American Journal of Traffic and Transportation Engineering
2024, Vol. 9, No. 5, pp. 74-78
https://doi.org/10.11648/j.ajtte.20240905.11

Research Article

Comprehensive Analysis of the Transport Sector in Narayanganj City: Existing Scenario and Way Forward

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Abstract

This study examines transportation issues in Narayanganj City Corporation, one of the densely populated cities in Bangladesh. It examines the Chashara intersection which is a major intersection within the city, suffers from ever worsening traffic and poor infrastructure. Using qualitative research methods, information was obtained through field surveys, observation as well as four focus group discussions with residents aged 20-50 years mainly students, urban dwellers experts. Some of the problems that emerged from the study include poor traffic control, limited road construction and maintenance. The findings also highlight significant challenges, including poor traffic management, insufficient road networks, and inefficient regulation of transport services, notably the prevalence of auto-rickshaws contributing to the congestion. The study identifies the Chashara intersection as a critical area requiring urgent intervention. Proposed solutions emphasize the introduction of alternative routes to alleviate bottlenecks, stricter regulation of auto-rickshaw operations, and the implementation of congestion pricing mechanisms to manage traffic flow. These recommendations aim to provide a strategic framework for improving urban mobility and ensuring sustainable development in the transportation sector of Narayanganj. The need for immediate, coordinated efforts from local authorities and urban planners is underscored, as addressing these issues is essential for enhancing the city's livability and accommodating future growth.

Keywords

Transportation, Infrastructure, Congestion, Development

1. Introduction

Narayanganj City Corporation, situated at the crossroads of trade and business, is a thriving metropolitan hub in Bangladesh. It offers a wide range of transportation options, including as buses, trains, launches, and soon, a metro rail system. But in the middle of all of this excitement is a city that is struggling with a lot of issues that are made worse by how many people live there. This comprehensive study aims to delve into the intricacies of Narayanganj's transport sector, conducting an in-depth analysis of existing infrastructure, identifying key challenges faced by commuters and stakeholders, and proposing effective recommendations for improvement, with a particular focus on the critical Chashara intersection. Drawing upon relevant literature, studies [1, 2] emphasize the importance of understanding commuter behaviour and infrastructure inadequacies in similar urban contexts. Similarly, research [5] suggests traffic management strategies applicable to Narayanganj, while research [3] underscore the significance of community involvement in

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Received: 1 May 2024; **Accepted:** 9 July 2024; **Published:** 10 October 2024

transportation planning. A qualitative approach was employed in this study, utilizing data collected through field studies, direct observations, and focus group discussions with stakeholders from relevant fields. This methodology allowed for a nuanced understanding of the transport dynamics in Narayanganj, facilitating the identification of challenges and the formulation of targeted recommendations.

2. Methodology

The methodology for this qualitative research involved a multifaceted approach to data collection, including direct observation, focus group discussions (FGDs), survey, and secondary data analysis. Direct observation provided firsthand insights into transportation patterns and infrastructure conditions, while four FGDs with stakeholders from various sectors offered valuable perspectives on transportation issues in Narayanganj City Corporation. Additionally, a traffic volume survey conducted at the Chashara intersection provided quantitative data, which was qualitatively discussed to complement the findings. Photographs were taken during observation to visually document key aspects, and secondary data from sources like the Narayanganj City Corporation website were utilized to gain further context. This mixed-methods approach facilitated a comprehensive analysis of the transport sector, informing the formulation of practical recommendations.

3. Findings

3.1. Intersection (Chashara) Challenges

The intersection challenge in Narayanganj city, Bangladesh, is characterized by chaos and congestion, exacerbated by its status as a densely populated area, particularly known for industrial and commercial activities. The heavy traffic flow throughout the day is further compounded by narrow roads and unplanned urban development. Vehicles, including rickshaws, motorcycles, and pedestrians, compete for space, leading to bottlenecks and increased congestion. Another significant challenge is the disregard for traffic rules and poor driving habits. Many drivers neglect traffic signals, overtake from the wrong side, or park illegally near intersections, obstructing the smooth flow of traffic. Traffic congestion has significant socio-economic impacts in the port and industrial areas of Chittagong city, Bangladesh [4]. Similarly, Narayanganj, as the port area of Dhaka, faces comparable challenges. Daily crossings of the railway line contribute heavily to traffic jams, exacerbating delays and affecting both economic activities and daily commuting in the region. The traffic congestion at this intersection is primarily caused by the frequent train crossings, resulting in approximately 2-3 hours of wasted commuting time daily. A traffic volume survey during peak hours was conducted to assess the extent of the problem [6].

Table 1. *Traffic Volume Survey Analysis - Chashara Intersection, Narayanganj (10 am to 11 am).*

Vehicle Mode	Dhaka, Matuail road to Narayanganj City Corporation (Vehicle per hour)	Narayanganj City Corporation to Matuail, Dhaka Road (Vehicle per hour)
Bus	197	183
Private Car	114	102
Auto-Rickshaw	325	124
Truck	27	15
Pick-up	14	17
Motorcycle	97	85
Others	9	5

Source: Traffic Survey, 2024

During the peak hour from 10 am to 11 am, a traffic volume survey conducted at the Chashara intersection in Narayanganj City Corporation area revealed a predominance of auto-rickshaws, with a total count of 325, indicating heavy reliance on this mode of transportation within the city. Buses followed closely with 197 counted. Private cars were less prevalent with 114 counted. The low number of vehicles observed from Narayanganj City Corporation area to Siddhirganj road suggests a more streamlined traffic flow in that direction.

3.2. General Challenges

Feedback from focus group discussions regarding traffic congestion and the current transport situation in Narayanganj highlighted several significant issues. Participants mentioned

that roadside parking of vehicles causes congestion, and the absence of speed limits, particularly for auto-rickshaws, exacerbates the problem. Lack of enforcement of traffic rules, road design and infrastructural issues, insufficient speed breakers, especially in front of schools and hospitals, inadequate usage of traffic signage, limited footpath availability, and obstructions and poor management of footpaths were identified as major concerns.

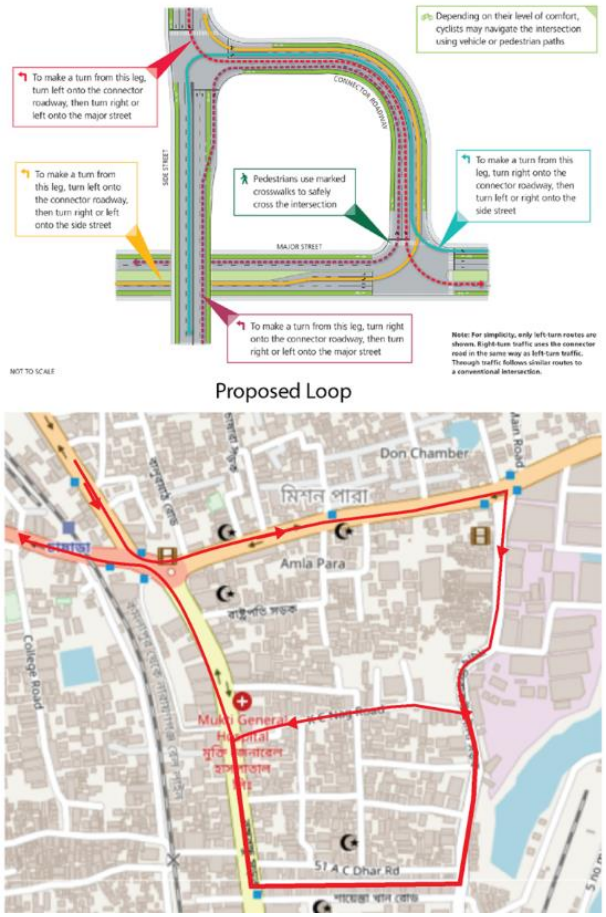

Figure 1. *Proposed Alternative Route.*

4. Recommendation

The comprehensive analysis of the transport sector in Narayanganj City Corporation has identified several key issues and proposed strategies for improvement. These include addressing traffic congestion and infrastructure deficiencies at the Chashara intersection, enhancing traffic management, and implementing general improvement measures. Narayanganj City Corporation (NCC) has taken a move to construct a light rapid transit (LRT) system as a remedy to the city's traffic congestion [7]. Specific recommendations focusing on the Chashara intersection include the implementation of using alternative roads for crossing heavy vehicles and buses, regulation of auto-rickshaws and multiple stands, creation of a temporary parking station, introduction of an underpass rail crossing, and congestion pricing during peak hours.

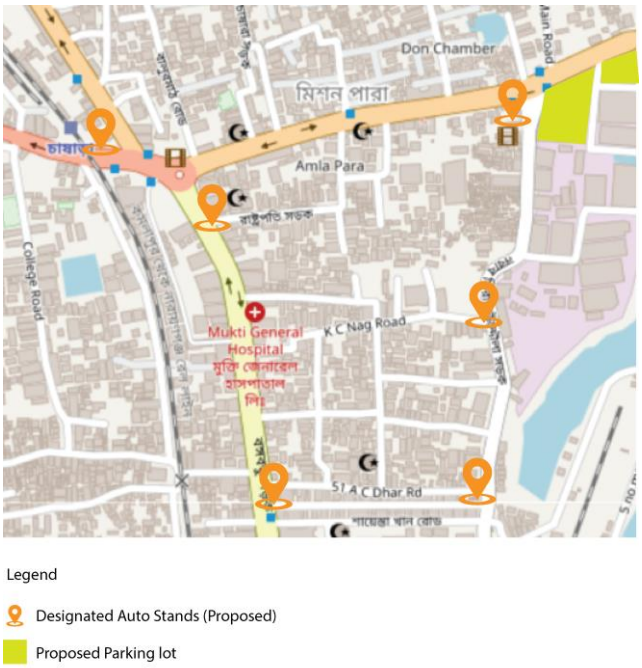

Figure 2. *Proposed Auto stand and Parking lot.*

Implementing loop roads as alternative routes to bypass the Chashara intersection would significantly reduce traffic congestion and minimize the number of vehicles idling near the intersection. Loop roads offer a more efficient solution for crossing and passing through busy areas, helping to streamline traffic flow and ease the overall burden on the intersection [8].

Additionally, effective management of the overwhelming number of rickshaws is essential, as their high volume contributes significantly to traffic congestion [9]. So, regulation of Auto Rickshaws and multiple stands by managing and controlling the number of auto rickshaws operating on Bangabandhu Sarak from Chashara intersection to reduce congestion caused by standing autos, as highlighted in the field survey. NCC authority should enforce regulations and provide multiple designated autos stands to manage the flow of auto rickshaws effectively. Regulating the number of auto rickshaws and providing designated stands, traffic flow can be improved, reducing congestion and enhancing safety for pedestrians and commuters, as suggested by the findings from the field survey.

Again, parking mismanagement is a major contributor to traffic congestion in Bangladesh, as improper parking practices reduce road space and disrupt the smooth flow of vehicles [10] and also seen in Chashara intersection too. So, establish a temporary parking station near the metro bus stop within 500 meters of Chashara intersection, as recommended in the field survey, to accommodate vehicles and reduce

illegal parking on the roads. Pedestrians can utilize nearby footpaths or take rickshaws from the designated auto stands after parking their vehicles. The temporary parking station provides a convenient solution for commuters, reducing the need for illegal parking and improving traffic flow in the vicinity of Chashara intersection, as emphasized in the field survey.

An underpass can effectively reduce congestion at intersections by easing vehicle flow during crossing [11]. Construct an underpass rail crossing to mitigate delays caused by train crossings during peak hours, as identified in the field survey. By providing an alternate route for vehicles, the underpass can alleviate congestion and improve traffic flow at Chashara intersection. The underpass rail crossing serves as a critical infrastructure improvement, ensuring uninterrupted traffic flow and reducing travel time for commuters during peak hours, aligning with the recommendations from the field survey.

Congestion pricing is a potential solution for alleviating traffic jams in areas with high traffic volumes [12]. Implement congestion pricing during peak hours (10 am to 12 pm and 4 pm to 6 pm) to discourage the use of Chashara intersection, based on insights from the field survey. Drivers can opt for alternative routes, such as Bhasha Sainik Mamtaz Jahan Sarak to College Road to Jamtola Road, to avoid congestion and reduce traffic volume at the intersection. Congestion pricing incentivizes commuters to use alternative routes, effectively reducing congestion at Chashara intersection and improving overall traffic management in the area, in line with the findings from the field survey.

Effective traffic management strategies are essential for optimizing traffic flow and enhancing safety at the Chashara intersection. Proposed measures include:

1. Implementing strict enforcement of traffic rules and regulations to deter illegal parking, lane violations, and other traffic offenses [13].
2. Enhancing signal coordination and timing to minimize delays and improve the synchronization of traffic movements [14].
3. Introducing smart traffic management systems equipped with real-time data analysis capabilities to monitor traffic conditions and adjust signal timings dynamically [15].

Table 2. *Year Wise plan.*

Time Period	Initiatives
Short-term (Year 1-2)	- Implementation of alternative route for crossing: Feasibility studies, design planning, and land acquisition processes. - Regulation of Auto Rickshaws: Enforcement of regulations and installation of signage. - Creation of Temporary Parking Station: Identification of suitable locations and commencement of land acquisition. - Construction of road infrastructure for U-loop system and monitoring of progress. - Stricter enforcement and collaboration with local authorities for auto rickshaw regulation. - Initiation of construction and development of plans for the temporary parking station.
Medium-term (Year 3-4)	- Continuation of using the roads for crossing and trial runs. - Monitoring compliance and public awareness campaigns for auto rickshaw regulation. - Completion of construction and implementation of management measures for the temporary parking station. - Planning and design work for the introduction of underpass rail crossing. - Framework development for congestion pricing.
Long-term (Year 5 and beyond)	- Completion of underpass rail crossing construction. - Launch and monitoring of congestion pricing.

Source: Author

5. Conclusion

5.1. Summary of Findings

The analysis reveals several critical issues plaguing Narayanganj's transportation infrastructure and management. These include insufficient road infrastructure, traffic congestion at key intersections like Chashara, inadequate parking facilities, and environmental pollution. Additionally, management challenges such as ineffective traffic management, lack of enforcement of traffic rules, and poor maintenance further exacerbate the situation. Stakeholder

involvement, technological interventions, and environmental considerations emerge as key themes to address these challenges effectively.

5.2. Implications for the Future

The findings emphasize the need for coordinated action and strategic planning to tackle Narayanganj's transportation issues. Collaborative efforts involving government agencies, private sector entities, and the local community are crucial to implementing sustainable solutions. Stakeholder engagement is essential to ensure that transportation projects meet the needs and expectations of all stakeholders while promoting inclusivity and transparency. Leveraging technology, such as intelligent traffic management systems and smart transportation solutions, can significantly enhance the efficiency and effectiveness of transportation services. Furthermore, prioritizing environmental sustainability by addressing pollution, promoting eco-friendly transportation modes, and preserving natural resources like the Shitalakhya River is vital for the long-term well-being of Narayanganj and its residents.

The conclusion emphasizes the importance of a holistic approach to transportation planning and management in Narayanganj. By addressing infrastructure gaps, improving management practices, engaging stakeholders, embracing technology, and prioritizing environmental sustainability, the city can pave the way for a more efficient, equitable, and sustainable transportation system that meets the needs of its residents and supports its long-term development goals.

Abbreviations

NCC	Narayanganj City Corporation
FGD	Focused Group Discussions

Conflicts of Interest

The authors declare no conflicts of interest.

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