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PHYSICALLY HANDICAPPED AND VISUALLY IMPAIRED:
TRIP CHARACTERISTICS AND TRANSPORT PROBLEMS IN CAIRO

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1. INTRODUCTION

In December 1975 the United Nations (UN) issued a set of declarations regarding the rights of handicapped people to all aspects of daily life. The UN defines a handicap as a person who is fully or partially unable to ensure by himself all the necessary requirements for his life as a result of a disability. One of the basic rights of any person should be the ability to freely and comfortably move from one place to another. Handicapped people, like others, need transportation facilities to travel from their homes to different places for various purposes. The 1986 European Conference of Ministers of Transport endorsed the recommendation that "each member country should strive to meet the objective that all transport systems and their support services such as toilets, catering, and telephones, should be usable by mobility handicapped people and that as a matter of course all new systems should be planned to be usable by mobility handicapped people...".

Research in the area of transportation mobility for handicapped people has been gaining momentum for the past decade. As a result several countries have produced design guidelines for the different transport facilities to cater for the needs and requirements of the mobility handicapped, see Barham et al. 1994, Balog et al. 1992, Briaux et al. 1992, IHT 1991, TPD 1986.

In many countries, still, handicapped people are considered as a minority group and their needs are not catered for properly. Egypt is one of the countries that signed the 1975 UN declaration regarding the rights of the handicapped people. The Egyptian government is striving to improve some of the life aspects for handicapped people. As an example, the Egyptian legislation states that 5% of the employees in any government enterprise should be handicapped. However, there are lots of areas, related to the handicapped daily life activities, that are still relatively neglected. Transport is one of these areas.

The overwhelming majority of residents in Cairo, the capital of Egypt, face lots of transport-related problems in their daily commuting. However, these problems are magnified when encountered by the handicapped people. In addition mobility handicapped confront other transport problems that can be directly related to their type of disability.

2. OBJECTIVES

The main objectives of this study can be stated as follows:

1. To recognise the trip characteristics of the mobility handicapped in Cairo.
2. To identify the perception of mobility handicapped towards the seriousness of the problems that they encounter when using public transport modes, namely Cairo Transport Authority (CTA) buses.

3. To suggest a set of policies and measures that are meant to relieve the transport problems confronted by the mobility handicapped, and in general to improve their public transport accessibility and mobility.

These objectives were achieved through conducting a questionnaire survey with a sample of the mobility handicapped in Cairo, see appendix I for questionnaire details. The questionnaire is of the revealed preference type. It comprises ranking and choice type of questions. It was decided to concentrate the research efforts on surveying the Physically Handicapped (PH) and the Visually Impaired (VI) people. These two groups were thought to be the most significantly hindered groups in terms of transport mobility. This study considers only (PH) people whose physical disabilities are mainly in their lower limbs. It is to be noted that there exist some minor differences between the questionnaire forms presented to the (PH) and those presented to the (VI).

A total of 172 (PH) and 142 (VI) people completed the questionnaire. Survey details and sample representation are presented in Mabrouk and Abbas 1994. The questionnaire responses were analysed to investigate, understand and statistically infer the trip characteristics and the transport problems of the mobility handicapped in Cairo. The sample of respondents disaggregated according to socio-demographic data such as gender, level of education, employment, type of work, type of physical disability, current age and age at which disability occurred, all, are detailed in table 1.

Table 1: Socio-demographic statistics of questionnaire respondents

PHYSICALLY HANDICAPPED		VISUALLY IMPAIRED	
Socio-Demographic Data		Statistics	
Responses	Statistics	Responses	Statistics
Number	Percentage	Number	Percentage
Gender		Gender	
146	86	96	47
26	16	67	33
Male		Male	
Female		Female	
Level of Education		Level of Education	
64	31	47	33
64	31	44	31
42	24	17	12
19	11	22	16
1	1	11	8
1	1	1	1
Employment		Employment	
66	39	66	39
60	36	16	11
6	4	1	1
0	0	2	1
12	7	8	6
16	10	34	24
7	4	27	19
Employed with government		Employed with the government	
Employed with private sector		Employed with the private sector	
39	36	39	26
36	36	36	26
4	4	31	26
6	4	8	8
0	0	1	1
0	0	1	1
16	10	8	6
12	7	34	24
7	4	27	19
Type of Work		Type of Work	
28	17	44	31
3	2	36	26
66	39	60	36
7	4	12	8
68	36	68	36
6	3	1	1
0	0	1	1
Type of Physical Disability		Type of Physical Disability	
132	77	132	77
36	20	36	20
6	3	6	3
Age at which disability occurred		Age at which disability occurred	
Mean	Stand. Dev.	Mean	Stand. Dev.
30	10	33	7
6	7	14	11
Min. Max.		Min. Max.	
12	68	7	63
40	40	11	49
Birth		Birth	

3. TRIP CHARACTERISTICS OF MOBILITY HANDICAPPED IN CAIRO

The questionnaire results reveal important information regarding the trip characteristics of mobility handicapped in Cairo. Table 2 shows that the most common trip purpose for both (PH) and (VI) is the work trips. The table further demonstrates the very limited possession of driving licences by the (PH). Other trip characteristics include the most frequently used travel mode by mobility handicapped. Table 3 reveals that the most frequently used mode by the (PH) and the (VI) for the different trip purposes is the (CTA) public buses.

Table 2: Trip purpose statistics of questionnaire respondents

PHYSICALLY HANDICAPPED				VISUALLY IMPAIRED			
Trip Purpose	Responses		Mode	Responses		Mode	
	Number	Percentage		Number	Percentage		
• Work Trips							
Yes	133	77	Yes	87	61	Yes	
No	39	23		55	39		
• Education/Training Trips							
Yes	55	32	No	73	51	Yes	
No	117	68		69	49		
• Social/Recreational Trips							
Yes	70	41	No	55	39	No	
No	102	59		87	61		
• Medical Treatment Trips							
Yes	10	6	No	16	11	No	
No	162	94		126	89		
• Other Trips							
Yes	0	0	No	13	9	No	
No	172	100		129	91		
Possession of Driving Licence	Responses		Mode	Responses		Mode	
	Number	Percentage		Number	Percentage		
Yes	12	7	No				
No	160	93					

Table 3: Questionnaire respondents statistics of the frequently used mode according to trip purpose

PHYSICALLY HANDICAPPED

Trip Purpose \ Mode	Work		Education/Training		Social/Recreational		Medical Treatment		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%
Bus (CTA)	106	80	47	86	57	81	6	60	0	0
Other Modes	27	20	(CTA) 8	14	(CTA) 13	19	(CTA) 4	40	(CTA) 0	0

VISUALLY IMPAIRED

Trip Purpose \ Mode	Work		Education/Training		Social/Recreational		Medical Treatment		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%
Bus (CTA)	72	83	44	85	48	91	14	88	9	90
Other Modes	16	17	(CTA) 8	15	(CTA) 5	9	(CTA) 2	22	(CTA) 1	10

The frequency of trip making, the average walking and average riding times for the different trip purposes of the (PH) and the (VI) are displayed in table 4. The table demonstrates that work trips are the most frequently made trips. The average is 6 trips per week for (PH) and 5 trips per week for (VI). The table also shows that the average walking time component for a work trip by a (PH) is 9 minutes, which is generally higher than that of a (VI), 7 minutes. On the other hand, the average riding time component for a work trip by a (VI) is 60 minutes, which is generally higher than that of a (PH), 39 minutes. In addition, table 5 shows the average monthly income as well as the average monthly expenditure on transport for (PH) and (VI). It is concluded from the table that transport expenditure represents about 28% of the monthly income of a (PH) and about 23% of the monthly income of a (VI).

Table 4: Questionnaire respondents statistics of trip characteristics according to trip purpose

PHYSICALLY HANDICAPPED

Trip Purpose	Frequency Per Week				Average Walking Time (min.)				Average Riding Time (min.)			
	Mean	STDV.	Min.	Max.	Mean	STDV.	Min.	Max.	Mean	STDV.	Min.	Max.
Work	6	0	6	6	10	8	0	60	39	32	0	120
Education/Training	4	1	1	6	9	5	0	20	47	40	0	180
Social/Recreational	3	1	1	6	10	9	0	60	44	33	4	160
Medical Treatment	3	1	2	6	10	5	5	20	49	69	0	240
Other	0	0	0	0	0	0	0	0	0	0	0	0

VISUALLY IMPAIRED

Trip Purpose	Frequency Per Week				Average Walking Time (min.)				Average Riding Time (min.)			
	Mean	STDV.	Min.	Max.	Mean	STDV.	Min.	Max.	Mean	STDV.	Min.	Max.
Work	5	2	1	7	7	9	0	40	60	47	0	180
Education/Training	4	2	1	6	11	15	0	60	58	43	0	180
Social/Recreational	2	2	1	8	5	9	0	40	66	47	10	180
Medical Treatment	2	1	1	4	6	9	0	30	35	24	10	90
Other	3	2	1	7	6	6	0	15	64	53	20	180

Table 5: Questionnaire respondents statistics of monthly income and transport expenditure

PHYSICALLY HANDICAPPED

Transport Budget	Mean	Std. Dev.	Min.	Max.
Average monthly income	99	104	0	950
Average monthly expenditure on transport	28	30	0	250

VISUALLY IMPAIRED

Transport Budget	Mean	Std. Dev.	Min.	Max.
Average monthly income	92	84	0	360
Average monthly expenditure on transport	21	21	0	100

4. AVAILABILITY AND DETERMINANTS OF MODE CHOICE

Diagrammatic representations of the responses to some of the questionnaire questions are obtained through the use of bar charts. In viewing the bar charts, note that rank "1" signifies the highest degree of importance, in relative terms, given to the respective factor/parameter.

Figure 1 illustrates the limited availability of mode choice to the (PH), 81% stated their captivity to one mode. On the other hand, 45% of the (VI) stated the availability of alternative modes to choose from among them.

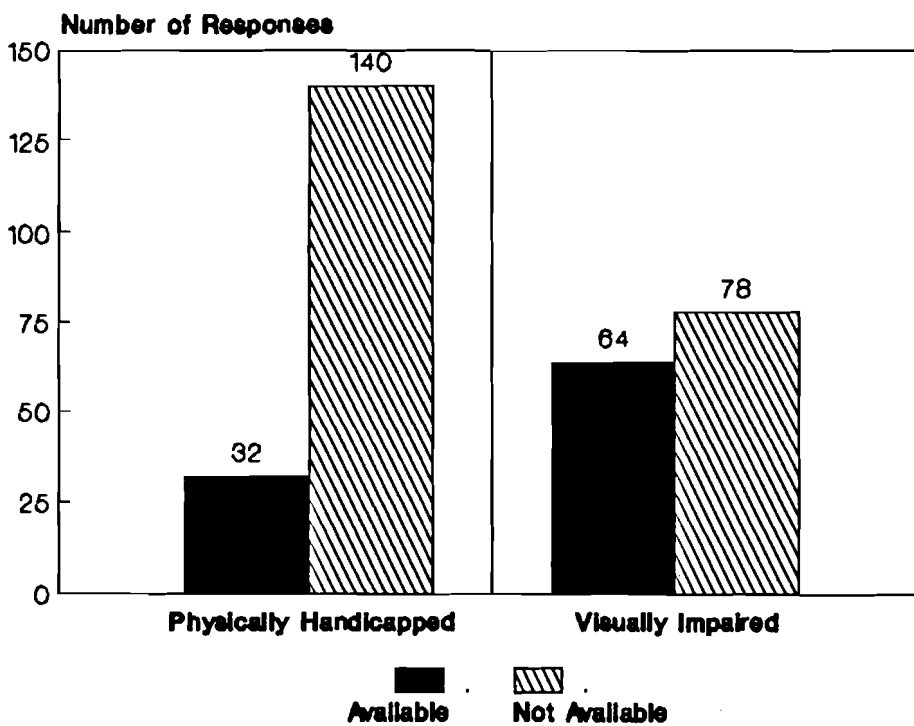


Figure 1: Extent of availability of mode choice to questionnaire respondents

In case mode choice is available, figures 2 and 3 respectively show the ranking of the choice of modes by the (PH) and the (VI). In both cases the dominance of the use of (CTA) public buses is further emphasised. Figure 4 presents the ranking of factors that govern the choice of mode by the (PH). Accessibility is the most important factor that govern their choice of mode, followed by comfort, followed by low cost and then safety. In case of (VI), the most important factor governing the choice of mode is low cost followed by comfort, followed by safety, and then accessibility, see figure 5.

5. TRANSPORT PROBLEMS ENCOUNTERED BY MOBILITY HANDICAPPED

CTA public buses was identified as the most usable mode of transport both by the (PH) and the (VI). The study attempts to infer the perception of the mobility handicapped towards the most serious travelling problems that they encounter when using buses in Cairo. The results of the analysis to the questionnaire responses are displayed in figures 6 and 7. Figure 6 shows that the restriction of using the free travel passes on all bus routes represents the most critical transport problem perceived by the (PH). This is followed in order of seriousness by:

- * difficulties faced in boarding and alighting buses,
- * overcrowding of passengers inside buses,
- * lack of courtesy and concern of public transport staff,
- * lack of courtesy and concern of other passengers,
- * buses stopping at distances from stations' platforms, and finally
- * stations far from origins/destinations of (PH).

Similarly, figure 7 demonstrates that the restriction of using the free travel passes on all bus routes is the most profound travel-related problem faced by the (VI). This is followed in order of seriousness by:

- * lack of courtesy and concern of public transport staff,
- * overcrowding of passengers inside buses,
- * lack of courtesy and concern of other passengers,
- * buses stopping at distances from stations' platforms,
- * difficulties faced in boarding and alighting buses, and finally
- * stations far from origins/destinations of (VI).

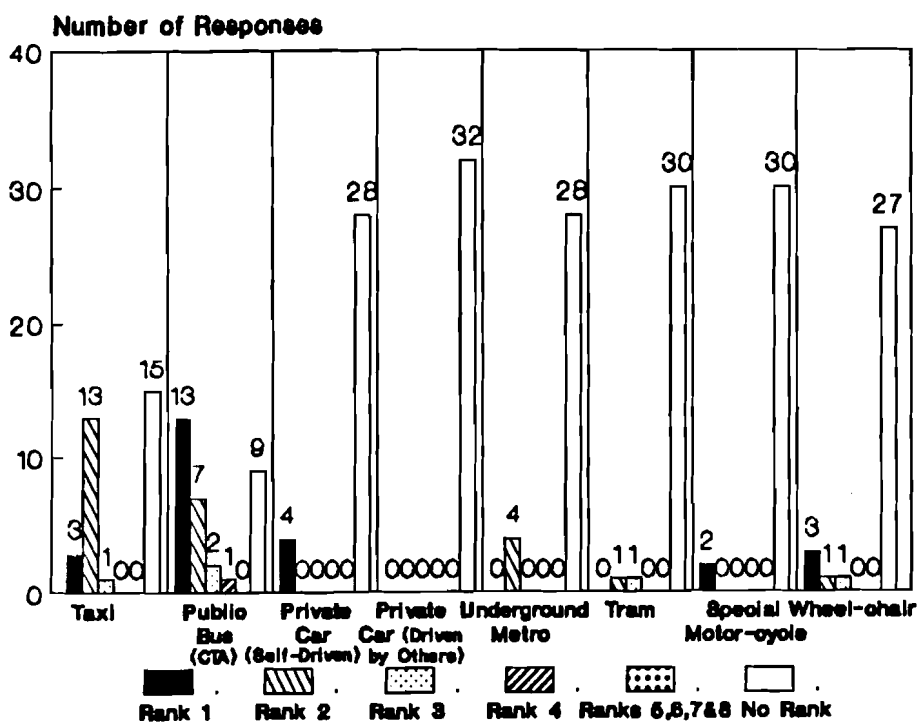


Figure 2: Ranking of modes chosen by the physically handicapped respondents

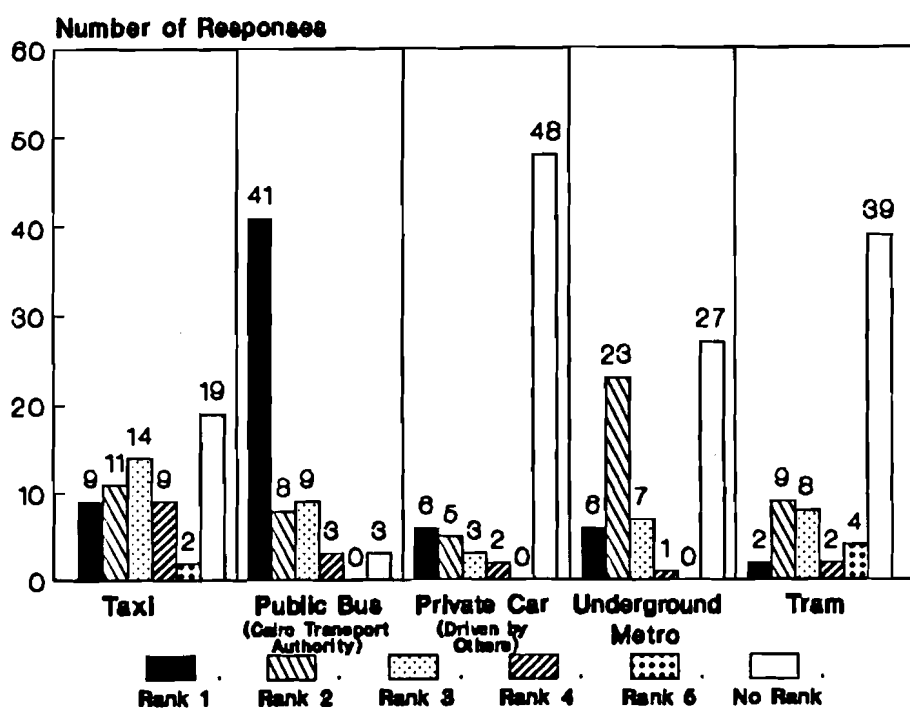


Figure 3: Ranking of modes chosen by the visually impaired respondents

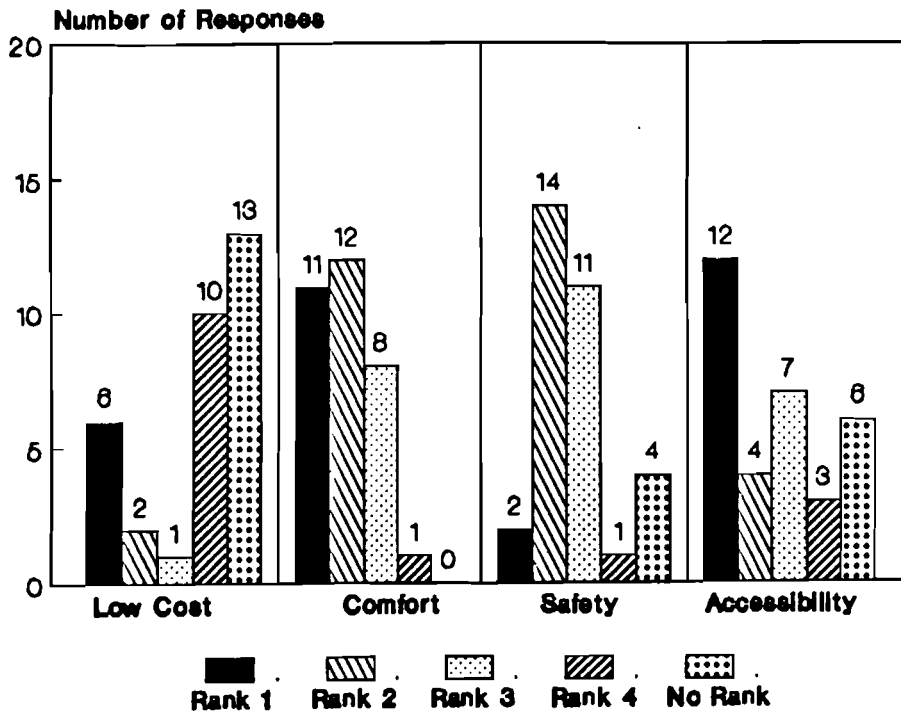


Figure 4: Ranking of determinants affecting mode choice of physically handicapped respondents

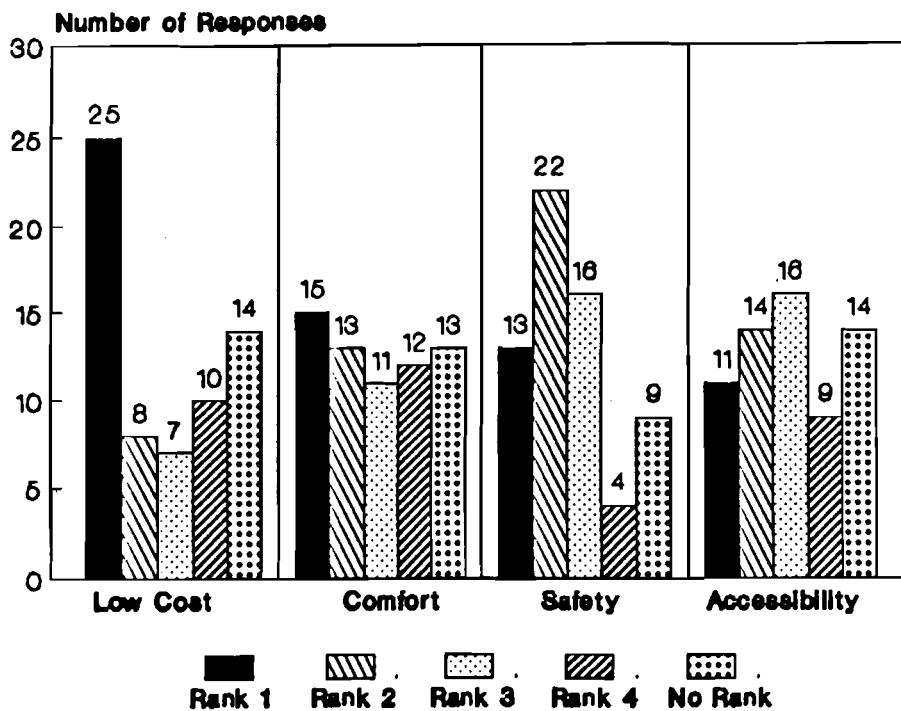


Figure 5: Ranking of determinants affecting mode choice of visually impaired respondents

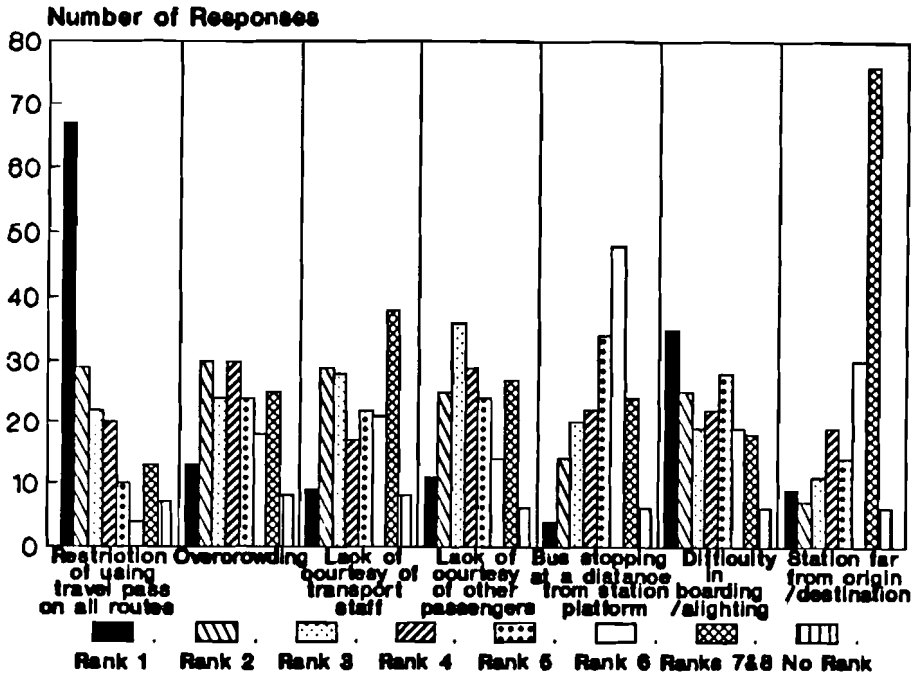


Figure 6: Ranking of transport problems encountered by the physically handicapped respondents

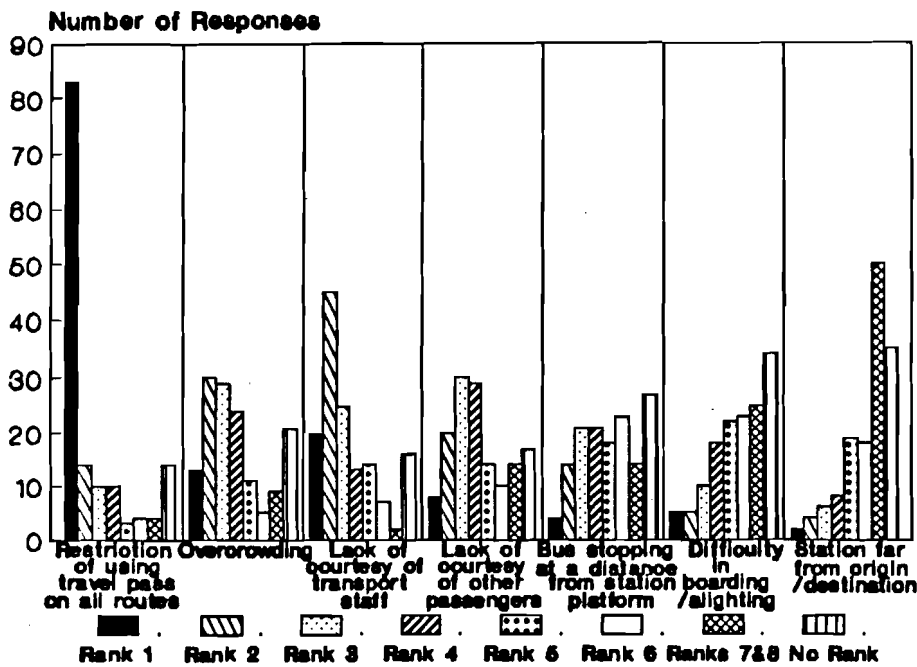


Figure 7: Ranking of transport problems encountered by the visually impaired respondents

6. POLICIES AND MEASURES SUGGESTED TO IMPROVE ACCESSIBILITY AND MOBILITY FOR HANDICAPPED PEOPLE IN CAIRO

Improving transport (accessibility and mobility) for handicapped passengers brings wider benefits to all transport users and especially children, women particularly pregnant women, frail, elderly, sick people (heart disease, diabetics) and in general all other able-bodied passengers.

Based on the literature survey and the study results, the following subsections present a set of suggested policies and measures that could be adopted and implemented to better meet the travelling requirements of mobility handicapped and to relieve the current transport problems that they encounter when using buses as their main mode of public transport in Cairo. It is to be noted that measures are divided into relatively inexpensive transport measures and to relatively costly transport measures. Inexpensive measures can be easily implemented over the short term in developing countries. On the other hand, costly transport measures should be thought of over a relatively long period of time. It is to be noted that these policies and measures fall within the known phrases education, enforcement, engineering, publicity and training. These mainly fall within the responsibility of the public transport operators, the Cairo governorate, and the ministries of transport, information and education.

6.1 Special Transport Policies

The following represents a list of special transport policies that are meant to enhance the travelling environment for mobility handicapped.

- * Extending the use of travel passes to allow the free travelling, with acceptable levels of service, of mobility handicapped and their escorts on all forms of public transport.
- * Designation of a number of priority labelled seats (2 to four seats) for handicapped passengers in public transport modes and enforcement of the implementation of this policy. It is to be noted that a regulation already exists within the (CTA) to allocate two seats on each bus for the handicapped, however this is seldom practised. Heavy fines should be collected from able-bodied passengers who occupy these seats despite the presence of people with disabilities.
- * Heavy fines should be enforced on vehicles parking at bus stations or stopping points. Passengers should be advised through publicity campaigns to wait for buses on the bus platforms so as to clear the areas for approaching buses to stop as much as possible near the kerbs. Bus drivers should be instructed to stop, as much as the space allows, near the platforms' kerbs. In addition bus drivers should be instructed to stop automatically for (PH) and (VI) people waving for a bus to stop. On board staff should be available to help disabled passengers in getting on/off buses.
- * Developing a strong awareness among public transport staff members towards treating handicapped passengers with courtesy and concern. This can be achieved through specialised attitudinal training courses for (CTA) staff to train them on how to treat passengers in general and how to help disabled people in particular. This training should be followed by continuous monitoring and recording of the performance of public transport staff in terms of their behaviour towards handicapped passengers. Any existing system of incentives/penalties should allocate points to this aspect of staff performance. Training should also include training drivers to drive smoothly to avoid the fall and injury of handicapped passengers.
- * Promoting the awareness and courtesy of other public transport users towards handicapped passengers. This can be achieved through continuous media campaigns and school children education to instigate a society feeling of understanding and appreciation of the difficulties that disabled people may encounter in their daily commuting.
- * Public transport operators should allow in their scheduling longer stop times at stations that exist in districts where mobility handicapped are known to live and work. Some of these areas identified by the survey include: Al-Sayda Zeinab and Al-Darb Al-Ahmar for (PH) and Al-Matrya and Al-Zeitoun for (VI).

- * Handicapped passengers should be given priority to board on or alight from public transport facilities.
- * Cessation of customer taxes on private cars specially made for (PH) and exemption of (PH) from all forms of driving licence fees and road use taxes. Private cars driven by (PH) should have a disability badge so that other drivers would be aware and watchful in their manoeuvres. Designation of parking spaces for (PH) where there is a demand for parking by them.

6.2 Relatively Inexpensive Transport Measures

The following represents a list of measures that are meant to improve mobility and accessibility of mobility handicapped to public transport.

- * A number of specially designed sheltered seats to be allocated for mobility handicapped passengers at stops of public transport modes. This is meant to provide a comfortable environment for handicapped passengers while waiting for the arrival of the public transport mode.
- * Each main bus and metro station should have a special information and aid office for helping handicapped passengers. According to Dejeammes et al. 1990 "Information is necessary for several reasons: to establish the route to destinations, to locate public transport stops and for safety. Journey planning is important for everyone, not just the handicapped. The difference for handicapped people is the necessity to avoid the physiological overexertion that incorrect planning implies. Effort can become so intolerable that handicapped people prefer not to make the trip at all".
- * Fitting handrails and grip bars at stations and inside public transport facilities. These are meant to act as support for handicapped passengers to facilitate their walking through stations and to prevent them from falling when transport facilities make manoeuvres.
- * Audible announcements, both at stations and within transport modes, should be continuously made to announce timetables, boarding times and different departure and destination stations. This would mainly help (VI) passengers.

6.3 Relatively Costly Transport Measures

"It is clear that getting on and off presents difficulties to the highest percentage of disabled people. These difficulties increase substantially as the degree of disability increases", Mitchell 1988. Oxley 1989 stated that "improved design of vehicles, infrastructure and service levels is important in maintaining mobility among disabled people." The following represents a list of transport measures that are also meant to improve handicapped mobility and accessibility to public transport.

- * Station platforms to be at the same level of entrances/exits to public transport facilities (bus, metro, tram) to facilitate the boarding and alighting of handicapped passengers to/from transport facilities. This can be achieved by purchasing buses with lower stairs as well raising the level of kerb station platforms or alternatively using automatically kneeling vehicles or vehicle mounted lift/automatic stairs.
- * Future bus specifications should take into account the provision of buses with wide doors. This is also meant to facilitate the bus boarding and alighting of disabled people.
- * Buses to be fitted with audible push buttons for bus stop requests.
- * Provision of Braille tactile information (maps, timetables) for the (VI).
- * Operating specially designed public transport services that pass through areas of concentration and most commonly travelled routes of handicapped people. Future studies could look at identifying potential routes to be serviced.
- * Provision of escalators and lifts at underground metro station.
- * Moving walkways in widely spread stations.
- * Ramps in underground metro stations to allow for the slipping of wheel-chair passengers provided that the slope is not too steep.
- * Concessionary fare schemes which allow mobility handicapped passengers to use taxis at a cheaper rate.

7. CONCLUSION

A questionnaire survey was undertaken in an attempt to get acquainted with the trip characteristics of mobility handicapped in Cairo, namely the (PH) and the (VI) as well as to infer the way in which they perceive the seriousness of potential travel-related problems. The data collected throughout the questionnaire was coded and statistically analysed. The results of the analysis showed the trip characteristics of the mobility handicapped as well as the most serious and frequently encountered transport problems. It also demonstrated the differences in the trip characteristics and the perception towards the importance of these problems between the (PH) and (VI). The results of the study can be summarised as follows.

1. The most common trip purpose for both (PH) and (VI) is the work trips.
2. Very limited possession of driving licences by the (PH).
3. The most frequently used mode by the (PH) and the (VI) for the different trip purposes is the (CTA) public buses.
4. Work trips are the most frequently made trips. The average is 6 trips per week for (PH) and 5 trips per week for (VI).
5. In general, the average walking time component for a work trip by a (PH) is 9 minutes, which is generally higher than that of a (VI), 7 minutes.
6. The average riding time component for a work trip by a (VI) is 60 minutes, which is generally higher than that of a (PH), 39 minutes.
7. Transport expenditure represents about 28% of the monthly income of (PH) and about 23% of the monthly income of a (VI).
8. Limited availability of mode choice to the (PH), as 81% stated their captivity to one mode. On the other hand, 45% of the (VI) stated the availability of alternative modes to choose from among them.
9. In case mode choice is available for (PH), accessibility is the most important factor that govern their choice of mode, followed by comfort, followed by low cost and then safety.
10. In case mode choice is available for (VI), the most important factor governing the choice of mode is low cost followed by comfort, followed by safety, and then accessibility.
11. In case mode choice is available, still (CTA) public buses were identified as the most usable mode of transport both by the (PH) and the (VI).
12. The restriction of using the free travel passes on all bus routes represents the most critical travel-related problem perceived by the (PH) as well as by the (VI). This conclusion coincides with Dallmeyer 1976 conclusion: "Handicapped people do not travel as much as most people. Indications are that they would if the cost was lower and the transportation was more accessible".

In conclusion, a set of suggested policies and measures that could be adopted and implemented to better meet the travelling needs of mobility handicapped and to relieve the current travel-related problems that they encounter when using buses as their main mode of public transport in Cairo were presented. Measures are divided into relatively inexpensive transport measures and to relatively costly transport measures.

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APPENDIX I

QUESTIONNAIRE

SOCIO-DEMOGRAPHIC INFORMATION

1. Gender:

Male.....

Female.....

2. Age:

3. Age at which you became disabled:

N.B.: In case of physically handicapped

Type of physical disability:

Paralysis of lower limb(s).....

Amputation of lower limb(s).....

Disfigurement of lower limb(s).....

4. Level of Education:

Education

Choice

Illiterate

Primary/Preparatory school

Secondary school

Higher education

Postgraduate

Other, please state

5. Employment or current activity:

Employment

Choice

Employed with the government

Employed with the private sector

Self-Employed

On pension

Unemployed

Student

Other, please state

6. Current work type:

N.B.: In case of physically handicapped

Do you possess a driving licence:

Yes.....

No.....

3. In making your trips, is there more than one mode available to choose from among them
- Yes.....
No.....
- N.B.: If your answer to this question is No, please move to question 6
4. Rank the following means (modes) of transport according to the frequency of their usage.
- Means of Transport
- Rank
- Taxi
Public Bus
Private car (driven by others)
Underground metro
Tram
Other, please state
In case of physically handicapped
Private car (driven by yourself)
Special Motorcycle
Wheel-Chair

Trip Purpose	Mode	Frequency	Type	Trip Destination	Trip Time	
					Walk	Ride
Work						
Education/Training						
Social/Recreational						
Medical Treatment						
Other (Please State)						

1. Please state the name of district where you live (Origin)
2. Weekly Trips

TRIP CHARACTERISTICS

7. Mobility Needs (**)
- Needs
- Choice
- N.B.: In case of physically handicapped
- Need the help of others
Need a walking stick
Need the help of others as well as a walking stick
Do not need any aid
- Need the help of others
Need a wheelchair
Need artificial limb(s)
Need a crutch/stick
Need artificial limb(s) and the help of others
Need a wheelchair and the help of others
Need a crutch/stick and the help of others
Need a walking stick and the help of others
Do not need help but still have mobility problems
Do not need any aid

5. Rank the following reasons in their order of priority as determinants of mode choice

Reasons Rank

Low Cost
Comfort
Safety
Accessible
Other, please state

6. Could you please state your approximate monthly expenditure on transport.
7. Could you please state your average monthly income.

PROBLEMS ENCOUNTERED WHEN USING PUBLIC BUSES

1. Rank the following public transport problems in their order of priority in hindering your usage of public buses.

Problems Rank

Restriction of using the free travel pass on all routes
Overcrowding
Lack of courtesy of public transport staff
Lack of courtesy of other passengers
Bus stopping at a distance from station platform
Difficulty in boarding/alighting
Station far from origin/destination
Other, please state

STREET MOBILITY PROBLEMS^()**

1. Rank the following problems in their order of priority in hindering your mobility along sidewalks

Problems Rank

Narrow width of sidewalks
Unevenness of sidewalks
Opened electricity kiosks
N.B.: In case of physically handicapped
Vehicles parked on sidewalks
Obstacles on sidewalks
Overcrowding of pedestrians on sidewalks
Lack of courtesy of other pedestrians
Other, please state

2. Rank the following problems in their order of priority in hindering your mobility while crossing streets

Problems

Rank

Lack of safety fences around gutters/potholes

N.B.: In case of physically handicapped

High speed of approaching vehicles

High level of kerbs

Inadequate provision for pedestrian crossing

Lack of concern of drivers

Wide streets

Other, please state

SUGGESTIONS AND COMMENTS

Thank you for your cooperation towards completing this questionnaire, we appreciate if you could state any suggestions or comments that can help to enhance the provision of transport facilities and improve the pedestrian environment for the mobility handicapped in Cairo.

(**) See Mabrouk and Abbas, 1994 for analysis, results and conclusions of these parts of the questionnaire.