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An investigation of factors influencing the participation of stroke survivors in social and leisure activities

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Objective: Participation restrictions are serious problems that stroke survivors experience while reintegrating into family, work, community, and social situations after participating in rehabilitation programs. The purpose of this study was to explore the factors affecting participation in activities of daily living (ADL), as well as social and leisure activities of individuals with hemiparetic stroke.
Design: Cross-sectional study.
Methods: The study involved 96 participants who were diagnosed with a first stroke 6 months before the study (58 men, 38 women; 60.3±14.3 years). The Berg Balance Scale, Modified Barthel Index, Manual Function test, and Activity Card Sort were used to assess static and dynamic balance function, upper limb function, level of independence, and their level of participation within the community. A regression analysis was used to identify the influence of factors affecting participation in ADL, social and recreational activities.
Results: The Activity Card Sort scores were significantly affected by the Manual Function test and Modified Barthel Index scores (p<0.05). Participation in leisure activities was affected by the level of independence. Participation in social activities was affected by the balance function and level of independence of the participants.
Conclusions: The results of this study have shown that participation restrictions are affected by upper limb function, balance function, and the level of independence in individuals with hemiparetic stroke.

Key Words: Activities of daily living, Physical activities, Social participation, Stroke

Introduction

Participation restrictions are problems that stroke survivors encounter while reintegrating into premorbid life roles as well as social interactions, such as instrumental activities of daily living (IADL) (e.g., home management and meal preparation), work, and community roles [1]. Following a stroke incident, individuals may experience changes in their performance in work, leisure, and social activities. To encourage their participation in family and community activities, there is the need to identify factors that restrict their participation while performing activities in the individual's current real-life environment, even if it is considered to be mild. By considering these restricted factors, therapeutic interventions must be provided to enable improvements in actual occupational performance settings [2,3]. Previous studies have described the determining factors of participation after stroke [4-7]. They have suggested that significant determining factors seem to include the functional/physical ability, dependency in activities of daily living (ADL), and the severity of the stroke, as well as age, sex, and the onset of depression [2,4,6].

However, most of these studies focused on the frequency of general participation restrictions. Studies included specific participation restrictions that were specific to individuals with stroke, including leisure and social activities, and the

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relationship between the levels of physical, cognitive and leisure activities. Furthermore, no study has identified the factors affecting the specific area of participation in daily living, social, and leisure activities for persons with chronic stroke. In addition, there have been no reports of the effects of functional capacity on participation in the areas of IADL, leisure activities, and social activities. Thus, the aim of this study was to identify the specific factors affecting participation in ADL, social and leisure activities in persons with hemiparetic stroke.

Methods

Participants

Ninety-six chronic stroke participants were recruited using the convenience sampling method among inpatients at a rehabilitation center located in Gyeonggi-do. The inclusion criteria were as follows: (1) diagnosis with stroke, with an onset of 6 months or more; (2) no severe visuoperceptual impairment; (3) no severe somatosensory impairment; (4) the ability to maintain a sitting position in a chair for longer than 20 minutes; (5) the ability to walk independently with or without an assistive device for 10 meters; (6) the absence of any orthopedic disorders that could potentially affect the results of the study; and (7) the absence of neurological disorders except for stroke.

The study protocol was approved by the Baekseok University Human Research Ethics Committee (approval No. BUIRB-201608-HR-017), and written informed consent was obtained from all participants. Table 1 shows the demographic and clinical characteristics of the participants.

Table 1. Demographic characteristics of the participants (N=96)

Variable	Value
Sex	
Male	58 (60.4)
Female	38 (39.6)
Affected side	
Right	31 (32.3)
Left	65 (67.7)
Attack type	
Infarction	67 (69.8)
Hemorrhage	29 (30.2)
Age (y)	60.3 (14.3)
Onset-stroke period (mo)	23.5 (27.4)
Mini Mental State Examination (scores)	26.3 (2.8)
Modified Barthel Index (scores)	71.4 (19.0)
Manual Function Test-affected (scores)	14.1 (9.3)
Manual Function Test-unaffected (scores)	29.2 (1.9)

Values are presented as n (%) or mean (SD).

Procedures

This study used a cross-sectional research design to identify the specific factors affecting participation in daily, social and leisure activities among participants. The research process was divided into four stages. The first stage assessed the participants for eligibility using the inclusion and exclusion criteria. In the second stage, the participants were assessed by four clinical outcome measures, namely the Berg Balance Scale (BBS), Modified Barthel Index (MBI), Manual Function test (MFT), and Activity Card Sort (ACS) to assess their balance performance, upper limb function, level of independence and level of participation within their community. The third stage involved statistical analysis. Finally, this study identified the specific factors affecting the participation in ADL, social, and leisure activities. To ensure the accuracy of the data, the outcome measures were conducted by two rehabilitative clinicians with 10 years of experience or more on using clinical assessment tools in a neurological setting.

Outcome measures

This study assessed the two main areas of functional activities and level of participation using four clinical measures, namely the BBS, MFT, MBI, and ACS. The BBS was developed by Katherine Berg to assess static and dynamic balance ability in the adult population [8]. The test is a 14-item objective measure, with each item-level score ranging from 0 (unable) to 4 (able). Scores are determined by the participant's ability to perform the activity being assessed. The item scores are summed, and the maximum score is 56. The cut-off score is 45 out of 56. The BBS has a strong reliability and validity, and the test is useful and easy to use in the clinic setting [9,10].

The MFT was originally developed as an assessment tool of the affected upper extremity of persons with hemiparetic stroke. The MFT is one of the assessment methods available for upper limb functional disorders. It was developed in the Research Facility for Rehabilitation Medicine at Tohoku University as a measure to assess the function of the paralyzed upper limb in those with hemiplegia after stroke [11]. Normative variations of the MFT based on age, sex, and hand dominance are available. The tasks included in the test takes less than 10 minutes to perform. The MFT includes a total of 32 criterias for the 8 tasks (3-6 criteria for each task).

For each task, the best performance of the three attempts was selected, and the selected task performances were assessed for the accomplishment of the 32 criterias. Each test item was scored as a success when the patient has satisfied the criterion [11,12].

The MBI was originally developed by Mahoney and Barthel in 1965 and modified by Vanclay and Cooper in 1989 to assess the ability of an individual with a neuromuscular or musculoskeletal disorder to care for him/herself. The test consists of 10 ADL or mobility activities, and each item is rated based on the amount of assistance required to complete each activity, with a maximum score of 100 points. The cutoff score that indicates a favorable outcome is >75 (sensitivity, 95.7%; specificity, 88.5%) [13,14].

The original ACS was developed by Baum and Edward (2008) [15]. The ACS comprises 89 cards depicting a photographed activity, categorized into three groups, namely IADL (20 items), leisure activities (35 low-physical-demand leisure activities and 17 high-physical-demand leisure activities), and social activities (17 social activities). For this test, the Cronbach's α for internal consistency was 0.97, and the test-retest reliability was 0.87. This tool was used to determine the specific participation level of each research participant [16].

Statistical analysis

This study employed the frequency analysis and descriptive statistics to analyze the general characteristics of the participants. This study used the assumptions of regression analysis to investigate the determining factors of specific participation and the functional abilities of the participants. This study used IBM SPSS Statistics ver. 20.0 (IBM Co., Armonk, NY, USA) for data analysis. The statistically significant standard was set to α=0.05.

Results

Table 1 details the demographic and clinical characteristics of the participants. The mean age was 60.3±14.3 years, and the mean onset period and average Mini-Mental State Examination score were 23.5±27.4 months and 26.3±2.8, respectively. The results of the correlation analysis between functional ability and level of specific participation are shown in Table 2. The ACS-IADL scores were positively correlated with the BBS scores (r=0.244, p<0.05), MBI (r=0.422, p<0.01), and the MFT scores of the unaffected arm (r=0.393, p<0.01). The ACS-leisure scores were positively correlated with the MBI scores (r=0.293, p<0.05), and the MFT-unaffected scores (r=0.208, p<0.05). The ACS-social scores were positively correlated with the MBI scores (r=0.320, p<0.05), and the MFT-unaffected scores (r=0.224, p<0.05) (Table 2).

The results of the regression analysis indicate that specific participation in IADL was influenced by the MFT-unaffected (t=2.167, p<0.033) and MBI scores (t=2.047, p<0.044), participation in leisure activities was affected by MBI scores (t=2.004, p<0.048), and participation in social activity was affected by BBS (t=−2.475, p<0.015) and MBI (t=2.682, p<0.009) scores (Table 3).

Table 2. Correlation between specific participation and functional abilities (N=96)

Variable	ACS-IADL	ACS-leisure	ACS-social
Berg Balance Scale	0.244*	0.108	0.032
Modified Barthel Index	0.422**	0.293*	0.320*
MFT-affected	0.184	0.091	0.123
MFT-unaffected	0.393**	0.208*	0.224*

ACS: Activity Card Sort, IADL: instrumental activities of daily living, MFT: Manual Function Test.
*p<0.05, **p<0.01.

Table 3. Results for factors influencing specific participation after stroke (N=96)

Dependent variable (ACS)	Independent variable	β	Standard error	t	p-value
IADL	MFT-unaffected	4.350	2.007	2.167	0.033
	MBI	0.573	0.280	2.047	0.044
Leisure participation	MBI	0.853	0.426	2.004	0.048
Social participation	BBS	−0.562	0.227	−2.475	0.015
	MBI	0.649	0.242	2.682	0.009

ACS: Activity Card Sort, IADL: instrumental activities of daily living, MFT: Manual Function Test, MBI: Modified Barthel Index, BBS: Berg Balance Scale.

Discussion

This study investigated the specific factors affecting participation in ADL, social and leisure activities after a hemiparetic stroke. The main findings were as follows: First, ADL were affected significantly by the manual function of upper extremity and daily activities; Second, participation in leisure activities was affected by the level of independence; and Finally, participation in social activities was affected by the balance function and level of independence of the participants.

Recently, previous studies focused on whether to integrate the survivors into their family roles as well as social and leisure activities following stroke into rehabilitation research and clinical settings or not [17-19]. Many studies have been concentrated on limitations in functional mobility skills such as transfer, walking, lifting, or carrying objects, and in ADLs such as feeding, dressing, bathing, grooming, toileting, and so on [2]. However, participation restrictions are problems that stroke survivors may experience while involving themselves in daily and functional activities as well as social interactions and leisure activities [20-23].

Blomer *et al.* [17] and colleagues investigated the changes in the frequency of participation 6 months post-stroke compared with the pre-stroke frequency to establish whether the change was associated with participation restrictions. The satisfaction with participation 6 months post-stroke was then used to create a frequency scale including vocational activities (work, volunteer work, education, and household activities), leisure, and social activities. They found that the frequency of participation decreased after a stroke, and this decrease was associated with participation restrictions experienced and the satisfaction with participation. They also recommended that vocational activities should be a priority in stroke rehabilitation in order to treat depressive symptoms [17]. van der Zee *et al.* [24] and colleagues sought to describe participation and to determine how physical and cognitive independence and subjective complaints (pain, fatigue, and mood) influence participation in community-dwelling stroke survivors in the Netherlands. They reported that most persons with chronic stroke experienced participation problems, despite the relatively good physical recovery, warranting rehabilitation programs to consider the relationship between the level of physical and cognitive independence and satisfaction with leisure.

This study also showed the relationship between IADL and static and dynamic balance activities, between IADL and daily and functional activities, and between IADL and unaffected upper extremity function. Therefore, researchers and clinicians should consider balance activities as a priority, followed by movement performance, functional activities, and unaffected upper extremity function to improve the IADL function in their clients in their care plan. In particular, rehabilitation centers usually focus on the affected limb to improve the physical function of patients following a stroke, but this study showed that the unaffected upper extremity function is an important factor affecting IADL function. Therefore, this study recommends treatment to improve bilateral upper extremity function to ensure proper recovery and integration into social and leisure activities, because human movement is not unilateral, although the recovery of the affected side is very important in the intensive training period during rehabilitation.

This study found a positive relationship between social and leisure activities, and functional activities and unaffected upper extremity function. This study used the MBI to assess the daily and functional activities of participants such as feeding, bathing, grooming, dressing, bowel and bladder control, toileting, chair transfer, ambulation, and stair climbing. These are basic daily activities, and so the results of this study could suggest that the most important factors to improve the social and leisure activities are the capabilities of the participants for basic daily activities more than the severity of task, the environment in which the task is performed, or the demands of the task. Unaffected upper extremity function is another important factor in improvement in performance of social and leisure activities following a stroke incident.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

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