

Road User's Perception about the Sidewalk Condition of Dhaka City

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Abstract—In recent years there have been initiatives in metropolitan areas throughout the world to create more livable communities where walking are encouraged and accepted as a legitimate form of transportation. In Dhaka walking is an essential mode of transport but often ignored. Despite the high emphasis on walking, condition of side-walk is extremely poor in most of the parts. The aim of this study is to evaluate the existing sidewalk facilities by collecting pedestrians' views about it in Dhaka City. A questionnaire survey was conducted to assess the pedestrians' perception of the existing sidewalk conditions. The majority of the respondents do not prefer to use the sidewalks due to poor road surface condition and untidy footpath while most of the respondents feel that the side walk is not so spacious. Attractive and user friendly footpath facility must be ensured by eliminating local shops and ensuring good surface condition.

Keywords—Walking, sidewalk, pedestrians' perception, road surface condition

I. INTRODUCTION

IN recent years there have been initiatives in metropolitan areas throughout the world to create more livable communities where walking are encouraged and accepted as a legitimate form of transportation. Since walking trips are highly variable and pedestrian activity is not conducive to measurement, this mode is often neglected [1]. Every person who travels from one place to another is pedestrian and every pedestrian is an element of road space [2]. In urban areas of developing countries, where high rates of urban growth, large poor populations, and high densities prevail, walking is the only option available to a significant portion of the population. Many people cannot afford an alternative of walking; therefore, the state of the pedestrian atmosphere is crucial to allowing walkers to reach their daily needs. Despite the high emphasis of walking in Dhaka city, condition of side-walk is extremely poor in most of the parts.

In metropolitan areas of developing countries, where extreme proportion of urban growth and considerable poor populations exist, walking is the only alternative available to a major portion of the population. Most of the people cannot afford an alternative and hence the pedestrian walking environment is crucial for everyday necessities.

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In Dhaka, the capital of Bangladesh with a population of roughly 12 million, walking is an essential mode of transportation but often neglected. Walking is in fact the main form of transport, with 60% of trips made by foot and only 4% by car [3], something made more feasible by the fact that 76% of all trips are under 5 km, and 50% under 2 km [4]. The crowded urban conditions, the extreme space demands of the car, the fact that the vast majority of people do not have access to cars and rely on walking for transport, all indicate that walking would both improve traffic conditions [5], [6] and improve the conditions of the poor [7]. Despite the prevalence of walking in Dhaka, facilities for it are generally extremely inadequate. The main victims of road crashes are pedestrians, but the government's main response to the problem is to prevent people from crossing the street, rather than to make it safe to do so. Even where sidewalks exist, they are often extremely uneven and discontinuous and frequently completely blocked by car parking or vendors. The level of car traffic in the city makes walking dangerous and unpleasant, with pedestrians disturbed by the noise and smoke of vehicles. Despite the dominance of walking in Dhaka, pedestrian environment is generally exceptionally terrible. Sometimes the motor vehicle makes pedestrian movement unsafe and hazardous due to the street geometry. Thus the aim of this study is to explore the pedestrians' perception towards existing sidewalk facilities for safe and convenient pedestrian movements in the sidewalks of Dhaka City. On the other hand people tend to walk further and more frequent if the high quality sidewalk facilities provided to them [8]-[10].

II. LITERATURE REVIEW

Walking is nature's mode of transport. For a vast population in the developing world, it is the only form of transport. The globe's rapid urbanization, particularly in low-to-middle income countries, stimulates a high demand for low cost, sustainable urban transport [1]. Historically, compared to the level of research that has been done for motorized transportation, there has been relatively little study and analysis of the factors that affect the quality of the walking environment. Evaluating the performance of a roadway section for the walking mode is far more complex in comparison to that of the motor vehicle mode.

A well-designed and maintained walking network can satisfy the demand for walking, while contributing to poverty reduction, health benefits, and saved lives. Since walking trips

are highly variable and pedestrian activity is not conducive to measurement, this mode is often neglected [1].

The quality of the path context in the network are important criteria that can affect the likelihood of walking [11]-[14]. However when it comes to urban transportation planning, the provision of pedestrian facilities is usually neglected despite the unquestionable importance of the pedestrian [15], [16]. Only least conveniences are provided for the pedestrian in some areas. Pedestrian are among the most vulnerable of all road users as they are relatively unprotected and usually exposed to accident risks, adverse weather, thieves and other hazard which make people tend to avoid travelling by walking in long distance. Inadequate pedestrian facilities cause constant conflict between the pedestrians and the vehicles on the roadway between pedestrian and another pedestrians, parked vehicles and with roadside development [17].

Providing walkways for pedestrians dramatically increases how well pedestrians perceived needs are being met along roadways [18]. The wider the separation between the pedestrian and the roadway is, the more comfortable the pedestrian facility. By providing facilities that are more comfortable, the number of trips made by walking, particularly in areas with mixed land uses can be increased [19]. Providing sidewalks, widened paved shoulders, or stabilized shoulders—particularly when providing access to public transit—can increase the transportation options for individuals who may not be able to drive a car. Additionally, by moving pedestrians off the travel lanes, motorist operations are improved and capacity increased.

Research indicates that people will walk for recreational purposes if a facility is provided [19]. Recreational walking is one of the easiest ways for people to get the recommended allotment of physical exercise each day. Moderate exercise, such as walking, contributes to both physical and mental well being [20].

Overall support for the pedestrian environment, or walkability, has grown increasingly important as the world urbanizes and motorized modes threaten to displace or constrain travel on foot [1]. This concern encompasses virtually every aspect of the pedestrian experience. Walkability takes into account the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security, and comfort for walking [21]. Each of these facets of the pedestrian environment impacts the use of walking as a primary mode of transport.

Sidewalks should be wide enough to accommodate the expected levels of pedestrian traffic. Narrow sidewalks that cannot accommodate the volume of foot traffic may encourage pedestrians to walk in the roadway or take alternate routes, increasing the potential for conflict with motor vehicles. It is desirable to provide a sidewalk clear width (i.e., lateral space available for pedestrian travel for the length of a corridor) at least wide enough to accommodate two people walking side-by-side [22].

III. METHODOLOGY

Data collection was conducted in two phases for this research. Part one was about field survey. Information of various features of the side-walk, its major deficiencies and suitability etc. were collected. Among the several existing means of surveying modes, questionnaire is the precise option to investigate the user preferences. Part two was questionnaire survey. The survey was conducted to the high generations locations. The survey was conducted at high pedestrian generations sidewalks located at Mirpur Section -12, Mirpur Section -10, Mirpur Section -14, Kamal Ataturk Avenue-Banani and Kakoli-Banani Bus Stop. These sites were selected based on the volume of pedestrian traffic and existing pedestrian facilities. The questionnaire survey was carried out in the morning peak hour from 7:00 a.m. to 8:45 a.m. on the designated locations. During the data collection, it was ensured that pedestrians of different classes (for example students, office workers, day labours etc.) are participated in the survey. Fig.1 shows the sidewalk condition of study locations.



Fig. 1 Sidewalk condition of study locations

IV. DATA ANALYSIS

This chapter deals with the analysis of various collected data to obtain significant findings from questionnaire survey.

A. Pedestrians' Information

According to field survey it was found that 69% of the respondents are male and 31 % are female. Among the total number of pedestrians in all locations 49% are aged between

15 to 25yrs, 34% are between 26 to 35 yrs, 14% are between 36-45 yrs and the rest are above 45yrs. 27% of the overall respondents are office workers, 35% are students, 18% are garments employees, 5% are parents of students and 15% belong to other occupations.

B. Pedestrians' Perception about the Sidewalk Condition

TABLE 1 shows pedestrians' opinion about the sidewalks. Most of the respondents at Mirpur-12 stated the sidewalk as user friendly. On the contrary the respondents of Mirpur-14, Banani (Kamal Atatürk) and Banani (Bus Stand) stated the sidewalk not user friendly. In general 34% of the respondents think the sidewalk is user-friendly and 66% think not.

TABLE I
PEDESTRIANS' VIEW ABOUT THE USER FRIENDLINESS OF SIDEWALKS

Location	Sidewalks are user-friendly	
	Yes (%)	No (%)
Mirpur-12	83	17
Mirpur-10	67	33
Mirpur-14	10	90
Banani(Kamal Atatürk)	7	93
Banani(Bus Stand)	3	97
Total respondents	34%	66%

C. Pedestrians' Perception about the Sidewalk Environment

Pedestrians of the above mentioned locations were requested to rate the sidewalk environment using Likert scale where 0 is for very bad environment, 1 is for bad, 2 is for not so bad, 3 is for good, 4 is for very good and 5 is for excellent sidewalk environment. TABLE 2 shows that sidewalk environment is very bad in Banani (Kamal Atatürk avenue), bad in Mirpur-10, not so good in Banani (Bus Stand), good in Mirpur-14 and very good in Mirpur-12.

TABLE II
PEDESTRIANS' FEELING ABOUT THE SIDEWALK ENVIRONMENT

Location	Pedestrians feeling about the sidewalk environment (%)					
	Very bad	Bad	Not so good	Good	Very good	Excellent
Mirpur-12	8	20	5	10	30	27
Mirpur-10	24	30	27	3	3	13
Mirpur-14	10	0	7	53	23	7
Banani(Kamal Atatürk)	67	20	13	0	0	0
Banani(Bus Stand)	6	6	28	47	13	0

D. Pedestrians' Preference for Using the Sidewalk

Pedestrians prefer to use the sidewalks in some locations and in some locations they do not as shown in TABLE 3. Overall 52% of the respondents prefer to use the sidewalk while 48% do not.

TABLE III
PEDESTRIANS' PREFERENCE FOR USING THE SIDEWALK

Location	Pedestrians' Preference for Using the Sidewalks	
	Yes (%)	No (%)
Mirpur-12	87	13
Mirpur-10	80	20
Mirpur-14	20	80
Banani(Kamal Atatürk)	40	60
Banani(Bus Stand)	33	67
Total respondents	52% (n=78)	48% (72)

1. Reasons Behind not Preferring The Sidewalk

Several options were provided for the respondents to choose why they do not prefer the sidewalk. The options are as follows:

- a) Unfinished side-walk
- b) Discontinuity of sidewalk
- c) Poor road surface condition
- d) Street Hawkers
- e) Movement of Motor-cycle
- f) Bus counters
- g) Untidy footpath
- h) Position of lamp posts, pylons, columns of over-bridge etc
- i) Other reasons

TABLE 4 shows that majority among the respondents do not prefer to use the sidewalks due to street hawkers. The second highest percentage of respondents do not prefer sidewalk because of the poor road surface condition followed by untidy footpath.

TABLE IV
REASONS BEHIND NOT PREFERRING THE SIDEWALK

Location	Reasons behind not preferring the sidewalk (%)							
	a	b	c	d	e	f	g	h
Mirpur-12	0	0	0	75	0	0	25	0
Mirpur-10	0	0	0	83	0	0	17	0
Mirpur-14	13	4	21	33	0	0	25	4
Banani	0	0	39	22	0	6	28	5
Banani(Bus Stand)	0	5	35	35	0	0	25	0

E. Pedestrians' Perception about the Width of Sidewalk

The respondents were asked about the width of the sidewalk. Following options were provided:

- a) Too Narrow
- b) Narrow
- c) No certain feeling about the width
- d) Not so spacious
- e) Spacious

37% of the respondents feel that the side walk is not so spacious while 33% feel spacious. Only 4% of the respondents think the sidewalks are too narrow.

TABLE V

PEDESTRIANS' ABOUT THE WIDTH OF SIDEWALKS					
Location	a	b	c	d	e
Mirpur-12	01	05	01	14	09
Mirpur-10	03	08	00	05	14
Mirpur-14	00	02	07	16	05
Banani (Kakoli)	00	12	01	10	07
Banani(Bus Stand)	02	02	01	11	14
Total Percentage	4%	19%	7%	37%	33%

F. Pedestrians' Perception about the Safety of Sidewalk

Pedestrians were asked whether they feel safe at the sidewalk or not. TABLE 6 shows that 39% of the respondents feel safe on the sidewalks whilst 61% do not.

TABLE VI

PEDESTRIANS OPINION WHETHER THEY FEEL SAFE OR NOT AT THE SIDEWALK

Location	Yes	No
Mirpur-12	24	06
Mirpur-10	10	20
Mirpur-14	10	20
Banani(Kamal Ataturk)	06	24
Banani(Bus Stand)	09	21
Total Respondents	59(33%)	91(61%)

1. Reasons for Feeling Unsafe: The respondents were asked the reason for feeling unsafe on the sidewalk. The reasons provided were as follows:

- a) Collision with vehicles
- b) Hijacking
- c) Movement of motorcycle on the side-walk
- d) Crossing of side-walk and road
- e) Absence of Guard-rail

TABLE VI

PERCENTAGE OF THE PERCEIVED IMPORTANCE FOR THE SAFETY FACTORS

Location	A	B	C	D	E
Mirpur-12	02	02	01	00	01
Mirpur-10	03	10	05	01	01
Mirpur-14	04	08	07	00	01
Banani(Kamal Ataturk)	04	15	05	00	00
Banani(Bus Stand)	03	09	09	00	00
Total Respondents (%)	18%	48%	30%	1%	3%

The major reason behind feeling unsafe at the sidewalks is hijacking, according to 48% of respondents. Movement of motorcycle on the sidewalk and collision with vehicles are other significant reasons behind feeling unsafe.

G. Pedestrians' Opinion about Feeling threatened at night at sidewalk

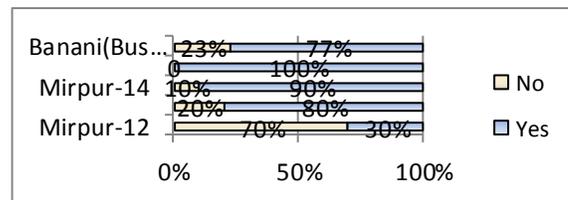


Fig. 2 Pedestrians' Opinion about Feeling threatened at night at sidewalk

Fig. 2 shows that only at Mirpur -12 location people do not feel threatened at night. But at all other locations (Mirpur- 10, Mirpur-14, Banani-Kamal Ataturk, Banani-bus stand) pedestrians feel threatened at night.

Reasons for feeling threatened at night:

- a) Insufficient lighting
- b) Inadequate security (Pick pocketing, hijacking etc.)
- c) Used as shelter by homeless people
- d) Other reasons

Fig 3. Shows that most of the respondents (49%) feel threatened at night due to inadequate security (Pick pocketing, hijacking etc).

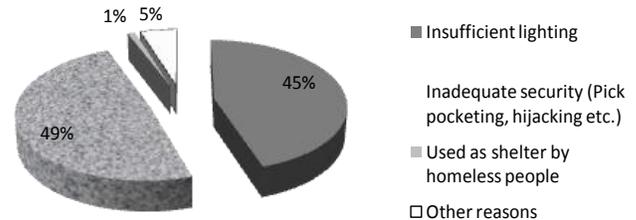


Fig. 3 Pedestrians' Perceptions about Feeling Threatened at Night

H. Pedestrians' Perception about Comfort at sidewalk

Pedestrians' were asked the most effective measure to be taken for the comfort during moving on the sidewalk. The following options were provided for this question:

- a) Enhancing the width of the footpath
- b) Improving the surface condition
- c) Maintaining a clean footpath
- d) Removal of street hawkers
- e) Improving street lighting
- f) Improving security
- g) Other measures.

TABLE 6 shows that at Mirpur-12 people think that by enhancing the width of the sidewalk pedestrians' comfort can be confirmed during moving in the sidewalk.

TABLE VI

MEASURES TO BE TAKEN FOR PEDESTRIAN COMFORT AT THE SIDEWALK

Location	A	B	C	D	E	F
Mirpur-12	12	04	07	04	01	02
Mirpur-10	03	04	08	11	01	03
Mirpur-14	04	01	08	12	04	01
Banani(Kamal Ataturk)	01	14	06	09	00	00
Banani(Bus Stand)	02	12	09	01	06	00
Total Respondents (%)	15%	23%	25%	25%	8%	4%

At Mirpur-10 and Mirpur-14 most of respondents found that removal of street hawkers can be the best solution for ensuring the comfort of the pedestrians. At Banani (Kamal Ataturk) and Banani (Bus Stand) pedestrians think that by improving the sidewalk surface pedestrian's comfort can be ascertained.

V. CONCLUSION

Results showed that respondents were more concerned about the safety of the sidewalk compared to the other factors. Likewise, some respondents left a comment at the end of the questionnaire complaining about the high risk of walking at the sidewalk finding it unsafe especially at nights. In other words, they feel there is no one who could come to help in the event of attack [23].

In general, about 25% people found keeping sidewalk clean can be the best measure and about 25% think removal of street hawker can be the best to ensure the comfort of pedestrians. 23% pedestrians think improving the sidewalk surface condition can increase the comfort of pedestrians while moving in the sidewalk while 15% found enhancing the sidewalk width can do so. Percentages showed that respondents were concerned about enhancing the width of the footpath.

At all surveyed locations most of the respondents considered that street hawkers reduce the effective width of the sidewalk. Most of the respondents found inadequate security and insufficient lighting are the reasons for feeling unsecured at night while using the sidewalk.

At last, it can be suggested that at Mirpur-12 sidewalk width should be increased, at Mirpur-10 and Mirpur-14 street hawkers should be removed and at Banani (Kamal Ataturk) and Banani (Bus Stand) sidewalk surface condition should be improved to ensure comfort of the pedestrians. Majority of the respondents (about 75%) do not feel safe at night at sidewalk. It can be said that at Mirpur -10, Mirpur-14, Banani -Kamal Ataturk, Banani-Bus Stand measures should be taken to ensure the safety of the pedestrians at night.

The metropolitan pedestrian condition is an aspect of the city which requires careful attention and can considerably improve the livability of a city. Developed countries in Europe, North America, and Australia have taken the initiatives in identifying and resolving the problems of walkability in many urban centers. However, developing countries, which have much higher numbers of walkers, have done little to improve their alarming pedestrian facilities.

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