

## **PEDESTRIAN BEHAVIORAL INSIGHTS INTO ILLEGAL MID-BLOCK CROSSINGS: A STUDY OF LEISURE WALKERS IN URBAN DHAKA**

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### **ABSTRACT**

In rapidly urbanizing cities like Dhaka, Bangladesh, pedestrian safety at urban mid-block locations has become a growing concern. These locations, often lacking adequate infrastructure or being underutilized despite existing facilities, pose serious risks to pedestrian safety. Understanding the motivations and behaviors of pedestrians, especially leisure walkers when crossing at mid-block locations, is crucial for ensuring urban road safety and mobility in densely populated cities. Leisure walk means a calm and easy walk taken primarily just to enjoy yourself or clear your mind, light physical exercise, or mental refreshment, often aimed at clearing the mind and reducing stress. A lot of research has focused on general pedestrian behavior, but not much attention has been given to people who walk just for pleasure. That's why we want to explore this topic. A field-based questionnaire survey was conducted, with a total of 198 valid responses collected directly from pedestrians at various midblock locations across Dhaka city, where people agreed that they were walking for pleasure. The questionnaire was divided into two sections: the first focused on respondents' demographic information, and the second explored their road crossing behaviors when walking for their pleasure. To identify the relationship between demographic factors and crossing behaviors, a Binary Logistic Regression Model was applied to determine which factors influence safe or unsafe road crossing practices. Findings from the analysis said that gender, occupation, travel frequency, and mode of transport significantly influence individuals' crossing behaviors. Male respondents were found to be more likely to cross roads illegally than females. Students were less likely to engage in illegal road crossing. In comparison, working individuals often face time pressure during their commutes, making them more likely to cross at non-designated areas for convenience. Travel frequency significantly influenced pedestrian crossing behavior due to their familiarity and time constraints. Daily commuters were more likely to cross unsafely. Transport mode also played a role: public transport users typically crossed at proper locations, while private vehicle users, especially those who walk for their leisure, were more likely to cross at random or risky areas for convenience. This study supports the creation of safer, more enjoyable walking environments by focusing on those who walk for pleasure and well-being. Understanding their experiences can help shape more welcoming, people-friendly spaces that make walking a joyful activity. This will ultimately contribute to improved urban livability, reduced pedestrian accidents, and the development of sustainable mobility systems that support both safety and well-being.

**Keywords:** *Leisure Walkers, Crossing Practices, Urban Mid-block, Dhaka City, Binary Logistic Regression*

## 1. INTRODUCTION

Road traffic accidents remain a major global public health concern, particularly for vulnerable road users such as pedestrians, cyclists, and motorcyclists (B S. , 2008). According to the World Health Organization (2024), nearly half of all traffic-related deaths worldwide involve these groups, highlighting the urgent need to improve pedestrian safety, especially in rapidly urbanizing areas (WHO, 2024). According to the Bangladesh Road Transport Authority (BRTA) report (2023), national road safety data indicate that pedestrians account for more than 40-45% of total road traffic casualties, representing one of the highest proportions in South Asia. Urban crash statistics suggest that a significant share of pedestrian deaths occur during road crossing movements, particularly at locations lacking formal crossing facilities. In developing cities like Dhaka, Bangladesh, pedestrian vulnerability becomes worse due to dense traffic, mixed land use, and inadequate pedestrian infrastructure (B M. S., 2009). The city's streets are often congested and lack features such as continuous sidewalks, pedestrian signals, and safe crossing facilities. As a result, pedestrians are forced to share limited road space with fast-moving vehicles. Among different types of pedestrian behavior, mid-block crossings, when people cross the road between intersections or away from marked crosswalks, are especially common but also quite risky. Studies have shown that pedestrians crossing at mid-block locations are more likely to face difficulties or accidents compared to those using designated crossings, primarily due to the absence of traffic control systems and weak driver obedience to pedestrian right-of-way (R, J, & T, 2012). This problem is further worsened in Dhaka, where high vehicle density, infrastructural gaps, and behavioral factors together weaken pedestrian safety and mobility (L & L, 2024). Mid-block crosswalks play an important role in urban transportation systems by providing more direct access to destinations not conveniently served by adjacent intersections (B & P, 2018). However, in many low- and middle-income countries (LMICs), these crossings are poorly designed, unchecked, or simply absent, forcing pedestrians to use random or illegal crossing areas (Boun, et al., 2024). Inadequate pedestrian infrastructure, combined with rapid motorization and limited monitoring, has resulted in frequent vehicle-pedestrian collisions and increased accident risks (Stoker, et al., 2015). A growing body of international research has studied pedestrian crossing behavior and its determinants, identifying key influences such as gender, age, occupation, traffic perception, and environmental conditions (Papadimitriou, Lassarre, & Yannis, 2016). In addition, male and younger pedestrians are more likely to take risks, whereas females and elderly pedestrians are more careful and follow crossing rules (Holland & Hill, 2010). However, most of these studies have focused on purposeful walking trips made for work, education, business purposes, or transportation rather than leisure walking, which involves walking for relaxation, exercise, or mental well-being (Mondal, et al., 2020). Leisure walkers, defined as individuals who walk for enjoyment, light exercise, or physical relaxation, may show noticeable behavioral motivations and patterns. Being less constrained by time and more motivated by comfort or convenience, they might choose to cross at mid-block locations for convenience or due to environmental factors, rather than out of safety concerns. Despite the increasing importance of walkability and livable cities, leisure walkers remain a largely understudied group in pedestrian safety research, especially in developing country contexts such as Bangladesh (Hyder, 2024). Understanding the motivations and behaviors of leisure walkers is crucial for promoting safer and more inclusive urban environments (Distefano & Leonardi, 2023). As leisure walking gains popularity due to public health awareness and lifestyle changes, leisure walkers are becoming a visible component of urban mobility in Dhaka. Although the city's infrastructure still prioritizes motorized transport, it offers very few pedestrian-friendly routes or safe mid-block crossing facilities. Because of this mismatch, leisure walkers often end up engaging in unsafe behaviors such as crossing illegally at mid-block locations to avoid lengthy diversions or poorly maintained sidewalks. This study determines why leisure walkers in urban Dhaka prefer to make illegal mid-block crossings. Focusing on this frequently neglected group of pedestrians provides new perspectives on mid-block crossing behavior and safety. The findings will contribute to more adaptive urban design and policy decisions that promote safer, more enjoyable, and welcoming environments in growing cities such as Dhaka.

## 2. METHODOLOGY

### 2.1 Study Area Description

The data for this study were collected through a field-based questionnaire survey conducted across four selected locations in Dhaka city: Bangla College Road, Sat Masjid Road, Jamuna Future Park Road, and Shomobay Super Market Road. These study locations were chosen due to their high pedestrian activity, combined with moderate traffic flow and their proximity to educational institutions and commercial areas such as offices and shopping malls, where recreational and stress-relief walking are common, particularly during morning and evening periods. Notably, all the selected locations have a visible crosswalk or a pedestrian footbridge, providing suitable conditions for observing leisure walkers' crossing behavior.

### 2.2 Data Collection

A comprehensive questionnaire survey was conducted to collect data for this study. The questionnaire consisted of two main sections. The first section focused on demographic information, including participants' gender, age, education level, employment status, frequency of road crossing, and usual mode of daily travel. The second section explored the perceptions of pedestrians, particularly those who walk for leisure, regarding illegal crossing behavior. Responses were collected using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). A total of 198 valid responses were collected from the field who identified as leisure walkers. To improve the convenience of our respondents, we showed an image of the Mid-block to pedestrians. Here is an image of a Mid-block location.

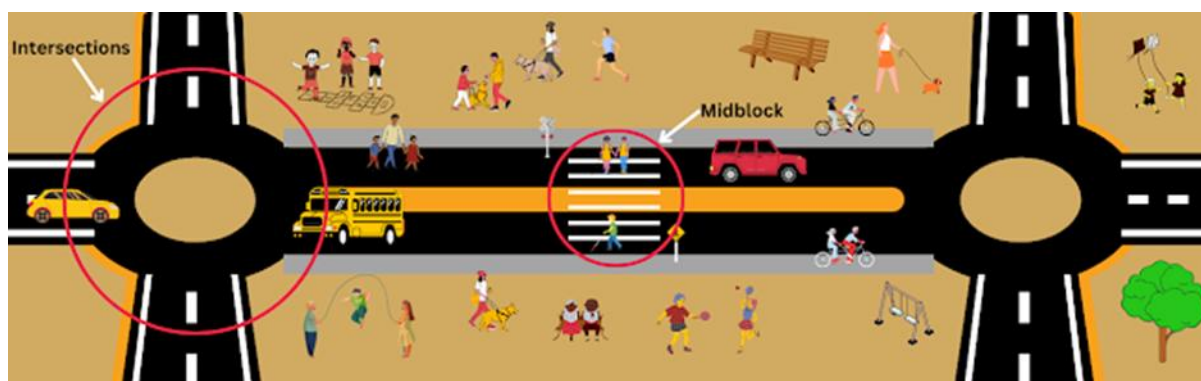


Figure 1: Mid-block

Table 1: Descriptive Statistics of Sample Data

Demographic Factors	Operational Definition	Coding	Frequency (%)
Gender	Male = 1	Male	68
	Female = 2	Female	32
Age	Less than 30 years old = 1	Age≤30	84
	More than 30 years old = 2	Age>30	16
Education	Below or equal to HSC = 1	Below_HSC	60
	Above HSC = 2	Above_HSC	40
Profession	Students = 1	Students	73
	Employed = 2	Employed	17
	Unemployed = 3	Unemployed	10
Income	Household Income Equal to or less than 50000 BDT	Income≤50K	46
	Household Income more than 50000 BDT	Income>50K	24
	Other (if the respondent is a student)	Students	30

<b>Crossing Frequency</b>	Daily	Travel Daily	74
	Weekly	Travel Weekly	10
	Monthly	Travel Monthly	16
<b>Travel Mode</b>	Public Transport	Trans Public	65
	Private Car	Trans Private	5
	Others	Trans Others	30

### 2.3 Binary Logistic Regression

The Binary logistic regression model is based on the logistic function, which is an S-shaped curve defined as:

$$P\left(Y = \frac{1}{x}\right) = \frac{1}{1 + e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_K X_K)}}$$

Where:

- $P\left(Y = \frac{1}{x}\right)$ : The probability of the outcome (e.g., speeding behavior occurring).
- e: The base of the natural logarithm.
- $\beta_0$ : The intercept of the model.
- $\beta_0, \beta_1, \beta_2 \dots \dots \beta_K$  Coefficients of the independent variables
- $X_1, X_2, \dots \dots X_K$  Independent variables

## 3. MODEL DEVELOPMENT

### 3.1 Response Variables

In this study, a binary logistic regression analysis was employed to investigate factors influencing pedestrian crossing preferences based on their walking purpose or habit. Participants were presented with a specific scenario and asked to indicate their crossing preferences. The responses were subsequently converted into binary outcomes (Agree=1, Disagree=0) and used as the dependent variable in the logistic regression analysis to identify the key factors influencing crossing decisions.

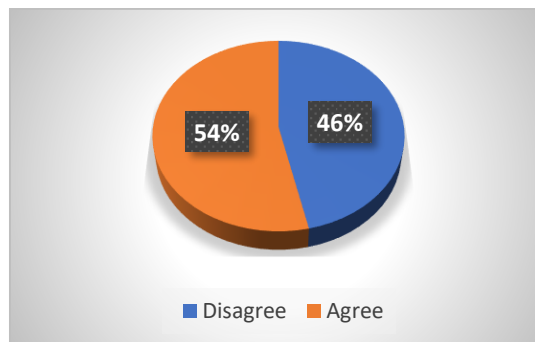


Figure 2: Engaging in illegal mid-block road crossing as a leisure walker

### 3.2 Regressor Variables

The surveyor asked participants about the factors they consider when choosing to cross at a mid-block. Their responses take a binary format (Agree=1, Disagree=0), which we used as our regressor variables in the analysis.

Regressor Variables:

1. How many times do they travel on this type of road (Travel Frequency)?
2. What kind of Transportation do they usually use in their daily travel?

## 4. RESULTS AND DISCUSSIONS

### 4.1 Model Estimation

This study conducted a binary logistic regression analysis, and the result is shown below.

Table 2: Parameter Estimation for Illegal Road Crossing Preference Regarding Demographic Characteristics

Variable Name	B	S.E.	Wald
Gender	-2.215***	0.489	20.542
Young (Age ≤30)	-2.882**	0.918	9.863
Above HSC	-0.846*	0.421	4.041
Daily Crossing Frequency	-1.126*	0.466	5.828
Others Transport	2.275***	0.442	26.489
Conestat	5.848***	1.550	14.225

Note: \*P<0.05, \*\*P<0.01, \*\*\*P<0.001.

### 4.2 Result Interpretation

The analysis explored why pedestrians choose to cross mid-block illegally, with a focus on leisure walkers in Dhaka City. The findings show that their crossing choices are influenced not only by road conditions but also by their personal habits, travel routines, and socio-demographic factors.

Male leisure walkers, who often walk for stress relief or recreational purposes, tend to be more safety-conscious, as they are generally under less time pressure and do not need to reach a destination urgently. Also, though they spend most of their time outside due to their office or regular work, they are aware of road crossing safety, so they generally avoid illegal crossing. In contrast, female pedestrians are more frequently engaged in purpose-driven trips, such as visiting shopping malls or local markets, where convenience and proximity strongly influence route choice. In many cases, crossing facilities are located at a considerable distance from these destinations, which encourages illegal mid-block crossings. As a result, female walkers may be more likely to prioritize time efficiency over strict compliance with road-safety.

A similar pattern is observed when considering age level and educational status. Younger people who are less than 30 years old tend to engage in fewer illegal crossings compared to older people. This is likely because younger people often move through familiar and well-organised environments such as campuses or office areas, and they also know about road crossing rules via the internet, and always shows negative attitude in the illegal road crossing case, where older people are more into illegal crossing due to an overconfident attitude. Moreover, highly educated people are extremely aware of road safety, so they always follow the crossing rules and avoid illegal crossing.

Moreover, travel frequency appears to be associated with road crossing behaviour. Individuals who travel daily are less likely to engage in illegal road crossings than those who travel less frequently. Daily travellers typically move for work, study, or other routine commitments and repeatedly use the same routes. This repeated exposure fosters familiarity with the road environment, including the location of crossing facilities, and encourages habitual compliance with formal crossing practice. Consequently, the distance to crossing facilities may be perceived as less restrictive by regular users. In contrast, Occasional travellers may have limited awareness of available crossing facilities and are therefore more inclined to choose more direct but illegal crossing points to reach their destinations with minimal effort.

Finally, the mode of transportation appears to be associated with the likelihood of illegal road crossing. The results indicate that users of non-public transport modes (such as CNGs, rickshaws, legunas, or private cars) are more likely to engage in illegal crossing behaviour than individuals who rely on public transport. One possible explanation is that public transport users tend to access services at fixed and well-defined locations, such as bus stops or terminals, which are often supported by nearby crossing facilities and encourage more structured crossing behaviour. In contrast, users of informal or private transport modes can access vehicles at flexible and unregulated locations along the roadway. This flexibility may increase the tendency to cross at random or undesignated points, particularly during routine activities such as morning and evening walks, thereby contributing to a higher likelihood of illegal crossings.

### 4.3 Model Fitting Information

Table 3: Model Fit Statistics for Logistic Regression

Chi-Square		Model Summary		
Omnibus Test	Hosmer & Lemeshow Test	-2 Log likelihood	Cox & Snell R <sup>2</sup>	Nagelkerke R <sup>2</sup>
87.968	17.472	185.527 <sup>a</sup>	0.359	0.479

The goodness-of-fit analysis evaluates how well the selected models explain pedestrian behavior related to illegal mid-block crossings, taking into account their demographic characteristics.

The goodness-of-fit statistics indicate that the binary logistic regression model is statistically sound and adequately specified. The Omnibus Tests of Model Coefficients confirm that the model is statistically significant, indicating the joint significance of the explanatory variables. The Hosmer-Lemeshow Test suggests adequate model calibration, while the -2 Log Likelihood value indicates a reasonable overall fit. Furthermore, the Cox & Snell R<sup>2</sup> and Nagelkerke R<sup>2</sup> statistics demonstrate moderate-to-strong explanatory capability, suggesting that the model captures a substantial proportion of the behavioral variability typically observed in pedestrian crossing studies. Overall, the predictors significantly explain the variability in the dependent variable, with a P-value less than 0.001, confirming the strong statistical significance and reliability of the model.

## 5. CONCLUSION

The study provides important insights into the behavioral factors influencing illegal mid-block road crossing among leisure walkers in Dhaka's dense urban environment. The findings indicate that local perceptions of leisure walking are closely linked to individual characteristics, travel routines, and transport use patterns. Frequent road users and certain demographic groups are less likely to engage in illegal crossings, whereas leisure walkers who regularly rely on private transport systems show a greater tendency to take such risks. This reflects how leisure walking in Dhaka is often viewed as a flexible and informal activity, which can reduce perceived consequences associated with crossing roads at non-designated locations.

These findings highlight the importance of addressing behavioral aspects when seeking to reduce illegal mid-block crossing among leisure walkers. Awareness initiatives that consider local risk perception, habitual behavior, and gender differences can play a key role in influencing safer decision-making. Understanding how leisure walkers interpret convenience, familiarity, and perceived control over traffic environments is essential for shaping effective safety strategies.

Ultimately, improving pedestrian safety in Dhaka requires a strong focus on behavioral change alongside broader traffic management efforts. By recognizing the motivations and limitations that shape

illegal mid-block crossing behavior among leisure walkers, policymakers and planners can work toward fostering a safer and more walkable urban environment.

### **Declaration of Use of AI**

AI tools were used only for grammar checking and improving clarity during manuscript preparation. No AI tools were used to generate the research methodology, analysis, results, or ideas presented in this paper. All research concepts, analytical procedures, calculations, and tables were entirely developed by the authors.

### **REFERENCES**

- B, K., & P, V. (2018, 1 26). Pedestrian quality of service at unprotected mid-block crosswalk locations under mixed traffic conditions: towards quantitative approach. *Transport*, 33, 302-314. Retrieved November 04, 2025, from <https://journals.vilniustech.lt/index.php/Transport/article/view/161>
- B, M. S. (2009). *IDENTIFYING THE DEFICIENCIES OF LANDUSE-TRANSPORT DEVELOPMENT IN DHAKA CITY*. Retrieved November 04, 2025, from [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=IDENTIFYING+THE+DEFICIENCIES+OF+LANDUSE-TRANSPORT+DEVELOPMENT+IN+DHAKA+CITY&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=IDENTIFYING+THE+DEFICIENCIES+OF+LANDUSE-TRANSPORT+DEVELOPMENT+IN+DHAKA+CITY&btnG=)
- B, S. (2008, December). Road traffic injuries: A major global public health crisis. *Public Health*, 122(12), 1399-1406. Retrieved November 04, 2025, from <https://www.sciencedirect.com/science/article/abs/pii/S0033350608001753>
- Boun, S. S., Janvier, R., Marc, R. E., Paul, P., Senat, R., Demes, J. A., . . . Druetz, T. (2024, 12 1). Environmental measures to improve pedestrian safety in low- and middle-income countries: a scoping review. *Global Health Promotion*, 31(4), 44-55. Retrieved November 04, 2025, from <https://journals.sagepub.com/doi/full/10.1177/17579759241241513>
- Budzynski, M., Guminska, L., Jamroz, K., Mackun, T., & Tomczuk, P. (2019, 9 1). Effects of Road Infrastructure on Pedestrian Safety. *IOP Conference Series: Materials Science and Engineering*, 603(4), 042-052. Retrieved November 04, 2025, from <https://iopscience.iop.org/article/10.1088/1757-899X/603/4/042052/meta>
- Distefano, N., & Leonardi, S. (2023, 12 7). Fostering Urban Walking: Strategies Focused on Pedestrian Satisfaction. *Sustainability*, 15(24), 16649. Retrieved November 04, 2025, from <https://www.mdpi.com/2071-1050/15/24/16649>
- Holland, C., & Hill, R. (2010, 7 1). Gender differences in factors predicting unsafe crossing decisions in adult pedestrians across the lifespan: A simulation study. *Accident Analysis & Prevention*, 42(4), 1097-1106. Retrieved November 04, 2025, from <https://www.sciencedirect.com/science/article/abs/pii/S0001457509003376>
- Hyder, M. B. (2024). *The governance of urban greenspace in Dhaka City, Bangladesh*. Retrieved November 04, 2025, from [https://research-repository.rmit.edu.au/articles/thesis/The\\_governance\\_of\\_urban\\_greenspace\\_in\\_Dhaka\\_City\\_Bangladesh/27602946?file=50770008](https://research-repository.rmit.edu.au/articles/thesis/The_governance_of_urban_greenspace_in_Dhaka_City_Bangladesh/27602946?file=50770008)
- L, T. W., & L, Y. (2024). The impact of road facility safety on pedestrian safety in urban environments. *International Conference on Social Sciences and Humanities*, (p. 13). Retrieved November 04, 2025, from <https://ir.lib.cyut.edu.tw/bitstream/310901800/43150/2/The+Impact+of+Road+Facility+Safety+on+Pedestrian+Safety+in+Urban+Environments.pdf>
- Mondal, A., Bhat, C. R., Costey, M. C., Bhat, A. C., Webb, T., Magassy, T. B., . . . Lam, W. H. (2020, April 24). How do people feel while walking? A multivariate analysis of emotional well-being for utilitarian and recreational walking episodes. *International Journal of Sustainable Transportation*, 15(6), 419-434. Retrieved November 05, 2025, from <https://www.tandfonline.com/doi/abs/10.1080/15568318.2020.1754535>
- Papadimitriou, E., Lassarre, S., & Yannis, G. D. (2016, 1 1). Introducing human factors in pedestrian crossing behaviour models. *Transportation Research Part F: Traffic Psychology and Behaviour*, 36, 69-82. Retrieved November 04, 2025, from <https://www.sciencedirect.com/science/article/abs/pii/S1369847815001849>

- R, H., J, L., & T, G. (2012, December 03). Evaluating pedestrian safety improvements : final report. *United States Department of Transportation, National Transportation Library*, 109. Retrieved November 04, 2025, from <https://rosap.ntl.bts.gov/view/dot/25710>
- Stoker, P., Garfinkel-Castro, A., Khayesi, M., Odero, W., Mwangi, M. N., Peden, M., & Ewing, R. (2015, August 12). Pedestrian Safety and the Built Environment: A Review of the Risk Factors. *Journal of Planning Literature*, 30(4). Retrieved November 05, 2025, from <https://journals.sagepub.com/doi/abs/10.1177/0885412215595438>
- WHO. (2024). *WHO EMRO - World Day of Remembrance for Road Traffic Victims 2024*. WHO. Retrieved November 04, 2025, from <https://www.emro.who.int/media/news/world-day-of-remembrance-for-road-traffic-victims-2024.html>