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นิพนธ์ต้นฉบับ
ORIGINAL ARTICLE

ผลของการฝึกโดยมีงานและผู้รับบริการเป็นศูนย์กลางต่อความสามารถทางกายและความภาคภูมิใจแห่งตนของผู้ป่วยบาดเจ็บไขสันหลังในอำเภออุบลรัตน์ จังหวัดขอนแก่น

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บทคัดย่อ

ปัจจุบันการฝึกโดยมีงานและผู้รับบริการเป็นศูนย์กลางเป็นทางเลือกหนึ่งสำหรับการฟื้นฟูสมรรถภาพผู้ป่วยบาดเจ็บไขสันหลัง แต่ยังไม่มีรายงานการวิจัยเกี่ยวกับการฝึกนี้ในประเทศไทย การศึกษานี้มีวัตถุประสงค์เพื่อประเมินผลของการฝึกโดยมีงานและผู้รับบริการเป็นศูนย์กลางเป็นเวลา 8 สัปดาห์ต่อความสามารถทางกายและความภาคภูมิใจแห่งตนของผู้ป่วยบาดเจ็บไขสันหลังในอำเภออุบลรัตน์ จังหวัดขอนแก่น จำนวน 12 คน (หญิง 1 คน และชาย 11 คน อายุเฉลี่ย 39.0±13.0 ปี ระยะเวลาการบาดเจ็บเฉลี่ย 10.7±11.5 ปี) ตัวแปรของการศึกษาประกอบด้วยความสามารถทางกายและความภาคภูมิใจแห่งตน ซึ่งประเมินก่อนเริ่มการฝึกและภายหลังการฝึกเสร็จสิ้น โดยใช้แบบประเมิน Spinal Cord Independence Measure version III และ Rosenberg Self-esteem Scale ฉบับภาษาไทย ตามลำดับ วิเคราะห์ผลการศึกษาด้วยสถิติ paired t-tests ผลการศึกษาพบว่าการฝึกโดยมีงานและผู้รับบริการเป็นศูนย์กลางเป็นเวลา 8 สัปดาห์ช่วยให้อาสาสมัครมีความสามารถทางกายดีขึ้นอย่างมีนัยสำคัญ (P = 0.001, 95% CI 3.22 to 7.12) โดยเฉพาะด้านการจัดการเรื่องการหายใจและการขับถ่าย (P = 0.008, 95% CI 0.57 to 2.94) และการเคลื่อนที่ภายในและภายนอกบ้าน (P = 0.003, 95% CI 1.06 to 4.10) นอกจากนี้ การฝึกดังกล่าวยังส่งผลดีต่อความภาคภูมิใจแห่งตนของอาสาสมัครด้วย (P = 0.043, 95% CI 0.05 to 2.78) สรุปได้ว่าการฝึกโดยมีงานและผู้รับบริการเป็นศูนย์กลางเป็นเวลา 8 สัปดาห์ช่วยเพิ่มความสามารถทางกายและความภาคภูมิใจแห่งตนของผู้ป่วยบาดเจ็บไขสันหลังในอำเภออุบลรัตน์ จังหวัดขอนแก่น ได้อย่างมีนัยสำคัญเมื่อเปรียบเทียบกับก่อนเริ่มการฝึก จึงควรมีการศึกษาในเรื่องนี้ต่อไปในลักษณะการทดลองแบบสุ่มและการศึกษาในระยะยาว เพื่อให้ผลของการฝึกโดยมีงานและผู้รับบริการเป็นศูนย์กลางในผู้ป่วยบาดเจ็บไขสันหลังในชุมชนมีความชัดเจนยิ่งขึ้น

คำสำคัญ: การบาดเจ็บไขสันหลัง, การฝึกโดยมีงานเป็นศูนย์กลาง, การฝึกโดยมีผู้รับบริการเป็นศูนย์กลาง, ความสามารถทางกาย, ความภาคภูมิใจแห่งตน

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ORIGINAL ARTICLE

The effects of task-oriented client-centered training on physical function and self-esteem of persons with spinal cord injury in Ubolratana District, Khon Kaen Province

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Abstract

At present, the task-oriented client-centered training has emerged as an alternative rehabilitation approach for persons with spinal cord injury. No research about this training approach, however, has been reported in Thailand. This study aimed to evaluate the effects of an 8-week task-oriented client-centered training on physical function and self-esteem of 12 persons with spinal cord injury (1 woman and 11 men, mean age ± SD 39.0±13.0 years, mean length of time since injury ± SD 10.7±11.5 years) who were living in Ubolratana District, Khon Kaen Province. Outcome measures consisted of physical function and self-esteem which were assessed at pre- and post-training periods by using the Spinal Cord Independence Measure version III and the Rosenberg Self-esteem Scale-Thai version, respectively. Data were analyzed by using paired t-tests. The results showed that the 8-week task-oriented client-centered training significantly improved physical function of the participants (P = 0.001, 95% CI 3.22 to 7.12), especially in the areas of respiration and sphincter management (P = 0.008, 95% CI 0.57 to 2.94) and mobility indoors and outdoors (P = 0.003, 95% CI 1.06 to 4.10). The other positive effect of the training was also found in the self-esteem of the participants (P = 0.043, 95% CI 0.05 to 2.78). In conclusion, an 8-week task-oriented client-centered training program could significantly improve physical function and self-esteem of persons with spinal cord injury in Ubolratana District, Khon Kaen Province, compared with the pre-training period. Future studies with a randomized controlled trial and longitudinal design are suggested to reveal further benefits of the task-oriented client-centered training on persons with spinal cord injury in the community.

Keywords: Spinal cord injury, Task-oriented training, Client-centered training, Physical function, Self-esteem

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Introduction

Spinal cord injury is a lesion to the spinal cord resulting in a change in its normal motor, sensory, or autonomic function. It can be classified as tetraplegia (injury to the spinal cord in the cervical region) and paraplegia (injury to the spinal cord in the thoracic, lumbar, or sacral segments, including the cauda equina and conus medullaris)[1]. In general, persons with spinal cord injury are in the working age group, and have permanent and often devastating neurological deficits and disability[2-4]. When compared with other neurological patients, individuals with spinal cord injury are more often exposed to a lot of undesirable consequences such as loss of role (at home and/or work), dependence, low quality of life and self-esteem, disruption of family life, social isolation or discrimination, decrease in community involvement, and economic strain[2-4]. In Thailand, after being discharged from the hospitals, persons with spinal cord injury are likely to live at home with their family because rehabilitation centers have not been established nationwide. Furthermore, because of economic strain, most of them have not enough potential to continue their rehabilitation programs at the hospitals.

Ubolratana Hospital is a 30-bed community hospital located at Ubolratana District, Khon Kaen Province. At present, there are about 400 persons with disabilities (1% of the total population) in Ubolratana District and approximately 4% of them are persons with spinal cord injury. Most health services served for persons with disabilities in Ubolratana community are recently in the responsibility of the investigator who is one of physical therapists of the hospital. To provide the best services to each person with disabilities, the investigator has made the great effort with physical therapy knowledge and skills following the physical therapy process, i.e. evaluating the client, making physical therapy diagnosis, specifying treatment goal(s) and plan(s), developing a training program, implementing the program, and re-evaluating the effectiveness of the program. The services are delivered to persons with disabilities both in institution- and community-based settings. The ultimate goal of the services is to restore maximal functional independence to each client. However, the outcomes so far are not great enough, especially in individuals with spinal cord injury. Most of them are still dependent, have low self-esteem, and decrease in community involvement although there are improvements in their muscle strength, flexibility and some functional activities. The investigator thus needs to find an effective strategy to help this group of persons.

At present, the task-oriented client-centered training has emerged as an alternative approach for persons with spinal cord injury[5]. The task-oriented training has focused on specific activities that are important to the patient[6]. The client-centered care has aimed to incorporate the patient's own needs and wishes in the rehabilitation process[7]. In this way, the client and the therapist work together to design a treatment goal plan that is motivating and engaging to the client[5]. A previous study[8] has demonstrated an advantage of the task-oriented client-centered training in upper extremity skilled performance of persons with tetraplegia. No research about this training approach has been reported in Thailand. Therefore, the investigator was interested in applying the task-oriented client-centered training to persons with spinal cord injury who were living in Ubolratana community. This study aimed to evaluate the effects of an 8-week task-oriented client-centered training on physical function and self-esteem of persons with spinal cord injury in Ubolratana District, Khon Kaen Province.

Materials and Methods

Participants

All persons with spinal cord injury who lived in Ubolratana District, Khon Kaen Province were

recruited with the following inclusion criteria: requiring partial help to perform daily life and/or outdoor activities, being able to verbally communicate, and having will to participate and cooperate with the study procedures. Volunteers were excluded if they were determined by a medical doctor that they had significant psychiatric or general medical morbidity that would preclude their understanding of the nature of the intervention or undertaking the exercises such as uncontrolled cardiovascular disorders, severe hypertension, heart disease, and pulmonary disease. All screening processes including an interview and physical examination were performed to all persons with spinal cord injury at their residences. Eligible participants were requested to give informed consent in accordance with the requirements of The Khon Kaen University Ethics Committee for Human Research (HE552133). The participants would be withdrawn from the study if they had to be hospitalized during the study period. Based on the database of Ubolratana Hospital in August 2012, there were 15 persons with spinal cord injury who were living in Ubolratana District. Fourteen persons met the inclusion criteria and participated in the pre-implementation assessment. However, 2 persons dropped out of the study: one because of lack of time and one due to a health problem. Therefore, 12 persons with spinal cord injury were left in the study.

Outcome measures

Pre- and post-implementation assessments were performed to each participant with the following outcome measures. The assessor was a research assistant who, prior to conducting the data collection, had to practice administering the research tools with 5 persons with spinal cord injury who were not involved in the current study.

1) Physical function

Independence in primary daily activities relevant for persons with spinal cord injury was assessed by using the Spinal Cord Independence Measure version III (SCIM III)[9,10]. This scale is comprised of 17 items grouped into 4 areas of function (subscales): self-care (scored 0-20), respiration and sphincter management (0-40), mobility in room and toilet (0-10), and mobility indoors and outdoors (0-30). The total possible score ranges from 0 (worst physical function) to 100 (greatest physical function). The SCIM III has shown to be good reliability (ICC>0.94)[11] and internal consistency[12]. Minimal change of 4 points on the total SCIM III score reflects the clinical change in independence in daily activities[13].

2) Self-esteem

Global self-esteem of the participants was evaluated using the Rosenberg Self-esteem Scale in Thai version which had been found valid and reliable[14]. The participants were required to answer 10 items of the scale. A 4-point Likert-type scale ranging from 1 to 4 was established to grade the self-esteem. The score ranged from 10 to 40 with higher scores reflecting high self-esteem and lower scores reflecting low self-esteem.

Procedures

This quasi-experimental study was conducted in Ubolratana community during September, 2012 to August, 2013. To follow the task-oriented client-centered training concept, the study was processed into 3 phases: client-centered phase, task-oriented phase, and implementation and evaluation phase.

1) Client-centered phase

After recruiting the participants, the investigator visited each participant to explore his/her most problematic activities. The participants were asked to identify daily activities in the area of self-care, productivity, and leisure which they wanted to do, needed to do, or expected to do by encouraging them to think about a typical day. Then, they were asked to rate the importance of each issue using a scale from 1 to 10 (10 being the most important).

Then, the participants had to choose at least

2 personally most problematic activities which were translated into individual treatment goals and used to compose an individual training program. Specific, measurable, achievable, and realistic goals to be achieved within a particular time frame of 8 weeks were set jointly between each participant and the investigator. Possible outcomes in each of the treatment goals were identified and expressed as a behavioral statement that was observable. The most likely outcome was what the participant would reasonably expect to occur within 8 weeks.

2) Task-oriented phase

Problematic activities and expected goals identified in the first phase were analyzed by the investigator. This task-oriented analysis was based on a concept that skill acquisition was the result of a proper interaction between different factors of the person, the task, and the environment[15]. For each participant, factors which limited or facilitated for the chosen tasks, and were trainable were determined. After that, an individually tailored training program was designed. It was based on principles of training physiology, motor learning and, if needed, the use of assistive devices[5]. This home-based training program was recommended at 30 minutes per set, 2 sets per day, and at least 3 days per week. The participants were facilitated to perform the programs by themselves. If necessary, however, the caregivers might involve in the programs.

3) Implementation and evaluation phase

Before implementing the training programs, a research assistant performed a pre-implementation assessment for the physical function and self-esteem. Then, the individual training program was conducted for 8 weeks. A post-implementation assessment was done in which the same outcomes were used.

Data Analysis

Descriptive statistics were applied to analyze the demographic data of the participants. The pre- and post-implementation data of outcome measures were compared using the paired t-tests. Normality of the data set was assessed using the Shapiro-Wilk W test. Statistical significant was inferred at a value of $P < 0.05$. All analyses were performed using the SPSS version 17.0.

Results

Table 1 outlines the demographic characteristics of 12 participants (1 woman and 11 men). Their ages ranged from 23 to 64 years with an average age of 39.0±13.0 years. The average length of time since injury was 10.7±11.5 years. Nine of them were paraplegia and 3 were tetraplegia. For all participants, the cause of spinal cord injury was trauma, i.e. motor vehicle accidents, falls, gunshot. Their main caregivers were family members (mother, sister, wife, daughter, or grand-daughter). Only 2 participants (M5 and M11) had co-morbidity (pressure sore at the buttocks). All of them were unemployed except a participant (M5) had a small computer game shop in the village.

Table 1 Demographic characteristics of participants (n=12).

Participant No.	Age (years)	BMI (kg/m^2)	Time since injury (years)	Diagnosis	Marital status	Educational level
M1	25	17.2	9	Tetraplegia C6, AIS D	Single	High school
M2	48	27.7	18	Tetraplegia C7, AIS C	Married	High school
M3	64	26.2	42	Tetraplegia C7, AIS D	Single	Primary school
M4	28	22.4	0.5	Paraplegia T3, AIS B	Married	Primary school
M5	36	16.4	15	Paraplegia T4, AIS A	Single	Diploma
M6	45	21.1	4	Paraplegia T4, AIS B	Married	Primary school
F7	45	23.4	2	Paraplegia T4, AIS D	Separated	Primary school
M8	37	24.2	15	Paraplegia T5, AIS A	Separated	Primary school
M9	23	14.3	12	Paraplegia T10, AIS B	Single	Primary school
M10	25	24.0	4	Paraplegia T12, AIS C	Single	High school
M11	56	22.2	3	Paraplegia L1, AIS C	Married	Primary school
M12	36	18.7	4	Paraplegia L2, AIS D	Single	Primary school
Mean±SD	39.0±13.0	21.5±4.1	10.7±11.5			

BMI = body mass index, AIS = The American Spinal Injury Association Impairment Scale

Table 2 summarizes the most problematic activities, current level of performance, and expected goals to be achieved within 8 weeks of each participant. Of 28 problematic activities identified by the participants, 10 of them (35.7%) were wheelchair transferring from and to any places, and wheelchair skills. The second and third ranks of most problematic activities were related to walking (25%) and use of toilet (14.3%), respectively.

Table 2 The most problematic activities, current level of performance, and expected goals to be achieved within 8 weeks of participants (n=12)

Participant No.	Most problematic activities	Current level of performance	Expected goals
M1	1) Use of toilet	Needs assistance to transfer wheelchair to and from toilet, cleans self independently	Uses toilet independently in all tasks but needs special setting (slope, grab-bars and shower chair)
	2) Sitting	Sits in cross-legged position about 2 hours, needs handhold support	Maintains balance without handhold support at least 5 minutes
	3) Mobility outdoors	Needs total assistance to operate manual wheelchair	Needs supervision while moving in manual wheelchair
M2	1) Use of toilet	Needs total assistance	Uses toilet independently in all tasks but needs special setting (slope, grab-bars and shower chair)
	2) Eating	Needs adaptive devices and assistance, cannot grip sticky rice and open containers	Needs adaptive devices but eats independently
M3	1) Standing up	Stands up from a bed or chair only by pulling an overhead bar	Stands up from a bed or chair independently by using walker
	2) Transferring: ground-bed	Unable to do	Needs partial assistance
	3) Walking	Walks with a walker on flat and non-slippery surfaces about 10 meters, needs minimal assistance	Walks with a walker independently on any surfaces about 10 meters
M4	1) Transferring: ground-wheelchair	Needs moderate assistance	Transfers independently
	2) Transferring: bed-wheelchair	Needs moderate assistance	Transfers independently
M5	1) Transferring: bed-wheelchair	Needs moderate assistance	Transfers independently

Table 2 The most problematic activities, current level of performance, and expected goals to be achieved within 8 weeks of participants (n=12) (Cont.)

Participant No.	Most problematic activities	Current level of performance	Expected goals
	2) Wheelchair skills	Moves independently in manual wheelchair but only on flat and non-slippery surfaces	Moves independently in manual wheelchair on any surfaces, can cross obstacles
M6	1) Transferring: ground-wheelchair	Unable to do	Transfers independently
	2) Transferring: wheelchair-motorcycle	Unable to do	Transfers independently
F7	1) Walking	Walks by pushing manual wheelchair about 30 meters	Walks independently without walking aids about 10 meters
	2) Weaving baskets	Cannot do because of back pain resulting in too short period of sitting	Prolonged sitting at least 2 hours
M8	1) Use of toilet	Manages urination and defecation on bed with minimal assistance, cleans self independently	Uses toilet independently in all tasks but needs special setting (slope, grab-bars and shower chair)
	2) Wheelchair skills	Moves independently in manual wheelchair but only on flat and non-slippery surfaces	Moves independently in manual wheelchair on any surfaces, can cross obstacles
	3) Cooking	Unable to do	Sits on wheelchair, cooks and prepares meals as well as cleans dishes independently
M9	1) Standing	Stands in parallel bars with KAFO, does not take body weight on legs, needs handhold support	Stands in parallel bars with KAFO, takes body weight on legs without handhold support about 3 minutes
	2) Walking	Unable to do	Walks in parallel bars with KAFO about 5 steps

Table 2 The most problematic activities, current level of performance, and expected goals to be achieved within 8 weeks of participants (n=12) (Cont.)

Participant No.	Most problematic activities	Current level of performance	Expected goals
M10	1) Walking on knees	Unable to do	Walks on knees independently about 5 steps
	2) Walking	Walks in parallel bars independently	Walks with crutches on flat and non-slippery surfaces
	3) Wheelchair skills	Moves independently in manual wheelchair but only on flat and non-slippery surfaces	Moves independently in manual wheelchair on any surfaces, can cross obstacles
M11	1) Use of toilet	Needs total assistance	Uses toilet independently in all tasks but needs special setting (slope, grab-bars and shower chair)
	2) Standing	Stands in parallel bars, does not take body weight on legs, needs handhold support	Stands in parallel bars, takes body weight on legs without handhold support
M12	1) Walking	Walks with a walker independently on flat and non-slippery surfaces about 20 meters	Walks with a 3-point cane on any surfaces about 20 meters
	2) Climbing stairs	Ascends and descends about 3 steps with support of both handrails	Ascends and descends about 5 steps with support of a handrail

KAFO = knee-ankle-foot orthoses

After analyzing the problematic activities and expected goals of each participant, an individually tailored training program was designed. Examples of the task-oriented analysis and home-based training program of a participant (M1) are shown in **Tables 3** and **4**, respectively.

Table 3 An example of the task-oriented analysis of a participant (M1)

Goals	Factors	Use of toilet		Sitting		Mobility out-doors	
		+/-	Therapy	+/-	Therapy	+/-	Therapy
Person	Muscle strength/endurance	-	✓	-	✓	-	✓
	Mobility	+		+		+	
	Co-ordination	+		+		+	
	Sensibility	+		+		+	
	Flexibility	-	✓	-	✓	-	✓
	Pain	+		-	✓	+	
	Cognition, e.g. attention, perception, motivation, emotion	+		+		+	
Task	Task category functional goal, stability, movement variability	+		+		+	
	Complexity	+		+		+	
	Speed	+		+		-	✓
	Task prerequisites, e.g. sitting balance, trunk control, hand function	-	✓	-	✓	-	✓
	Skill components, e.g. wheelchair skills, transferring	-	✓	+		-	✓
Environment	Location	-	✓	+		+	
	Caregiver	+		+		+	

+ = facilitator, - = barrier, ✓ = to be trained

Table 4 An example of the home-based training program of a participant (M1)

Activities	Recommended frequency (days per week)							
	wk 1	wk 2	wk 3	wk 4	wk 5	wk 6	wk 7	wk 8
Self exercises	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
1) Strengthening and endurance exercises - push up - triceps brachii - wrist flexors - back - abdominal								
2) Stretching exercises - back - abdominal - hip adductors - hamstrings - gastrocnemius								
Training by the investigator	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓
1) Sitting training								
2) Transferring training - bed-wheelchair - wheelchair-shower chair - wheelchair skills								
3) Back pain management								
Training at a local rehabilitation center		✓		✓		✓		✓
Group meeting with other participants		✓				✓		
Adaptation of a toilet								

Table 5 presents changes in physical function and self-esteem of the participants. The 8-week task-oriented client-centered training significantly improved physical function of the participants (P = 0.001, 95% CI 3.22 to 7.12), especially in the areas of respiration and sphincter management (P = 0.008, 95% CI 0.57 to 2.94) and mobility indoors and outdoors (P = 0.003, 95% CI 1.06 to 4.10). In addition, the mobility in room and toilet subscale had a trend to significantly improve (P = 0.054, 95% CI -0.01 to 0.84). The other positive effect of the 8-week task-oriented client-centered training was also found in the self-esteem of the participants (P = 0.043, 95% CI 0.05 to 2.78).

Table 5 Mean±SD of the Spinal Cord Independence Measure version III (SCIM III) and the Rosenberg Self-esteem Scale-Thai Version at pre- and post-implementation assessments and comparisons within groups (*P*-values obtained through paired t-tests)

	Pre- implementation	Post- implementation	Mean difference	95% CI	*P*-value
SCIM III					
Self-care (0-20)	17.0±3.6	17.4±2.8	0.4±1.0	-0.22 to 1.05	0.175
Respiration and sphincter management (0-40)	30.5±9.0	32.3±8.9	1.8±1.9	0.57 to 2.94	0.008
Mobility in room and toilet (0-10)	8.8±1.7	9.2±1.7	0.4±0.7	-0.01 to 0.84	0.054
Mobility indoors and outdoors (0-30)	6.9±1.8	9.5±3.3	2.6±2.4	1.06 to 4.10	0.003
Total (0-100)	63.2±13.3	68.3±14.2	5.2±3.1	3.22 to 7.12	0.001
Self-esteem (10-40)	25.7±4.0	27.1±3.6	1.4±2.2	0.05 to 2.78	0.043

CI = confidential interval

Discussion and Conclusion

An 8-week task-oriented client-centered training program could significantly improve independence in daily activities of persons with spinal cord injury. The mean change in total score of the SCIM III was 5.2 points which reached the clinically significant level of change of this tool (i.e. at least 4 points) [13]. Statistically significant changes were found in 2 subscales: respiration and sphincter management and mobility indoors and outdoors. The program could not significantly optimize self-care activities and mobility in room and toilet. It was observed that most of the participants of the study already obtained high ability level of self-care activities and mobility in room and toilet at pre-implementation assessment. This could lead to a non-significant change in scores of these subscales at the end of the study.

The effects of an 8-week task-oriented client-centered training program were prominent on mobility indoors and outdoors subscale. As presented in Table 3, the most problematic activities which were identified by a great number of participants were wheelchair transferring from and to any places, and wheelchair skills. These activities were components of the mobility indoors and outdoors, and were included in the training program. Therefore, it is not surprised to observe a significant improvement of the mobility indoors and outdoors subscale at the end of the study.

A significant change in the subscale of respiration and sphincter management is possibly related with an improved mobility of the participants. As all participants in the study breathed independently without assistance or device, it could be claimed that the significant change in this subscale was a result of an improvement in sphincter management. Although there was no specific bladder and bowel training procedures in a home-based training program of each participant, exercises and mobility training for 8 weeks could facilitate bladder and/or bowel functions of the participants[16]. Moreover, training at a local rehabilita-

tion center and group meeting with other participants may provide an opportunity for the participants to share their experiences and learn how to manage their sphincter problems. An adaptation of a toilet for some participants could be another factor to help improve the scores of this subscale.

The task-oriented client-centered training also had a positive effect on the self-esteem of the participants. This is probably caused by an improvement in independence in daily activities of the participants as it has been reported that an important factor in self-esteem is an ability to perform various activities[17-19]. Additionally, the provision of an opportunity for the participants to choose and negotiate about their care during the client-centered phase could empower them to take the lead in decision-making, thereby increasing their self-esteem[20]. Participation in social activities and social support by group meeting and training with other participants may be another reason for increasing self-esteem of the participants[18,21,22]. However, self-esteem seemed to be independent of gender, age, level or completeness of injury of the participants[23]. In the study procedures, it seemed that the first phase, the client-centered phase, was slightly complicated. In this phase, the investigator had to pay attention specifically to ensure that the participants would greatly involve in the procedure, i.e. selecting their most problematic daily activities and specifying expected goals to be achieved within 8 weeks. The investigator found that the length of time to finish the client-centered phase varied from 1 to 3 home visits, depending on attitudes to the illness of the participants and, similar to a previous study[24], various strategies had to be applied to deal with the participants in this phase. Most of the participants with long length of time since injury often had decreased community involvement, showed some depression about their illness, felt hopeless, and were rarely expressed ideas regarding their most problematic activities and training goals. Hence, the investigator had to visit them quite often to empower and exemplify them video clips of other cases who had similar severity of disability to them and could progress the ability. Their caregivers were also asked to cooperate with this procedure. These strategies could motivate this kind of participants to actively involve in the client-centered phase. On the other hand, the participants with shorter length of time since injury, i.e. less than 5 years, likely had positive attitudes to their illness, so the investigator could finish the client-centered phase for these participants within a home visit. Actually, the key success for completing the client-centered phase was building familiarity with the participants, being a good listener, expressing deep sincerity to solve problems, and respecting wishes, rights, and customs of the participants. The investigator has believed that these strategies are not too difficult for physical therapists as we are trained to have proper interpersonal relations and confidence in social and communication skills, which are the prerequisites for effective work in physical therapy career.

Some limitations were presented in this study. First, as the study area was limited at Ubolratana District which was a small district with 6 villages, only 12 persons with spinal cord injury participated in the study. However, this sample size was great enough for presenting normal distribution and statistical significance of the data. Second, because of a small study area, this study had to be a quasi-experimental trial. No comparison groups were recruited. Future studies with a randomized controlled trial manner in 2 or more study areas are suggested. This will demonstrate whether persons with spinal cord injury who receive task-oriented client-centered training improve their physical function and self-esteem in comparison with the controls. Third, because of the time limitation, the cost-effectiveness of the task-oriented client-centered training is simply of peripheral interest in this study. Further detailed investigation of the cost implication

of such training scheme is needed before it can be adopted unreservedly. In addition, a longitudinal study design should be conducted to determine the long term effects of the training program.

In spite of some limitations, this study reveals positive effects of task-oriented client-centered training on persons with spinal cord injury in the community. The client-centered procedure could lead to more in-depth understanding of the context regarding health needs and daily life activities, and provide them a sense of ownership of the intervention programs. The reality information could be useful for the task-oriented procedure for initiating an appropriate training program that fitted to each person with the aim of focusing the training on specific skills or activities the person was really interested in. Specific goals rather than an extensive package of rehabilitation goals were targeted. It was suggested that a home-based program with client-centered approach might be suitable than that with therapist-centered approach because of its relevance for individual patient[25]. Lack of the participation of clients in rehabilitation teams was reported as a cause of the incontinuity of rehabilitation services for individuals with neurological disorder[26]. In this study, the home-based training programs were designed for a relevance of each participant with low-priced equipment, and were performed at the community. The task-oriented client-centered training may be applied to persons with spinal cord injury at any types and stages to fulfill their recovery. These suggest a practical implication for physical therapists to apply task-oriented client-centered training for spinal cord injury rehabilitation in the community.

In conclusion, an 8-week task-oriented client-centered training program could significantly improve physical function and self-esteem of persons with spinal cord injury in Ubolratana District, Khon Kaen Province, compared with the pre-training period. It may be applied by physical therapists as an alternative approach for decreasing level of dependency and improving quality of life of persons with spinal cord injury in the community.

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