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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	Responses		Statistics			Responses		Statistics		
	Number	Percentage	Mode			Number	Percentage	Mode		
Gender										
Male	146	85	Male			95	67	Male		
Female	26	15				47	33			
Level of Education										
Illiterate	54	31	Illiterate			47	33	Illiterate		
Primary school	54	31				44	31			
Secondary school	42	24				17	12			
University/Institute	19	11				22	15			
Postgraduate	1	1				11	8			
Other	1	1				1	1			
Employment										
Employed with government	66	39	Employed with the Government			55	39	Employed with the Government		
Employed with private sector	60	36				15	11			
Self-employed	6	4				1	1			
On-pension	0	0				2	1			
Unemployed	12	7				8	5			
Student	16	10				34	24			
Other	7	4				27	19			
Type of Work										
Unemployed/Student/On-pension	28	17	Worker/ Civil Servant			44	31	Worker/ Civil Servant		
Educator	3	2				35	25			
Worker/Civil Servant	65	39				50	35			
Trainee	7	4				12	8			
Craftsman	58	35				—	—			
Stall-holder/Hawker	6	3				—	—			
Other	0	0				1	1			
Type of Physical Disability										
Paralysis of lower limb(s)	132	77	Paralysis of Lower Limb(s)							
Amputation of lower limb(s)	35	20								
Disfigurement in lower limb(s)	5	3								
	Mean	Stand. Dev.	Min.	Max.		Mean	Stand. Dev.	Min.	Max.	
Age	30	10	12	58		33	14	7	63	
Age at which disability occured	5	7	Birth	40		7	11	Birth	49	

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

Trip Purpose	Responses		Mode
	Number	Percentage	
• Work Trips			
Yes	133	77	Yes
No	39	23	
• Education/Training Trips			
Yes	55	32	No
No	117	68	
• Social/Recreational Trips			
Yes	70	41	No
No	102	59	
• Medical Treatment Trips			
Yes	10	6	No
No	162	94	
• Other Trips			
Yes	0	0	No
No	172	100	

Possession of Driving Licence	Responses		Mode
	Number	Percentage	
Yes	12	7	No
No	160	93	

VISUALLY IMPAIRED

Trip Purpose	Responses		Mode
	Number	Percentage	
• Work Trips			
Yes	87	61	Yes
No	55	39	
• Education/Training Trips			
Yes	73	51	Yes
No	69	49	
• Social/Recreational Trips			
Yes	55	39	No
No	87	61	
• Medical Treatment Trips			
Yes	16	11	No
No	126	89	
• Other Trips			
Yes	13	9	No
No	129	91	

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.	%age	Mode	No.	%age	Mode	No.	%age	Mode	No.	%age	Mode	No.	%age	Mode
Bus (CTA)	106	80	Bus	47	86	Bus	67	81	Bus	6	60	Bus	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.	%age	Mode	No.	%age	Mode	No.	%age	Mode	No.	%age	Mode	No.	%age	Mode
Bus (CTA)	72	83	Bus	44	85	Bus	48	91	Bus	14	88	Bus	9	90	Bus
Other Modes	15	17	(CTA)	8	15	(CTA)	5	9	(CTA)	2	22	(CTA)	1	10	(CTA)

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 Characteristics / 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	6	0	20	47	40	0	180
Social/Recreational	3	1	1	6	10	9	0	60	44	33	4	150
Medical Treatment	3	1	2	6	10	6	5	20	49	69	0	240
Other	0	0	0	0	0	0	0	0	0	0	0	0

VISUALLY IMPAIRED

Trip Characteristics / 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.

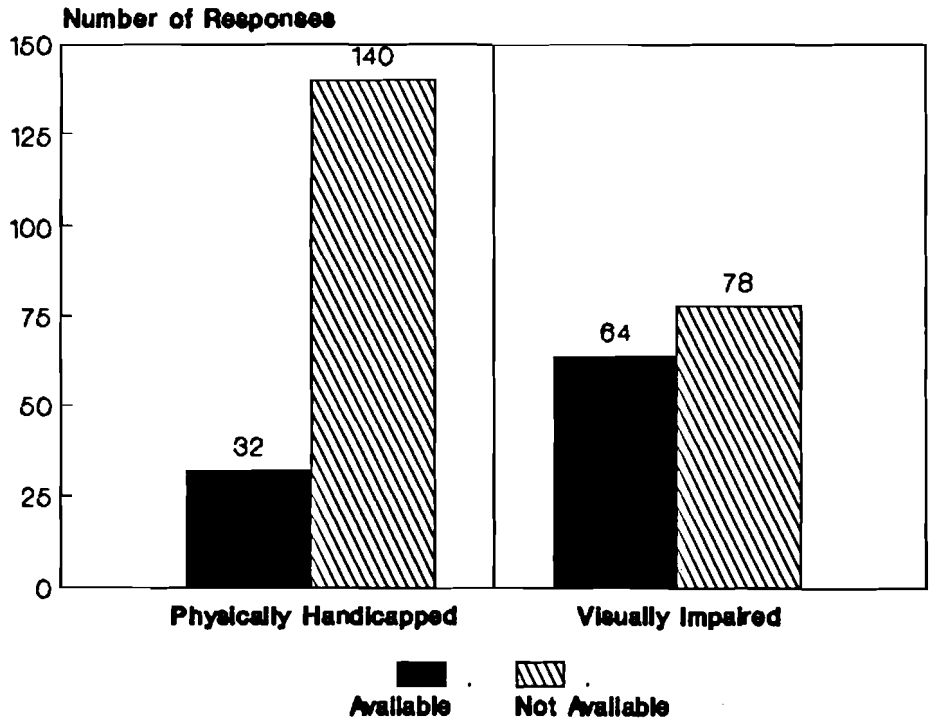

Figure 1: Extent of availability of mode choice to questionnaire respondents

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).

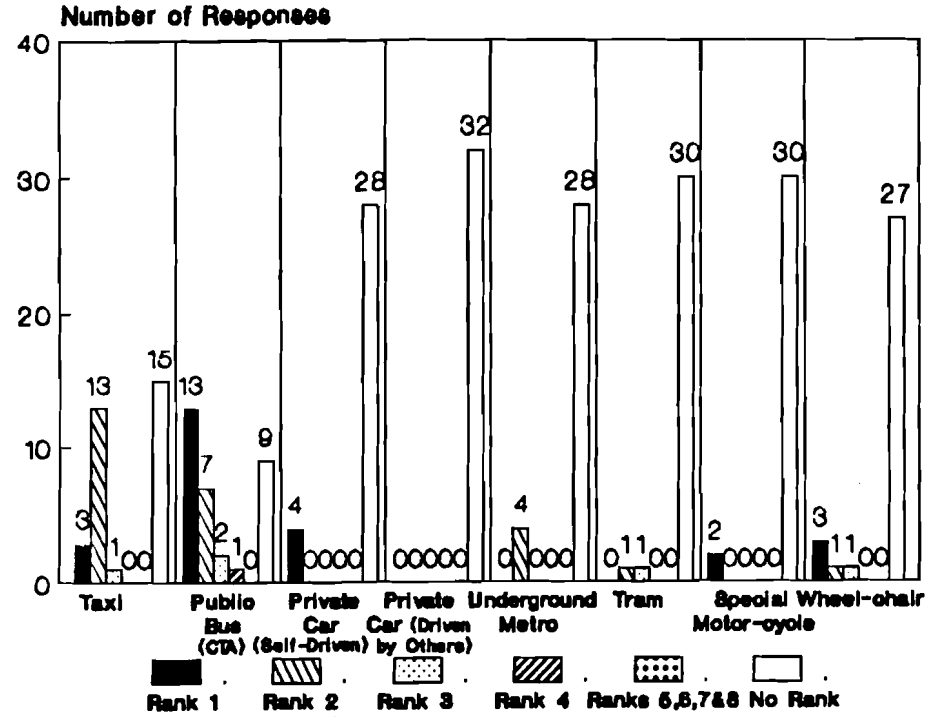

Figure 2: Ranking of modes chosen by the physically handicapped respondents

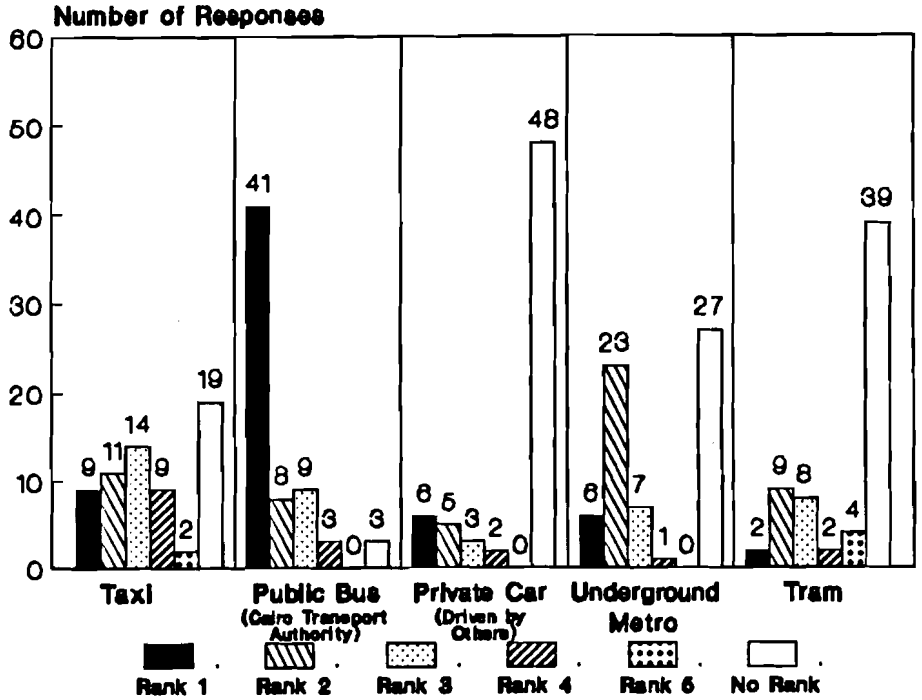

Figure 3: Ranking of modes chosen by the visually impaired respondents

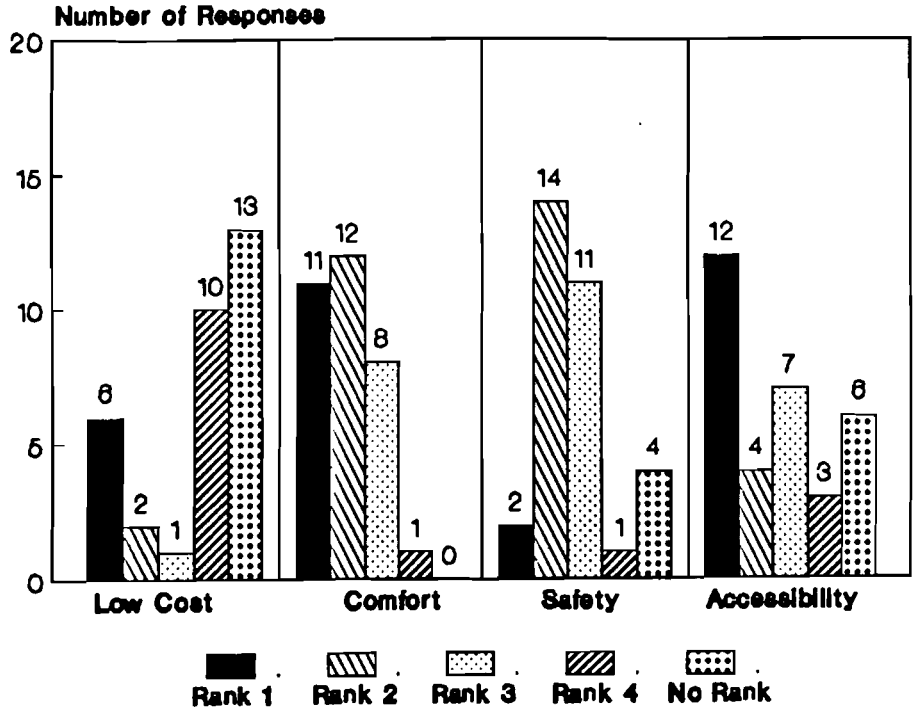

Figure 4: Ranking of determinants affecting mode choice of physically handicapped respondents

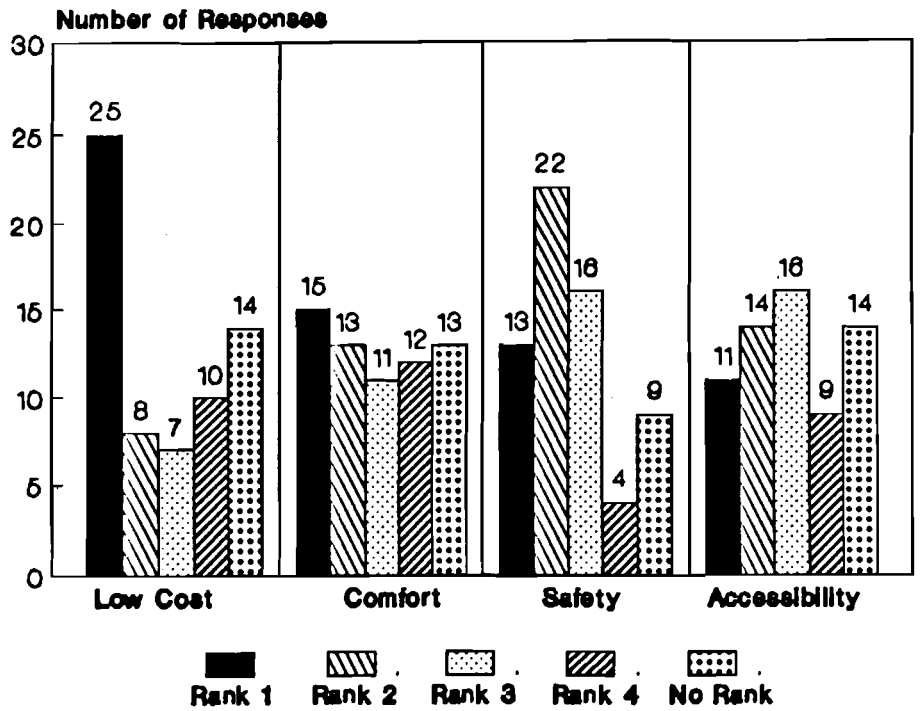

Figure 5: Ranking of determinants affecting mode choice of visually impaired respondents

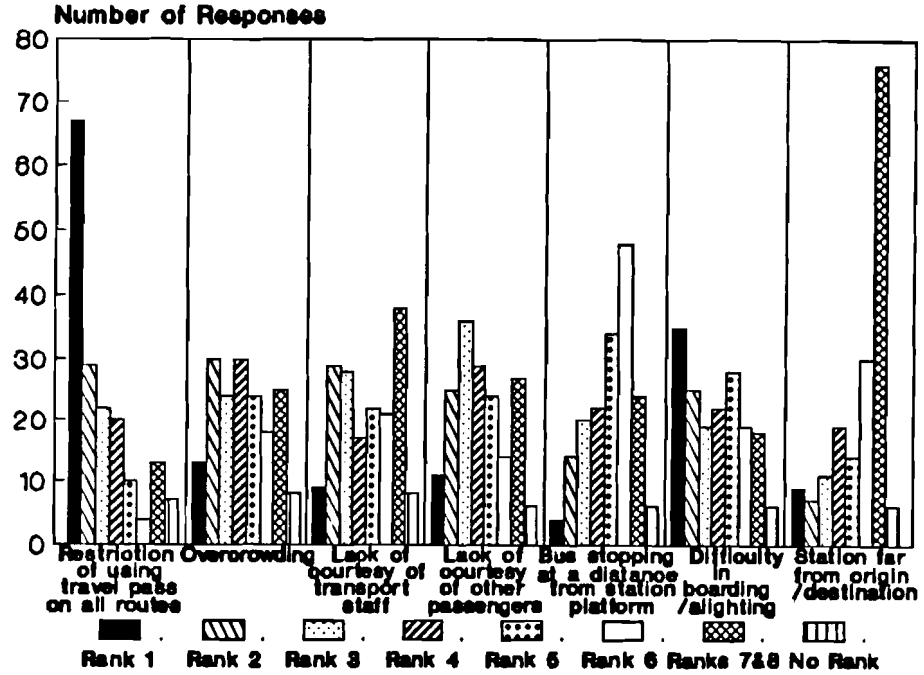

Figure 6: Ranking of transport problems encountered by the physically handicapped respondents

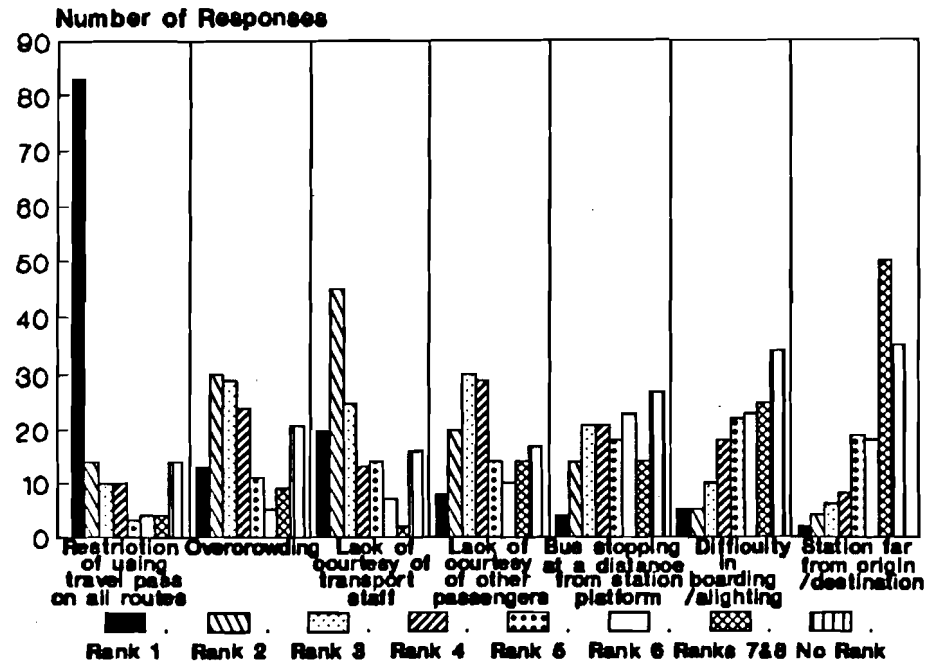

Figure 7: Ranking of transport problems encountered by the visually impaired respondents

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.....

7. Mobility Needs (**)

Needs	Choice
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	

N.B.: In case of physically handicapped

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	
Do not need help but still have mobility problems	
Do not need any aid	

TRIP CHARACTERISTICS

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

2. Weekly Trips

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

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	

N.B.: In case of physically handicapped

Private car (driven by yourself)	
Special Motorcycle	
Wheel-Chair	

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 you 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.**