

Environmental barriers and facilitators encountered by elderly stroke patients with somatosensory injuries

Hee Young Kim, Tae Yun Kim

ABSTRACT

Aims: This study was designed to identify facilitators and barriers among stroke geriatrics with somatosensory injury by International classification of functioning, disability and health (ICF) categories. **Methods:** 78 stroke geriatrics were interviewed based on ICF categories of environmental factors of the extended version of ICF core set for stroke between June to October 2015. **Results:** Half or more of participants with somatosensory injury were documented with two ICF categories as a facilitator and one category as barriers. But participants without somatosensory injury were documented with six ICF categories as a facilitator and no category as barriers. It was significantly more common for stroke geriatrics with somatosensory injury to indicate immediate family (e310), friend (e320), acquaintances, peers, colleagues, neighbors and community members (e325) in ICF chapters of supports and relationship, transportation services, systems and policies (e540), health services, systems and policies (e580) in ICF chapters of services, systems and policies as barriers than normal somatosensory stroke geriatrics. **Conclusion:** Geriatric stroke patients with somatosensory injury perceived more several barriers relate to

supports and relationship, services, systems and policies than patients without somatosensory injury.

Keywords: Barrier, Facilitator, International classification of disability and health (ICF), Somatosensory injury

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Hee Young Kim¹, Tae Yun Kim²

Affiliations: ¹Professor, department of Occupational Therapy, Honam University, Gwangju, Gwangsang, Republic of Korea; ²Professor, department of Physical Therapy, Wonkwang Health Science University, Iksan-si, Jeollabuk-do, Republic of Korea.

Corresponding Author: Hee Young Kim, Gwangsan-Gu, Gwangju, 506-714, Email: guruma2000@naver.com

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INTRODUCTION

Somatosensory impairment is common after stroke having been reported in 65% [1], 60–74% [2], and 100% [3], of all stroke patients. Totals of 7–53% of patients reported impaired tactile sensation, 31–89% impaired stereognosis, and 34–64% impaired proprioception [4]. Somatosensory function may be defined as the ability to interpret bodily sensations. Loss of this function negatively affects the ability to explore the environment [5], to discriminate sensory information, to recovery, to engage in activities of daily living [6], to participate successfully in rehabilitative and functional outcomes [6, 7], and to remain safety [8].

Today, a disability is regarded as resulting from the interaction between an impaired subject and barriers in the physical, attitudinal, communication, and social

environments [9]. The environment has a major impact on the experience and extent of disability. Inaccessible environments create disabilities by virtue of the existence of barriers to participation and inclusion [10]. Categorization of environmental factors as either facilitators or barriers is necessary to reduce the creation of disability and facilitate rehabilitation [11]. The aim of the present study was to identify environmental facilitators and barriers encountered by geriatric stroke patients with or without somatosensory injuries.

MATERIALS AND METHODS

Participants

We studied 78 geriatric stroke patients. The inclusion criteria were medical stability [1], the ability to adequately comprehend the assessment instructions [2], age over 65 years [3], and either no or mild limitation of voluntary motor control and cognitive functioning as defined based on the International classification of functioning, disability and health (ICF qualifier) [12],

Data collection

All patients answered semi-structured questions based on International classification of functioning, disability and health (ICD) categories of environmental factor. We used the extended version of the ICF core set of stroke questions exploring stroke outcomes. The study ran from June to October 2015. The core set of questions explores 166 ICF categories, of which 37 are environmental categories. Eight categories belong to the chapter 'products and technology', 3 categories to 'natural environment and human-made changes to environment', 7 categories to 'support and relationships', 9 categories to 'attitudes' and 10 categories to 'services, systems and policies' [10]. The scale was proposed by the World Health Organization (WHO) [9].

Assessment of environmental factors

The proposed ICF qualifier has nine response categories ranging from 4 to +4. A specific environmental factor can be a mild/moderate/severe/complete barrier (1 to 4), a mild/moderate/substantial/complete facilitator (+1 to +4), or can have no influence (0), not specified (8), not applicable (9) [9].

Data analysis

The aim of this study was to identify the presence of absence of facilitators and barriers. The degrees of the qualifier scale were reduced to categorical data as follows: ICF qualifiers 1 to 4 were recoded to 1 (facilitator),

qualifiers 1 to 4 were recoded to 1 (barrier), the response option '8 – not specified' was handled as a missing, and qualifiers 0 (neither/nor) and 9 (not applicable) were maintained. Univariate statistics were used to describe the sample characteristics and examine the frequency of facilitators and barriers. To describe the subjects, frequency analysis and to investigate differences between groups, Chi-square test was used. All tests were carried out two sided at local alpha levels of 5%. Statistical analyses were made with SPSS (version 18.0).

RESULTS

Description of the participants

Of all patients, 37 were somatosensorily impaired. They were unable to detect stimuli applied to the affected side in any of six trials. Rivermead Assessment of Somatosensory Performance (RASP) were defective in all of six primary somatosensory sensations (sharp/dull discrimination, surface pressure touch, detection of a surface touch, temperature discrimination, the ability to detect movement, and capacity to define the direction of proprioception). A total of 41 patients experienced normal sensation as revealed by RASP. The characteristics of all participants are given in Table 1.

Experienced environmental factors by stroke with somatosensory injuries

More than half or all participants with somatosensory injuries identified two ICF categories as a facilitators and at least one category as a barriers. Participants lacking somatosensory injuries identified six ICF categories as a facilitator and none as a barrier. Geriatric stroke patients with somatosensory injuries identified the immediate family (e310), friends (e320), and acquaintances, peers, colleagues, neighbors and community members (e325) as facilitators in the ICF chapters of supports and relationship, transportation services, systems and policies (e540), health services, systems and policies (e580) as barriers in the ICF category of services, systems and policies. Geriatric stroke patients with somatosensory injuries identified these facilitators and barriers significantly more often than did geriatric stroke patients with normal somatosensory function (all p values were <0.05).

DISCUSSION

The same environmental factors may exert different effects in patients varying in nature and severity of impairment [11]. This is the first study to identify facilitators and barriers perceived by geriatric stroke with somatosensory injuries.

Table 1: General characteristics of participants

		N(%)	
	Variables	Somatosensory Intact Participants (N=41)	Somatosensory Impaired Participants (N=37)
gender	male	20(48.8)	17(45.9)
	female	21(51.2)	20(54.1)
age(year)	65-69	13(31.7)	19(51.4)
	70-79	23(56.1)	18(36.4)
	80-	5(12.2)	5(12.2)
education level	no education	10(24.4)	15(36.6)
	elementary school	15(36.6)	7(22.9)
	middle school	6(14.6)	9(24.3)
	high school	8(19.5)	3(8.1)
	university	2(4.8)	3(8.1)
financial status(won)	-500,000	3(7.3)	4(10.8)
	500,000-1,000,000	29(70.7)	22(59.5)
	1,000,000-	9(22.0)	11(29.7)
affected side	left	14(34.1)	13(35.1)
	right	19(46.3)	17(45.9)
	both	8(19.5)	7(18.9)
motor control (ICF qualifier)	0(no problem)	25(61.0)	0(0.0)
	1(mild impaired)	16(39.0)	37(100.0)
cognitive function (ICF qualifier)	0(no problem)	39(95.2)	35(94.6)
	1(mild impaired)	4(9.8)	2(5.4)
somatosensory (RASP)	30	43(100.0)	0(0.0)
	25~29	0(0.0)	10(27.0)
	20~24	0(0.0)	27(73.0)
	0~19	0(0.0)	0(0.0)

Table 2: Facilitators and barriers of environmental factors on stroke geriatrics

		N(%)		
Category		Somatosensory Intact (N=41)	Somatosensory Injured (N=37)	χ ²
Chapter 1. Products and technology				
e110 Products or substances for personal consumption	Barrier	2(4.9)	32(86.5)	2.510
	Neither/nor	31(75.6)	5(13.5)	
	Facilitator	8(19.5)	0(0.0)	
e120 Products and technology for personal indoor and outdoor mobility and transportation	Barrier	2(4.9)	5(13.5)	2.145
	Neither/nor	28(68.3)	25(67.6)	
	Facilitator	11(26.8)	7(18.9)	

Table 2: (Continued)

e125 Products and technology for communication	Barrier	1(2.4)	0(0.0)	2.723
	Neither/nor	35(85.4)	28(75.7)	
	Facilitator	5(12.2)	9(24.3)	
Chapter 2. Natural environment and human made changes to environment				
e210 Physical geography	Barrier	5(12.2)	6(16.2)	2.030
	Neither/nor	34(82.9)	31(83.8)	
	Facilitator	2(4.9)	0(0.0)	
Chapter 3. Support and relationships				
e310 Immediate family	Barrier	5(12.2)	3(8.1)	6.949*
	Neither/nor	5(12.2)	14(37.8)	
	Facilitator	31(75.6)	20(54.1)	
e315 Extended family	Barrier	1(2.4)	2(5.4)	5.619
	Neither/nor	30(73.2)	33(89.2)	
	Facilitator	10(24.4)	2(5.4)	
e320 Friend	Barrier	0(0.0)	0(0.0)	5.333*
	Neither/nor	17(41.5)	25(67.6)	
	Facilitator	24(58.5)	12(32.4)	
e325 Acquaintances, peers, colleagues, neighbors and community members	Barrier	0(0.0)	0(0.0)	8.690**
	Neither/nor	14(34.1)	25(67.6)	
	Facilitator	27(65.9)	12(32.4)	
e355 Health professionals	Barrier	1(2.4)	0(0.0)	3.041
	Neither/nor	15(36.6)	20(54.1)	
	Facilitator	25(61.0)	17(45.9)	
Chapter 4. Attitudes				
e450 Individual attitudes of health professionals	Barrier	3(7.3)	0(0.0)	3.902
	Neither/nor	17(41.5)	21(56.8)	
	Facilitator	21(51.2)	16(43.2)	
Chapter 5. Services, systems and policies				
e540 Transportation services, systems and policies	Barrier	0(0.0)	3(8.1)	6.581*
	Neither/nor	31(75.6)	31(83.8)	
	Facilitator	10(24.4)	3(8.1)	
e570 Social Security services, systems and policies	Barrier	0(0.0)	4(10.8)	4.866
	Neither/nor	22(53.7)	16(43.2)	
	Facilitator	19(46.3)	17(45.9)	
e580 Health services, systems and policies	Barrier	0(0.0)	2(5.4)	8.517*
	Neither/nor	2(14.6)	14(37.8)	
	Facilitator	35(85.4)	21(56.8)	

*p< .05, **p< .001

These patients identified the immediate family (e310), friends (e320), and acquaintances, peers, colleagues, neighbors and community members (e325) as facilitators in the ICF category of support and relationships, and they identified transportation services, systems and policies (e540), and health services, systems and policies (e580) as barrier in the ICF categories of services, systems and

policies. Geriatric stroke patients with somatosensory impairments identified these facilitators and barriers significantly more often than did geriatric stroke patients with normal somatosensory function.

Immediate family, friends, acquaintances, peers, colleagues, neighbors and community members are in chapters of supports and relationship. Somatosensory

loss compromises communication and interaction with the surroundings [5]. Limitations in motor functioning may contribute the learned non-use of a limb, triggering further deterioration in motor function, and it can have a negative impact on re-acquisition of skilled upper limb movement [13]. Activity limitation also has impacts on life roles, social communication, safety, participation in activities, sexual functioning, and leisure. Such limitations negatively affect social interactions with family, friends, and community members. It is important for community members to improve their understanding of psychosocial coping mechanisms and modes of adaptation to somatosensory loss.

Transportation services, systems and policies, health services, systems and policies are in ICF chapters of services, systems and policies. The important role played by sensations in motor function is particularly evident under conditions of sensory conflict, such as that experienced when walking on a rough surface [14]. Impairment of bodily sensation can have negative impacts on personal safety, motor function [1] postural control and ambulation [15]. Somatosensory injured stroke patient's special needs about services, systems and policies should be assessed and reflected in planning of public services, systems and policies.

More than half of patients with somatosensory injuries identified two or more ICF categories as facilitators and one more as a barrier. However, patients without such injuries identified six ICF categories as a facilitators and no category as a barrier. The somatosensory system allows us to explore the environment, alerting us to danger and affording a means of communication with others [16]. It is thus important that the environments in which care is delivered are accessible, safe and appropriate to the needs of patients with somatosensory loss. It is necessary to create adaptive technologies that facilitate continuation of valued activities in barrier-free environment [17].

Our small sample size is limitations of this may hamper their generalization of the results.

CONCLUSION

In conclusion, geriatric stroke patients with somatosensory injuries perceived more several barriers terms of supports and relationship, services, systems and policies than did patients without such injuries.

Author Contributions

Hee Young Kim – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Tae Yun Kim – Substantial contributions to conception and

design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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