

Travel Behavior of Elderly People in Dhaka City: Changes due to COVID-19

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Abstract: Travel pattern and behavior of elderly people are often different than working adults. In developing country cities, transport infrastructure and services are often not accessible for elderly people. Lack of infrastructural facilities with poor traffic conditions is one of the major challenges for the poor income groups due to their dependency on public transport. This paper discusses the travel pattern of elderly people of Dhaka city and the changes and problems due to novel coronavirus disease 2019 (COVID-19). Data were collected from face-to-face interviews done at household in November and December 2020. The results show that there was a significant decrease in the number of trips commuted during the lockdown.

Keywords: COVID-19; elderly; mobility; travel; trip.

1. INTRODUCTION

Globally the number of elderly persons is increasing. The share of the population aged 65 years or over increased from 6 percent in 1990 to 9 percent in 2019 (United Nations, 2019). In 2019, there were 703 million persons aged 65 years or over in the world which is projected to double to 1.5 billion in 2050. Mobility of elderly people has received considerable attention in recent years. During the last decade, priority for elderly people was given on longer, happier and fuller life (Rondón-García and Ramírez-Navarro, 2018, Khaje-Bishak et al., 2014). Now-a-days, elderly people have more energetic, busy and mobile lives. This improved situation put forward serious concern about their travel requirements and travel behavior. Without having a proper transport system and service, elderly people may find themselves cut off from the very aspects of life (Rosenbloom, 2004). An elderly person is unlikely to travel for work or job, hence

travel demand for elderly is different from a working young adult. The common types of mobility purpose for elderly persons are amenities and assistance and their mode choice is different (Meyer and Speare, 1985). The car continues to be the prime mode of transport for older people, at least in high income countries, including those across America and Europe (O'Hern and Oxley, 2015). However, the situation is different in developing country cities where it is more likely for elderly people to depend on public transport. In many cities, the authority is trying to incorporate action plan to make the elderly more mobile and socially active.

Similar to the global trend, the number of elderly people in Bangladesh is increasing and expected to continue the growing trend in future. According to the United Nations Population Division (2013), the size of population aged 65 years or more in Bangladesh has reached about 8 million in 2010 from 4 million in 1990; the pattern of increase is forecasted to be steeper in the coming years. Bangladesh has the youngest population of any major country in the Asia region, with 3 percent of 65 years or older population in 2000 (BBS, 2015).

Transport sector in Dhaka city, the capital of Bangladesh, failed to keep pace with the high growth of the city because of insufficient provision of transport mode and inadequate infrastructure (Mahtab-uz-Zaman and Lau, 2000). Unplanned spatial growth allied with poor transportation facilities has resulted problems such as inadequate accessibility, poor safety and comfort, operational efficiency, congestion, pollution, and psychological strain (Mahmud and Rabbani, 2012). The situation is deteriorating over the years. The vehicle mix of transport data (BRTA, 2014) shows that 39% is motorcycle, cars (24%), jeep and microbus (10%), bus (3%), taxi (4%), pickup (5%), and truck (5%). Along with these motorized vehicles, there are over 500,000 rickshaws operating in Dhak (RSTP, 2015). Public transport in Dhaka is mainly bus based. Despite the poor public transport services, the modal share of public transportation in Dhaka is still very high (Rahman, 2013).

The novel coronavirus disease 2019 (COVID-19) pandemic brought unprecedented levels of disruption globally and impacted transport sector at the worst. All the countries are impacted to one extent or another (Scott, 2020). However, the measures taken by the authorities varied from country to country ever, varied across the cities as well. Chinazzi (2020) showed that travel ban was initially effective to reduce the spread of the virus in Chinese cities. Researchers showed a diverse impact of COVID-19 on travel behavior in different cities. One important effect of COVID-19 is the decrease number of trips (Scott, 2020). Some of the research (De Vos, 2020, Gao et al., 2020) indicated that COVID-19 is a factor for long term travel behavior change such as shift of modal choice from public transport to cycling or walking.

The first case of COVID-19 in Bangladesh was identified and confirmed in Dhaka on 8 March 2020. The government declared the enforcement of lockdown labelled as ‘general holiday’ from 22 March 2020 (Rahman, 2021). A transport ban was implemented on all modes across the country from 26 March to 4 April 2020, accompanied by the closure of all businesses, industries and educational institutions except those providing essential necessities (e.g. pharmacies and groceries). The lockdown and transport ban were extended until the end of May 2020. The lockdown has adversely affected to the business and economy. Offices were opened and public transport services resumed on 31 May 2020, ending 66 days of lockdown measures (Rahman, 2021). Public transport was allowed to operate on a limited scale (e.g. using only 50% of seating capacity) and subject to passengers’ compliance with health and safety guidelines such as maintaining physical distancing and wearing face masks. Since then, ‘local lockdowns’ continue to be implemented, based on situations where confirmed positive cases are very high.

The main purpose of this paper is to discuss the mobility of elderly people in Dhaka city and the changes or problems in their travel due to COVID-19. The methodology is discussed in Section 2 and the profile of the respondents is provided in section 3. The mobility and trips of the respondents during COVID-19 post-lockdown, during lockdown and before COVID-19 are discussed in section 4, section 5 and section 6 respectively. Travel changes and problems due to COVID-19 is discussed in section 7 and section 8 provides summary of discussion and conclusion.

2. METHODOLOGY

The data was collected from households in various locations of Dhaka city. Totals of 199 respondents older than 60 years old were selected randomly following a stratified sampling technique. The city was hypothetically divided into 60 strata (or neighborhoods) and 30 of them were selected for the survey. While selecting the strata, it was considered that they represent the socio-economic variation and spatial distribution of the city. From each of the strata, around 5 to 8 individual respondents were drawn randomly for conducting the interviews. The face-to-face interviews were conducted using the pre-determined questionnaire. The questionnaire had four parts; questions related to: socio-economic profile, travel before COVID-19, travel during COVID-19 (lockdown), and travel during COVID-19 (post-lockdown).

The interviews were conducted during November and December 2020. The enumerators visited the selected neighbourhood and started to visit a house (by knocking on a door) randomly from a corner of the neighbourhood to see if the house had any elderly inhabitant. If there was more than one such inhabitants in the house (or

in multiple households in different apartments of the building), the interview was done with one person particularly with whom the enumerators met first. If there was no such person in that house, the enumerator approached the next house until (s)he got a valid sample. After completing the interview with that respondent, the enumerator approached the 11th house (along the road towards center or another corner of neighborhood) if there is any valid respondent to conduct interview. If a valid respondent was not available in that house the next house was approached, but if a valid respondent was found then, again, the 11th house was approached for next respondent.

3. PROFILE OF THE RESPONDENTS

3.1 Age Group and Disability Types

Table 1 shows the socio-economic profile of the respondents. Male respondents are slightly higher than the female. The majority of the respondents (78%) belong to the age group of 60-70 years. Of the respondents, 73.5% do their daily needs themselves whilst 26.5% are dependent on family members or relatives.

Table 1. Socio-economic profile of the respondents

Variable		Frequency	% of respondents
Gender	Male	105	53
	Female	94	47
Age group	60-70	155	78
	71-80	33	17
	80+	11	5
Dependency for daily needs	Dependent	45	26.5
	Independent (do himself)	125	73.5
Household size	1 person	3	2
	2-3 persons	25	15
	4-5 persons	100	58
	6-7 persons	30	18
	8+ persons	13	7
Education attainment	Illiterate	53	31
	Primary	46	27
	SSC	30	18
	HSC	17	10
	Graduate	14	8
	Masters	10	6
Occupation (before COVID-19)	Retired	37	22

	Business	36	22
	Housewife	53	31.5
	Employee (got/pvt)	10	6
	Worker or labor	21	12.5
	Unemployed	4	2
	Other	7	4
Household income (Tk/month)	Below Tk 10,000	11	6.5
	Tk 10,000- 25,000	42	25
	Tk 25,000- 50,000	34	20
	Tk 50,000 – 100,000	46	27
	Tk 100,000 +	36	21
Individual expenditure (month)	Below Tk 1,000	3	2
	Tk 1,000-5,000	80	47
	Tk 5,000- 10,000	58	34
	Tk 10,000+	29	17
Vehicle ownership	Yes	48	28
	No	121	72

A very small portion of the respondents, only 2%, live alone. The household size between 4 and 5 members is for the majority of the respondents (58%). Only 6% are employed in government or private sector while 31.5% are housewife and 22% are retired. Of the retired respondents, only 20% are now working while the remaining are not engaged in any job. Household income of the respondents reveal that the majority is middle- or lower-middle-income group, with BDT 10,001-25,000 or 25,001-50,000 per month. A small portion of the respondents are very poor or very rich. This also been reflected in the average individual personal expenditure per month.

3.2 Household Vehicle Ownership

The majority of the households (72%) do not own any private vehicle, as seen in Table 2. Only 28% mentioned that the household has a private vehicle. These private vehicles mainly consist of car and motorcycles. However, the respondents having a household vehicle, around 72% of them do not have access to the vehicle. In many cases, one member of the household using the car (e.g. office car from carpool) which are not available for other members in general. Of the respondents with household vehicle, 70% do not know how to drive that vehicle. A significant portion (39%) of the respondents have the access to household vehicle at the time when they need it, 30.5% always have the access. Whereas 17.5% of them never use the household vehicle and the remaining 13% rarely have the access.

Table 2. Household vehicle ownership of the respondents

Vehicle Ownership	Vehicle	Number of Respondents	%
No		121	72%
Yes	Car	29	17%
	Motorcycle	10	6%
	Bicycle	2	1%
	Other*	6	3%
	Sub-Total	47	28%

* Other includes rikshaw and van.

4. MOBILITY AND TRIPS DURING COVID-19 (POST-LOCKDOWN)

4.1 Travel Pattern

The majority of the respondents travel alone while 33.68% are accompanied or escorted by another person. Of the accompanied persons, the majority is a family member while a very few 12.30% is a relative. The frequency of travel is shown in Table 3. A significant portion travel very rare (e.g. few times in a year or month). The respondents were asked if the public transport is available for their trips and whether physical distancing and health precautions (e.g. hygiene or protective measures) are maintained in the vehicle. Almost 69% mentioned that public transport is available and in terms of physical distancing, 77% mentioned it is maintained. Only 9.23% mentioned that they are facing travel problems such as less travel or afraid of going outside, less availability of public transport where physical distancing is not properly maintained, and increased travel cost.

Table 3. Respondents' travel frequency in Dhaka city during COVID-19

Categories	Frequency	%
None	9	4.5
Few times/year	30	15
Few times/month	20	10
1/month	21	11
1/week	24	12
2-3/week	36	18
4-5/week	26	13
5+/week	27	13.5
Several times/day	6	3
Total	199	100%

Table 4. Respondents' total trips during last week

Travel Frequency of Respondents	Frequency	%
None	83	42
1-2/week	58	29.5
3-5/week	17	8.5
5+/week	39	20
Total	197	100%

To understand more detailed travel information, the respondents were asked what their total number of trips during the previous week was. Table 4 shows almost 29.5% had 1-2 trips and a major portion 42% did not travel last week who usually travel very rarely e.g. several times per year or month. The details of trip characteristics are discussed in the next section.

4.2 Trip Characteristics

Table 5 delineates the characteristics of trips including purpose, distance, travel time, travel cost, and mode used during COVID-19. The main purposes for trips are grocery or shopping, work, visiting doctor or purchase medicine. The trips are mostly for short distance, within 5 km, a small portion is for long distance (20 km or outside of city).

Table 5. Trip characteristics in Dhaka city during COVID-19 post-lockdown

Categories	Number of Trips	%
Purpose		
Grocery	56	27
Personal Need	18	9
Doctor Visits	36	17.5
Work	46	22.5
Social	31	15
Recreation	14	7
Prayer	1	0.5
Other	3	1.5
Distance		
Below 0.5 km	16	7.5
0.5 - 1 km	56	26.5
1.1 – 2 km	59	28
2.1 – 5 km	36	17
5.1 – 10 km	24	11.5
10.1 – 20 km	7	3.5

Above 20 km	4	2
Outside of the city	9	4
Mode		
Walking	69	33
Bicycle	1	0.5
Rickshaw	59	28
Bus	35	16.5
Car	28	13.5
Taxi	4	2
Motorcycle, Pathao	1	0.5
CNG or easy bike	8	4
Tempo, Leguna	1	0.5
Other	5	2.5
Distance		
Below 5 minutes	26	12.5
6 – 15 minutes	92	43.5
16-30 minutes	59	28
31-45 minutes	7	3.5
46 minutes - 1 hour	6	3
1 - 2 hours	11	5
2+ hours	1	0.5
Trip Cost		
None or Not Applicable	91	44.5
Below Tk 10	11	5.5
Tk 11 – 20	21	10
Tk 21 – 50	47	23
Tk 51 – 100	12	6
Tk 101 – 200	5	2.5
Tk 201 – 500	17	8
Tk 500+	1	0.5

Travel time for the majority of the trips is within 30 minutes though a small portion of trips require time for above 1 hour. Travel time is related with the distance, mode used for the trip and the congestion level of city. Travel cost for almost half of the trips is not applicable as they walk or use own vehicle (and do not know cost for the particular trip). Though the cost for majority is within Tk 50, a small portion is above Tk 100 or above Tk 200. The travel cost or fare is often high when they need to hire or reserve a vehicle.

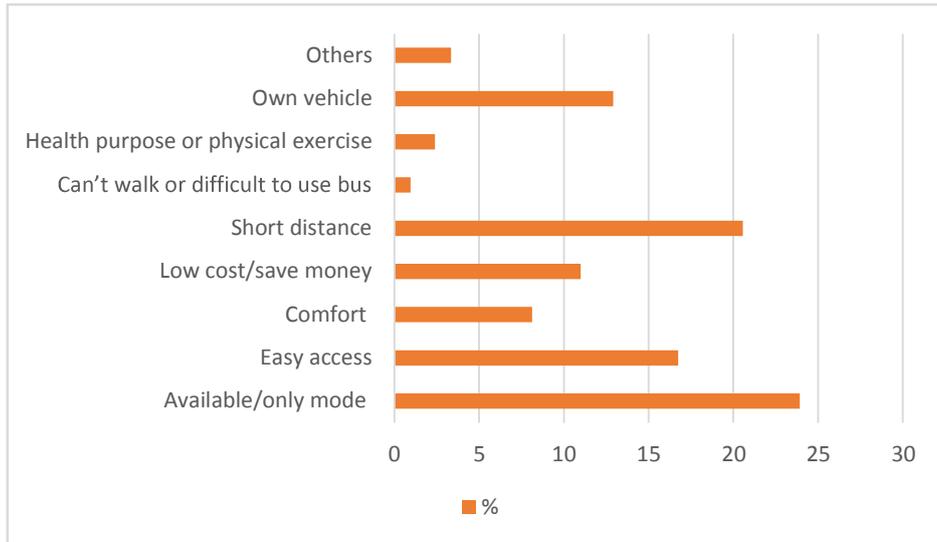


Figure 1. Reasons for using the travel mode in Dhaka city during COVID-19

Travel mode walking and rickshaw are significant in Dhaka. A large portion of the respondents travel by bus and car. As seen in Figure 1, the main reasons for using a particular travel mode are: availability, easy access and short distance. Others include Emergency need, personal need, traffic jam, long distance, motion sickness.

5. MOBILITY AND TRIPS DURING LOCKDOWN

5.1 Travel Pattern

During lockdown most of the respondents lived in their own house. Only 7% were in other places such as home at village, another part of the city or other city before the lockdown and they returned home mostly by bus (78%) or personal vehicle. Most of the respondents did not travel or go outside of home during lockdown. Only 20.5% did travel during lockdown and their frequency of trips are shown in Table 6.

Table 6. Travel frequency of respondents in Dhaka city during lockdown

Frequency	Respondents	%
None	157	79
Few times/year	1	0.5
Few times/month	5	2.5
1/month	12	6
1/week	10	5
2-3/week	7	3.5
4-5/week	1	0.5
5+/week	3	1.5
Several times/day	2	1
TOTAL	198	100

Among the 20.5 percent who travelled during lockdown, around 45% mentioned that the public transport was available for their trips during lockdown. In terms of health measures and precautions, 85% mentioned that physical distancing and precautions was maintained while the remaining mentioned not maintained.

5.2 Trip Characteristics

Table 7 describes the characteristics of trips including purpose, distance, travel time, travel cost, and mode used during lockdown. The main purpose for travel during lockdown is purchase grocery or shopping, for 55% of the respondents. Other purposes are insignificant and they are: visiting doctor or health center, and social or visiting relatives/friends. The distance of trips during lockdown is short, for almost half of the respondents is below 1 km. During lockdown the majority of the respondents walked for their trips. This is probably to maintain physical distancing and for avoiding crowd in public transport. Travel mode for a large portion was rickshaw while car are also significant.

Travel time during lockdown is mostly within 15 minutes. Short travel time is mainly because of empty roads and also the short distance. However, travel time for several trips are 1-2 hours or even 2+ hours. Tavel cost for the majority of the trips during lockdown is low and a significat portion have no cost as walked or used bicycle or own vehicle. However, a few trips had higher cost such as Tk 201-500 or even over Tk 500.

Table 7. Characteristics of the trips in Dhaka city during lockdown

Categories	Number of Trips	%
Purpose		
Grocery	25	55
Personal Need	2	4.5
Doctor Visits	3	6.5
Work	5	11
Social	5	11
Recreation	0	0
Prayer	0	0
Other	5	11
Distance		
Below 0.5 km	11	25
0.5 – 1 km	10	23

1.1-2 km	7	16
2.1-5 km	5	11
5.1-10 km	4	9
10.1-20 km	3	7
Outside of the city	4	9
Travel Mode		
Walking	25	57
Bicycle	0	0
Rickshaw	5	11
Bus	7	16
Car	4	9
CNG or easy bike	0	0
Motorcycle or pathao	0	0
Other	3	7
Travel Time		
Below 5 minutes	8	18
6 - 15 minutes	19	43
16 - 30 minutes	6	14
31 - 45 minutes	4	9
45 minutes – 1 hour	0	0
1 - 2 hour	4	9
2+ hour	3	7
Travel Cost		
None or Not Applicable	30	70
Below Tk 10	1	2
Tk 11-20	3	7
Tk 21-50	6	14
Tk 51-100	0	0
Tk 101-200	0	0
Tk 201-500	1	2
Tk 500+	2	5

The main reason for selecting or using travel mode during lockdown are short distance (32%) and available mode (27%) are dominant, as seen in Table 8. The other reasons are easy accessible, fast and safe mode.

Table 8. Reason for selecting or using travel mode during lockdown

Reason for Selecting Travel Mode	Frequency	%
Available/ only mode	12	27.5
Easy access	8	18
Comfortable	0	0
Low cost or save money	6	13.5
Short distance	14	32
Health purpose or fitness	0	0
Own vehicle	1	2
Others *	3	7
Total	44	100%

* Others included carrying goods and emergency travel needs.

6. MOBILITY AND TRIPS BEFORE COVID-19

6.1 Travel Pattern

Before COVID-19, frequency of trip or going outside of home are shown in Table 9. The majority had 5+ trips or 2-3 trips per week.

Table 9. Respondents' frequency of trips before COVID-19

Travel Frequency of Respondents	Respondents	%
Few times/year	26	13.5
Few times/month	22	11.5
1/month	7	4
1/week	14	7
2-3/week	35	18
4-5/week	28	14.5
5+/week	51	26.5
Several times/day	8	4
Total	191	100

Before COVID-19, the majority of the respondents travel alone while 23% are accompanied or escorted by another person (mostly a family member). Almost 64% of the respondents mentioned that before COVID-19 there was public transport available for their trips. About 9% of the respondents mentioned they faced problems before COVID-19 are traffic congestion, overcrowding in buses and not accessible public transport for elderly (difficulty in using public bus and walking), and mobility problems due to poor eye sight or health condition. The characteristics of the trips are discussed in next section.

6.2 Trip Characteristics

Table 10 describes the characteristics of the trips including purpose, distance, travel time, travel cost and mode used before COVID-19. Before COVID-19, trip for purposes such as shopping, work, social or recreation was for the majority of the respondents. Trip distance for the majority is concentrated between 1 km and 5 km. Travel time for the majority of the trips is within 30 minutes though many respondents mentioned 1 hour or 2+ hour.

Table 3. Trip characteristics before COVID-19

Categories	Number of Trips	%
Purpose		
Grocery	63	27
Personal Need	21	9
Doctor visits	17	7.5
Work	54	23
Social	44	19
Recreation & sports	17	7
Prayer	1	0.5
Other	6	2.5
Distance		
Below 0.5 km	30	13.5
0.5 - 1 km	57	25.5
1.1 – 2 km	47	21
2.1 – 5 km	41	18
5.1 – 10 km	20	9
10.1 – 20 km	18	8
Above 20 km	2	1
Outside of the city	7	3
Travel Mode		
Walking	77	35
Bicycle	1	0.5
Rickshaw	53	24
Bus	36	16.5
Car	32	14.5
Motorcycle or Pathao	1	0.5
Taxi or Uber	2	1
CNG or Easybike	12	5.5

Tempo or Laguna or Maxi	1	0.5
Other	5	2
Travel Time		
Below 5 minutes	30	13.5
6 – 15 minutes	97	44
16 - 30 minutes	51	23
31 - 45 minutes	11	5
46 minutes - 1 hour	9	4
1 - 2 hours	19	8.5
2+ hours	5	2
Travel Cost		
None or Not Applicable	108	49.5
Below Tk 10	8	4
Tk 11 – 20	30	14
Tk 21 – 50	38	17.5
Tk 51 – 100	14	6.5
Tk 101 – 200	5	2
Tk 201 – 500	15	7
Tk 500+	1	0.5

Travel mode rickshaw and on foot is high. Short distance, easy access and available mode are the main reason mentioned by the majority for using travel mode as seen in Figure 2.

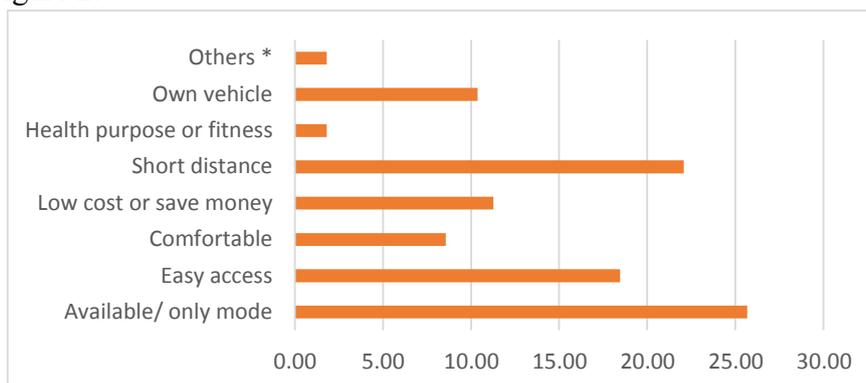


Figure 2. Reason for using the travel mode before COVID-19 (% of Respondents)

7. CHANGES AND PROBLEMS DUE TO COVID-19

7.1 Impacts of COVID-19 on Travel and Mobility

Only 21.76% of the respondents mentioned that their typical travel behavior and mobility have been changed due to COVID-19. Their reported main changes are:

- Less travel and movement to remain safe, avoiding unnecessary trips (48%);
- Avoid crowd, public bus (8%);
- Do not go to market/shopping (11%);
- Do not go to office (2%);
- Do not go outside & fear of travelling (11%);
- Less rickshaws and travel mode/vehicles are available (6%);
- New trips, visit for worship (6%);
- Do not walk for exercise (2%);
- Do not travel alone (2%).

Only 16% of the respondents mentioned that their trip cost has increased and 4% mentioned decreased while the remaining mentioned stable due to COVID-19. Trip cost increased mainly because most people who used shared mode have shifted to individual or reserved mode of transport while decreased for a small portion who shifted to walk. However, there is also change in income because of COVID-19. More than half of the respondents (69%) mentioned that their household income has decreased after COVID-19 while 31% mentioned stable.

Occupation for not many, only 7%, have changed after COVID-19. This is not surprising to find change for a very a small portion because the majority of the respondents were not working before COVID-19, as the population of this research is elderly and disabled persons. The major changes in occupation are: loss of job (unemployed), change or shift in job pattern or profession, left the job or business.

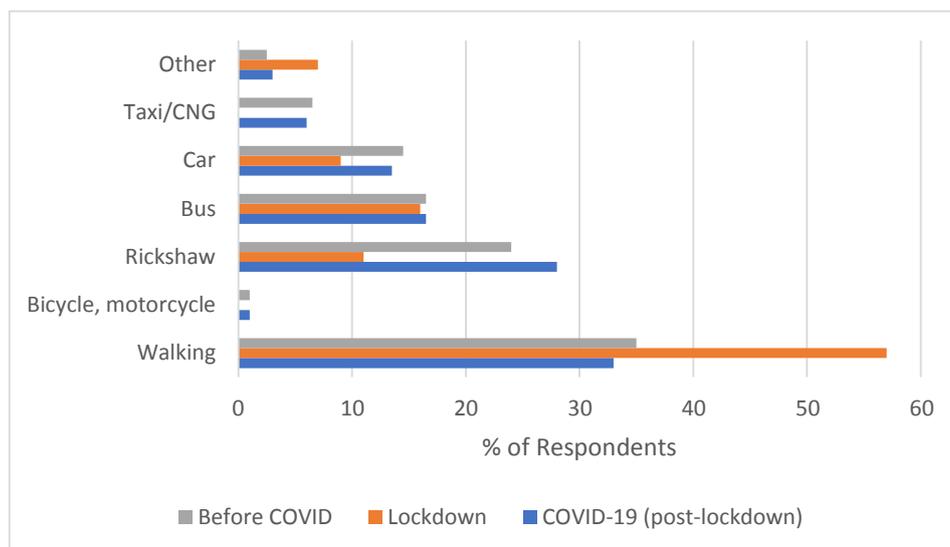


Figure 3. Modal share distribution during and before COVID-19

The proportion of active modes significantly increased during lockdown while all other modes reduced, as seen in Figure 3. Though the proportion of the modes during

post-lockdown and before COVID-19 are almost similar, a slight increase of paratransit and private modes is observed during post-lockdown while a slight decrease of public transport during post-lockdown.

The major portion of the respondents travelled 2-3 trips or 4-5 trips or 5+ trips per week before COVID-2019 though there are many respondents who travel just a few times in a year or month, as seen in Figure 4. During post-lockdown also found similar pattern, but slightly decreased the percentage; the proportion make 5+ trips per week reduced but the proportion make 1 trip per week or per month increased. During lockdown, the majority did not travel while a few travelled a trip per month or week.

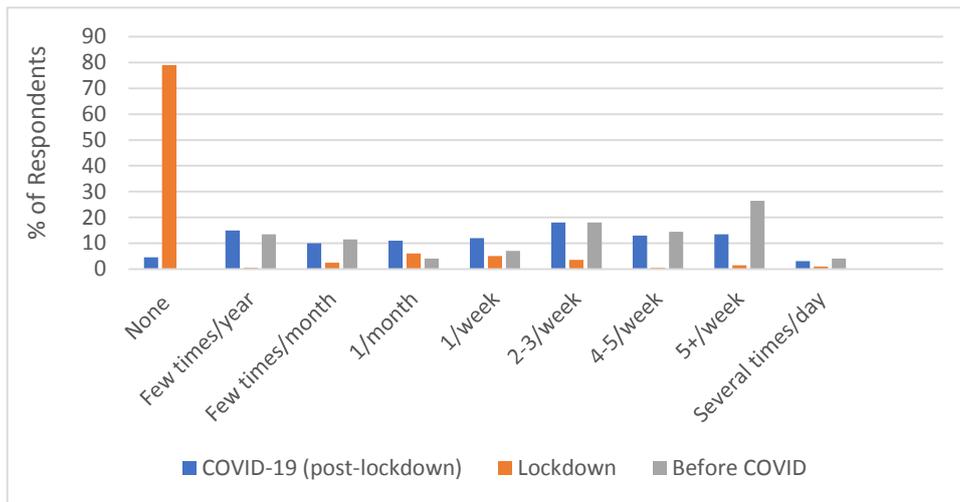


Figure 4. Travel frequency of respondents in Dhaka city during and before COVID-19

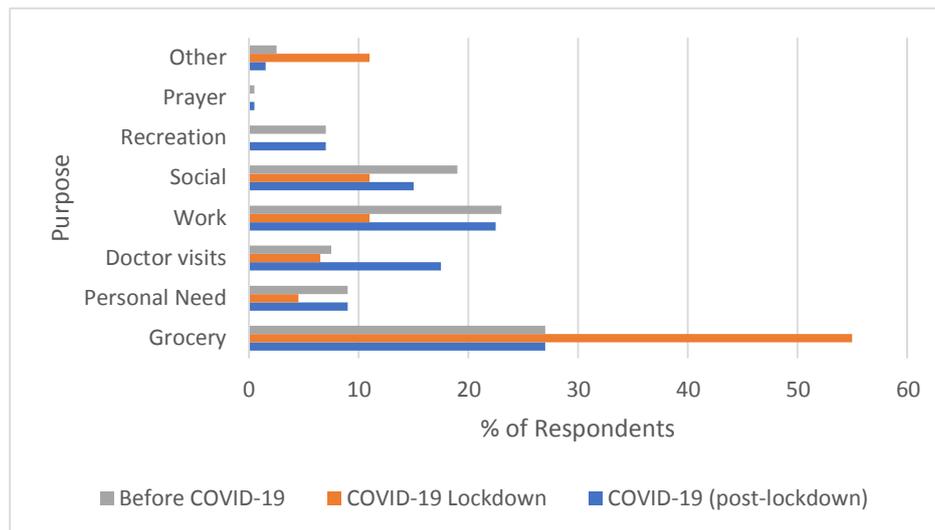


Figure 5. Travel purpose of respondents in Dhaka city during and before COVID-19

Figure 5 depicts the purpose of trips; during lockdown the majority is for grocery. Social trips and recreation trips reduced. Trip purposes before COVID-19 and post-lockdown are almost similar but slightly less during post-lockdown except for doctor visits which increased.

7.2 Problems and Expectations

Figure 6 illustrates the difficulty of finding public transport and any location in the city. In general, finding a public transport and riding for a trip in Dhaka is not easy, though almost 41% mentioned ‘manageable’, about 56% of the remaining mentioned ‘difficult’ or ‘very difficult’. Similarly, in terms of easiness in finding or navigating a location, a large portion mentioned ‘difficult’ or ‘very difficult’.



Figure 6. Difficulty of finding public transport mode and a location in Dhaka city

The respondents were asked if they have faced any particular problem related to travel and mobility due to COVID-19. Overall, 13% of the respondents mentioned that they face travel problems due to COVID-19. Nevertheless, the respondents were asked if they have any new or additional problem for mobility due to COVID-19. Only 3% mentioned that they feel additional problems due to COVID-19, as in Table 11, are: less public transport vehicles are available, increased travel cost or bus fare, uncomfortable or breathing problem because of wearing mask.

Table 11. Additional problems for travel due to COVID-19 that was not before

Problems	Frequency	%
Uncomfortable for breathing because of wearing mask	2	25
Less vehicle available, cannot travel in public bus	2	25
Increased travel cost, higher fare for rickshaws	4	50
Grand Total	8	100

However, the respondents who do not feel any additional travel problem because of COVID-19, only 4.5% of them consider that there is an increase of the magnitude of the usual travel problem due to COVID-19. The problems during COVID-19 (post-lockdown) and during lockdown are the same problems which were before COVID-19 plus some other additional problems. The reported problems before COVID-19 are:

- Difficult to walk and cannot travel alone;
- Buses remain overcrowded and no access, difficult to board/alight;
- No transport facilities, sidewalk or crossroad in provided;

- Poor road condition, damaged road and traffic jam.

During COVID-19 the added problems are:

- Increased travel cost (bus fare, easybike fare);
- limited public transport (e.g. buses) and rickshaws;
- Lack of safe transport facility; avoid easybike trips due to COVID-19 and fear.
- Breathing problem or uncomfortable for wearing mask;
- Less travel – avoid unnecessary trip (particularly for shopping or recreation);

Nevertheless, the respondents were asked if they have any expectation or suggestion for improving travel and mobility. Only 28% provided their suggestions. Their suggestions are for travel during COVID-19, shown in Table 12, and some are for overall travel even if there is no COVID-19 problem.

Table 12. Suggestions from the respondents for improving mobility or travel

Suggestions for during COVID-19	Frequency	Percentage
Maintain hygiene and government guidelines, e.g. mask, physical distancing, gloves, sanitizer	23	93%
Limited passengers in public transport to ensure physical distancing	2	7%
Mass awareness generation to avoid unnecessary trip	2	7%
More vehicles or increase number of buses with safety measures	1	3.5%
Discontinue work during COVID-19	1	3.5%
Total	29	100%

The respondents mentioned some measures need to improve the overall mobility and access of elderly people even if there is no COVID-19; these are:

- Elderly friendly transport, improved transport and accessible for elderly
- Reduced or subsidised travel cost for elderly people particularly for the poor;
- Reduce traffic congestion;
- Everyone should maintain traffic rules and regulations;
- Provide ample walking space and parks for elderly people.

8. DISCUSSION AND CONCLUSION

In the context of developing countries, transport infrastructure is often inadequate, unsatisfactory and inaccessible to many people especially for elderly and individuals who requires special assistance. This research is an attempt to explore the travel behavior issues of such individual elderly. Data reveals that the elderly people in Dhaka city are more likely to use public transport rather than private mode of vehicle as the household vehicle ownership is very low. Existing public transport of the city is not

elderly friendly; therefore, elderly people are often forced to choose alternate travel mode. Although some of them have household vehicle.

During COVID-19 lockdown, the majority of the elderly people avoided travelling. They preferred walking or using rickshaw rather than using any other travel mode considering the risk issue associated with shared mode of transports. Their travel distance was reduced; mostly within 1 or 2 km so that it is easy to travel by rickshaw or walking. Though their modal preference changed for the short run, for the long-distance travel public transport mostly buses are used. During lockdown and post-lockdown a decrease of public transport use and slight increase of private vehicles (car, motorcycle, bicycling) and walking is observed.

The study revealed some problems related to travel of elderly people that need to be addresses. The common problems mentioned by the respondents are: poor quality of walking facility, overcrowded and poor bus and difficult for elderly to get access. Due to COVID-19, except less frequent public bus service and higher fare rates there is no such significant problems associated with the travel of elderly people.

Interestingly a good number of respondents (more than 90%) do not see any difference in their commuting or daily travel. This has multi-facet interpretation. First, during COVID-19 the government has imposed a range of regulatory measures which has reduced number of vehicles. As a result, demand remains high though passenger number has reduced significantly. Second, a good share of elderly population does not use public transport. So, for them COVID-19 has not changed the travel cost in any way. However, for many people COVID-19 has caused different challenges to their everyday essential travel.

The suggestions and expectations mentioned by the respondents are: improving hygiene of the transport, increasing the number of public bus, provision of walking and cycling infrastructure. In post-COVID situation, improving the quality of public transport is walking facilities needed for the mobility of elderly people.

These evidence-based findings could be helpful for the authorities in identifying priority actions that required for immediate response and recovery, in developing guidelines related to elderly mobility enhancement. This guideline will also be helpful for elderly to ease their mobility or to overcome their mobility constraints, improve their access to transport and services, increase their convenience for travel and thus potentially more participation in productive activities.

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