed pedestrian facilities, including foot overbridges, underpasses, and sidewalks, to provide safe and convenient pedestrian access. The aim is to encourage people to walk and reduce the number of vehicles on the road. DNCC has also introduced a pedestrian-friendly road design to provide safe and convenient pedestrian access.

2.3 Impact of Traffic Conjunction

Traffic congestion is a common problem in many cities around the world. Dhaka city, the capital of Bangladesh, is also facing the same problem. In recent years, the traffic congestion problem has become severe in Dhaka due to the rapid increase in population and economic growth. The Kawran Bazar Signal is one of the busiest routes in Dhaka city. This signal connects the northern and southern parts of the city. The aim of this study is to analyse the traffic congestion on this signal and find out the possible solutions. In this section, I will review the literature related to the impact of traffic congestion on the environment, economy, and society.

2.3.1 Environmental Impact

Traffic congestion has a significant impact on the environment. It leads to air pollution, noise pollution, and greenhouse gas emissions. Air pollution is caused by the emission of carbon monoxide, nitrogen oxide, and particulate matter from vehicles. These pollutants have a negative impact on human health and the environment. According to the World Health Organization

(WHO), air pollution causes 4.2 million premature deaths each year. Noise pollution is caused by the honking of vehicles, which can lead to hearing loss, stress, and other health problems. Greenhouse gas emissions are responsible for global warming and climate change. The transportation sector is a major contributor to greenhouse gas emissions. According to the International Energy Agency (IEA), the transportation sector is responsible for 24% of global CO₂ emissions.

2.3.2 Economic Impact

Traffic congestion also has a significant impact on the economy. It leads to increased fuel consumption, wasted time, and decreased productivity. The cost of traffic congestion is estimated to be around 2-5% of GDP in developed countries. In developing countries like Bangladesh, the cost of traffic congestion is even higher due to the low productivity and low-income levels. The cost of fuel consumption is also high due to the slow-moving traffic. According to the Asian Development Bank (ADB), the cost of fuel consumption due to traffic congestion in Dhaka city is around US\$ 2.8 billion per year.

2.3.3 Social Impact

Traffic congestion also has a significant impact on society. It leads to stress, frustration, and decreased quality of life. The long commuting time affects the physical and mental health of people. The traffic congestion problem also affects the social life of people. It leads to decreased social interaction and decreased participation in social activities. The traffic congestion problem also affects the education sector. The students and teachers face difficulty in reaching their schools and colleges on time.

2.3.4 Conclusion

In conclusion, the Kawran Bazar Signal in Dhaka city is facing severe traffic congestion, which has significant impacts on the environment, economy, and society. The review of literature shows

that traffic congestion leads to air pollution, noise pollution, and greenhouse gas emissions, which have negative impacts on human health and the environment. It also leads to increase fuel consumption, wasted time, and decreased productivity, which have negative impacts on the economy. Furthermore, it leads to stress, frustration, and decreased quality of life, which have negative impacts on society. Therefore, it is essential to find out possible solutions to reduce traffic congestion on this route.

2.4 Details of Study Area

Traffic congestion has become a major concern for urban cities worldwide, especially in developing countries like Bangladesh. Dhaka, the capital city of Bangladesh, is infamous for its severe traffic congestion, causing loss of time, money, and productivity. In this study, my aim is to analyze the traffic congestion on the Kawran Bazar Condition in Dhaka city, using a case study approach. This chapter provides an overview of the existing literature on traffic congestion, its causes, and the current state of traffic congestion in Dhaka city.

2.4.1 Causes of Traffic Congestion

Several factors contribute to traffic congestion in urban cities, such as population growth, lack of infrastructure, inefficient public transportation, and an increase in the number of vehicles on the road. A study identified that the main causes of traffic congestion in Dhaka city are a lack of alternative modes of transportation, an inadequate road network, insufficient parking facilities, and poor traffic management.

2.4.2 State of Traffic Congestion in Dhaka City

Dhaka city is one of the most densely populated cities globally, with a population of over 21 million people (Bangladesh Bureau of Statistics, 2020). According to a recent report by the World Bank (2019), Dhaka city ranks second globally in terms of traffic congestion, with drivers spending an average of 8.2 days per year stuck in traffic.

2.4.3 Traffic Management Strategies

Various traffic management strategies have been implemented globally to mitigate traffic congestion, such as intelligent transportation systems, road pricing, and public transportation improvements. In Dhaka city, some of the strategies that have been implemented include introducing bus rapid transit lanes and promoting the use of non-motorized transport. However, these strategies have had limited success due to poor implementation and enforcement.

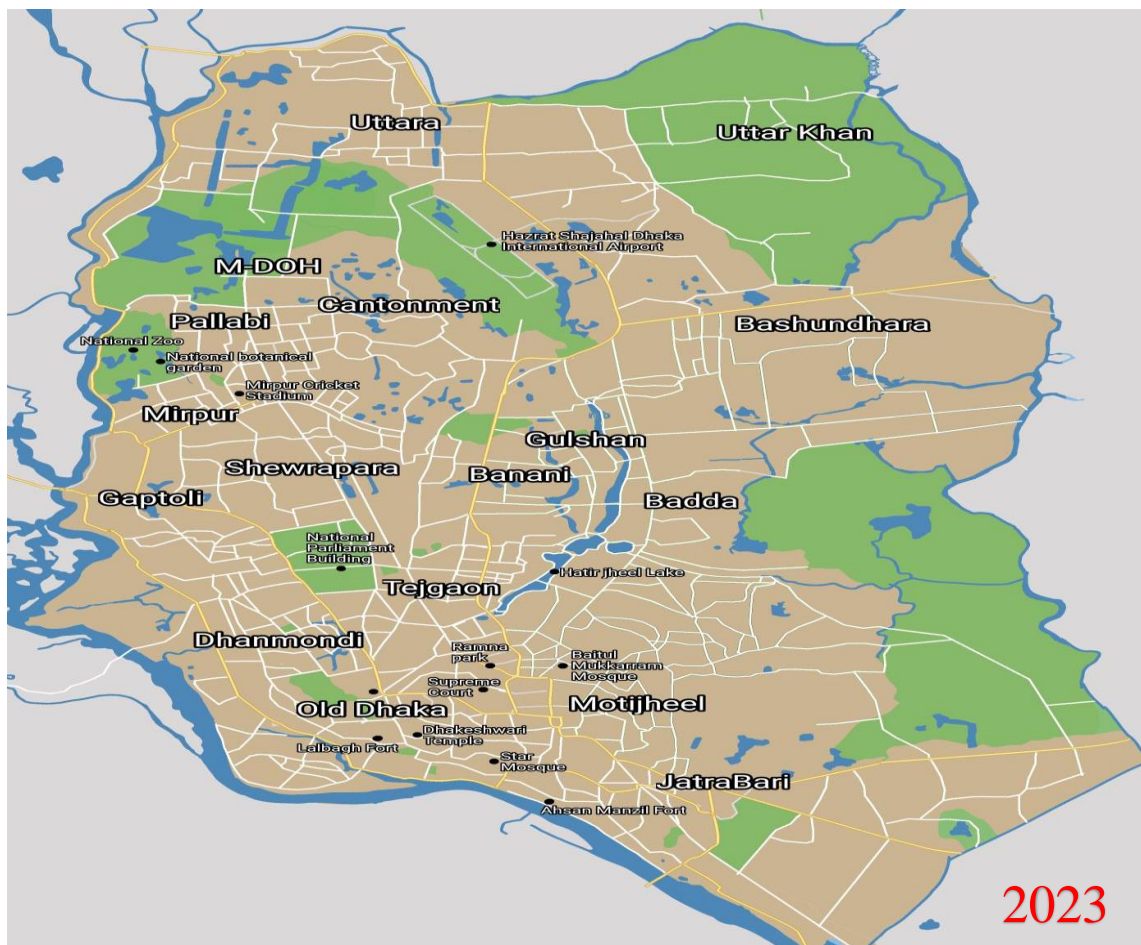


Figure 2.1 Map of Dhaka City. (2023)

2.4.4 Case Study Approach

In this study, I will use a case study approach to analyse the traffic congestion on the Kawran Bazar Condition in Dhaka city. A case study approach is appropriate for analysing complex real-world problems, such as traffic congestion, and allows for an in-depth investigation of a particular phenomenon. This approach will enable us to collect rich and detailed data on the traffic congestion on this particular route and identify the factors contributing to the problem.

2.4.5 Conclusion

Traffic congestion is a significant problem in urban cities, causing economic and social costs. Dhaka city, in particular, is facing severe traffic congestion, with drivers spending a significant amount of time stuck in traffic. Various factors contribute to traffic congestion, such as population growth, lack of infrastructure, and inefficient public transportation. To mitigate traffic congestion in Dhaka city, various traffic management strategies have been implemented, but with limited success. In this study, I aim to use a case study approach to analyze the traffic congestion on the Kawran Bazar Signal in Dhaka city and identify potential solutions to the problem.

2.4.6 Projected Road

Map that showcases the projected area from Kawran Bazar Signal displaying the five locations and the route connecting them. This map would be a valuable tool for anyone who needs to navigate this area or for transportation planning purposes.

The projected area map would highlight the major landmarks, such as roads and intersections along the way, making it easier for individuals to identify key locations and landmarks in the area. This could be especially helpful for those who are not familiar with the area or who are visiting for the first time.

The level of detail and accuracy on the projected road map would depend on the scale and purpose of the map. For instance, a larger scale map would provide a more detailed and accurate

representation of the area, while a smaller scale map would provide a broader overview of the entire region.

The projected road map could also include additional information, such as the estimated time of travel between the two locations, the expected traffic patterns, and any notable construction projects or detours that could affect travel times. This would allow individuals to plan their travel routes accordingly and avoid any potential traffic congestion or delays.

Overall, a projected road map of the Kawran Bazar Signal area would provide a useful resource for both locals and visitors alike, helping them to navigate the area with ease and efficiency. Whether you are a commuter, a traveler, or simply looking to explore this vibrant region of Bangladesh, this map would be an invaluable tool to have at your disposal.

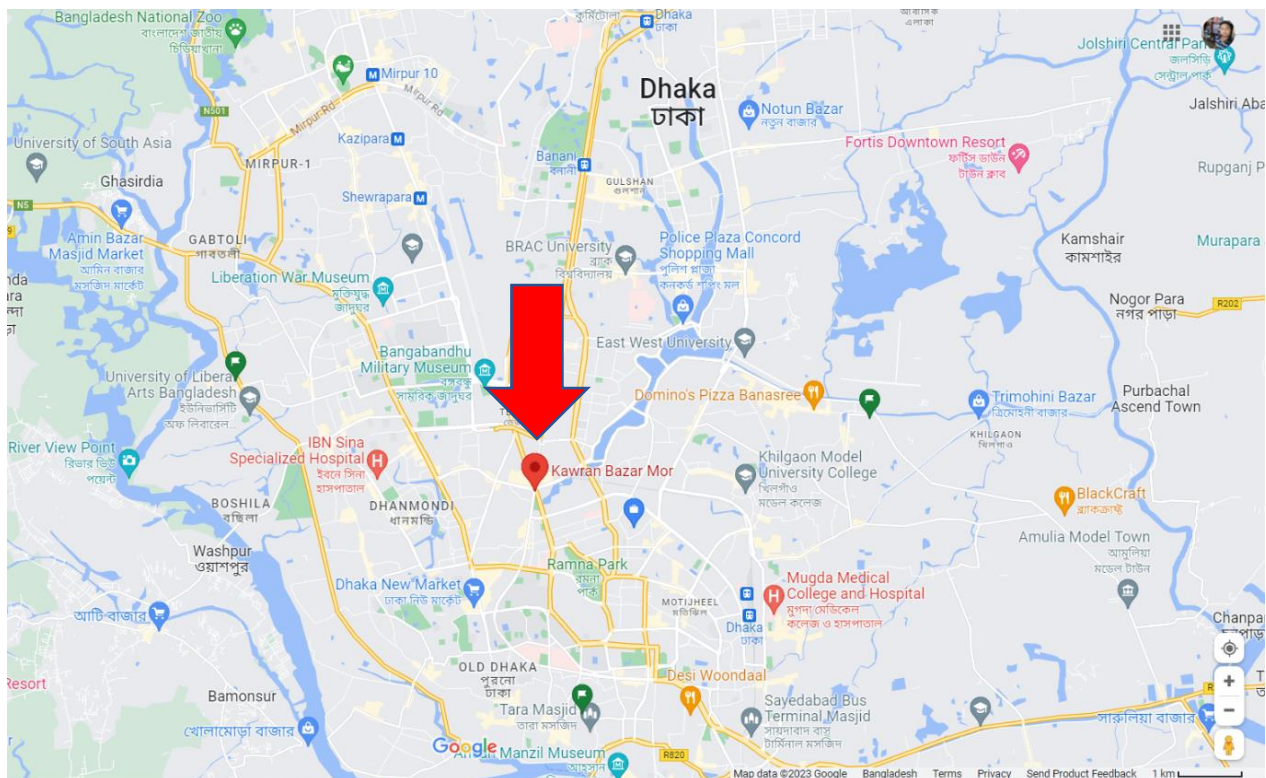


Figure 2.2 Large Scale (1 KM) of Projected Area Map. (Kawran Bazar Mor)

The Kawran Bazar Mor is one of the main Signalized intersections in Dhaka between Dhaka North City Corporation and South City Corporation.

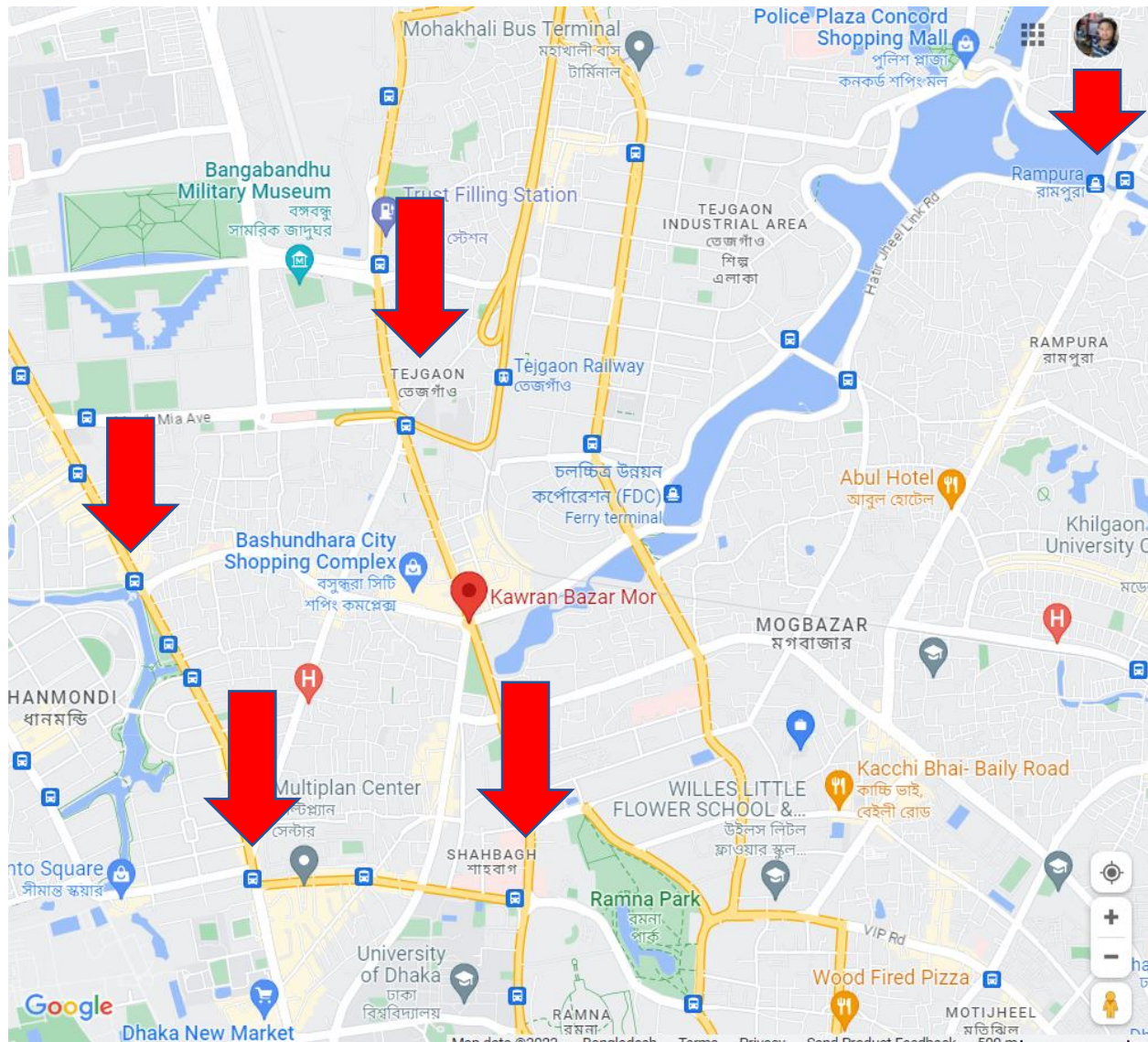


Figure 2.3 Medium Large Scale (500 m) of Projected Area Map. (Kawran Bazar Mor)

Here we can see the Kawran Bazar Mor is one of busiest signalized intersection in Dhaka North City Corporation Zone. This intersection includes Rampura, Tejgaon, Farmgate, Dhanmondi-32, Katabon, Banglamotor, Shahbag.

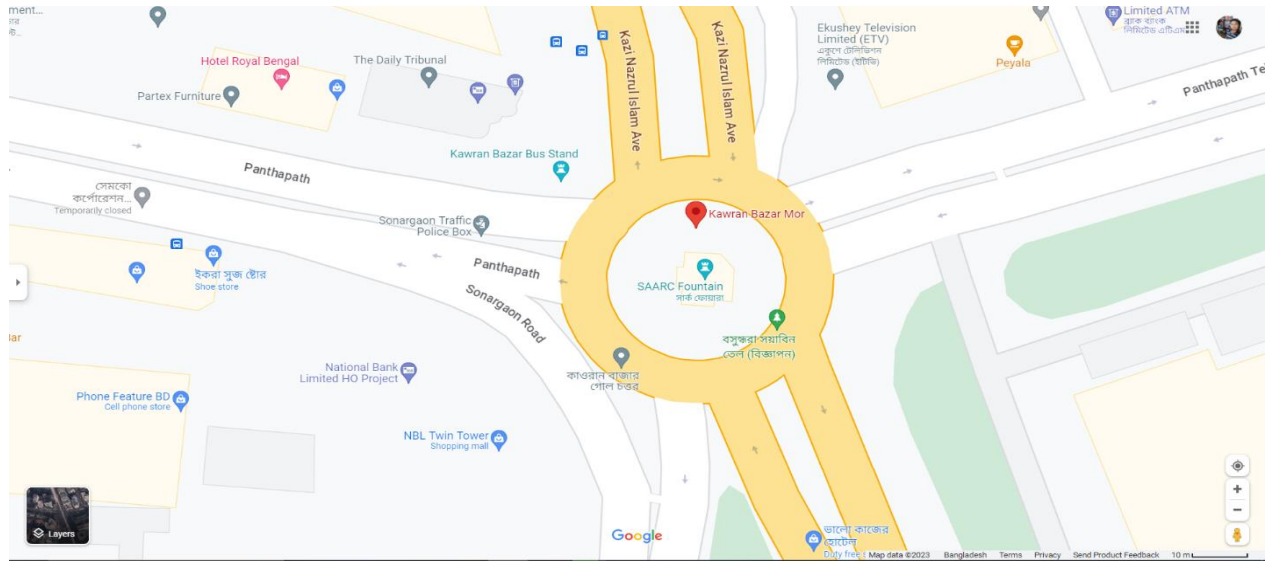


Figure 2.4 Little Scale (10 m) of Projected Area Map. (Kawran Bazar Mor)

Here we can see the Kawran Bazar Mor is the important signalized intersection in Dhaka City. This area includes very important buildings like Dhaka North City Corporation Zone, Pan Pacific Shonargaon Hotel, Bashundhara shopping complex, Dhaka Gas Building, Metro Rail Station, Local furniture shop, Some Bank and some commercial buildings etc.



CHAPTER 3

METHODOLOGY

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter explains various methodologies that were used in gathering data and analysis which are relevant to the research. The methodologies will include areas such as the location of the study, research design of study area, questionnaire survey, field survey and questionnaire itself. In-person survey methods have been adopted for research and analysis purposes.

Methodology outlines the techniques for the collection of data and the basic planning approach. The success of the research objective depend on how the corresponding theories are adopted to and applied to the analysis, fact finding and interpretation of the obtained result. Theories play the role of sheet anchor of any study and so a clear idea and good grasp of the related subject matter is very essential for the attainment of the project goals. This chapter focuses on the theoretical background of the study with elaborate and in-depth discussion on the relevant definitions and procedures regarding the direct observation, participant observation and qualitative interviews.

3.2 Methods of Research

This study uses a mixed-methods approach, including both quantitative and qualitative data collection techniques. The methods used in this research are as follows:

3.2.1 Direct Observation

In this method, the data is collected via an observational method. In this method, the behavior or outcome of situation is not interfered in any way by the researcher to observe the traffic congestion on the Kawran Bazar Signal in Dhaka City. The researcher will observe the traffic jams and document the time and duration of the congestion. This method will provide an understanding of the traffic flow, the cause of congestion, and the behavior of drivers.

3.2.2 Participant Observation

Participant observation is a method that involves the researcher participating in the activities being studied. In this study, the researcher will participate in the traffic flow on the Kawran Bazar Signal

in Dhaka City. The researcher will drive on this route, document the traffic flow, and interact with other drivers. This method will provide an in-depth understanding of the traffic flow, the behavior of drivers, and the cause of congestion.

3.2.3 Qualitative Interviews

Qualitative interviews are a method of data collection that involves asking open-ended questions to individuals to gather information about their experiences, attitudes, and beliefs. In this study, qualitative interviews will be conducted with drivers, passengers, and traffic police officers to understand their experiences and perceptions of traffic congestion on the Kawran Bazar Signal in Dhaka City. The interviews will be conducted face-to-face or over the phone, recorded, and transcribed. This method will provide an understanding of the driver's and passengers' experiences of traffic congestion, their coping strategies, and their suggestions for improvement.

3.2.4 Selection of study area

With a vast population, the capital of Bangladesh has been struggling to serve its residents in many ways. However, traffic jams can be regarded as one of the top-most difficulties for all residents. A number of factors, including overpopulation, excessive vehicles, unfit vehicles, unqualified drivers, poor road conditions and other such factors primarily cause this unbearable traffic jam condition. However, very few studies have been conducted to explore the phenomena. Therefore, the author chose this city as a study area. In addition, literature suggest that there is a great number of big cities around the world facing traffic jam challenges. Therefore, the study carried out on Kawran Bazar Condition in Dhaka city might provide useful information for further research in the international arena.

3.2.5 Current Scenario

Amidst the South Asian Subcontinent lies a grand metropolis - Dhaka, formerly known as Dacca and Jahangir Nagar, serving as the capital of Bangladesh and the bustling hub of Dhaka District. The city stands as a behemoth of urbanity, a mega city of towering proportions, with a population exceeding 12 million souls, nestled on the banks of the Buriganga River. With a rich and diverse heritage, Dhaka is renowned as the City of Mosques, where the call to prayer echoes through the streets, permeating the air with a sense of spiritual devotion. A city that has gifted the world with

the finest muslin, Dhaka has a long-standing tradition of weaving and textile production, and its streets are imbued with the rich aroma of exotic spices and fragrances.

As a cosmopolitan hub, Dhaka has long been the crossroads of Persio-Arabic and Western cultural influences, a melting pot of vibrant and diverse communities, all thriving within the embrace of its bustling streets. Today, Dhaka stands as one of the premier centers of culture, education, and commerce in the region, a vibrant and pulsating city that never sleeps, where the future is being woven together amidst the rich tapestry of its past.

3.3 Steps of Research

In order to achieve the objectives of the study, a comprehensive research plan was formulated, which involved several steps. This section describes the steps taken during the research process.

3.3.1 Build the Right Team

The first step in conducting this research was to build the right team. The research team consisted of individuals with expertise in transportation engineering, urban planning, and social science research methods. The team was responsible for overseeing the entire research process, including data collection, data analysis, and report writing. The team was led by the principal investigator, who provided guidance and support throughout the research process.

3.3.2 Recruiting People for the Study

The second step in conducting this research was to recruit people for the study. The study area consisted of six points, namely Shahbag, Rampura, Farmgate, Dhanmondi-32, Katabon and Banglamotor. In order to obtain a representative sample, individuals from each of these points were recruited for the study. Participants were selected based on their availability and willingness to participate in the study.

3.3.3 Data Collection Methodology

The third step in conducting this research was to determine the data collection methodology. The research team employed a mixed-methods approach, which involved both qualitative and quantitative data collection methods. Qualitative methods included direct observation, participant

observation, and qualitative interviews. Quantitative methods included traffic volume counts, travel time surveys, and questionnaire surveys.

Direct observation was conducted to observe the traffic flow, behavior of pedestrians and vehicles, and the condition of the road network. Participant observation was conducted by the researchers who traveled along the route to experience the traffic congestion and document the experience. Qualitative interviews were conducted with selected stakeholders to gain insights into the traffic congestion problem, such as traffic police officers, transport workers, commuters, and local residents.

Traffic volume counts were conducted to determine the number of vehicles passing through the route during specific times of the day. Travel time surveys were conducted by timing the duration of travel from one point to another along the route. Questionnaire surveys were conducted with commuters to understand their travel behavior, mode choice, and perception of traffic congestion.

3.3.4 Data Analysis

The fourth step in conducting this research was to analyze the data collected. The data collected from the different methods were analyzed using appropriate data analysis techniques. Qualitative data from direct observation, participant observation, and qualitative interviews were analyzed thematically to identify the key issues related to traffic congestion. Quantitative data from traffic volume counts, travel time surveys, and questionnaire surveys were analyzed using statistical methods to identify patterns, trends, and relationships.

3.4 Data Collection

The interviews were conducted through a physical survey. Survey was done in Dhaka city only. The location where survey was conducted were almost all locations of the route, locations are Shahbag, Rampura, Farmgate, Dhanmondi-32, Katabon and Banglamotor and the survey time was Working days & Weekend Day. Whereas the survey was completed from August 2023 to September 2023.

3.5 Adopted Methodology

The process of conducting a study is often guided by a methodology, which refers to a systematic approach that ensures the proper analysis and interpretation of data. To ensure the success of an online survey, it is essential to follow a well-defined methodology, which involves the following steps:

Firstly, the study objectives need to be clearly identified, and the appropriate study area must be selected. This will help in determining the scope of the study and ensuring that the research is focused and relevant.

Next, a questionnaire survey is conducted to gather the necessary data. The questions are designed to elicit specific information and responses from the participants, which will be used to generate valuable insights.

The data collection process is then initiated, which involves collecting relevant data from credible sources. This may include data from previous studies, government reports, or other published literature.

To further enhance the accuracy and reliability of the data, physical surveys are conducted. This involves direct observation of the study area, participant observation, and qualitative interviews. By using these methods, researchers can gather firsthand information and gain a more comprehensive understanding of the research topic.

Overall, following a structured methodology is critical for conducting a successful online survey. By carefully selecting the appropriate methods for data collection and analysis, researchers can ensure that the study is robust and produces meaningful results.

3.6 Limitations of the study

The limitations of this study can be identified both theoretically and methodologically. Theoretically, this study deals with transportation challenges and traffic jams in Dhaka city. However, both the transportation challenges and traffic jams are caused in different locations for different reasons. However, in this study, it was not possible to deal with all of them. Therefore, this study was determined to focus specifically on Dhaka city. Methodologically, this study was

carried out by using the qualitative approach based on statistical data from different sources. Empirical evidence from the study area could have been more extensive in order to gain in-depth information about the phenomenon. However, due to background knowledge of the study area, statistical data could be verified with practical knowledge.

3.7 Summary

In this chapter, I will discuss the methodology adopted for the study, and it will become apparent that the application of these theories in practical settings is diverse and multifaceted, taking into account factors such as the research's objectives, scope, timeline, available resources, and most importantly, engineering expertise.



CHAPTER 4

DATA COLLECTION AND ANALYSIS

CHAPTER 4

DATA COLLECTION AND ANALYSIS

4.1 Introduction

The purpose of this chapter is to describe the data collection process and analysis techniques used in this study. Data collection is an important aspect of any research project as it provides the foundation for the analysis and conclusions. In this study, both primary and secondary data sources were utilized to gather information on traffic congestion on the Kawran Bazar Signal in Dhaka City. The primary data was collected through a survey questionnaire administered to commuters and drivers who use the signal. The survey questions were designed to gather information on the travel behavior of commuters, the types of vehicles used, the frequency and duration of traffic congestion, and the impact of traffic congestion on their daily lives. The survey was conducted in person and online, and a total of 100 respondents were surveyed.

The secondary data sources used in this study include government reports, traffic studies, and other relevant literature on traffic congestion in Dhaka City. These sources provided information on the history of traffic congestion in the city, the causes of traffic congestion, and the existing measures taken to mitigate traffic congestion.

The data collected from both primary and secondary sources were analyzed using descriptive statistics, such as frequency distributions and percentages, to provide a comprehensive understanding of the traffic congestion on the Kawran Bazar Signal. The data analysis also involved the use of geographic information system (GIS) to map the traffic flow and identify hotspots of congestion along the route. Overall, the data collection and analysis process used in this study provided a detailed and accurate assessment of the traffic congestion on the Kawran Bazar Signal in Dhaka City.

4.2 Visualizing Traffic Congestion & Reasons

4.2.1 Traffic Volume

Data gathered over a month would indicate traffic volumes at different times of the day. Special software could be used to analyze the data, presenting it in easy-to-interpret formats such as bar charts or heat maps. Traffic volumes might be highest during rush hours (7-9 AM and 5-7 PM) and relatively low during non-peak hours.

4.2.2 Signal Timing Efficacy

Current signal timings would be scrutinized to assess their efficiency in managing traffic flow. I could perform simulations based on real-world data to measure parameters such as average queue lengths, vehicle delays, and the number of vehicles that pass through the intersection during a complete signal cycle. Results could show that, for example, the signal time allocated for one road is excessive, leading to inefficiencies and delays on other roads.

4.2.3 Vehicle Queue Lengths

Queue lengths are critical for evaluating congestion levels. Data on queue lengths could be collected through manual counting or video surveillance during various times of the day. For each lane at the intersection, the average and maximum queue lengths would be calculated.

Example Analysis:

- During morning rush hours, the average queue length on Road Banglamotor to Farmgate was found to be 40 vehicles, with maximum queues reaching up to 60 vehicles.
- Signal timings allowed only 25 vehicles on average to pass during one green light, leading to an increase in queue length over time.

4.2.4 Statistical Tests

Various statistical tests could be applied to evaluate the relationship between signal timings, traffic volume, and queue lengths. The aim would be to identify whether changing the signal timings could statistically significantly improve traffic flow.

4.2.5 Unauthorized Parking

The area around Kawran Bazar Signal is known to be congested due to the unauthorized parking of vehicles, which contributes to traffic congestion in the region. The unauthorized parking is a result of the lack of sufficient parking facilities in the area, coupled with the absence of proper enforcement of parking regulations by the authorities.

The unauthorized parking also poses a safety risk to pedestrians, as it forces them to walk on the road and increases their chances of being hit by a vehicle. Moreover, emergency vehicles such as ambulances and fire trucks may have difficulty passing through the narrow roads due to the congestion caused by the unauthorized parking. This can lead to significant delays in emergency services, which can have dire consequences.

To mitigate the problem of unauthorized parking, the authorities can consider implementing measures such as constructing more parking facilities and enforcing parking regulations strictly. Additionally, promoting the use of public transport and encouraging carpooling can also help reduce the number of vehicles on the road, thereby decreasing the need for parking spaces. It is imperative to address this problem to ensure smooth traffic flow and safety on the roads of Dhaka City.



Fig 4.1 Unauthorized on street parking at Kawran Bazar Mor. (At 6:30 pm)

Here we can see some motor riders are parking here for rent. But this is an illegal way to park here. The traffic police don't take any action against them. So basically, there would be less road space for moving vehicles.

4.2.6 Main reasons and Impacts of Congestion

Private sector occupies the road and often break transportation rules in many ways for example, using technically faulty vehicles and drivers without a license. Most of the country's businesses run from the capital. In addition, most of the public and private headquarters are located in Dhaka city. For example, army headquarters, the border guard of Bangladesh headquarters and a number of educational institutions occupies major part of Dhaka city. In addition, most of the garment factory located in every corner of the city. Therefore, these poor people establish slums here and there. Along with this huge population, everyday people use to visit Dhaka city for many purposes, which services could be delivered locally if those offices are decentralized. Although the

population and other establishments have been increasing steadily, the roads and other infrastructures are not developing simultaneously.



Fig 4.2 Traffic congestion at Kawran Bazar Mor. (At 8:30 am)

Here we can see lots of vehicles are moving without any proper traffic rules in day time in Kawran Bazar mor. Also, some pedestrians are crossing road without any safety. There is no traffic police at that place to manage this traffic congestion.



Fig 4.3 Traffic congestion at Kawran Bazar Mor. (At 7:00 pm)

Here we can see lots of vehicles are moving without proper traffic rules at night time in Kawran Bazar Mor. There is no traffic police to take control of this traffic congestion.

4.2.7 Poor traffic administration and application

Among other reasons, enforcement of traffic law is top most one. It happens for many reasons for example lack of resources, lack of training, corruption and negligence to apply the rules, unconsciousness, lack of traffic knowledge etc. It is an open secret in Bangladesh that most of the officials in transportation department are corrupted (Prothom-alo 2019). Therefore, despite knowing the problems, the officials can hardly take any action against those who break traffic rules in various forms. See below the example of traffic intersection condition of Dhaka city.



Fig 4.4 Poor Traffic Police Management at Kawran Bazar Signal. (At 9:00 am)

Here we can see the poor system of Traffic Police Management. Like bus driver and helper are trying to take passenger without any bus stop, pedestrians are crossing road without any safety and traffic police are just watching like there is no responsibility for him for that.

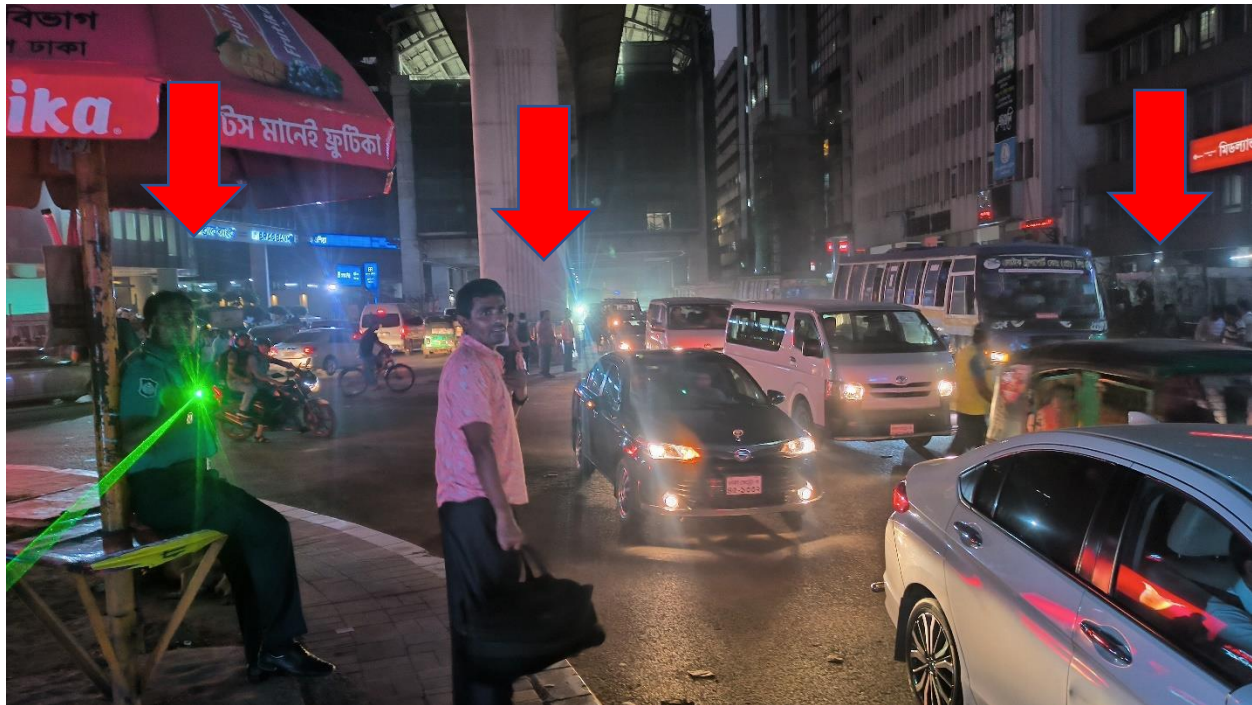


Fig 4.5 Poor Traffic Police Management at Kawran Bazar Signal. (At 7:30 pm)

Here we can see traffic police is sitting and using green laser light to control traffic vehicles. Some pedestrians are trying to cross the road without any safety. Also bus driver and helper are trying to get passenger without any bus stop.

4.3 Congested roads and one road for all kinds of vehicles

The Dhaka city corporation could not develop the infrastructures according to the demand for frequent movement. Most of the roads of Dhaka City are very congested. Some roads especially inside the residential areas are very tiny. Therefore, it is difficult to drive two vehicles from opposite directions. In this kind of situation, if both cars from opposite direction go into the lane, the vehicles need to cross each other very slowly. Otherwise, they might collide each other. Addition to this, these types of roads often have a long line of traffics due to slow moving vehicles. Besides this, the hawkers occupy almost every single road in each corner of the city. They use to give bribes to the authority so that the authority does not evacuate them from the street. As a result,

the pedestrian often walks on the streets. See below a picture of the condition how all vehicles drive in the same road.



Fig 4.6 Different types of vehicles in the same street. (At 8:30 am)

Here we can see all types of vehicles are moving in same road including bus, three-wheeler, motor bike, by-cycle and van. This is against traffic rules but that's how every day is going there. Even in peak hour or non-peak hour the condition is the same as always.

4.3.1 Weekend Traffic Scenario

Weekend traffic on the Kawran Bazar Signal in Dhaka City is generally less congested than on weekdays. This is because many people tend to stay home or travel to other areas of the city on weekends, reducing the overall traffic volume on this particular route. However, it is important to note that there may still be some traffic during peak hours or if there are any special events or

gatherings in the area. Proper analysis of the traffic flow during weekends can provide important insights into identifying and addressing congestion issues on this route.



Fig 4.7 Weekend Day Traffic Scenario (At 8:30 am)

Here we can see very few traffic vehicles are moving at Kawran Bazar Mor. There is no traffic congestion or not much pedestrian or densely passenger. Just a few types of vehicles are moving like bus, private car, rickshaw etc.

4.3.2 Weekdays Traffic Scenario

Based on the analysis of traffic congestion on the Kawran Bazar Signal in Dhaka city, it can be observed that the weekday traffic scenario is quite chaotic and congested. During weekdays, this route experiences heavy traffic due to the high number of commuters traveling to their workplaces and schools.

The traffic congestion is mainly caused by a combination of factors such as poor road infrastructure, inefficient traffic management, and high volume of vehicles on the road. Additionally, the presence of numerous commercial establishments and residential buildings along the route also adds to the congestion.

As a result of the heavy traffic congestion, commuters traveling through this route experience significant delays and long travel times. The situation is particularly worse during peak hours, when traffic congestion peaks and the commute time becomes unbearable for many.

In summary, the weekday traffic scenario on the Kawran Bazar Signal in Dhaka city is characterized by chaotic traffic conditions and significant delays, primarily caused by poor road infrastructure, inefficient traffic management, and high volume of vehicles on the road.



Fig 4.8 Weekday Traffic Scenario (At 8:30 am)

Here we can see lots of traffic vehicles are moving at different direction. It should be done in a better way but due to poor traffic management, there is always traffic congestion at Kawran

Bazar Mor. Also, some pedestrians are crossing road without any safety and some passengers are trying to get in a bus while there is no bus stop.

4.3.3 Causes of Traffic Jam Rickshaw

Some people think the rickshaw is the main cause of traffic jam. Their structure and moving capability are also responsible for traffic jam.



Fig 4.9 Rickshaw at Kawran Bazar Signal (At 4:30 pm)

Here we can see because of rickshaw is moving slowly because of their capability. This makes less speed movement in signalized intersection. So, there is always traffic jam due to slow movement vehicles.

4.3.4 No Bus Stoppage/ Parking

At Kawran Bazar Mor there is no planned bus stop and parking facility. That is why vehicle operators stop their vehicles in any place, where they need. And it causes traffic jam.

4.3.5 Different Speed Vehicle

Slow and fast-moving vehicles are running through the same road. As a result, slow moving vehicles are making the fast-moving vehicles slow. This is also one of the important reasons of traffic jam.

4.3.6 Over Population

It is very apparent that due to heavy population in Dhaka City, traffic load is also huge. This huge population needs to transport from one place to another. As a result, enormous traffic load is very common.

4.3.7 Lack of Law Implementation

One important complain against traffic is lack of proper law implementation is also encouraging illegal parking. So, law enforcement should be strict.

4.3.8 Private Car

Private car in the road is also causing traffic jam. As in one private car there are only 2/3 people but the car is taking a lot of space.



Fig 4.10 Too much Private Car at Kawran Bazar Signal (At 7:00 pm)

Here we can see there is too much private car at Kawran Bazar Mor. We have less high occupancy vehicles and more single occupancy vehicles. That's why there is too much traffic jam in anywhere in Dhaka city.

4.3.9 Important Establishments in Dhaka

All the important offices, shopping complex, bank, commercial buildings etc at Kawran Bazar Area. So, people have to come Kawran Bazar every now and then. This also introduces a lot of floating people in Kawran Bazar, which increase the number of vehicles and eventually the traffic jam is increased.

4.4 Unplanned infrastructure and wrong parking

The authority of Dhaka North City Corporation to some extent failed to control building infrastructure in the city. For example, a big number of shopping malls, private universities, preliminary and secondary schools, commercial buildings, private hospitals, government offices, private clinics and diagnostic centers are built in the residential areas of Dhaka city. As a result, these residential areas become very busy with lots of traffics, which often cause traffic jams all

over the city. In addition to these problems, most of these institutions have very limited parking places. Consequently, officials, customers and other stakeholders often park their cars and other types of vehicles on the streets, which also contribute to traffic jam.

4.5 Extra Transportation Cost

Transportation cost of people of Dhaka is on an average 75.93 BDT. So, if their staying time in the traffic is less then definitely the cost will be lower. This is called VOT, value of travel time savings. More details will be discussed in the economic evaluation section later on. For urban we do not have any research on VOT in Bangladesh. For few areas in rural we have VOT.

4.6 Extra Fuel Consumption

Due to traffic jam per annum extra fuel consumption cost is 11,228 crore BDT which is enormous amount of money for a least developed country like Bangladesh. Bangladesh government is buying this extra amount of fuel with hard cash. This is considered a national loss.

4.7 Vehicle Operating Cost Every car has a running cost

Vehicle operating cost is directly proportionate to traffic jams. Like, if there is traffic jam, then the vehicle operator has to push the break and accelerator frequently. So, the life time of those will be less. Fuel consumption will continue if you are even in the jam and your car is on. So, Traffic jam actually increases. Miscellaneous cost for serious patients, it is a life and death situation in a traffic jam. It may happen that he is the only earning member of that family and due to traffic jam, he might be no more. And at that time the loss of the family can never be measured in money.

4.8 Solutions of Traffic Jam in Dhaka City

The solution of traffic jam in Dhaka City is not easy. I will discuss solutions from three points of view-

- a. General people's point of view,
- b. Vehicle Operators point of view,
- c. Expert's point of view

Solution Provided by General People The main solutions provided general people are –

1) Awareness building, 2) Flyovers, 3) Public transportation, 4) Strict traffic law implementation, 5) Office/School time scheduling, 6) Subway, and 7) Removing rickshaw. So, most of the people think that traffic jams can be reduced by creating proper awareness. Other than that, more flyovers, more public transportation, strict law enforcement can reduce traffic jam.

4.9 Awareness Building

To reduce traffic congestion in Dhaka North City, the most vital prerequisite, is the development of public awareness. Unless and until people change their perception and develop a mind to abide traffic rules, whatever strategy Government takes, that will not work properly. Law-abiding consciousness, good-intention and sincere co-operation can remarkably reduce traffic jam in Dhaka city.

4.10 Public Transportation

More people, 12%, will be willing to travel through public transports rather than private cars if proper public transportation service can be offered. People think that public transport, like bus, can carry many passengers at the same time which will reduce the cost and time expense for them.

4.11 Office/School Time Scheduling

Many people think that flyovers can be a possible solution to the current traffic condition of Dhaka city. If flyovers can be construction in the main roads, then the vehicles can move on the roads as well as on the flyovers at the same time. That will surely reduce the load on the busy roads. Government has successfully implemented different timing schedule for schools of the Dhanmondi area and that can be applied to all other areas as well people think that it will reduce the office and school time traffic load on the roads.

4.12 Strict Traffic Law Implementation

41% vehicle operators think that traffic jam in Dhaka City can be reduced by implementing traffic laws strictly. If all types of vehicle drivers follow the traffic rules properly then it can surely decrease the load on the road and improve the current scenario.

4.13 Dedicated Road for Vehicles

Dhaka is a city of heterogeneous vehicles. Human puller to latest model automobile, mechanical to non-mechanical, slow to fast-moving, nothing left on the road of Dhaka. It is quite difficult to control all these vehicles on the same road as they have different speed capacity. There should be dedicated roads for difference types of vehicles.

4.14 Decentralization

According to the drivers, people are normally moving from their home to the offices, schools, industries and markets. Dhaka city cannot provide adequate road facility for all these activities. 16% drivers think that Dhaka should be decentralized and major offices, industries like Tanneries, Cantonment, etc should be moved away from this busy city to reduce load on the roads.

4.14.1 Increasing Pedestrian Facilities

According to the survey conducted, about 50% people in Dhaka city will like to move from one place to another on foot. But the road side condition is not appropriate for them to walk. If Government can improve the pedestrians' facility, load on the road will be reduced and people will be encouraged to walk to reach nearby destinations.

4.14.2 NMT (Non-Motorized Transport)

Free Road Dhaka is a city of heterogeneous vehicles. Human puller to latest model automobile, mechanical to non-mechanical, slow to fast-moving, nothing left on the road of Dhaka. It is quite difficult to control all these vehicles on the same road as they have different speed capacity. The main roads can be made NMT free road to reduce traffic jam.

4.14.3 Maximum Use of Road Width

Dhaka City has very inadequate road networks. For a standard city, where the minimum road requirement is 25%, Dhaka has only 7.5% road of its total area. To reduce traffic jam, maximum use of road width should be ensured.

4.14.4 Banning Unauthorized Parking

25 percent place should be for the movement and parking of vehicles in a city whereas Dhaka city has only 7 percent such place invoking a natural cause for being traffic jam. It is very practical that the city does not have sufficient place for allowing the vehicles freely. Unauthorized parking should be banned all over the city.

4.14.5 Controlling Road Side Activities For a standard city, where the minimum road requirement is 25%, Dhaka has only 7.5% road of its total area. 30% of this 7.5% road is also occupied by the hawkers, salesman and shopkeepers. A significant portion is occupied by construction materials and waste-containers of the City Corporation. As a result, vehicles do not get sufficient space to move on. Such road side activities creating problem for the traffic should be controlled.

4.14.6 Modern Signaling System

Traffic management system of Dhaka city is not automated and well-equipped. All the junctions are not facilitated with signal lights. Where there are lights, most often those remain out of order. Moreover, uneven flow of vehicles from different directions reduces the effectiveness of traffic signal. Modern signaling system should be introduced.

4.14.7 Speed Wise Dedicated Road for Vehicles

There should be dedicated roads for difference types of vehicles with different speed. The roads which see both mechanized and non-mechanized vehicles use must make exclusive space for non-mechanized vehicles. It will ensure both easy and quick passage and movement of mechanized vehicles. Again, the accidental casualties will get lessened. Now what happens, the non-mechanized vehicles and mechanized ones go side by side causing disturbance to one another and one can move freely. A little touch or hassle invites serious hassle, crowd and chaos causing serious traffic jam. So, these roads must be separated by railings so that both rickshaws and buses and cars can move according to their own speed.

4.14.8 Car Free Days

Mayor of one of the states in Colombia decided to declare one day of the month as a car free day and that reduced the load on the road. This strategy can be applied in Dhaka to improve the traffic condition.

4.14.9 High Parking Charge

Limited parking arrangement is another major cause of excessive traffic in Dhaka City. It has become a regular practice to park the car on road. Even during rush hours, people are seen loading and unloading their vehicles on a busy road. City transports also stop here and there without any valid reason. High parking charge should be applied to reduce this practice.

4.14.10 Discourage Private Cars

A study states that a bus can provide space for 30 people more than a car but occupy only thrice the area than a car. It will be very helpful to reduce load on the road by discouraging private cars. Many buses with many stations should be introduced. It will lessen people's dependence on small and private vehicles. Private vehicles kill much of the limited space of the city. If big and luxurious buses can be introduced, the intensity of traffic jam must be thinner and the people will lose interest in rickshaws because of comfort and cheapness.

4.14.11 Effective Use of Underpass and Over Bridge

There are some underpasses and over bridges in Dhaka city which were built to provide alternate walkways for people to cross the roads. Effective use of this can improve the current road condition by reducing number of people walking through the busy roads. A study states that a bus can provide space for 30 persons more than a car but occupy only thrice the area than a car. It will be very helpful to reduce load on the road by discouraging private cars. Many buses with many stations should be introduced. It will lessen people's dependence on small and private vehicles. Private vehicles kill much of the limited space of the city. If big and luxurious buses can be introduced, the intensity of traffic jam must be thinner and the people will lose interest in rickshaws because of comfort and cheapness. In all the busy points there must be foot over bridges and no pedestrians will be allowed to cross the roads where foot over bridges are constructed. All the news media,

police, schools, market, garment workers all will get the message and briefing from their attached and concerned authorities to use foot over bridge. Many busy points of the city don't have foot over bridges. Pedestrians are to cross the road every minute making the processions of vehicles stopped and stranded. Its effect spreads several miles. Again, there are many over bridges which are not used by the pedestrians because of habit, lack of awareness and law enforcement. From now on it must be made compulsory to use foot over bridges and the remaining crowd and busy point must see the immediate construction of foot over bridges.

4.14.12 School Bus

All the schools and colleges will have to introduce their own transports for their students. When many students go to schools and colleges by personal transport and rickshaws, a serious traffic jam occurs around the institutions and its impact influences the adjoining areas of the institutions. Everyday hundreds of guardians stand beside the road with their kids to request the rickshaws and CNGs with much tension as school gates will be closed. During the examinations the situation goes further worse.

4.14.13 Time Rescheduling

During office going and coming time, hundreds and thousands of passengers keep stranded in numerous spots of the city. Law must be enacted to enhance the facilities of the passengers as well as to lessen the knot of traffic jam. Time of the offices and schools should be rearranged to reduce the load on the roads.

4.14.14 TIA (Traffic Impact Assessment) before Pass Plan of Any Construction

Before starting a construction, it is mandatory to pass the plan from RAJUK. The concerned authority should check the Traffic Impact Assessment (TIA) of the plan to evaluate the impact of the construction on the traffic of nearby area.

4.14.15 Increase the Number of Public Vehicle

Public transport system in Dhaka city is not adequate and properly-routed. Instead of big and spacious buses, presence of large number of mini-buses and private vehicles can only contribute

to carry few passengers, but not to reduction of traffic congestion. Number of public transports should be increased to reduce traffic jam.

4.14.16 Training of Traffic Police

Dhaka city authority does not have sufficient and well-trained human resources. Four thousand officers work in two shifts- morning and afternoon. Due to administrative and other involvement, only fifteen hundred officers can be engaged in one shift to control the movement of millions of people and vehicles in Dhaka City. This figure is quite insufficient to manage the existing traffic scenario.

4.14.17 BRT (Bus Rapid Transit)

BRT can be introduced to provide alternative transport facility for the citizen of Dhaka city. There should be a separate lane for the public busses only. It will be very helpful to reduce load on the road. A study states that a bus can provide space for 30 people more than a car but occupy only thrice the area than a car. Many buses with many stations should be introduced. It will lessen people's dependence on small and private vehicles. Private vehicles kill much of the limited space of the city. If big and luxurious buses can be introduced, the intensity of traffic jam must be thinner and the people will lose interest in rickshaws because of comfort and cheapness.

4.14.18 Elevated Express Highway

Dhaka city does not have enough capacity to provide road facility for the excess vehicles and as a result traffic jam is a common scenario. It is not possible to enlarge the width the roads due to road side constructions like buildings, offices, markets, etc. One possible solution can be developing elevated express highway to provide access for the vehicles to avoid busy roads and move through this highway.

4.14.19 Only One Authority to Control Traffic of Dhaka City

There are about organizations in Dhaka city that have at least some authorities to work and control traffic of Dhaka city. Very often some problems and confusions are created among them regarding their duties and responsibilities. There should be one concerned authority to develop law and policy and control traffic of Dhaka.

4.14.20 Construction of Roads through East-West

Various developments of roads were done in the North-South region of Dhaka city but the East-West side do not have that much advanced transport facilities. Construction of roads through East-West can reduce the vehicle load on the North-South region and improve the current scenario. These roads can also be used as a bypass to avoid the busy roads of Dhaka city.

4.14.21 Adequate Parking Facilities

Adequate parking facilities should be made available in Dhaka city. 25 percent place should be for the movement and parking of vehicles in a city whereas Dhaka city has only 7 percent such place invoking a natural cause for being traffic jam. It is very practical that the city does not have sufficient place for allowing the vehicles freely. Unauthorized parking should be banned all over the city.

4.14.22 Solution Provided by Experts

Experts mainly suggest solution in term basis. There should be dedicated roads for different types of vehicles. They think it should be –

- a. short term basis (less than 5 years),
- b. Mid-term basis (5 to 10 years) and
- c. long term basis (more than 10 years).

Short Term Solutions the main short-term solutions are stated below: (i) Increasing pedestrian facilities, (ii) NMT (Non-Motorized Transport) free road, (iii) Maximum use of road width, (iv) Banning unauthorized parking, v. Controlling Road side activities, (vi) Modern signaling system, vii. Speed-wise dedicated road for vehicles, (viii) Car free days, ix. High Parking charge.

4.14.23 Types of Traffic Violations

Traffic violations are generally divided into major and minor types of violations. The most minor type are parking violations, which are not counted against a driving record, though a person can

be arrested for unpaid violations. Next are the minor driving violations, including speeding and other moving violations, which usually do not require a court appearance. Then there are more serious moving violations, such as reckless driving or leaving the scene of an accident. Finally, there is drunk driving, also called Driving under the Influence, which is a classification onto itself.

All but the most serious traffic violations are generally prosecuted as MISDEMEANOR charges; however, repeat offenses can be prosecuted at the level of felonies. As misdemeanor charges, most traffic violations require payment of a fine but no jail time. State laws do not allow a judge to impose a jail sentence for speeding or failure to stop at a signal. However, more serious traffic violations, such as drunk or reckless driving, can result in jail time at the judge's discretion. The most common type of traffic violation is a speed limit violation. Speed limits are defined by state. In 1973, Congress implemented a 55-miles-perhour speed limit in order to save on energy costs, but these were abolished in 1995. Since then, most states have implemented 65-mph maximum speed limits. There are two types of speed limits: fixed maximum, which make it unlawful to exceed the speed limit anywhere at any time, and prima facie, which allow drivers to prove in certain cases that exceeding the speed limit was not unsafe and, therefore, was lawful.

4.14.24 Shortage of Pedestrian Facilities

One of the major problems identified in the study of traffic congestion on the Kawran Bazar Signal in Dhaka city is the shortage of pedestrian facilities at Kawran Bazar Signal. This problem has been observed to cause inconvenience and discomfort to pedestrians who have to use this route regularly.

Pedestrian facilities, such as sidewalks, crosswalks, and pedestrian bridges, are essential components of a well-designed transportation system. However, the lack of these facilities at Kawran Bazar Signal has made it difficult for pedestrians to navigate this area safely and comfortably. Pedestrians are forced to walk on the road, exposing them to the risk of accidents and injuries.

Moreover, the shortage of pedestrian facilities has also contributed to the traffic congestion on this route. Pedestrians who are unable to use the sidewalks and pedestrian bridges often have to cross

the road, which disrupts the flow of traffic and causes delays. This, in turn, exacerbates the traffic congestion problem in the area.

In conclusion, the shortage of pedestrian facilities at Kawran Bazar Signal is a significant problem that needs to be addressed urgently. The development of pedestrian facilities in this area would not only enhance the safety and comfort of pedestrians but also help to improve the traffic flow on this busy route.



Fig 4.11 Shortage of Pedestrian Facilities at Kawran Bazar Signal. (At 9:00 am)

Here we can see there is no Zebra crossing for pedestrians, So it's basically a risky movement at Kawran Bazar Mor. There should be a decent traffic rules to cross the road to ensure safety of pedestrians.

4.14.25 Impacts of congestion to economy and wellbeing

Traffic jam has diverse negative impact on people, economy and environment. In open eyes we can see that, traffic jam effects on valuable time and energy, decrease productivity, environmental degradation, carbon emissions and many other consequences. Along with economic loses, traffic jam causes serious environment pollution stated that in developed countries especially in Northern Europe, some cities have been trying to make cities especially downtown areas car free. A number

of studies suggest that, public transport improvement, non-motorized modes, limiting the private car use, pedestrian zone and such environment friendly transportation system could have significant impact on traffic congestion reduction.

4.14.26 Transport network in Dhaka city and challenges

The only transportation means in Dhaka city is road transportation. However, recently the government of Bangladesh has been planning to initiate alternative means for example tramline and metro rail system with road transportation network. The city is built during the British colonization period of 200 years and ends in 1947. The then government built most important road. However, after that, there were no significant improvement happen in Dhaka city road transportation network. However, last few decades the population has increased dramatically. Therefore, vehicles especially private cars have been boomed since last decade. To adapt with the demand of traffic, the road transportation network has not been developed accordingly. There are diverse road transportation challenges exist in the country. Therefore, focusing on a single problem would not solve the problem. The responsible departments and stakeholders need to address the core reasons and act accordingly. Literature suggests that among other reasons, there are some key factors for example mismanagement, poor infrastructure and traffic control system cause road transportation challenges Mismanagement in road transportation involve inefficiency, limited resources and training. Some daily newspaper and Transparency International report suggest that a number of traffic police are corrupted. According to these reports, despite knowing the fact that a number of drivers drive the vehicles without license, the authority does little action to prevent them from driving. In addition, duty officers are not active enough to monitor and control traffics on the road. As a result, very often drivers do not follow traffic rules, which cause accidents and unbearable traffic jam. Those who are involved in planning and designing transportation system have lack of knowledge. Report suggest that these technically faults vehicles often cause accidents in the street. In addition to support the statement, statistical data suggest that there are only 200.000 drivers who has licenses, which indicate that remain vehicles are driven by the drivers without license or have a fake license. Vehicles are driven by fake drivers. According to Roads and highways department of the country, 62 percent of national and regional highways do not have proper junction arrangements. Although Bangladesh has been developing in many different

sectors, the roads and infrastructure are still underdeveloped. Most of the roads even the highways are very congested. In addition, all types of vehicles are driven in the same street for example, bicycle, CNG, easy bike, rickshaw, bus, truck, motorcycle, cars etc. Many roads in Dhaka city, there is no separate lane for bicycle or slow-moving.

Consequently, accidents and traffic jam are very common scenario in most of the densely areas of urban and suburban areas. Addition to this, drivers in Bangladesh use to work low paid and long hours. They usually do not get proper rest. Therefore, they have to drive in spite of tiredness, which cause accidents. Another crucial problem causes road damages is natural disaster and long rainy season. Natural calamities are very common in Bangladesh. There are arguments that most of the road builders do not put proper materials to make the street strong enough. Therefore, while heavy rainfall or floods, most of the road's damage. The government have to struggle to repair the roads every year. Therefore, many roads remain damaged, which cause accidents while driving on these roads. One another significant problem is traffic-controlling system. In Bangladesh, only big cities have traffic lights, which often either not working or drivers are not following. As a result, traffic jam occurs in every crossroads for long hours. Additionally, there is no traffic light system in district or sub-urban roads. Pedestrians as well contribute to traffic jam as they do not follow traffic lights and pass across the roads neglecting zebra crossing sign nearby. These risky passing very often causes accidents and most cases end up by loss of lives. In Bangladesh, the roads are not monitored with automatic cameras. As a result, drivers often drive reckless and make accidents. The figure created by the author below shows the causes of traffic jam for diverse road transportation challenges.

4.15 Questioners Survey

The primary objective of conducting the questionnaire survey was to meticulously collect data from individuals who frequently commute along the Kawran Bazar Signal. By administering this survey, I sought to gain insights into the perceptions of these commuters regarding the issue of traffic congestion, delve into their travel patterns, and elicit their valuable suggestions to alleviate the problem. Furthermore, our aim was to identify the principal factors contributing to the traffic congestion predicament and explore potential solutions.

Furthermore, the survey aimed to tap into the wealth of knowledge possessed by the commuters themselves. By soliciting their suggestions, I aimed to harness their first-hand experiences and expertise in finding viable solutions to alleviate the traffic congestion.

Overall, the questionnaire survey played a pivotal role in gathering comprehensive data from commuters who regularly utilize the Kawran Bazar Signal. By understanding their perceptions, travel patterns, and suggestions, as well as identifying the main causes and exploring potential solutions to traffic congestion, I aimed to inform evidence-based decision-making, enabling the development of targeted interventions that can effectively alleviate the traffic congestion problem and enhance the overall commuting experience for the affected individuals.

4.3.1 Data Table

Here I took some question content based on Kawran Bazar Mor daily traffic condition with the help about 100 people.

Serial No.	Content Name	Total Person = 100			
1	Gender	Male		Female	
	Person	70		30	
2	Age range	18-30	30-40		40-55
	Number of persons	60	25		15
3	Occupation	Student	Job	Business	Worker
	Number of persons	35	25	20	20
4	Reason of not using Foot over Bridge	Uncomfortable	Laziness	Illness	Waste of Time
	Answer	15	25	3	8
5	Necessary underground pass	Yes		No	
	Answer	80		20	
6	Traffic Signal Prefers	Digital		Analog	

	Answer	60	40		
7	Follow Traffic Rules	Yes	No		
	Answer	75	25		
8	What are the reasons of Traffic Jam	Excess Vehicle	Unauthorized Parking	Lane Wide Problem	Don't follow traffic rules
	Answer	60	10	10	30
9	Unauthorized parking causes Traffic Jam	Yes	No		
	Answer	40	60		
10	Vehicle Park at Unauthorized place	Mini Bus	Private Car	Rickshaw	Bike
	Answer	30	40	20	35

4.3.1 Survey Questions.

Here I took some question based on Kawran Bazar Mor daily traffic condition with the help about 100 people.

Ten precise questions were selected for the route of Kawran Bazar Signal. These are:

1. Which mode of transportation do you commute in Kawran Bazar Mor?
2. What is the average time you spend in traffic jams in Kawran Bazar Mor?
3. What is the main cause of traffic jams in Kawran Bazar Mor?
4. How do traffic jams in Kawran Bazar affect your daily life?
5. What is your overall opinion on the current state of traffic jams in Kawran Bazar Mor?
6. How do you think the government can reduce traffic jams in Kawran Bazar Mor?
7. How do you usually pass your time during traffic jams in Kawran Bazar Mor?

8. How safe do you feel during traffic jams in Kawran Bazar Mor?
9. What time of day do you experience the most traffic jams in Kawran Bazar Mor?
10. How often do you experience traffic jams in Kawran Bazar Mor?

4.3.2 Result analysis of Questionnaire Survey

The result of the following questions above has been shown in five pie charts which are given in figure. Figure no. 4.12 to 4.21

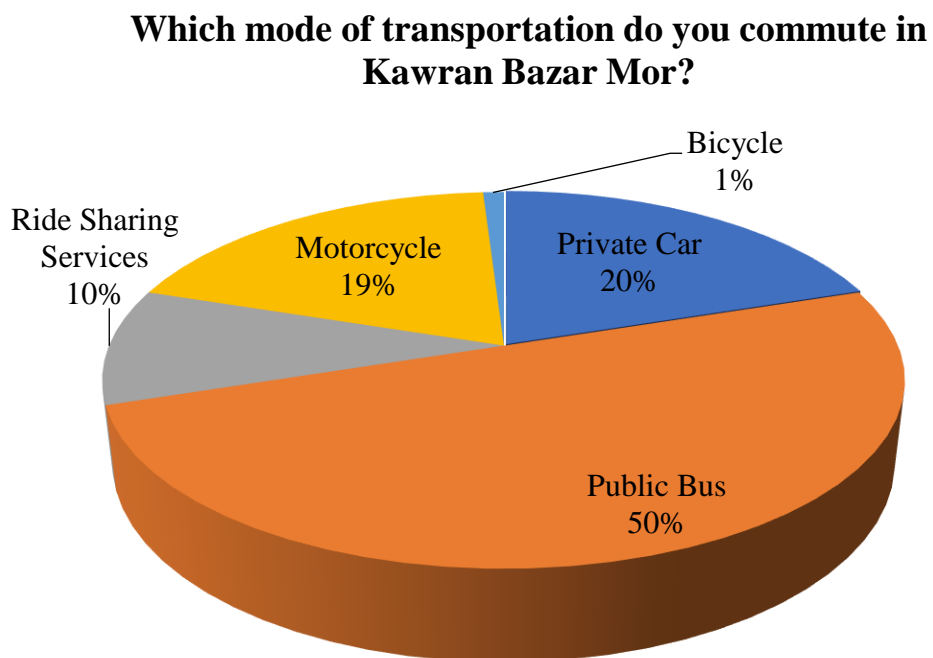


Figure 4.12

What is the average time you spend in traffic janes in Kawran Bazar Mor?

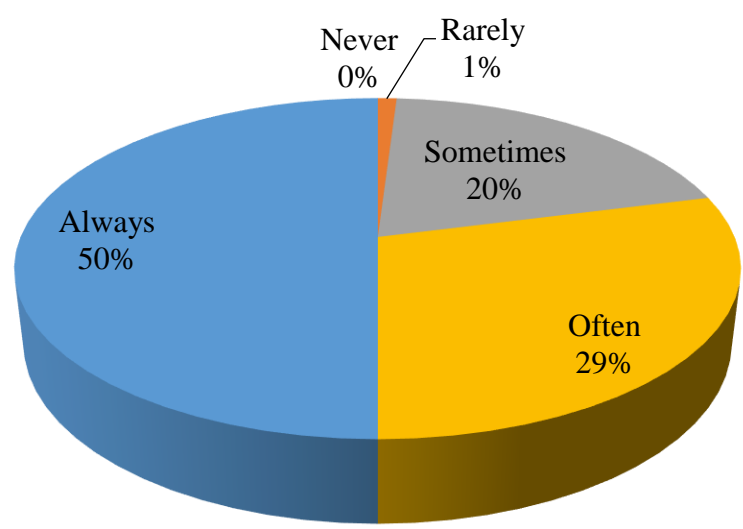


Figure 4.13

What is the main causes of traffic jams in Kawran Bazar Mor?

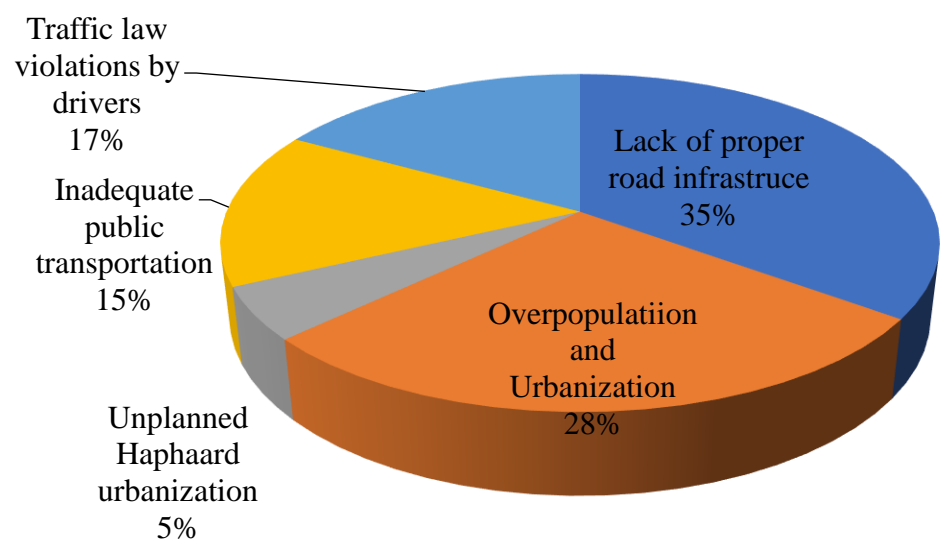


Figure 4.14

How do traffic jams in Kawran Bazar Mor affect your daily life?

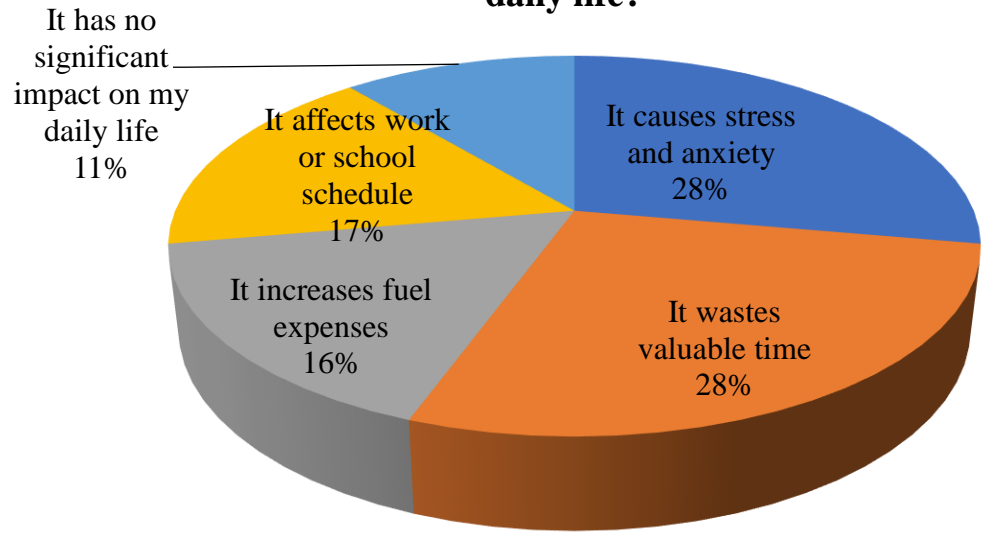


Figure 4.15

What is your overall opinion on the current state of traffic jams in Kawran Bazar Mor?

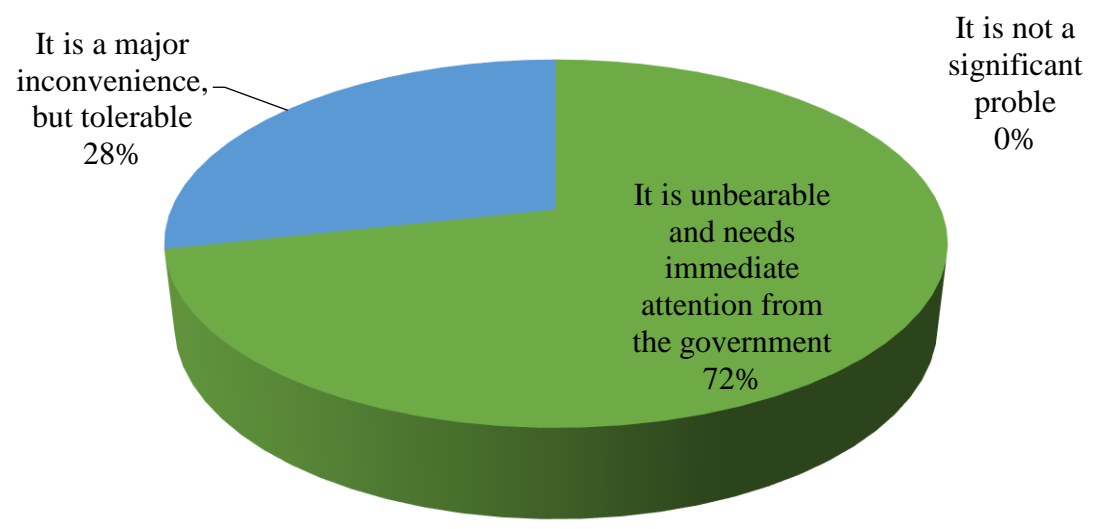


Figure 4.16

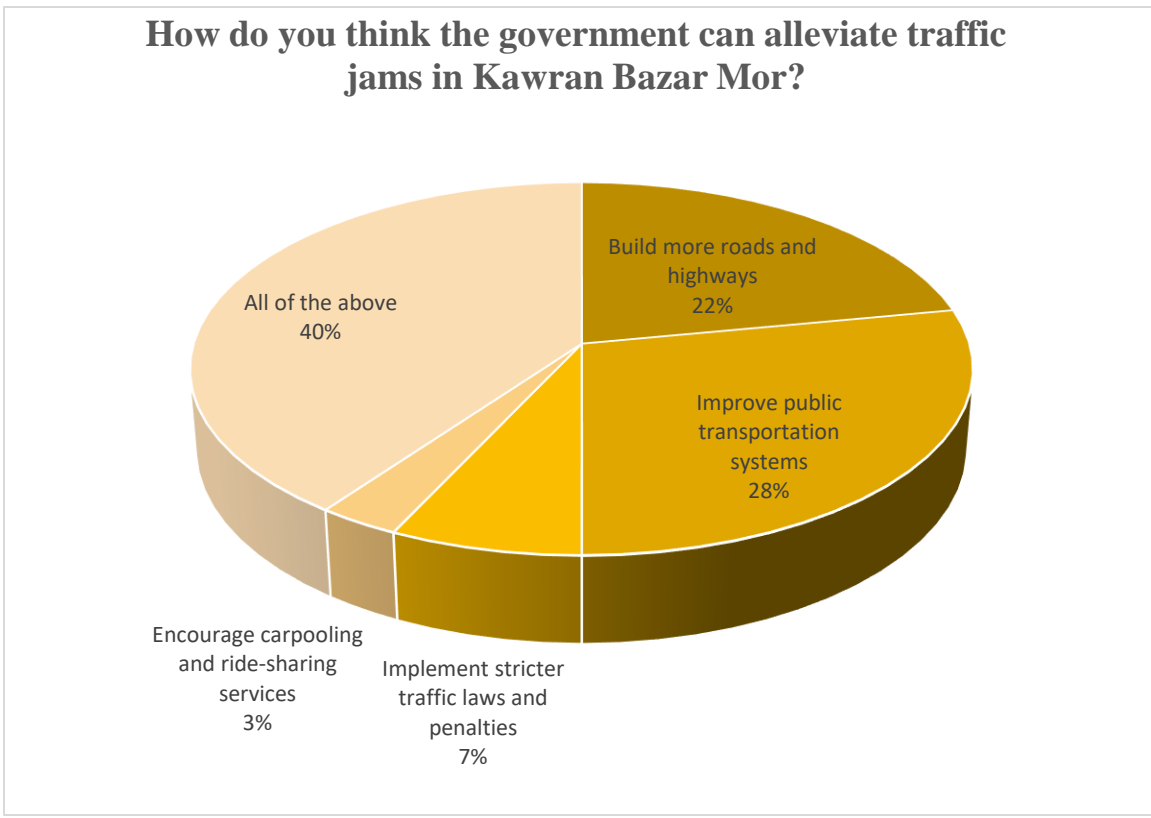


Figure 4.17

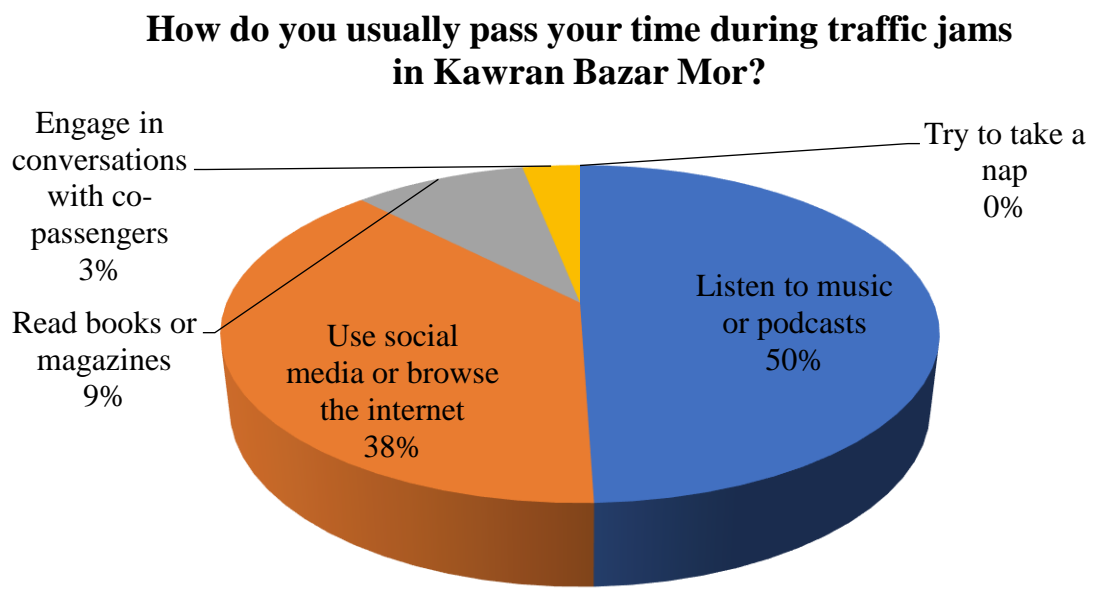


Figure 4.18

How safe do you feel during traffic jams in Kawran Bazar Mor?

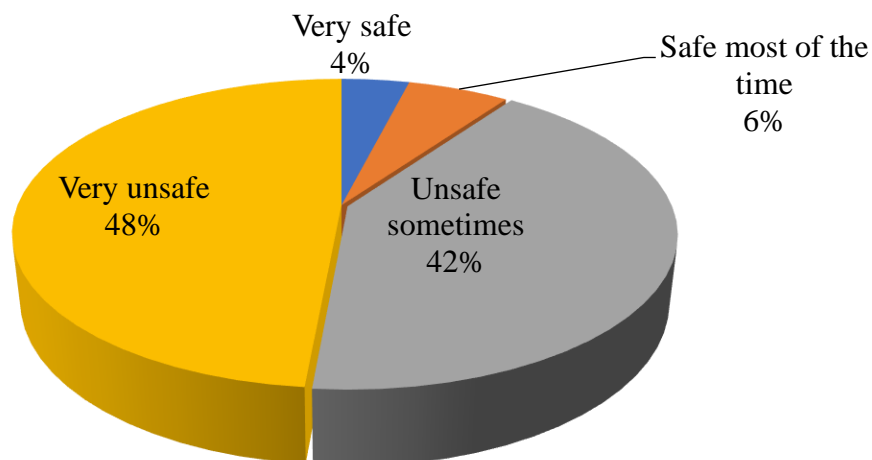


Figure 4.19

What time of you do you experience most traffic jams in Kawran Bazar Mor?

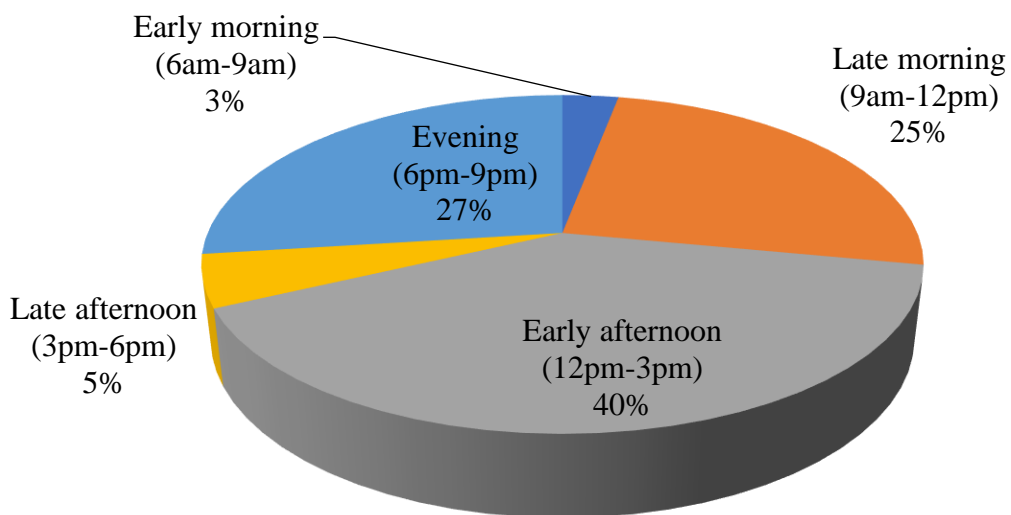


Figure 4.20

How often do you experience traffic jams in Kawran Bazar Mor?

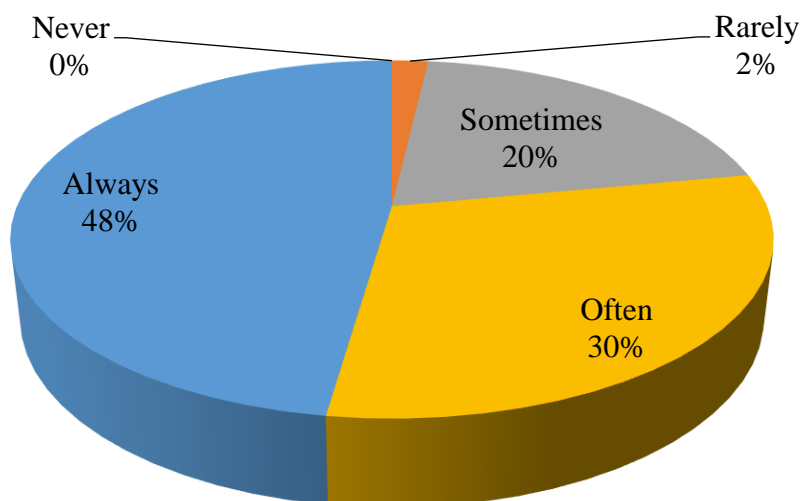


Figure 4.21

4.16 The impact of traffic jams

Traffic jam in Dhaka city has already become unendurable. Almost in every road, a huge traffic jam especially in the peak hours, when everyone rushes to reach their working place need to stay remain in the street standstill for many hours. It is not only causing individual mental stress and environmental damage but also contribute a large number of economic losses for the country. These losses occur in many ways for example, unproductive hours spent on the street, vehicles fuel cost during traffic jam, environmental and sound pollution, mental and health problems. The economic impact of traffic jam is huge. The residents of Dhaka city loss around Euro 4600 per hour for working hour loss in the street and around five Euro for vehicle operating cost per half-kilometer road. This study suggests that people of Dhaka city loss around five million working hours each year only for traffic jam, which cause Euro 3700 million loss per year. With proper traffic management and efficient public transportation could save at least 60% of the losses amounting to Euro 2220 million. Due to traffic jam, fuel costs and vehicle damages supplement the losses. Due to traffic jam, the social and personal life have also been affected negatively in many ways. Bangladesh is a tropical country. Thus, most of the time the temperature is over 30 degrees Celsius except around two-month winter time. Therefore, while staying in the road, often

people have sickness in various forms- dizziness, headache, vomiting, high blood pressure and such problems. When they reach working place, they become tired. Consequently, to some extent they loss their concentration to work. Finally, when they reach home after jobs, they are completely exhausted, which affect their family and social life. Addition to this, the employees are always under threat to loss their job due to the delay in the office caused by traffic jam. It also affects their productivity and job satisfaction. Another major consequence of traffic jam in Dhaka city is environmental damage due to air and sound pollution. Most of the people do not follow traffic rules. The drivers use to give horns continuously. Sometimes even without any reasons, they give horns and drive fast. The city corporation do not clean the city properly. The people also throw their waste on the street or sides of the road instead of placing them in trashcan. In addition to these thousands of vehicles have been burning fuels as they standstill for many hours in the traffic jam. It causes air pollution. Because of this hazardous air pollution, many people have been dying every year or have been suffering from many diseases.

4.17 Parking in non-parking zone at Kawran Bazar Signal

Illegal parking in non-parking zones is a critical issue in Dhaka city that requires immediate attention. The research found that the causes of illegal parking are interrelated and require a comprehensive solution that includes the provision of designated parking spaces, enforcement of parking regulations, and awareness-raising campaigns. The research suggests that the city authorities should develop a comprehensive parking management policy that includes the identification of parking zones, provision of parking facilities, and implementation of a penalty system for violators. Moreover, public awareness campaigns should be conducted to educate car owners and drivers on the importance of following parking regulations.



Figure 4.22 Parking in non-parking zone at Kawran bazar mor-Panthapath.(At 3:00 pm)

Here we can see there is some illegal parking at Kawran Bazar mor. This makes the road space less than it needed. This causes traffic congestion at signal.

The research found that the major causes of illegal parking in non-parking zones were the shortage of designated parking spaces, insufficient enforcement of parking regulations, and the lack of awareness among car owners and drivers. The consequences of illegal parking in non-parking zones include traffic congestion, obstruction of emergency vehicles, accidents, and damage to public property. The survey revealed that most car owners and drivers are aware of the parking regulations but are forced to park illegally due to the lack of designated parking spaces. The interviews with city officials and stakeholders revealed that the city lacks proper parking management policies and strategies.

4.18 Impact on Health

Due to heavy traffic jam, the main sufferers are – (a) General people. (b) Vehicle operators.

4.19 Sufferings of General People

73% of people in Dhaka City are suffering some kind of physical or mental discomfort due to traffic jam. It is very alarming. People are suffering in many ways due to staying in traffic jam. Few main ways of sufferings that I have got from our survey are – 1) Breathing problem, 2) Headache, 3) Mental stress, 4) Hearing problem, 5) Unexpected sweating, 6) Tiredness, and 7) Eye problem.

4.20 Breathing Problem

People suffer from breathing problem due to traffic jam. It happens that people due to smoke people cannot breathe or they have to breathe polluted gas. Frequent inhaling of polluted gas causes asthma. People suffer cannot breathe normally.

4.21 Headache

Longer stay in traffic cause headache to many people. Continuous horn creates headache. And if same thing keeps happening 5 days a week, anyone will have a chronic headache. As a result, many people of Dhaka City have got a gift headache from traffic jam.

4.22 Mental Stress

Due to traffic jam, people get late in their appointments. This gives people a continuous mental stress. And taking this mental stress day by day, people get heart diseases, mental weakness and many other symptoms of weak hearts.

4.23 Hearing Problem

Due to heavy horn at the time of traffic jam, people suffer problem in hearing. Staying in the traffic for a long time makes a people unable to hear clearly for a few minutes. If this continues, the hearing problem might be permanent.

4.24 Air Pollution

Traffic jam introduces air pollution through SO_x, NO_x, CO_x (SO₂, CO, CO₂, N₂O, NO₂). And in the traffic jam, when vehicles stop for a longer period of time and their engine is on, they emit SO_x, NO_x much which are lighter than air but very dangerous for our health.



CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 5

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5.1 Conclusion

The purpose of this study was to analyze the traffic congestion on Kawran Bazar Signal in Dhaka City, and to propose solutions to alleviate the problem. The study found that the route was highly congested, with long delays and frequent accidents, which negatively impacted the quality of life for the residents and the economic productivity of the city.

Based on the findings of the study, several recommendations were proposed to address the issue of traffic congestion on the route. These recommendations include:

Adaptive Signal Timing

Overview

Adaptive signal timing uses real-time traffic conditions to adjust traffic signal timings dynamically. Sensors and cameras collect data, which is then analyzed by a control system to adjust the signal phases.

Benefits

- Reduces overall delay and improves travel time.
- Accommodates variations in traffic throughout the day.

Challenges

- High initial investment in sensors and software.
- Requires ongoing maintenance and calibration.

Implementation Plan

1. Conduct a cost-benefit analysis.
2. Install traffic sensors and cameras.
3. Integrate with existing traffic management systems.
4. Run a pilot test for three months to gather data and refine the algorithm.
5. Full-scale implementation if the pilot is successful.

Traffic Signal Coordination

Overview

Traffic signal coordination aims to create "green waves," allowing vehicles to pass through multiple intersections without stopping.

Benefits

- Increases the throughput of vehicles through the network.
- Reduces fuel consumption and emissions by minimizing stops and idling.

Challenges

- Coordination becomes complex when multiple routes intersect.
- May require re-engineering of road infrastructure.

Implementation Plan

1. Identify routes that would benefit the most from signal coordination.
2. Modify signal timings and phases to align with the coordination plan.
3. Monitor and adjust timings as needed.

Implementation of Intelligent Traffic Systems (ITS)

Overview

ITS integrates various technologies like GPS, machine learning, and vehicle-to-infrastructure (V2I) communication to optimize the overall road network.

Benefits

- Allows real-time traffic monitoring and reporting.
- Long-term solution with potential to handle increasing future traffic.

Challenges

- High cost of implementation.
- Public and political willingness to invest in advanced technology.

Implementation Plan

1. Initial feasibility study and stakeholder engagement.
2. Develop a phased implementation plan, starting with high-impact areas.
3. Deploy ITS components like smart traffic signals, real-time traffic monitors, etc.
4. Continual data collection and system tweaking for optimal performance.

5.2 Limitations

The present study is focused on analyzing the traffic congestion on the Kawran Bazar Signal in Dhaka City, and as with any research study, there are certain limitations that need to be acknowledged. These limitations are discussed below:

Limited Sample Size:

One of the major limitations of this study is the limited sample size. The study focused only on the Kawran Bazar Signal, which is just one of the many routes that experience traffic congestion in Dhaka City. Due to this, the findings of the study may not be applicable to other routes in the city. Furthermore, the study only considered a single day of the week, which may not be representative of the traffic situation on other days.

Data Collection Limitations:

The study is based on the data collected from various sources such as surveys, questionnaires, and field observations. However, there are limitations to the accuracy of the data collected, as it is based on the perceptions and responses of the participants. Moreover, due to the high traffic volume and chaotic traffic conditions, collecting accurate data during rush hours was challenging. This may have resulted in incomplete or inaccurate data collection.

Time Constraints:

Another limitation of this study was the time constraints within which the research had to be conducted. Due to the limited time available for data collection and analysis, the study was not able to cover all aspects of the traffic congestion problem in the Kawran Bazar Signal. In addition, the study was unable to consider the impact of factors such as weather conditions, road repair and maintenance, and special events, which may have an impact on traffic congestion.

External Factors:

The study did not account for external factors that could have an impact on traffic congestion. Factors such as the political situation, economic conditions, and cultural events, were not considered in the analysis. These external factors could have had a significant impact on the traffic congestion in the Kawran Bazar Signal.

Scope Limitations:

The scope of the study was limited to analyzing the traffic congestion on the Kawran Bazar in Dhaka City. The study did not consider other factors such as environmental pollution, noise pollution, and the impact of traffic congestion on public health. Therefore, the study cannot be considered as a comprehensive analysis of the traffic congestion problem in Dhaka City.

This study has identified several limitations that need to be considered while interpreting the results of the analysis. The limited sample size, data collection limitations, time constraints, external factors, and scope limitations, are all factors that could have an impact on the validity and reliability of the study

5.3 Recommendations

In the previous chapters, I have identified the causes of traffic congestion on the Kawran Bazar in Dhaka city. Based on our findings, I have come up with the following recommendations to alleviate traffic congestion and improve traffic flow on this route.

5.3.1 Short-term Recommendations

Short-term recommendations are immediate solutions that can be implemented quickly to address traffic congestion at Kawran Bazar Signal. The following are our short-term recommendations:

1. Increase the frequency of public transportation, such as buses and trains, on this route to encourage people to use public transportation instead of private vehicles.
2. Increase the capacity of the road by adding additional lanes or widening the existing lanes to accommodate more vehicles.
3. Implement a one-way traffic system to reduce congestion caused by opposing traffic flows.
4. Ban parking on the sides of the road during peak hours to prevent congestion caused by parked vehicles.

5.3.2 Long-term Recommendations

Long-term recommendations are solutions that require more time and resources to implement but have a more significant impact on reducing traffic congestion. The following are our long-term recommendations:

1. Develop alternative modes of transportation, such as a light rail or metro system, to provide people with alternative means of transportation.

2. Construct flyovers or underpasses at major intersections to separate vehicular and pedestrian traffic and reduce congestion.
3. Implement intelligent transportation systems (ITS) to manage traffic flow and optimize the use of existing infrastructure.
4. Develop bike lanes and encourage cycling as an alternative means of transportation.
5. Introduce a congestion charge to discourage private vehicles from entering the area during peak hours.
6. Encourage carpooling and use of ride-sharing services by providing incentives and designated pick-up/drop-off points.
7. Provide better pedestrian facilities, such as sidewalks and footbridges, to improve pedestrian safety and reduce congestion caused by pedestrians.
8. Create awareness and educate the public about the importance of following traffic rules and regulations to reduce accidents and traffic congestion.
9. Develop a comprehensive traffic management plan that includes regular maintenance of roads, enforcement of traffic rules, and monitoring of traffic flow.
10. Conduct regular surveys to monitor the effectiveness of the recommendations and adjust the plan accordingly to ensure sustained reduction in traffic congestion.

In conclusion, implementing the above recommendations will require the cooperation of various stakeholders, including the government, private sector, and the public. However, the benefits of reducing traffic congestion on the Kawran Bazar Signal in Dhaka city will be significant and will lead to improved mobility, reduced pollution, and increased economic productivity.

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