Effects of Teach-Back Education on Exercise Adherence and Quality of Life in Elderly Patients with Post-Stroke Hemiplegia: A Postprint

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Abstract

Objective: To investigate the effects of teach-back education on exercise compliance and quality of life in elderly post-stroke hemiplegic patients.

Methods: Using convenience sampling, 80 elderly post-stroke hemiplegic patients admitted to the hospital from September 2020 to February 2021 were selected as study subjects, numbered according to admission order, and randomly divided into a control group and an intervention group, with 40 cases in each group. The control group received conventional health education, while the intervention group received education combining conventional methods with the teach-back method. Through 3 months of follow-up, the Rehabilitation Exercise Compliance Scale, National Institutes of Health Stroke Scale (NIHSS), Fugl-Meyer Assessment (FMA), Modified Barthel Index (MBI), and Stroke-Specific Quality of Life Scale (SS-QOL) were used to compare the effects on exercise compliance, neurological function, limb motor function, self-care ability, and quality of life between the two groups.

Results: The exercise compliance rate in the intervention group was 85.00% (34/40), which was higher than the 72.50% (29/40) in the control group, and the difference was statistically significant ($P < 0.01$).

Full Text

Abstract

Objective: To explore the effect of teach-back education on exercise compliance and quality of life in elderly patients with hemiplegia after stroke.

Methods: Using convenient sampling, elderly patients with post-stroke hemiplegia admitted to a hospital were selected and randomly divided into a control group (n =) and an intervention group (n =) based on admission order. The

control group received routine health education, while the intervention group received teach-back education in addition to routine care. After a -month follow-up, the rehabilitation exercise compliance scale, National Institutes of Health Stroke Scale (NIHSS), Fugl-Meyer Assessment (FMA), Modified Barthel Index (MBI), and Stroke-Specific Quality of Life Scale (SS-QOL) were used to compare exercise compliance, neurological function, limb motor function, self-care ability, and quality of life between the two groups.

Results: The exercise compliance rate in the intervention group was %, significantly higher than the % in the control group (P <). After intervention, NIHSS scores decreased in both groups, with the intervention group's scores significantly lower than the control group's (P <). FMA and MBI scores increased in both groups after intervention, with the intervention group's scores significantly higher than the control group's (P <). The total SS-QOL score in the intervention group was significantly higher than that in the control group (P <).

Conclusion: Applying teach-back education in patient health education has important clinical significance and promotional value for improving exercise compliance, promoting healthy behaviors, and enhancing quality of life in elderly patients with hemiplegia after stroke.

Keywords: teach-back method; health education; elderly; stroke; hemiplegia; compliance; quality of life

Introduction

Stroke is a common clinical cerebrovascular disease characterized by sudden onset, rapid progression, and high mortality [1]. Most survivors experience varying degrees of sequelae, with the majority presenting hemiplegia [2]. Hemiplegia causes limb dysfunction or partial loss of function, such as loss of walking ability and working capacity, which seriously affects patients' physical and mental health and quality of life [3]. Early rehabilitation exercise for stroke patients can help promote functional compensation and reorganization of the central nervous system, alleviate muscle spasticity, reduce disability rates, and lower recurrence rates [4]. However, due to various stress factors and pressures, patients often demonstrate poor compliance with limb rehabilitation exercises after receiving health education.

Teach-back education typically involves health professionals providing health education content to learners, then having learners express their understanding in their own words. Educators then re-emphasize information that was misunderstood or not understood until learners can correctly grasp all educational information [5]. As a common health education method to improve patient self-management skills, it has been promoted in various fields [6]. This study applied teach-back education to health education management for elderly patients with post-stroke hemiplegia to explore its application effects and provide evidence for improving clinical health education effectiveness.

1. Materials and Methods

1.1 Study Design and Participants

Using convenient sampling, elderly patients with post-stroke hemiplegia admitted to a tertiary hospital in Shanghai from to were selected as study subjects. Inclusion criteria: (1) First stroke onset, diagnosed according to the Chinese Guidelines for Diagnosis and Treatment of Acute Ischemic Stroke [7] and confirmed by cranial CT or MRI; (2) Conscious and able to communicate without barriers; (3) Aged $\geq$ years, with limb hemiplegia; (4) Informed consent and voluntary participation, able to accept health education and cooperate with assessments. Exclusion criteria: (1) Coma or confusion, unable to express themselves; (2) Combined allergic diseases, systemic infectious diseases, or other comorbidities affecting limb recovery; (3) Complete paralysis; (4) Non-cooperation with the study.

Patients were numbered according to admission order and randomly divided into a control group and an intervention group, with cases in each group. The control group had males and females with an average age of ( ) years. The intervention group had males and females with an average age of ( ) years. There were no statistically significant differences between the two groups in stroke type, gender, comorbidities, or primary caregivers ($P > 0.05$). See for general patient information.

1.2 Interventions

Control Group: The control group received routine health education methods. Bedside nurses provided paper health education materials, explained the content orally, offered individualized guidance (including consultation during hospitalization), discharge instructions, and follow-up care. The education covered knowledge about post-stroke hemiplegia, psychological adjustment, dietary guidance, medication management, self-management, rehabilitation exercise, and complication prevention.

Intervention Group: The intervention group received teach-back education in addition to routine care.

Establishment of Teach-Back Education Team: To ensure quality and effectiveness, a teach-back education team was established with support from the hospital and department. The team included chief physicians, associate chief physicians, associate chief nurses, supervising nurses, and senior nurses (responsible for implementation). Team leaders retrieved relevant domestic and international literature on teach-back education, developed a preliminary education plan based on hospital conditions and disease characteristics, and invited experts to revise and finalize the plan. Senior nurses received training on teach-back education content and precautions, and only those who passed the assessment could participate. The team was also responsible for feedback and adjustment during implementation, as well as data analysis and organization.

Implementation of Teach-Back Education: Based on patient conditions, education team members distributed relevant educational materials on post-stroke hemiplegia functional exercise and provided face-to-face education to patients and families about post-stroke hemiplegia theories, psychological adjustment, dietary guidance, medication management, self-management, rehabilitation exercise, and complication prevention. After the education session, team members used 反问 questions such as: "What clinical symptoms can stroke cause?" "Why is early functional exercise necessary after hemiplegia? Do you understand the risks?" "What should be noted during post-stroke limb exercise?" "Besides rehabilitation exercise, what should be noted in daily life after stroke?" Patients and families were given limited time (min) to answer, allowing evaluation of their understanding. Based on their responses, the team identified content needing reinforcement for subsequent education sessions. Education continued until patients and families could fully answer all questions. Follow-up lasted months, with teach-back method applied to follow-up education content as well.

1.3 Outcome Measures

Exercise Compliance: Measured using the Stroke Rehabilitation Exercise Compliance Scale [8], which includes compliance with persistent exercise participation, active learning, and maintaining functional limb position. Using a 4-point Likert scale ("cannot do at all," "occasionally can do," "basically can do," "completely can do"), scores were positively correlated with compliance level. Compliance rates were calculated using the formula (actual score/maximum theoretical score $\times$ %) and categorized as complete, partial, or non-compliance.

Neurological Function: Assessed using the National Institutes of Health Stroke Scale (NIHSS) [9], where scores of indicate mild, moderate, and severe neurological deficits respectively. Higher scores indicate more severe neurological impairment.

Motor Function: Evaluated using the Fugl-Meyer Assessment (FMA) [10], which includes limb movement, sensation, balance, joint range of motion, and pain. Total score is points, with higher scores indicating better limb motor function.

Daily Living Ability: Assessed using the Barthel Index (MBI) [11], which evaluates activities of daily living including feeding, personal hygiene, bathing, dressing, bowel and bladder control, and toileting. Lower scores indicate poorer daily living ability.

Quality of Life: Measured using the Stroke-Specific Quality of Life Scale (SS-QOL) [12], covering energy, social role, language, emotion, activity, limb function, vision, personality, and self-care. Using a 5-point Likert scale across dimensions, scores are positively correlated with quality of life level. The scale has good reliability (Cronbach's $\alpha =$).

1.4 Statistical Analysis

SPSS software was used for data analysis. Descriptive statistics were performed for general patient data. Measurement data were expressed as mean ± standard deviation (x ± s). Independent samples t-test was used when data met normality and homogeneity of variance assumptions; otherwise, non-parametric Wilcoxon rank-sum test was used. Count data were expressed as percentages (%) and analyzed using ^{2} test. The test level was set at $\alpha = 0.05$.

2. Results

2.1 Exercise Compliance

After months, the intervention group had cases with high compliance, with a compliance rate of %, significantly higher than the control group's % (^{2} = , P <). See .

2.2 Neurological Function

After months, NIHSS scores in both the intervention and control groups were lower than before intervention (P <), and the intervention group's NIHSS scores were significantly lower than the control group's (P <). The difference was statistically significant. See .

2.3 Motor Function

Compared with before intervention, upper and lower limb motor function scores in both groups increased after intervention (P <). Compared with the control group, the intervention group's upper and lower limb motor function scores were significantly higher (P <). The difference was statistically significant. See .

2.4 Daily Living Ability

Compared with before intervention, MBI scores in both groups increased after intervention (P <). Compared with the control group, the intervention group's MBI score was significantly higher (P <). The difference was statistically significant. See .

2.5 Quality of Life

Before intervention, there were no statistically significant differences between the two groups in various dimensions of quality of life (P > 0.05). After intervention, the intervention group scored significantly higher than the control group in energy, social role, personality, activity ability, limb function, and self-care ability (P <). See .

3. Discussion

3.1 Teach-Back Education Improves Exercise Compliance in Elderly Post-Stroke Hemiplegia Patients

WHO defines compliance [13] as behavior consistent with medical advice and the degree to which patients execute recommended treatments. Knowledge about rehabilitation exercise significantly impacts exercise compliance in elderly post-stroke hemiplegia patients. This study showed that after teach-back health education intervention, patients' rehabilitation exercise compliance rate increased to %, significantly higher than the control group, consistent with domestic and international studies [14,15]. This indicates that teach-back education helps patients comprehensively understand rehabilitation exercise elements and improves compliance.

Traditional education remains primarily oral, with single-form, broad content lacking specificity and feedback, resulting in insufficient patient and family knowledge and poor exercise compliance. Teach-back education is not only a learning process but also a feedback process that actively encourages patient participation throughout health education, changing passive learning states and maximizing learning initiative [16]. Through teach-back education, post-stroke hemiplegia patients and families receive 普及 knowledge about stroke theories and rehabilitation exercise skills. Open-ended questions about rehabilitation exercise are used to assess understanding, followed by targeted health education based on disease mastery until complete understanding is achieved. This truly helps improve patients' cognition about rehabilitation exercise, recognize its importance, build confidence and motivation to overcome disease, promote healthy behaviors, and ultimately improve exercise compliance.

3.2 Teach-Back Education Improves Quality of Life in Elderly Post-Stroke Hemiplegia Patients

Quality of life refers to individuals' perceptions of life goals, expectations, and standards within certain cultural contexts and value systems, primarily including physical and psychological health, self-care ability, family and social support systems, and life satisfaction [17]. Elderly post-stroke hemiplegia patients often experience reduced quality of life due to varying degrees of limb dysfunction [18]. Effective rehabilitation exercise is crucial for symptom improvement. Hu et al. [19] found that intensive exercise training improved functional 障碍 and enhanced patients' self-care ability and quality of life.

In this study, the intervention group using teach-back education showed significantly better NIHSS scores, limb motor function, self-care ability scores, and quality of life scores compared to the control group ($P <$). These findings align with studies by Zhang et al. [20] and Wang et al. [21], primarily because teach-back education can target patients' knowledge gaps and strengthen weak areas, helping patients actively recognize disease issues and promote behavioral changes, thereby improving rehabilitation compliance, clinical indicators, and

self-care ability and quality of life. This study also found that quality of life in elderly post-stroke hemiplegia patients is affected by factors including energy, activity ability, personality, role, limb function, and self-care ability (P <). Therefore, when implementing teach-back education, we should actively consider patients' individual factors, provide personalized education, reduce or eliminate health barriers, and promote establishment of good self-health management behaviors to effectively improve quality of life.

In conclusion, teach-back education can improve cognition, exercise enthusiasm, and compliance in elderly post-stroke hemiplegia patients, enhance neurological and motor function, and improve self-care ability and quality of life. However, this study did not involve multiple centers and had relatively short intervention and observation periods, which may introduce certain biases.

Conflict of Interest Statement: The authors declare no conflict of interest.

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Note: Figure translations are in progress. See original paper for figures.