

Barriers and Facilitators to Community Ambulation in Maharashtra, India: Perception of Individuals with Stroke

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ABSTRACT

Purpose: *The study aimed to understand the self-perceived environmental barriers/ facilitators to community ambulation among stroke survivors in Maharashtra State, India.*

Method: *The Facilitators and Barriers Survey /Mobility Questionnaire (FABS/M) was used to collect information from a of 50 individuals with stroke through purposive sampling. Data was analysed using descriptive statistics in Statistical Package for Social Sciences (SPSS) 22.00.*

Results: *Kerbs, gravel surfaces, rain, noise, and crowd were marked as barriers by 56%, 58%, 52%, 36% and 50% of the participants, respectively. Ramps, elevators, and flat surfaces were reported as facilitators by 42%, 70% and 82% of the participants, respectively. Participants also mentioned the absence of automatic doors and escalators in community areas (92% and 88%), specialised exercise equipment, handrails and specialised bathroom equipment at home (92%, 50% and 52%), and inaccessibility to public places (50%), as barriers to easy mobility.*

Conclusions: *To enhance community mobility of individuals with stroke, environmental barriers should be reduced and facilitators should be enhanced. The marked absence of facilitators in the environment should be rectified and appropriate steps should be taken to enhance ambulation.*

Limitations of the study are the small sample size. Factors like balance, economic status, physical activity of the stroke individuals and severity of stroke were also not considered.

Key words: *Facilitators And Barriers Survey /Mobility Questionnaire, stroke, community ambulation.*

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INTRODUCTION

Incidence of stroke is increasing worldwide and is one of the major causes of disability. About 145 out of every 1 lakh people are affected by stroke in India (Pandian, 2013). Stroke can result in a multitude of deficits like motor and sensory deficits, cognitive and perceptual deficits, communication and swallowing difficulties, urinary dysfunction, and emotional alterations (Barker, 2006). These have a devastating effect on a person's physical functioning and social participation.

Mobility, defined as the ability to walk safely and independently, is integral to the performance of basic activities of daily living (BADLs) and instrumental activities of daily living (IADLs) (Shumway-Cook, 2002). Reduced mobility is a common occurrence following stroke. The recovery of mobility, specifically the ability to walk safely and independently in the home and community, is one of the most important goals reported by stroke survivors. They perceive community walking as a difficult task. Walking in the community requires cognitive and motor flexibility to address challenges while attending to a range of environmental stimuli or concurrent tasks (Physiopedia, 2016). Walking speed and endurance among community-dwelling stroke survivors are markedly lower than age-matched controls and are associated with reduced quality of life.

Environment describes the world in which people with different levels of functioning must live and act. A person's environment has a major impact on the extent and experience of disability. Inaccessible environment creates disability by creating barriers to participation (Physiopedia, n.d). Environmental factors like natural and built environments, products and technology, support and relationships, attitudes, services and policies can either be facilitators or barriers for the individual. Recently, the International Classification of Functioning, Disability and Health (ICF) (World Health Organisation, 2002) promoted the "Bio-psycho-social model", which understands the functioning and disability as a dynamic interaction between health conditions and contextual factors, both personal and environmental factors (Physiopedia, 2016). Thus, knowledge of environmental facilitators or barriers is necessary to reduce the disability creation process and enhance the rehabilitation and participation process.

A new dimension for research is emerging, wherein researchers consider the interaction between the environment and stroke individuals so as to improve knowledge about their needs and requirements. Studies with environmental

objectives usually examine the impact of particular environmental factors on walking capability. The perceived importance and difficulty associated with walking in the community following stroke, underscores the need to identify the factors that contribute to ambulation. Among individuals who have had a stroke, self-efficacy of fall and clinical measures of balance have been associated with frequency of community walking. However, little is known about how perceptions related to managing specific environmental features (e.g. avoidance) influence frequency of community walking.

Objective

The growing number of stroke survivors need to be active participants in society, despite limitations in their physical abilities. Hence, the goal of this study was to understand the factors that influence participation in the mobility domain following a stroke.

METHOD

Study Sample

This study was conducted in Maharashtra State, India. Purposive sampling method was used to select 50 stroke survivors for participation in the study.

Inclusion criteria:

- Individuals diagnosed with stroke, ambulating with or without assistive device,
- Able to walk one way from home to office/recreation/Physical Therapy (PT) centre for at least 1 km,
- >3 months post stroke,
- Mini Mental Scale Examination (MMSE) score ranging from 25-30 (no cognitive impairment).

Exclusion:

- Individuals with any sensory, musculoskeletal, neurological, cognitive and medical condition other than stroke that can affect walking.

Data was collected in the Physiotherapy OPD, Community centres, parks and clubs.

Outcome Measure

Facilitators and Barriers Survey/Mobility Questionnaire (FABS/M) which has a good reliability and validity (reliability - 0.69, validity - 0.71) was used as an outcome measure (Gray, 2008). This questionnaire contains up to six environmental domains comparable with the five chapters of environmental factors in the International Classification of Functioning, Disability and Health (ICF): (1) products and technology; (2) natural environment and human-made changes to environment; (3) support and relationships; (4) attitudes; and (5) services, systems and policies.

Information obtained from the questionnaire can help to understand the barriers faced by the stroke individuals in the community and thus help to modify or reduce them in order to create a safe and encouraging environment for individuals with stroke (Physiopedia, 2016).

The researcher explained the questions in patient's mother tongue. Care was taken to give similar explanation and instructions then filled the form.

Data Analysis

Data obtained was analysed using descriptive statistics in Statistical Package for Social Sciences (SPSS) 22.00.

Ethics

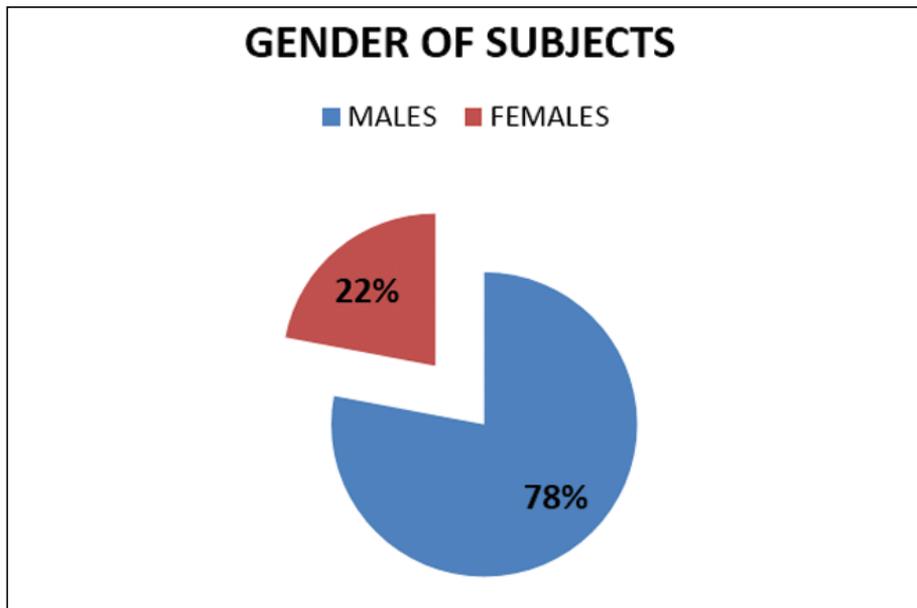
Clearance from the Ethics Committee of the college was obtained. Written consent was taken from the participants after the purpose of the study was explained to them.

RESULTS and DISCUSSION

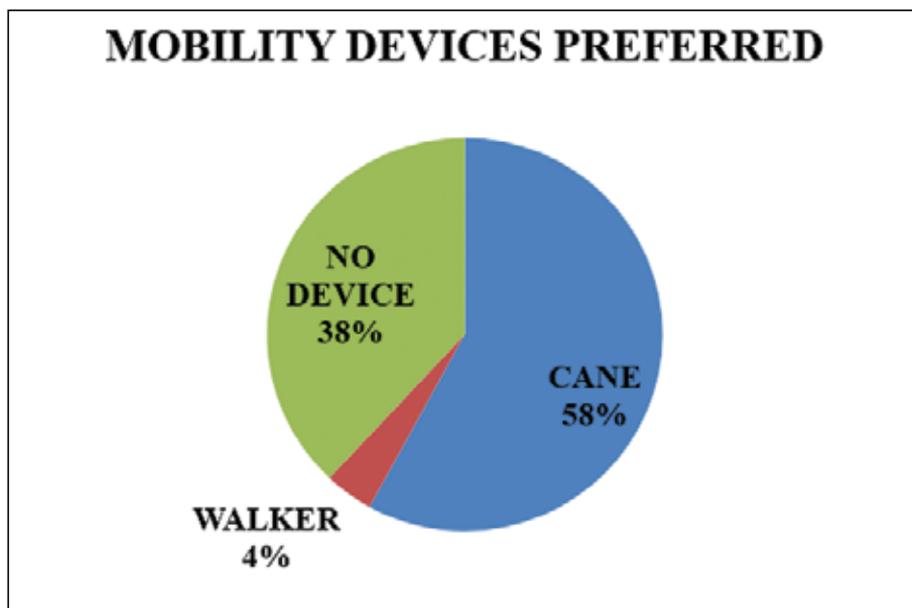
The study participants were 78% male and 22% female (as seen in Table 1). Most of the participants were able to walk using an assistive device. The cane was preferred by 58% of individuals, 4% preferred the walker, while 38% walked without any assistive device (as seen in Table 2). People preferred the cane for aesthetic appeal and found the walker to be "too catchy". Although some people found the cane a little unstable, they felt it gave them a near-normal appearance and preferred to use it rather than the more stable walker.

Table 1: Study Participants

Gender	Number	Percentage
Males	39	78%
Females	11	22%

Graph 1: Gender of the Fifty Study Participants**Table 2: Mobility Devices Preferred**

	Number	Percentage
Cane	29	58%
Walker	2	4%
No device	19	38%

Graph 2: Mobility Devices Preferred by Study Participants

Regarding the barriers to community participation, 56% of individuals reported kerb cuts, 58% reported gravel surfaces, 52% reported rain, 36% reported noise and 50% reported crowd. Due to their structural and functional impairments, these individuals require extra help to be independent at home and in the community. Availability of the necessary type of help in the community can play an important role in their participation. Due to the presence of extensor synergy, spasticity and reduced strength in the lower limb muscles, stroke individuals are unable to generate enough force in the lower limb muscles which leads to reduced hip and knee flexion (Gray & Rice, 2012). Difficulty in overcoming spasticity, reduced range of motion and tightness, and lack of facilitators like ramps, escalators, lifts and a good transport system may discourage an individual from moving about in the community. This was seen in the results of the current study. Tendo Achilles spasticity also leads to affected heel strike of the stroke individuals. Hence, stepping up and down, and crossing obstacles are difficult for them, and they might find it hard to walk on kerb cuts and gravel surfaces in the community. Reduced strength in the lower limb muscles, especially Dorsiflexion and lack of range of motion at the ankle, may result in inability to use ankle strategy which can lead to instability while walking.

Delayed reactions as well as slow cognitive processing abilities may also lead to difficulty in walking on an uneven or slippery surface, especially during the rainy season. As ground surface becomes slippery in the rain, persons with stroke think that they can suffer a fall, thus limiting their community walking (Robinson et al, 2011). It has been proven that an individual needs intact cognitive and motor capacities to perform dual tasks effectively (Kunstler et al, 2018). As per capacity sharing theory, when the individual is exposed to two tasks simultaneously, since resources are limited there is competition between resources utilised for the tasks. This leads to unskilled performance of both the tasks as compared to the performance of a single task at a time. Studies have proven that impairment of one or both (cognitive and motor) capacities can lead to affected dual task performance in a neurologically intact adult. Impairment of this ability in stroke affected individuals due to lack of physical and cognitive reserve is well proven (Kunstler et al, 2018). Walking requires visual scanning along with depth perception to anticipate the position of another person, and cognitive capabilities such as attention, executive function, memory, etc. Walking in a crowd also demands judgement to take steps to ensure safety. Studies have proven that walking in a crowd requires an individual to do multiple tasks simultaneously. Thus, when individuals with stroke are subjected to external stimuli when walking in noisy or crowded areas, they are fearful of losing their balance and falling, or of being dashed against by other people.

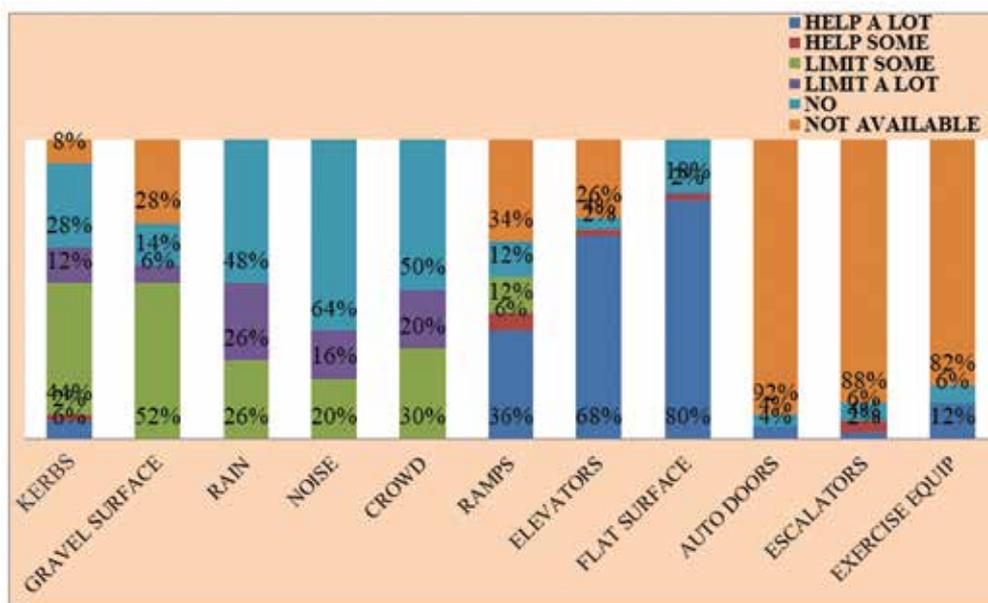
Flat surfaces were reported, by 80% of the study participants, to be helpful for community ambulation. The ground reaction force is less while walking on flat surfaces. Individuals with stroke generally have extensor spasticity in lower limbs, making it difficult to control and flex their knees. Consequently they find it easier to walk on ramps rather than climb stairs. Presence of elevators is one of the main facilitators to enhance community participation of stroke individuals. This was reported by 68% of the participants in this study, while 42% found ramps to be helpful for walking in the community.

Majority of the study participants (92%) reported the absence of automatic doors in the community, whereas 88% reported the absence of escalators and 82% reported the lack of specialised exercise equipment. Escalators can reduce the physical effort of climbing stairs, and automatic doors would ease entry and exit into public places. Provision of specialised exercise equipment to improve their strength and flexibility would boost physical activity and participation in the community.

Table 3: Community Environment – Barriers and Facilitators

	Help a lot	Help some	Limit some	Limit a lot	No effect	Not available
Kerbs	6%	2%	44%	12%	28%	8%
Gravel surface	0%	0%	0%	52%	6%	14%
Rain	0%	0%	26%	26%	48%	0%
Noise	0%	0%	20%	16%	64%	0%
Crowd	0%	0%	30%	20%	50%	0%
Ramps	36%	6%	12%	0%	12%	34%
Elevators	68%	2%	0%	0%	4%	26%
Flat surfaces	80%	2%	0%	0%	18%	0%
Automatic doors	4%	0%	0%	0%	4%	92%
Escalators	2%	4%	0%	0%	6%	88%
Specialised exercise equipment	12%	0%	0%	0%	6%	82%

Graph 3: Community Environment – Barriers and Facilitators

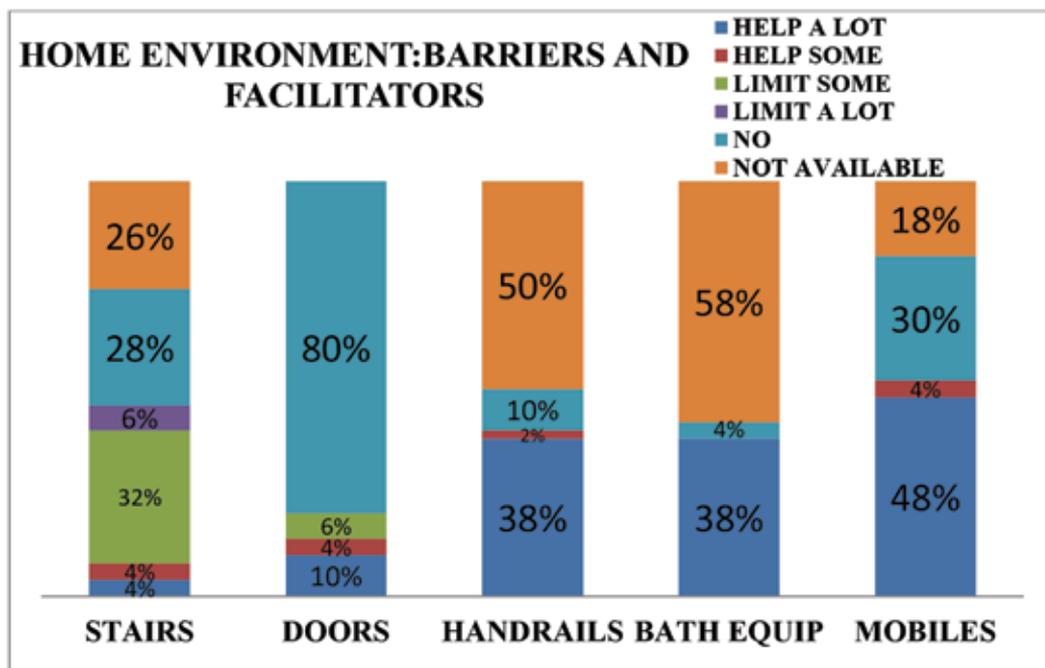


The study participants mentioned the barriers to ambulation in their homes as well. Difficulty in controlling extensor spasticity, and thus climbing the stairs, was probably responsible for 40% of stroke individuals mentioning that stairs limit their participation in home activities. While 58% of participants reported absence of specialised bathroom equipment, 50% reported absence of handrails in their homes. Handrails provide good support and reduce the risk of falling, especially during or after bathing. It is advisable to install them to avoid falls for individuals with stroke. Bathroom equipment like hand showers and commode chairs can be helpful in reducing the physical effort of squatting or bending to reach the necessary cleaning material. These facilities were lacking in the homes of the study participants.

Mobile phones were viewed as facilitators by 52% of the stroke affected individuals. These phones are considered handy and easy to use. Since they are carried around, users do not have to walk to a telephone to receive a call, and can also call for help easily if required. Mobile phones also serve as a source of entertainment for them.

Table 4: Home Environment – Barriers and Facilitators

	Help a lot	Help some	Limit a lot	Limit some	No effect	Not available
Stairs	4%	4%	32%	6%	28%	26%
Doors	10%	4%	6%	0%	80%	0%
Handrails	38%	2%	0%	0%	10%	50%
Bathroom equipment	38%	0%	0%	0%	4%	58%
Mobiles	48%	4%	0%	0%	30%	18%

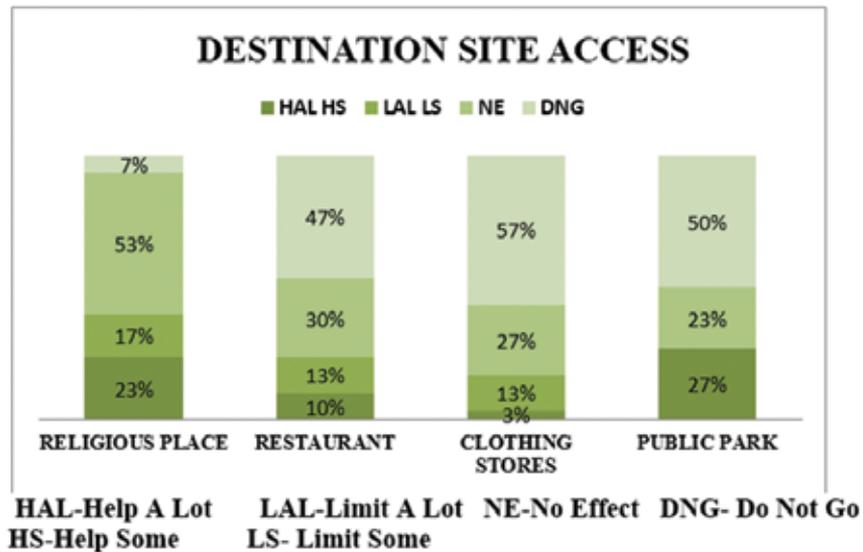
Graph 4: Home Environment – Barriers and Facilitators

It was noted that about 57% of stroke survivors do not go to clothing stores, 50% do not go to public parks and about 47% do not go to restaurants because of their physical impairment, absence of good transport systems and inaccessibility of these places. Lack of a good transport system was also the reason for avoiding travel to distant places by themselves.

Table 5: Destination Site Access

	Helps	Limits	No effect	Do not go
Religious place	23%	17%	53%	7%
Restaurants	10%	13%	30%	47%
Clothing stores	3%	13%	27%	57%
Public parks	27%	0%	23%	50%

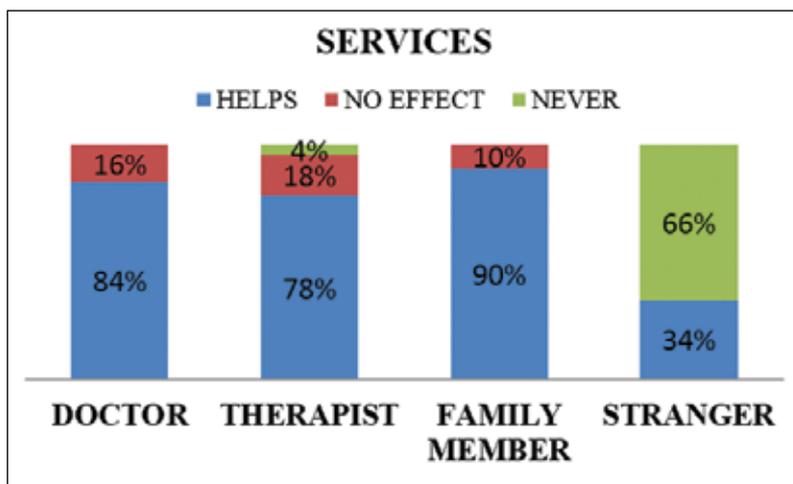
Graph 5: Destination Site Access



Individuals with structural and functional impairments may require extra help to be independent at home and in the community. Availability of help in the community can play an important role in their community participation. It was found that 90% take physical help from family members, 84% take help from doctors and 78% from physical therapists. However, 66% of stroke survivors avoid taking help from strangers, based on the assumption that they are not approachable or easily accessible, and fearing ridicule due to their own disability or appearance.

Table 6: Services / Helping Facilities

	Helps a lot	No effect	Never
Doctor	84%	16%	0%
Physical therapist	78%	18%	4%
Family member	90%	10%	0%
Stranger	34%	0%	66%

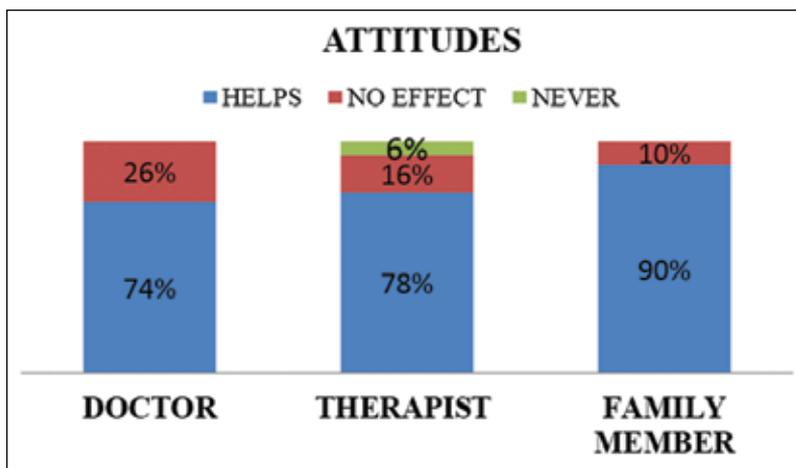
Graph 6: Physical Help for Stroke Survivors

Attitude of family members is influential in community as reported by 90% of the stroke individuals. Encouragement of physical therapists, reported by 78% of the participants, and helpful and motivating attitudes of doctors, reported by 74%, helps in their speedy recovery (see Table 7 and Graph 7). Positive and encouraging attitude of all these individuals is beneficial as it boosts their morale and helps them perform better. A similar finding was noted by Gray et al (2008) in their study on individuals with mobility restrictions. They found that environmental facilitators and barriers can be aggravated by diagnostic conditions, mobility devices and demographic variables. This study gave a broader view of environmental changes that influence community participation of such individuals.

Table 7: Influence of Attitudes on Community Participation

	Helps	No effect	Never
Doctor	74%	26%	0%
Physical therapist	78%	16%	6%
Family member	90%	10%	0%

Graph 7: Attitudes that Influence Community Participation



A similar study by Robinson et al (2013) found that survivors of stroke had reduced community walking as compared to a control group of adults without stroke. They concluded that environmental dimensions were associated with community walking following stroke, suggesting that environmental features may limit community walking more than others (Robinson et al, 2013). Thus, a combination of subjective and objective measures of communities could be used to guide services, systems and policies.

Limitations

The small sample size purposive sampling of the study is a limitation. Also, factors like balance, economic conditions, physical activity of the stroke individuals and severity of stroke were not considered in the study.

CONCLUSION

From the survey, it is concluded that kerb cuts, gravel surfaces, rain, noise and crowds are barriers for community ambulation among stroke individuals. Ramps, elevators and flat surfaces facilitate their walking, thereby influencing community participation. Absence of automatic doors, escalators and specialised exercise equipment in the community were reported. Absence of handrails and specialised bathroom equipment was noted in the homes of the participating

stroke individuals.

Stroke survivors avoid going to public places like restaurants, clothing stores and parks mainly because of inaccessibility, lack of transport and their physical structure. They avoid taking help from strangers as they think that they are not approachable. Attitudes of family members, physical therapists and doctors influence community participation of stroke individuals.

Keeping these factors in mind, policies should be made to bring in modifications to enhance community walking and participation of stroke individuals.

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The authors declare there is no conflict of interest.

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