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Original Article

Effects of community-based rehabilitation program on activities of daily living and cognition in elderly chronic stroke survivors

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Abstract. [Purpose] The aim of this study was to examine the effects of community-based rehabilitation program in chronic stroke patients. [Subjects and Methods] Eleven subjects received community-based rehabilitation program ten times for ten months. The main outcome measures were the Modified Barthel Index score for activities of daily living and the Korean Mini-Mental State Examination score for cognition. [Results] The results of the study demonstrated that the community-based rehabilitation program improved activities of daily living performance and cognition significantly. [Conclusion] Based on the study results, the community-based rehabilitation program is an effective method for improving activities of daily living performance and cognitive function in elderly patients with chronic stroke.

Key words: Community-based rehabilitation, Elderly, Stroke

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INTRODUCTION

Stroke is one of the main causes of mortality and disability among the elderly[1)]. Stroke results in serious complex functional problems in many areas, especially cognitive and physical impairments that significantly limit their activities of daily living (ADLs)[2)]. Eventually, stroke survivors after returning to living in the community after discharge would need to attend alternative rehabilitation program[3)]. Most stroke survivors experience several limitations to participate their community[4)], particularly ADL performance and cognition[5)].

Community-based rehabilitation (CBR) is an effective method for individuals with stroke and utilizes therapeutic resources from community. Therapists are important resources because they can conduct effective CBR programs and counsel those with stroke[6)]. In South Korea, CBR programs have been conducted gradually for stroke patients[7)]. Furthermore, most CBR programs were focused on motor recovery[8)] or cognition for stroke[9)]. Further evidence regarding the effectiveness of CBR programs in various areas of rehabilitation of the elderly are needed. Therefore, the aim of this study was to investigate the effects of the CBR program on ADL performance and cognition, and to provide evidence for implementing the CBR program for elderly patients with chronic stroke.

SUBJECTS AND METHODS

This study was carried out from April 2015 to January 2016, and the community-dwelling, elderly chronic stroke survivors were recruited at the J City Health Center. Every participant was required to meet the following inclusion criteria: (a) stroke identifiable by a medical doctor, (b) age ≥65 years, (c) 5 years post stroke, and (d) intact cognitive function for understanding

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program instructions. Participants were excluded if they (a) had any other neurological diseases except stroke, or (b) did not provide consent. This study was approved by the Inje University's Institutional Review Board.

The CBR program comprised ADL (exercise) and cognition (crafts), and that was conducted in an auditorium of the J Health Center with group setting. The CBR program was summarized in Table 1. The CBR program performed for 2 hours in every session, once per month for ten months by two occupational therapists and four well-trained exercise assistants. The Modified Barthel Index (MBI) score[10] was used to assess ADL performance. The Korean Mini-Mental State Examination (MMSE-K) score[11] was used to assess cognitive function. The statistical analyses in this study were performed using SPSS 22.0. Demographics and clinical characteristics of the subjects were analyzed by using descriptive statistics. The mean differences between pre-and post-intervention scores were analyzed by using the Wilcoxon signed rank test, and the significance level was at $p<0.05$.

RESULTS

Demographics and clinical characteristics of the subjects are summarized in Table 2. After applying the CBR program, as shown in Table 3, the MBI score significantly improved from 42.8 ± 25.6 to 63.2 ± 22.2 ($p<0.05$). Further, the MMSE-K score showed a significant improvement from 19.3 ± 5.1 to 21.5 ± 4.7 ($p<0.05$).

DISCUSSION

This research aimed to identify the effect of CBR on ADL performance and cognition in elderly patients with chronic stroke. We recruited patients treated at J City Health Center. It needs to be considered the possibility of any biased factor between interventions since the interventions were done once a month. Therefore we exclude subjects if they have attended any other treatment above this program. Fifteen subjects started on CBR program and 11 subjects finished for this reason.

The stroke survivors have dysfunction mentally as well as physically[12]. Therefore, we consisted of motor and cognition

Table 1. General characteristics of subjects

Characteristics		N (%)
Gender	Male	4 (36.4)
	Female	7 (63.6)
Age (years)	65–74	8 (72.8)
	75–84	2 (18.2)
	85 and above	1 (9.1)
Lesion type	Hemorrhagic	4 (36.4)
	Infarction	7 (63.6)
Paretic side	Right	6 (54.5)
	Left	5 (45.5)
Disease duration (years)		7.4 ± 0.9*

*Mean ± SD

Table 3. Comparison of pre and post-intervention scores of MBI and MMSE-K

	Pre-intervention	Post-intervention
MBI	42.8 ± 25.6	63.2 ± 22.2*
MMSE-K	19.3 ± 5.1	21.5 ± 4.7*

MMSE-K: Korean Mini-Mental State Examination, MBI: Modified Barthel Index, Mean ± SD, *$p<0.05$

Table 2. CBR program

Session	ADL (Exercise)	Cognition (Craft)
1	ROM exercise with towel	Soap
2	ROM exercise with theraband	Gardening
3	Static balance training	Painting
4	Dynamic balance training with ball	Paper
5	Fall prevention (OEP)	collage
6	Locomotion training	Wire
7	Fall prevention (OEP)	Rubber band
8	Transfer training	Beads
9	Fall prevention (OEP)	Mosaic
10	Dressing training	Setting plans

ADL: Activities of Daily Living, CBR: Community-Based Rehabilitation, OEP: Otago Exercise Program

program in every session for ten months. This study was the first trial in application of motor and cognition for CBR program at the same time for elderly patients in South Korean. For this reason, this study would have more novelty than other studies for CBR. The MBI score was used to evaluate ADL performance and the MMSE-K score was used to assess cognition. The results of this study showed that the CBR program significantly improved ADLs and cognition. There are similar findings in previous studies about the effects of CBR program with stroke survivors on ADLs[13] and cognition[14]. Comprehensive rehabilitations are needed for stroke to adapt their community. The CBR program has been centered around Health Centers and shown positive effects by various approach in South Korea[15]. There are several limitations of this study. The sample size was small, therefore its results may not be generalizable to the entire population of elderly with chronic stroke. Further, various intervention programs should be considered along with exercise and crafts.

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