

# Effects of Community-based Rehabilitation Programs on Activities of Daily Living, Quality of Life and Assistive Technology Satisfaction for Disabled Adults in South Korea

The purpose of this study was to examine the effects of community-based rehabilitation (CBR) program on activities of daily livings (ADLs), quality of life and assistive technology satisfaction for disabled adults in South Korea. Fourteen community-dwelling subjects were participated in a home-based rehabilitation program which performed once a month for 2 months. The outcome measures included Modified Barthel Index (MBI) for assessing ADLs, EuroQol five-dimensions questionnaire (EQ-5D) for quality of life (QoL) and Quebec User Evaluation of Satisfaction with assistive Technology 2.0 (QUEST 2.0) for assistive technology. Significant improvements in ADLs, quality of life and assistive technology satisfaction were observed after the program. This study indicated that community-based rehabilitation program is an effective method for improving ADLs, quality of life and assistive technology satisfaction for adults with disabilities.

Key words: *Community-based Rehabilitation; Activities of Daily living; Quality of life; Assistive Technology*

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## INTRODUCTION

Community-based rehabilitation (CBR) has been performed for individuals dwelling in community and showed advantages for setting goals of rehabilitation, offering various proper types of service for community dwellers <sup>1</sup>. Recently, CBR started to provide assistive technologies with quality of life as well as exercises <sup>2</sup> and reported to be as effective as rehabilitation in hospital for adult patient <sup>3</sup>. CBR has been recognized as only alternative care except community health centers in South Korea <sup>4</sup>. However, most previous related studies were conducted by nurses and the subjects were mostly stroke <sup>5</sup>. Those reports did not estimate assistive technology services even though most CBR services are consisted of providing assistive devices <sup>6</sup>. Therapists usually conduct effective assistive technology program by counseling as well as suggesting various exercise for disabled patents. This assistive technology could

include providing, evaluating, demonstrating wheelchair assist/maintenance/modifications, communication aids, home modifications, orthotic devices, 3-dimensional printing fabrications and other assistive products <sup>7</sup>. Physical therapists mostly use orthopedic manipulation including continuous muscle strengthening applied to the antagonist muscles and these therapeutic techniques have been showing better outcomes which is consisted of pain reduction, joint movement range improvements and enhance quality of life <sup>8),13)</sup>.

Therefore, the main focus of this study was designed to estimate the effects of the CBR services provided by Korean government on activities of daily livings (ADLs), QoL and assistive technology satisfaction, by physical and occupational therapists, and to suggest evidences for implementing the CBR for people with lesser maneuverability, mobility, living in remote areas or even neglected class of people in South Korea.

## METHODS

### Subjects

Community-dwelling 6 females and 8 males who have disabilities and get CBR services ( $52.07 \pm 15.56$  years, mean  $\pm$  SD) were recruited at the J City Health Center. For pathologic aspects, subjects were stroke, spinal cord injury, rheumatoid arthritis, myopathy and ankylosing spondylitis. All subjects were informed of the aim and procedure of the study and agreed to take part in this program. Demographic information and general clinical aspects of the participants were reported through Table 1. This study was approved by the institutional review board of Inje University.

### Methods

CBR services were composed of several types of interventions including wheelchair modifications, wheelchair maintenance, communicating aid, toileting interventions, postural control education from physical therapists, conventional physical therapies like balancing training, gait training, strengthening exercises, orthopedic manipulation including continuous muscle strengthening applied to the antagonist of the sternocleidoma-

toid muscles and lower extremities, and assistive technology services. Assistive technology was also applied to subjects based on their needs, included in wheel chair modifications, eye-tracking mouse with computer system, support bar systems, etc. Every single experimental methods and conditions were different due to the facts that the participants had different medical conditions, ages, sexes, and even room status. This is natural aspect of the CBR. However, 2 physical therapists, 2 occupational therapists and 1 rehabilitation specialist nurse and the equipment were all the same.

Table 1. Patients profiles and general characteristics

		(n=14)
		Values (M $\pm$ SD /number of persons / %)
Sex	Male	8 (57%)
	Female	6 (43%)
Age		$52.07 \pm 15.56$
Pathologic Aspects	Stroke	4 (29%)
	Spinal Cord Injury	3 (21%)
	Myopathy	2 (14%)
	Rheumatoid Arthritis	3 (21%)
	Ankylosing Spondylitis	2 (14%)



Fig. 1. Community based Rehabilitation service practices: a) wheelchair modifications, b) wheelchair maintenance, c) communicating aid, d) toileting interventions, e) postural control education from physical therapists, f) conventional physical therapies

It was conducted for 2 hours once a month for 8 weeks by two physical therapists and two occupational therapists. Part of the interventions as a community-based rehabilitation therapy program and services were shown through Figure 1. Every participant received the CBR program pamphlet previously and had to answer the telephone monitoring for checking the program at the end of each week. The MBI<sup>9)</sup> was used to assess ADL, EQ-5D<sup>10)</sup> was used to assess quality of life and QUEST 2.0<sup>11)</sup> for assistive technology satisfaction. All the evaluations present higher score means improved aspects. The sub-categories and explanations of QUEST 2.0 presented through Appendix 1.

All the data was statistically analyzed through IBM SPSS 20 software and for assessing each session, we examined descriptive statistics and Wilcoxon signed rank test. The significance level was set at  $p < .05$ .

## RESULTS

The differences in total score of MBI, EQ-5D, QUEST 2.0 are shown in Table 2. Clinical improvements were found in MBI, EQ-5D and several subcategories of QUEST 2.0 including weight, adjustments, safety, easy to use, comfortable, effectiveness. These were statistically significant and meaningful for determining effectiveness of CBR services for different medical condi-

tions in the aspect of qualified analysis. Despite of the results in QUEST 2.0, no valuable enhancements in dimension and durability. In total score of MBI, there was no improvement or effects in bowel and bladder control. The differences were statistically significant ( $p < .05$ ).

## DISCUSSION

This study was conducted to identify effect of CBR for ADLs, quality of life and assistive technology satisfaction with disabled adults. CBR program was performed as a part of government project by physical and occupational therapists from J City health care center. Recently, therapists started to be participated in community-based rehabilitation via CBR in South Korea. The results showed that CBR presented clinical improvements significantly in MBI and EQ-5D. Similar findings were reported in a previous study for the effects of CBR on ADLs<sup>12)</sup> and quality of life<sup>13)</sup>. Assistive technology satisfaction showed significant improvements in all of subcategories of QUEST 2.0 except Dimension and Durability. This is the one of few trials focusing on assistive technology satisfaction with disabled adults in South Korea. Orthopedic manipulation by registered physical therapists including continuous muscle strengthening applied to the antagonist of the sternocleidomastoid muscles and lower extremities

**Table 2.** Detailed differences after the interventions in each assessments

(Unit : Score)

	Values (M ± SD)		z	p
	Before the Intervention	After the Intervention		
MBI	25.93 ± 19.71	29.57 ± 19.09	-3.070	.002*
EQ-5D	0.28 ± 0.23	0.40 ± 0.18	-3.018	.008*
Dimension	2.50 ± 0.53	2.10 ± 0.15	-1.00	.317
Weight	1.90 ± 0.88	2.40 ± 0.60	-2.01	.023*
Adjustments	2.80 ± 0.79	2.00 ± 0.82	-2.49	.026*
Safety	3.20 ± 0.78	1.70 ± 0.67	-1.73	.006*
Durability	3.40 ± 0.77	2.80 ± 1.91	-1.33	.125
Easy to Use	3.82 ± 0.87	1.80 ± 0.92	-2.62	.008*
Comfortable	3.80 ± 0.92	2.30 ± 0.67	-2.60	.006*
Effectiveness	3.50 ± 0.85	2.30 ± 0.50	-2.53	.037*

M ± SD= Mean and Standard Deviation, EQ-5D= EuroQol-5 Dimension, QUEST=Quebec User Evaluation of Satisfaction with Assistive Technology, MBI= Modified Bathel Index

\* $p < .05$

shown increased muscle movements and reduced pain, this is similar results from previous research<sup>14)</sup>.

The limitation of this study is the results might not be easy to generalize for all patients because of the insufficient number of subjects, short intervention program and lack of follow-up test. Although those limitations, this is leading and valuable research because CBR were rising rehabilitation care service for disabled adults by physical and occupational therapists in South Korea.

## CONCLUSIONS

This study investigated effects of community-based rehabilitation program on ADLs, quality of life and assistive technology satisfaction for disabled adults in South Korea. Clinical improvements were found in MBI, EQ-5D and all the sub-categories of QUEST 2.0 except Dimension and Durability. CBR program could be the valuable approaches for people with lesser maneuverability, mobility, living in remote areas or even for neglected class.

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## Appendix 1. Assistive device satisfaction questionnaire of QUEST 2.0

1	2	3	4	5
not satisfied at all	not very satisfied	more or less satisfied	quite satisfied	very satisfied

**ASSISTIVE DEVICE**

How satisfied are you with,

1. the dimensions (size, height, length, width) of your assistive device? Comments:	1 2 3 4 5
2. the weight of your assistive device? Comments:	1 2 3 4 5
3. the ease in adjusting (fixing, fastening) the parts of your assistive device? Comments:	1 2 3 4 5
4. how safe and secure your assistive device is? Comments:	1 2 3 4 5
5. the durability (endurance, resistance to wear) of your assistive device? Comments:	1 2 3 4 5
6. how easy it is to use your assistive device? Comments:	1 2 3 4 5
7. how comfortable your assistive device is? Comments:	1 2 3 4 5
8. how effective your assistive device is (the degree to which your device meets your needs)? Comments:	1 2 3 4 5