

# Barriers and facilitators to physical activity participation among community-dwelling physically inactive individuals after stroke: a qualitative exploratory study

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Physical activity has been shown to reduce the risk for first-ever stroke as well as recurrent stroke with positive effects on almost all known modifiable risk factors. However, the perceived barriers and facilitators for engaging in physical activity have been insufficiently studied and may differ between cultures. Therefore, the aim of this study was to explore the perceptions of community-dwelling physically inactive individuals with stroke about barriers and facilitators to their participation in physical activity. This qualitative study included two focus groups of ten individuals with stroke classified as physically inactive based on accelerometer recordings. A semi-structured set of questions was posed in each focus group session and the transcripts were analysed using thematic analysis. The results revealed three main themes and subthemes: individual factors (physical impairments, psychological factors, spirituality), interaction with the family (attitudes of family members/close community) and social and environmental factors (hobbies, lack of or presence of facilities, the use of orthosis). We conclude that physical activity participation is affected by a

multitude of factors as well as cultural differences. Thus, interventions aimed at increasing participation in physical activity after stroke should not only be planned according to individual clinical characteristics but also take into account a range of personal-to-social factors, including cultural differences. *International Journal of Rehabilitation Research* 47: 34–40 Copyright © 2024 Wolters Kluwer Health, Inc. All rights reserved.

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## Introduction

Physical activity (PA), defined by WHO as any bodily movement produced by skeletal muscles that requires energy expenditure, has been shown to reduce the risk for first-ever stroke as well as recurrent stroke, with positive effects on almost all known modifiable risk factors for stroke (high blood pressure, blood glucose, cholesterol level) [1–4]. The American Heart Association recommends 20–60 min of aerobic activity 3–5 days per week [5,6]. Besides other goals, stroke rehabilitation aims to promote and maintain an active lifestyle following the recommended PA and exercise guidelines in order to improve function and independence and prevent the recurrence of stroke and other cardiovascular events [7].

To overcome physical inactivity after a stroke, the first step is to assess it accurately. PA levels can be assessed by objective methods (double-labelled water method, heart rate monitors, calorimeters, accelerometers) and subjective methods (self-report questionnaires, self-report activity diaries) [1,8,9]. Accelerometers are wearable electromechanical devices, which assess acceleration signals objectively and accurately. These devices measure

the frequency, intensity and duration of PA and enable detection of the PA level under natural circumstances [2].

Previous quantitative studies demonstrated that individuals who suffered a stroke rarely meet the recommended levels of PA and remain inactive for a long time during the day [10,11]. To support and motivate stroke survivors to be active, it is imperative to fully understand the personal, social and environmental influences on PA participation after stroke [12]. Besides these factors, it is important to consider cultural differences. Thus, the aim of this qualitative study was to explore perceptions of community-dwelling individuals with stroke, classified as physically inactive by accelerometer, about barriers and facilitators to PA participation while considering the cultural milieu and values of the Turkish population.

## Methods

### Study design

This qualitative study was designed and conducted according to the existing guidelines and publications for the assessment of the quality of qualitative research [13–15]. A phenomenological qualitative approach was

selected. Data were collected in two focus group interviews by using a set of semi-structured questions.

We previously explored the PA levels of community-dwelling individuals with stroke and the factors associated with PA. We found many individuals to be physically inactive. Thus, a qualitative approach was considered necessary for detailed exploration and understanding of perceived barriers and facilitators to PA in this population. Focus group interviews were chosen to encourage the sharing of individual perceptions and views through interaction among the participants [13,16].

## Participants

The inclusion criteria were community-dwelling individuals with unilateral stroke who were able to walk independently or with an assistive device and older than 18 years. The exclusion criteria were acute stroke, uncontrolled hypertension, cardiopulmonary disease, severe heart disease, gait impairment unrelated to stroke and severe communication and mental impairments.

The sample was drawn among the participants in our unpublished descriptive study, which explored the PA levels and associations with demographics, motor function, cognitive function, functional status, balance and quality of life in chronic stroke (Master of Physiotherapy thesis #605266, available at <https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp>). Therein, the PA levels were compared between the stroke and healthy individuals based on the accelerometer (Actical) and Physical Activity Scale for the Elderly (PASE). Total activity counts and energy expenditure during sedentary, light, moderate, and vigorous activity, and step count were derived from the accelerometer recording. The daily time spent on sedentary behaviour ( $\leq 1.5$  METs), light-intensity PA ( $>1.5$  to  $<3.0$  METs), and moderate-to-vigorous-intensity PA ( $\geq 3.0$  METs) were calculated [17]. The reported adult activity cut-off points for the vertical axis were used to classify accelerometer data into different sedentary behaviour and PA intensity

categories (sedentary behaviour  $<100$  counts/min for the vertical axis and  $<200$  counts/min for the vector magnitude) [18].

Ten physically inactive individuals who spent most of their time in sedentary behaviour as defined above were recruited for the present study. Their PA data, including time spent in sedentary, low, moderate and vigorous intensity activities and step count, are summarised in Table 1.

## Ethical issues pertaining to human subjects

The study was approved by the ethics committee of Marmara University School of Medicine under the number 09.2020.35. Oral and written informed consent of the participants were obtained.

## Sampling strategy and context

We used a purposive sampling strategy to ensure the perspective on barriers and facilitators of PA participation is representative of individuals with stroke in whom physical inactivity was objectively documented despite walking with or without assistive devices. Prospective participants were recruited from stroke rehabilitation outpatient clinics of a tertiary university hospital.

## Researcher characteristics and reflexivity

The physiotherapist who was previously involved in the rehabilitation process called the potential participants to provide information about the study and invite them to participate. Those who agreed to participate were scheduled for one of two focus groups. Focus groups included 5–6 individuals to ensure appropriate group size for facilitating discussion and the contribution of each participant [13,16]. The investigator (S.C.) with experience in qualitative research and who was not involved in clinical management conducted the interviews. Another investigator (G.Y.) who was also not involved in clinical management served as an observer and took handwritten notes of the conversation.

**Table 1** Demographic and clinical characteristics of the participants

	1(HG)	2(NÖ)	3(CK)	4(RB)	5(UA)	6(HE)	7(OY)	8(SS)	9(NÇ)	10(ŞÖ)
Age	55	66	66	67	44	64	45	40	53	59
Sex	F	M	M	M	M	M	M	M	M	F
Time since stroke (months)	120	84	36	180	48	10	10	24	36	120
Hemiplegic side	L	L	R	L	L	L	L	R	L	L
Dominant side	L	R	L	R	L	R	R	R	R	R
Stroke aetiology	H	I	H	I	H	I	I	H	I	I
Occupational status	Retired	Retired	Retired	Retired	Retired	Retired	Retired	Retired	Retired	Retired
Modified Rankin Score	2	3	3	2	2	2	2	2	2	2
Brainstorm upper extremity proximal	3	2	2	3	2	2	3	3	4	2
Brainstorm upper extremity distal	4	2	2	3	2	5	3	4	4	2
Brunnstorm lower extremity	4	4	3	4	5	4	5	5	5	4
Functional Ambulation Category	3	3	3	4	4	4	4	4	3	3
Time spent in moderate activity (minute)	1	1	1	12	2	26	28	9	0	12
Time spent in light activity (minute)	44	67	12	125	54	109	90	88	18	183
Time spent in sedentary activity (minute)	1396	1372	1427	1303	1384	1305	1321	1343	1421	1244
Step count	689	141	96	426	342	956	255	1438	124	2023

### Data collection methods, data processing, and analysis

The investigator (S.C.) with experience in qualitative research developed a semi-structured interview guide consisting of questions [16,19,20], and the two experts in stroke rehabilitation (E.K.S. and E.G.) initially reviewed the interview guide. The semi-structured interview guide (Table 2) was pilot-tested, and no additional revisions were needed. To ensure data credibility, the group observer took notes during the interviews, aiming to summarize key points of the conversation and to clarify the meaning of participants' expressions, and also acted as a facilitator to ensure broad participation by asking the participants whether they had any additional comments if they did not contribute to a topic. Group interviews lasted between 90 and 120 min. Audio-video records of focus groups were transcribed.

To assure the rigor and the trustworthiness of the results, the codes and themes were generated through triangulation among three of the researchers to ensure confirmability [21]. The thematic analysis process was followed by using an inductive approach [22,23]. Three coders read the transcripts independently to get familiar with the text and notes and then marked the meaningful phrases that relate to the *phenomenon* being evaluated. After this step, three researchers discussed the codes together to establish their connections and generate the themes. Then, they reviewed all the codes, discussed in which theme each code fits and re-sorted the themes, if needed. Any disagreements were resolved by consensus. After this step, each theme was described and tabulated, as the best reflection of the transcripts.

### Results

A total of 10 participants were interviewed in the two focus group sessions. They were aged between 42 and 76. Two of them were female. The characteristics of the participants are summarised in Table 1.

All the participants except two said that they had an inactive lifestyle even before having a stroke. None of the participants continued working after a stroke although

**Table 3 Themes that emerged from the focus group interviews**

	Barriers	Facilitators
Individual factors		
Physical impairment	Motor impairments due to stroke Fear of falling/imbalance	Physiotherapy and therapist
Psychological factors	Psycho-somatic symptoms (fatigue, numbness/feeling stressed) Fear/perception of stigmatisation Unrealistic expectations of healing	Inner motivation/having a personal goal Knowledge
Spirituality	Perception of destiny as the absolute power	Religious belief/hope
Interaction with family		
Attitudes of family members/close community	Over-protective attitude of family members Family members' perception of disability	Being a caregiver as a source of motivation Family members' encouragement to perform daily activities
Social and environmental factors		
	Sedentary hobbies Lack of facilities for the disabled Lack of recreational areas/ crowded city AFO as a barrier	Personal interests/hobbies Facilities and services for the disabled Group therapy AFO as facilitator

at least five of them were considerably young. The only exception was participant number 4 who suffered stroke twice and continued working after the first episode.

Triangulation of focus group data led to the development of three key themes and several subthemes within. Namely, (1) individual factors (physical impairments, psychological factors, spirituality), (2) interaction with family (attitudes of family members/close community) and (3) social and environmental factors (hobbies, lack of or presence of facilities, the use of orthosis). As some of the themes (hobbies, spirituality, being a caregiver, facilities, ankle-foot orthosis) were described as both barriers and facilitators, they were not classified as either barriers or facilitators. Table 3 summarises the themes that emerged after the analysis of the transcripts. Figure 1 displays the relationships of these themes. The summaries and participants' quotes are in Tables 4–6.

### Discussion

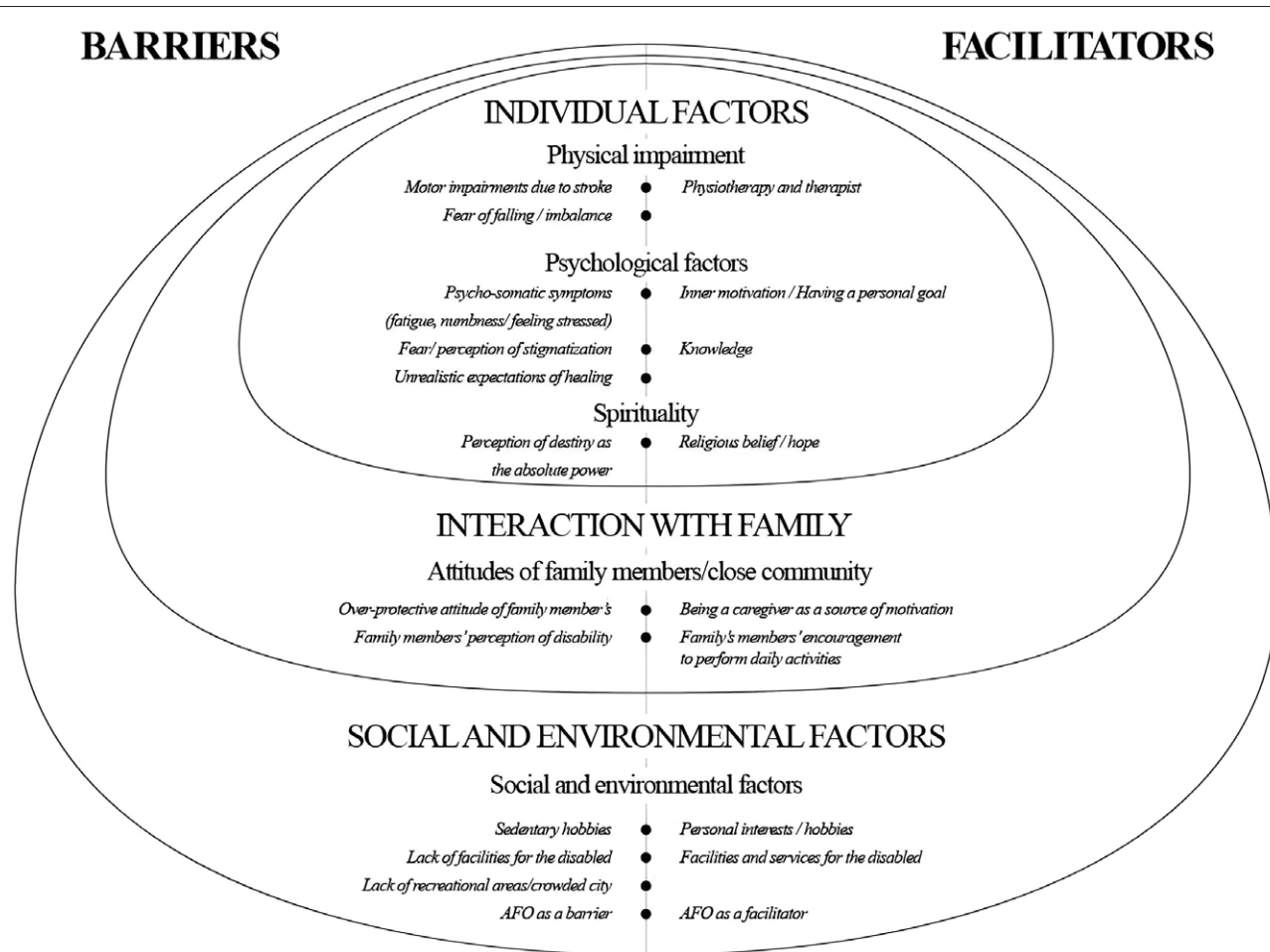
In this exploratory study, we conducted focus group interviews with physically inactive individuals after a stroke to gain deeper insight into barriers and facilitators to PA while also considering the cultural influences of the Turkish population. The three main themes that emerged are individual factors, interaction with family and social and environmental factors.

Recognizing the barriers and facilitators related to behaviour is an important step to finding a solution for a health problem. This study has captured an account of perceived barriers and facilitators to PA in patients with stroke as a first step toward developing and implementing

**Table 2 Focus group interview prompts**

Focus group interview questions
1.How would you define physical activity?
2.What kinds of things do you consider to be physical activity?
3.Have you heard of the term sedentary behaviour or sitting behaviour?
4.When you hear sedentary behaviour, what does it mean to you?
5.Why do you think you should do physical activity?
6.Could you please tell me how you spend your day?
7.Why will you choose to sit instead of stand or walk?
8.What kinds of things do you see as stopping you from being more involved in physical activity or exercise?
9.What kinds of things encourage you to continue participating in physical activity or exercise?
10.What supports do you think you will need to help you to sit less and move more?

Fig. 1



Schematic representation of the identified barriers and facilitators to physical activity.

an effective intervention for improving PA of physically inactive individuals with stroke despite being ambulatory with or without assistance. To be successful, it is also important to evaluate the impact of cultural differences, particularly interactions among family members.

Consistent with the previous studies, motor impairments due to stroke were perceived as a barrier to PA [16,19]. Mobility and balance were found to be important facilitators of exercise [16]. Ezeugwu *et al.* also captured physical limitations such as motor impairments, difficulty with walking fast, and fatigue as a barrier to PA after a stroke [19]. Based on our results, physiotherapy sessions and physiotherapists stand as facilitators of PA even though individuals post-stroke acknowledged motor impairments as a barrier. Similarly, another qualitative study investigating the factors influencing sedentary behaviours after stroke found that motivation from health professionals was a facilitator of PA [24]. Collectively, the results indicate that healthcare professionals should be reminded of their role in elevating the PA of stroke survivors through continuous support and encouragement.

Also, it seems that, beyond focussing on motor improvement, being involved in a rehabilitation program may have more beneficial effects than we typically expect, such as being a facilitator of PA.

Encouragement and praise from the family are also important [20]. The present study demonstrated that support from family members may enhance the PA of individuals post-stroke. Conversely, the overprotective attitudes of family members geared toward safety may discourage participation in PA [20]. The Turkish culture usually places the elderly at the head of the family and takes care of them. Also, stroke survivors are usually cared for by informal caregivers in their houses. Institutional care for individuals with chronic illness is generally not available. Therefore, it is important to consider cultural differences and work closely with the family toward achieving greater participation in PA after a stroke.

Our findings suggest that unrealistic expectations of healing acted as a barrier to PA. Low beliefs of own

**Table 4 Summary of participants' quotes on the theme 'individual factors'**

Individual factors - physical impairment
<p>Motor impairments due to stroke</p> <p>Although all the participants were mobile to some degree, they thought that the sequelae of stroke prevented them from being physically active. Even the participants who only had weakness in one arm expressed this weakness as a barrier against being physically active.</p> <p>'Doc, this arm (meaning hemiplegic arm).....(hesitates), falls down, that is, why I don't dare to walk. I wish I could use this arm a little.....! (Participant 9)</p> <p>'I can't go out because I can't stand on this foot...I feel I will stumble'. (Participant 2)</p> <p>Fear of falling/imbalance</p> <p>Some of the participants expressed fear of falling as a reason for not being physically active. These participants were ambulatory only inside the home. They wanted someone to accompany them when they go out, for example, for doctor visits. Participant 10 states; 'I cannot go out on my own. I am afraid of falling. Because if I fell, I wouldn't be able to get up by myself'.</p> <p>Another example of fear of falling is expressed by Participant 9: '...There should be somebody with me, for me to go out..... I cannot go out because I cannot stand on my foot properly, thus I stumble. So, I'm afraid of falling'.</p> <p>Rehabilitation and the therapist</p> <p>Although the participants had mostly negative attitudes about physical problems due to stroke, their attitudes were quite positive about rehabilitation sessions, and they defined these sessions as a motivating factor for being physically active. This was mostly due to the encouraging messages coming from the therapist and hope for improvement, as stated by Participant 4; 'I've worked with Mr. .... for 15 sessions, he gave me hope, encouraged me a lot to go on with the treatment'.</p>
Individual factors - psychological factors
<p>Psycho-somatic symptoms/fatigue/feeling distressed</p> <p>The participants described feelings of fatigue or numbness as a barrier against physical activity. Even though they were very much motivated to be physically active, they felt tired at the time they were about to start exercising. Participant 6 said; 'I feel like something heavy sits on top of me when I'm about to start exercising. Probably my body unconsciously rejects exercising'. Participant 6 also mentioned that stress might be the reason for his disease, and being emotional or sad prevents him from being physically active. 'I'm trying to avoid stress. I think my disease is caused by stress. Also, I'm really emotional like a shame plant'</p> <p>Fear/perception of stigmatisation</p> <p>How bystanders look at them was a concern expressed by some of the participants. They felt stigmatised by the people on the streets. This concern prevented them from doing outdoor activities. Participant 6 said; 'I have a coordination problem, so I watch other people on the sly. See if they are looking...!', or Participant 1; '... how people look really bothered me. It took me almost 10 years to overcome this feeling...'. Participants were not going out during busy hours to avoid other people. This was expressed by Participant 7: 'I go out after 11 : 00 pm. That hour belongs to the people like us. The streets are empty. ....'</p> <p>Unrealistic expectation of healing</p> <p>Analysis of the data revealed an unrealistic expectation of healing, and this expectation appeared to be a barrier against physical activity. The participants sort of 'mini-mized' their activities until they were as well as 'before'. Participant 6: 'I think, if I could be 80-90% of how I was before the stroke, that would be enough. That is my goal...'</p> <p>Inner motivation/Having a goal</p> <p>Participants stated that to be physically active, they need to be internally motivated and have important goals, a sort of 'will to live'. Statement of Participant 1 exemplifies this: 'My left side was paralysed after the brain surgery I had at the age of 23. At that time, I had a 2-year-old child. ....Thus, I worked extremely hard to learn how to write with my right hand, I was a lefty before. I committed myself to be better. I had another episode of stroke later, this time I didn't have such strong goals so I didn't try that hard.'</p> <p>Knowledge</p> <p>All participants were informed that they should be physically active, and they knew about the level of physical activity. They were trying to reach a state of PA according to the information given by their therapists:</p> <p>'Mr .....(therapist) told me that I should reach at least 7000 steps a day. I believe that I will achieve that goal (Participant 7)'</p>
Individual factors - spirituality both as a barrier and facilitator
<p>Participants mentioned religious belief as a relieving factor and a source of hope.</p> <p>'God tells us not to be hopeless' (Participant 4)</p> <p>However, to some extent believing in 'God being an absolute power of faith' might have prevented the participants from trying to control the factors that might affect their physical condition.</p> <p>'God decides all (our faith)'. (Participant 1)</p>

**Table 5 Summary of participants' quotes on the theme 'interaction with family'**

Interaction with family
<p>Being a caregiver as a facilitator and a barrier</p> <p>Participant 1 said that being a caregiver was an important facilitator for her to be physically active, she had to stay active to help her daughter with her grandchildren's care: 'I wouldn't do housework if it weren't for my grandchildren. When they want something, I definitely do it'.</p> <p>On the other hand, being a caregiver was also described as a barrier (Participant 6): "My daughter being pregnant prevented me from exercising. I had to take care of her."</p> <p>The overprotective attitude of family members</p> <p>Another theme mentioned by some of the participants was about their family members being a barrier against PA because they thought that the stroke person would fall and hurt themselves. An example is the expression below (Participant 4):</p> <p>'My wife does not let me go outside by myself; she thinks that I will fall. So, if I must go somewhere, ... I go with my wife. Other than that, I mostly stay home'</p> <p>Participant 7 described a similar attitude in the expression below:</p> <p>'My uncle says, "You shouldn't walk, you should drive", I think secretly he is ashamed of me being paralysed'.</p> <p>Family members' encouragement to perform daily activities</p> <p>Some of the participants described their close family as a facilitator of physical activity. Family members encouraged them to perform daily activities by themselves, encouraging them to be more active.</p> <p>Participant 6: 'My family, is very conscious about me being physically active, for example, they do not pick up my dishes after a meal. They tell me to pick up dishes by myself and I go along with them. I even wash dishes by myself with my paralysed hand'.</p> <p>Participant 1 describes her husband's support as 'I go trekking to the mountains, with my spouse, thankfully he is helping me a lot'.</p>

**Table 6** Summary of participants' quotes on the theme 'social and environmental factors'

Social and environmental factors
<p>Lack of recreational areas/crowded neighbourhood</p> <p>One of the most important barriers that almost all the participants mentioned was the lack of recreational areas like parks, walking trails, etc... In addition, living in a crowded city was defined as a barrier as expressed by Participant 10. 'Our neighbourhood is narrow. There is not enough room for taking a walk'. Similarly, Participant 7 said 'I am waiting for the new park being built nearby. I will start walking regularly then'.</p> <p>Participant 9 said; 'It is impossible to walk around in this city. One must go to the seashore or a park for a walk and they are far away from my house. It is impossible to walk around. People are crushing me'.</p> <p>Personal interests/hobbies both as a facilitator and a barrier</p> <p>Having a hobby that requires moving around was defined as a facilitator for physical activity. The following quote from Participant 8 is an example: 'I have pigeons, I take care of them on the roof. Thus, I climb stairs 4–5 times a day, which keeps me active'.</p> <p>On the other hand, sedentary activities, such as watching television, using the computer, tablet, etc. were defined as barriers against PA by the participants. As Participant 3 states; 'After having breakfast, I watch TV and drink tea. Time passes by'.</p> <p>Notably, the participants were not regularly active even before a stroke and thought that being physically inactive was one of the reasons for having a stroke. Participant 4 stated; 'I was not active before having a stroke. I think I would not have had a stroke if I were physically active'.</p> <p>Facilities for the disabled both as a barrier and a facilitator</p> <p>Almost all the participants pointed out the fact that there are not enough facilities for the disabled. Although the municipalities provide various services, the participants mentioned that access to those services is not easy. As Participant 1 describes in the statement below.</p> <p>'I've checked all the pools around. They are extremely crowded. They want the "disability card". However, too many procedures are needed to have that card'. On the other hand, some participants did not agree with this statement.</p> <p>Participant 4, 'It is quite easy to have a disability card in my district. There is a swimming pool and a fitness gym.....I will go again'.</p> <p>Group therapy</p> <p>Participants described a need for group therapies as a facilitator. One of the participants said, 'Coming together with other patients who have similar experiences is really good. To see other people who have overcome certain difficulties, climbing mountains for example is giving me hope, motivates me'.</p> <p>AFO both as a barrier and a facilitator</p> <p>Surprisingly, many of the participants mentioned AFO as a barrier against physical activity. Participant 4 describes this problem as follows: 'These AFOs. It causes spasms. I cannot use it in daily life. ....it is very rigid. It prevents my ankle's motion. ....'. On the contrary, Participant 7 says: 'When I put on my AFO, nobody can keep me at home. I walk around for hours'.</p>

capabilities after a stroke were identified as a barrier to PA [25]. Similarly, in another qualitative study, uncertainty about the prospects of recovery was identified as a barrier to reducing sedentary behaviour [19]. As demonstrated here, fear/perception of stigmatisation stands as a barrier to PA after a stroke. Similarly, the perception of feeling embarrassed in social situations, such as fear of facing people in terms of their disability, was identified as a barrier in another qualitative study [25]. It is warranted to increase societal understanding of disability and modify the environment so these individuals can engage in PA.

In the present study, participants highlighted the lack of PA facilities suitable for the disabled. Also, they identified a need for group therapies to improve PA. These needs were consistent with the previous reports recognizing the need for community exercise programs and knowledge of services [16,25].

Some of the themes identified in our study were perceived as both barriers and facilitators for increasing PA, namely, hobbies, spirituality, being a caregiver, facilities, and ankle foot orthosis. This implies that some factors can be perceived differently depending on an individual. Thus, an intervention should also be individualised to be effective.

To our knowledge, the present study is the first qualitative study from our region exploring the barriers and facilitators to PA in individuals with a previous stroke that accounted for cultural influences. Also, the results pertain to the target population since the physical inactivity of the recruited sample was ascertained by an accelerometer. Conversely, the study has some limitations. The

sample was drawn among those cared for in a tertiary hospital serving a large metropolitan area with limited environmental opportunities for PA. Since the study was carried out in a single centre, we might have reached data saturation earlier. Undoubtedly, the generalizability of results would have been greater had the patients been selected from several centres.

In conclusion, we identified a range of individual-to-societal barriers and facilitators to PA participation of individuals with stroke and highlighted the importance of cultural differences. We also revealed that perceived factors can be either barriers or facilitators depending on an individual. These insights should be considered by both researchers and health professionals when designing and implementing interventions for enhancing the PA of individuals who are ambulatory but still physically inactive after a stroke.

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### Conflicts of interest

There are no conflicts of interest.

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