

*Original Article***Short-term effects of goal setting by rehabilitation professionals on aspects of psychology: a non-randomized controlled trial involving recovering stroke survivors**Hikaru Takarada, MS, OTR,¹ Toshihiro Honke, PhD, OTR²¹Department of Rehabilitation, Faculty of Health Science, Japan Health Care University, Sapporo, Hokkaido, Japan²Health Sciences University of Hokkaido, Ishikari, Hokkaido, Japan**ABSTRACT**

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Objective: In rehabilitation, goals expected to have an effect on aspects of psychology, such as promoting participation in the program and reducing anxiety, are set between the patient and the therapist. This study aimed to compare and test the short-term effects of goal setting on such psychological aspects in an experimental group, in which the therapist selected the highest priority goals proposed by the patient, and a control group, in which the goals were proposed by the therapist.

Methods: Between October 2023 and March 2024, 88 stroke survivors were admitted to the Kaifukuki Rehabilitation Ward, of whom 32 met the inclusion criteria. The patients were divided into two groups: a goal-setting group in which the patient chose the highest priority goal (experimental group: $n = 17$) and a goal-setting group in which the patient agreed with the goal proposed by the therapist (control group: $n = 15$). The primary outcome was treatment engagement in rehabilitation, and the secondary outcomes were

anxiety/depression and mental health scores.

Results: Outcomes improved in both groups after goal setting. Between-group comparisons showed a significant improvement in treatment engagement in the experimental group ($p < 0.001$). The sample size required for the randomized controlled trial was 46 participants in each group.

Conclusion: In the short term, treatment engagement was influenced by the patient's consideration and choice of priority goals.

Key words: goal setting, physical therapist, occupational therapist, speech and language therapists, psychological effects

Introduction

To set goals and explain strategies for stroke survivors in Japan, rehabilitation is accompanied by comprehensive plan evaluation and goal-setting support and management fees. Here, goal setting is defined as the process of informed discussion between the patient and health-care provider to determine when and how rehabilitation should take place [1]. It has been reported that when goal setting is implemented in rehabilitation, both the patient's satisfaction and motivation improve [2, 3]. In addition, focusing on goals that are a high priority for the patient has been shown to be effective in improving motivation and reducing anxiety, which can have a positive psychological impact [4].

In a non-randomized controlled trial of goal setting in convalescent patients in Japan, goal setting using the life goal concept was shown to improve treatment engagement [5]. However, only physical therapists (PTs) and patients with cerebrovascular or orthopedic conditions were included in that study. Similarly, there have been few reports on goal setting conducted outside Japan, with studies of goal setting conducted only for PTs or occupational therapists (OTs) [6, 7].

Therefore, the effects of priority goals on aspects of psychology among stroke survivors undergoing

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rehabilitation in the recovery phase remain unclear. In the present study, we hypothesized that sharing priority goals with patients might have more beneficial effects on aspects of psychology compared with PTs, OTs, and speech and language therapists (STs) sharing their own goals with patients.

In addition, reports examining the effects of goal setting on aspects of psychology have been conducted over study periods ranging from 3 weeks to several months; to our knowledge, no studies examining short-term effects (e.g., about 1 week) have been reported [8]. If short-term effects can be demonstrated through goal setting for stroke survivors, this could facilitate improvements in outcomes related to psychological aspects such as anxiety and increased motivation to participate from the start of rehabilitation. Given this background, the present study aimed to compare and verify the short-term effects of goal setting on aspects of psychology in an experimental group, in which the PT, ST, and OT selected the highest priority goals proposed by the patient, and in a control group, in which the goals were proposed by the PT, ST, and OT.

Methods

1. Ethical considerations

The present study was approved by the Ethics Committee of the Faculty of Rehabilitation Science, Hokkaido University of Medical Science (approval No. 23R217226). All participants were given verbal and written explanations of the study aims and methods and provided consent to participate before the study began.

2. Overview of research institutions

The participants in this non-randomized controlled trial were recruited from among 88 stroke survivors admitted to the Kaifukuki Rehabilitation Ward between October 2023 and March 2024 as a preliminary study to calculate the required sample size based on the effect size. The recovery and rehabilitation unit at the study site has about 240 admissions per year, with 80% for cerebrovascular disease and 20% for orthopedic disease. The study period was during the Covid-19 pandemic, which resulted in fewer hospital admissions compared with previous years. The duration of PT, ST, and OT interventions was checked in advance by each therapist according to the content of the rehabilitation and delivered within a total of 3 hours. If the time required varied according to the rehabilitation content, adjustments were considered between the therapists and discussed with the patient.

3. Target group inclusion criteria

The following inclusion criteria had to be met between October 2023 and March 2024: (1) admission

to the Kaifukuki Rehabilitation Ward after stroke onset, (2) a stable general condition and the ability to get out of bed, (3) a score on the Mini-Mental State Examination (MMSE) of ≥ 24 (based on the cutoff for Alzheimer's disease), and (4) the ability to communicate about the availability of goals and willingness to cooperate with the survey. In addition, subjects with a history of neurological or psychiatric disorders or with complications of higher brain dysfunction (e.g. impaired consciousness, severe aphasia) were excluded. The PT, ST, and OT who participated in the study had been involved in stroke rehabilitation for at least 3 years.

4. Research procedures

4.1 Blinding

Stroke survivors admitted to the Kaifukuki Rehabilitation Ward were sham-randomized into two groups according to the order of admission to test the effects of goal setting on various psychological aspects [9]. To avoid bias, the patients were allocated according to the injured hemisphere (left or right) and scores on the Japanese version of the modified Rankin Scale (mRS).

4.2 Selection of the experimental and control groups

In this study, to compare differences in psychological aspects based on different goal-setting methods, we divided the patients into an experimental group, in which the PT, ST, and OT selected the highest priority goals proposed by the patient, and a control group, in which the goals were proposed by the PT, ST, and OT. The experimental group underwent an initial assessment within 1 week of admission to the Kaifukuki Rehabilitation Ward, where the PT, ST, and OT discussed goals and made suggestions. Next, the highest priority goals of each individual were identified, and rehabilitation interventions were implemented based on the individual's area of expertise. The priority of the goals was determined in consultation with the subject, with reference to the importance and urgency of the content of each goal [10]. In the control group, the PT, ST, and OT discussed the goals and, after proposing them to the subjects, implemented rehabilitation interventions based on their respective areas of expertise with regard to the agreed-upon content.

4.3 Goal-setting methods

Bovend'Eerd et al. advocated the use of a combination of SMART goals and Goal Attainment Scaling (GAS) [11] for goal setting and goal attainment assessment in rehabilitation [12]. The SMART law, which stands for S (specific; concrete), M (measurable), A (attainable), R (relevant; relevant to the person) and T (timely), is used internationally and considered an important concept in regard to the goals of rehabilitation

teams [13].

GAS involves a five-stage performance scale for each goal among individual subjects when setting goals. For each subject, the expected outcome after a certain period of time is set to 0, with a higher level (+1, +2) and a lower level (-1, -2).

Goal setting in the present study was carried out by conducting an initial assessment within 1 week of admission to the Kaifukuki Rehabilitation Ward and discussing goals with the PT, ST, and OT. The contents of the goals were determined based on SMART principles [13], including measurable, achievable, realistic/relevant, and with deadlines, and then combined with GAS to set achievement levels. Although GAS calculates an overall score according to the achievement of each goal, the present study did not set GAS scores as an outcome because this study only aimed to examine short-term effects on aspects of psychology. The final overall assessment of goal attainment was performed after the study period had ended, depending on the progress of rehabilitation. The goals were not limited and were decided according to the participants. The contents of the subjects' goals were classified into the International Classification of Functioning (ICF) Disability and Health domains of physical function/structure, activity, and participation.

4.4 Evaluation items

The following baseline characteristics were assessed: age, sex, time since onset, diagnosis, affected hemisphere, type of stroke, MMSE score, mRS score, and Functional Independence Measure (FIM) score. The primary outcome was the score on the Pittsburgh Rehabilitation Participation Scale (PRPS), and the secondary outcomes were scores on the Hospital Anxiety and Depression Scale (HADS) and the General Health Questionnaire-12 (GHQ-12) [14–16].

The PRPS is a quantitative scale that assesses attitudes toward participation in rehabilitation on a six-point scale, from 1 = no participation to 6 = excellent participation. The PRPS scoring method followed the method developed by Lenze [14] and was calculated as an average by dividing the total score assessed over 7 consecutive days of rehabilitation by the number of times it was performed. If there was any doubt about the decision, the lower value was used. As the measurement period was set to 7 days, another therapist took the measurements when the lead therapist was on holiday. Therefore, measurements were taken by all therapists who were responsible for

rehabilitation during the study period.

The HADS is a seven-item self-rating scale for anxiety (HADS-A) and depression (HADS-D) [15]. The Japanese version of the HADS has been used as an outcome in goal-directed intervention studies and has been validated for comorbid validity, correlation by retest methods, and internal consistency by Cronbach's alpha coefficient [16]. Measurements were taken during occupational therapy for each subject. A score of 8–10 was considered a suspected diagnosis and a score of ≥ 11 was considered a confirmed diagnosis.

The GHQ-12 is a 12-item questionnaire assessing mental health. Measurements were taken during occupational therapy for each subject using the GHQ scoring method. Scores range from 0 to 12. The Japanese version of the GHQ-12 has been validated for validity and reliability [17].

The primary and secondary outcomes were initially assessed approximately 1 week after admission to the Kaifukuki Rehabilitation Ward. Both groups then set goals and were reassessed after 1 week of rehabilitation based on the goals. The timetable for this study is shown in Table 1.

4.5 Statistical analysis

The normal distribution of the baseline data was confirmed by the Shapiro—Wilk test. Differences were analyzed using the Wilcoxon rank-sum test for continuous variables and the chi-square test for binary variables. The Wilcoxon signed-rank test was used for differences in before and after comparisons within the same group. The Mann—Whitney *U* test was used for differences between groups in the pre- and post-comparisons. Effect sizes of 0.1, 0.3, and 0.5 were interpreted as small, medium, and large, respectively. The sample size was calculated after data collection using G-power [18].

Results

1. Characteristics of the target population

Of the 88 patients who were admitted to the Kaifukuki Rehabilitation Ward during the study period from October 2023 to March 2024, 56 who did not meet the inclusion criteria were excluded, leaving 32 for inclusion in the analysis. The exclusion factors were a substandard MMSE score, orthopedic disease as the main illness, difficulty in setting initial goals, and aphasia. No subjects dropped out during the

Table1. Timetable for this study.

Admitted to hospital	One week after	Two weeks after	Three weeks after
Admitted to a recovery phase rehabilitation ward	Initial assessment and goal setting in both groups	Goal-based rehabilitation interventions.	Reassessment

intervention period (Figure 1).

2. Baseline characteristics

The baseline characteristics and MMSE, FIM, and mRS scores for the experimental and control groups are shown in Table 2. No significant differences in baseline characteristics or scores were found between the two groups.

3. Classification of goal contents

The results of the classification of the goal contents set in both groups into the ICF domains of physical function/structure, activity, and participation are shown in Table 3. Both groups had the same number of activity and participation level goals, but the control group had a higher proportion of functional level goals than the experimental group. FIM and mRS scores by number of goals in each group are shown in Table 4. The number of goals in the experimental group was prioritized, with four participants choosing only one goal. The goals were return to driving and work for two participants each. The four participants had no functional impairment or activity limitation affecting the performance of daily activities with FIM at the modified independent or independent level, and the purpose was to receive support on return to work and driving.

4. Outcome comparison

Table 5 shows a comparison of pre- and post-intervention scores within each group. Both the experimental and control groups showed significant improvements for all outcomes. Table 6 shows the results of group comparisons of pre- and post-intervention scores. The results indicated no significant difference in pre-intervention scores for the experimental and control groups, but the PRPS showed

a significant difference ($p < 0.001$) in post-intervention scores. No significant differences in HADS-A, HADS-D, or GHQ-12 scores were observed. The PRPS effect size was calculated using the test statistic $Z(4.41)$, with $r = 0.78$ indicating a large effect size.

5. Sample size

To estimate the sample size required for a randomized controlled trial with adequate power, this study used G-power based on an effect size for the primary outcome of PRPS ($r = 0.78$), a significance level of 0.05, and a power of 0.8. As a result, a sample size of 46 participants per group was required.

Discussion

This study investigated the short-term psychological effects of goal setting through PTs, STs, and OTs on stroke survivors in a recovery rehabilitation unit. The findings indicated that the primary and secondary outcomes improved in both groups. In addition, the experimental group scored significantly higher than the control group on the PRPS, an objective measure of treatment engagement.

1. Primary outcome

Previous reports investigating goal setting in rehabilitation settings have examined the practice of PTs or OTs alone [5], but goal setting for stroke survivors in the Kaifukuki Rehabilitation Ward is carried out by doctors, nurses, PTs, STs, and OTs [19]. The content of goals has also been shown to be broad, including physical function, communication, ambulation, self-care, household activities, work, and leisure activities [20], and the number of goals set by multiple professions and patients tends to increase [21]. Therefore, setting rehabilitation goals requires

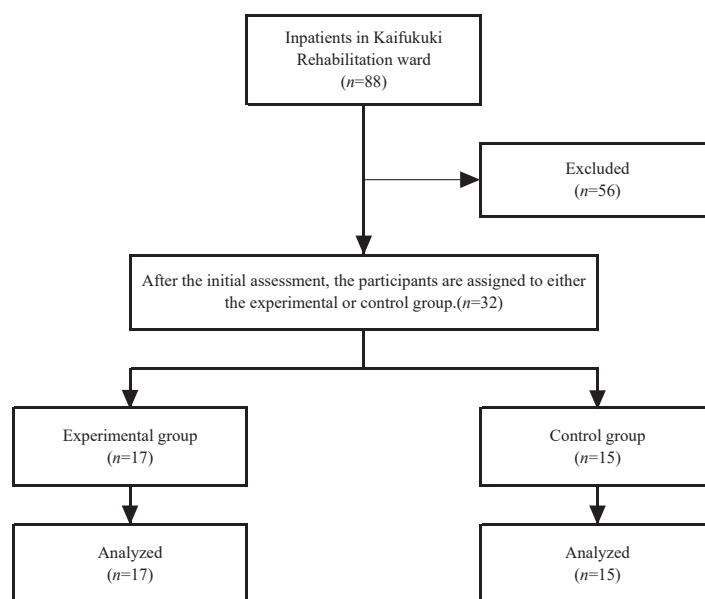


Figure 1. flowchart.

Table 2. Baseline assessment of each group.

	Experimental group (n=17)	Control group (n=15)	p value
Age (years), mean (SD)	69.6 (±14.9)	76.7 (±7.5)	0.278
Sex, n (%)			
Male	10 (59%)	8 (53%)	0.755
Female	7 (41%)	7 (47%)	
Time from onset (days), mean (SD)	27.6 (±21.0)	20.3 (±10.0)	0.411
Damaged hemisphere			
Right	9	8	0.982
Left	8	7	
Stroke type			
Hemorrhage	6	5	0.907
Infarction	11	10	
MMSE, median (IQR)	28.0 (5.0)	27.0 (4.0)	1.000
FIM, median (IQR)	70.0 (19.0)	86.0 (32.5)	0.261
mRS, median (IQR)	4.0 (2.0)	3.0 (2.0)	0.278
PRPS, median (IQR)	3.5 (1.00)	3.0 (1.0)	0.551
HADS anxiety, mean (SD)	6.59 (±2.92)	7.20 (±2.57)	0.502
HADS depression, mean (SD)	7.71 (±2.89)	8.67 (±2.16)	0.37
GHQ12, median (IQR)	5.0 (3.0)	4.0 (2.0)	0.97

* $p < .05$,

MMSE, Mini-Mental State Examination; FIM, Functional Independence Measure; mRS, modified Rankin Scale; PRPS, Pittsburgh rehabilitation participation scale; SD, Standard deviation; HADS anxiety, Hospital anxiety depression scale; HADS depression, Hospital anxiety depression scale; GHQ12, General Health Questionnaire 12.

Table 3. Comparison of target content set by both groups.

	Experimental group (n=17)	Control group (n=15)
Body functions/structures	8 (12.1%)	21 (26.5%)
Activities	46 (69.6%)	44 (56.4%)
Participation	12 (18.1%)	14 (17.7%)
Total number of goals	66	79

The goals for each group were categorized into the domains of physical function/structure, activity, and participation.

Table 4. FIM and mRS by number of targets in each group.

Number of goals	Experimental group (n=17)			Control group (n=15)	
	1	2–5	6–9	2–5	6–9
FIM, median (IQR)	113 (11.5)	68.5 (18.75)	70 (10.0)	87.0 (24.5)	77.5 (25.5)
mRS, median (IQR)	1.0 (1.0)	4.0 (0.0)	4.0 (1.0)	2.0 (1.5)	3.5 (2.0)

FIM, Functional Independence Measure; mRS, modified Rankin Scale.

consensus building and an action plan to achieve the goals. In fact, compliance with the program is higher when goals are set jointly by the patient and therapist than when set at the initiative of the therapist [22]. Therefore, in the present study, the experimental group was considered to be more motivated to participate in treatment than the control group. In addition, reports of improved physical outcomes as a result of patients'

active participation in training and increased activity levels may have been influenced by an increased willingness to participate as a result of the effects of rehabilitation [23]. In addition, in stroke survivors, PRPS scores are known to be associated with cognitive and motor function and to influence the prognosis of activities of daily living (ADL) [24]. When setting goals with PTs, STs, and OTs, improved motivation to

Table 5. Outcome change one week after target setting in each group.

	Experimental group		Pre-Post <i>p</i> value	Control group		Pre-Post <i>p</i> value
	(n=17)			(n=15)		
	Pre test	Post test	Pre test	Post test		
PRPS, median (IQR)	3.5 (1.00)	5.0 (0.0)	0.001	3.0 (1.0)	4.0 (1.0)	0.025
HADS anxiety, mean (SD)	6.59 (±2.92)	5.06 (±2.51)	0.003	7.20 (±2.57)	6.47 (±2.45)	0.005
HADS depression, mean (SD)	7.71 (±2.89)	5.76 (±2.68)	0.001	8.67 (±2.16)	7.47 (±2.36)	0.002
GHQ12, median (IQR)	5.0 (3.0)	3.0 (1.0)	0.003	4.0 (2.0)	4.0 (1.0)	0.005

PRPS, Pittsburgh rehabilitation participation scale; SD, Standard deviation; HADS anxiety, Hospital anxiety depression scale; HADS depression, Hospital anxiety depression scale; GHQ12, General Health Questionnaire 12.

Table 6. Comparison of outcome change one week after target setting in each group.

	Comparison of experimental and control groups			
	Pre test <i>p</i> value	Effect size (r)	Post test <i>p</i> value	Effect size (r)
PRPS	0.551	0.12	<.001	0.78
HADS anxiety	0.502	0.12	0.142	0.27
HADS depression	0.37	0.06	0.069	0.33
GHQ12	0.97	0.17	0.132	0.28

PRPS, Pittsburgh rehabilitation participation scale; SD, Standard deviation; HADS anxiety, Hospital anxiety depression scale; HADS depression, Hospital anxiety depression scale; GHQ12, General Health Questionnaire 12.

participate due to the inclusion of high-priority life goals may be related to motor function and ADL over the long term.

2. Secondary outcomes

One of the secondary outcomes, HADS scores, improved in each group before and after goal setting, but no significant differences were observed between the different goal-setting methods. Post-stroke anxiety symptoms occur in 36.7% of patients 2 weeks after stroke onset and in 24.1% at between 2 weeks and 3 months [25]. The participants in the present study were classified as having “no anxiety or depression” or “suspected diagnosis” at baseline, and none had symptoms of anxiety or depression that would be considered a “confirmed diagnosis,” suggesting that differences in goal-setting methods did not lead to changes in HADS scores.

Similar to the HADS, GHQ-12 scores improved in each group before and after goal setting, but no significant differences were seen between the different goal-setting methods. Rehabilitation practice for neurological conditions such as stroke has been shown to improve quality of life (QOL) over time [26]. In addition, a report examining the impact of goal setting on QOL showed that not only the importance of goals, but also the achievement of goals, was a predictor [27]. As this was a short-term efficacy study, the intervention may not have resulted in an improvement

in QOL related to goal attainment.

3. Short-term effects of goal setting

This study examined the short-term effects of goal setting within 1 week of admission to the Kaifukuki Rehabilitation Ward. In a previous report involving recovering stroke survivors, high motivation to participate at the start of rehabilitation had a positive effect on subsequent improvements in ADL [28]. Therefore, it is considered important to be involved from the outset with an awareness of goal setting, as an early increase in treatment engagement may influence later rehabilitation outcomes.

4. Sample size

This study used G-power based on the effect size of the PRPS ($r = 0.78$), a significance level of 0.05, and a power of 0.8 for the primary outcome, which required a sample size of 46 participants in each group, for a total of 92 participants. Improved outcomes have been reported in studies on goal setting outside of Japan, including a randomized controlled trial of 77 patients [29]. In addition, a study involving 87 subjects using semi-structured interviews with the Canadian Occupational Performance Measure showed that goal setting was effective for identifying ADL tasks [30], and the 92 subjects obtained in the present study was similar in number to that in previous studies.

5. Limitations

The study has several limitations. First, the study design was an unblinded, non-randomized controlled trial, which made it difficult to conceal the allocation of the target methods. Second, the FIM and mRS scores of the 32 subjects were predominantly at the low to moderate level of assistance; therefore, the results of this study may not apply to patients requiring substantial assistance. Third, 56 of the 88 patients admitted to the Kaifukuki Rehabilitation Ward in this study were excluded because they were below the MMSE cutoff score or had concomitant orthopedic conditions. In addition, due to the small sample size, at this stage, it may be difficult to apply the results of this study to the clinical setting. Future randomized controlled trials based on the sample size obtained in this study should be conducted for further validation. Fourth, the results may have been affected by the subject's functional disability and level of independence in ADL. A previous report in Japan compared and validated goal-setting interventions focusing on work, functional disability, and ADL in stroke survivors [31]. In the present study, the functional training goals proposed by the therapists and the goals of the ADLs may have influenced the content of the goals selected. It has also been suggested that goal setting for stroke survivors is not patient-centered and only focuses on short-term functional aspects [32]. In the present study, although allocations were made to avoid biases associated with mRS scores and left–right hemisphere damage, it was not possible to validate goal setting by the level of independence in ADL. To investigate further the impact of goal setting on aspects of psychology, measures such as categorization by level of functional impairment and independence in ADL are needed. Fifth, this was a preliminary study conducted to validate sample size. As the generalizability of the results is limited, future validation of efficacy based on sample size is required.

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