Impact of Family-Based Support on Recovery and Health in Stroke-Induced Hemiplegia: A Randomized Controlled Study

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Background: *Stroke is a long-term condition that often requires extended rehabilitation and consistent care. Engaging family members in the care process may enhance recovery and overall health outcomes. This study aimed to assess the impact of a family-centered care program on the health status of stroke patients with hemiplegia.*

Methods: *In this randomized controlled clinical trial, 40 patients with post-stroke hemiplegia were selected and randomly assigned to either an intervention or a control group. Caregivers of patients in the intervention group participated in a structured family-based care program consisting of four training sessions, each lasting 50–60 minutes, provided before hospital discharge. Following this, caregivers continued implementing the program at home for four weeks. The control group received only standard post-discharge care. Health status was measured using a standardized questionnaire before the intervention and one month after completion. Data analysis was performed using SPSS version 21 with appropriate statistical tests.*

Results: *Before the intervention, there was no significant difference in health status scores between the two groups. However, post-intervention results showed a statistically significant improvement in the intervention group compared to controls ($P < 0.05$). Additionally, within-group analysis revealed a significant improvement in the intervention group after training, while no meaningful change was observed in the control group.*

Conclusion: *Implementing structured family-based care training for caregivers can enhance patient self-care and overall health outcomes in individuals with post-stroke hemiplegia. Integrating such family-centered approaches into rehabilitation programs may strengthen recovery and long-term well-being.*

BACKGROUND

Stroke remains a major global health concern and is recognized as the third leading cause of mortality after cardiovascular diseases and cancer[1]. Worldwide, it is estimated that approximately 500,000 individuals experience their first stroke each year, with an additional 100,000 suffering recurrent episodes, and around 160,000 deaths are attributed to stroke annually[2]. Although a comprehensive national registry for stroke incidence and prevalence is lacking in Iran, regional data suggest an annual incidence ranging from 113–149 per 100,000 people across all age groups, rising to over 500 cases per 100,000 among individuals aged over 45 years[3]. Beyond its high mortality rate, stroke often results in long-term disabilities and physical impairments, creating significant challenges for both hospital and home-based care systems[4]. These functional limitations can lead to psychological distress and reduced independence, further complicating recovery[5]. Common post-stroke complications include balance and musculoskeletal issues, dysphagia, bladder and bowel dysfunction, impaired self-care ability, and skin breakdown[2,6]. Although the acute stage of stroke lasts only a few days, recovery is typically gradual and prolonged, requiring consistent

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follow-up and rehabilitation to regain functional stability [6,7]. While pharmacologic interventions are necessary for managing the acute phase and preventing secondary complications, the cornerstone of recovery lies in continuous, long-term rehabilitation[8]. Early initiation of rehabilitation activities following the acute phase is crucial for addressing residual deficits and improving patient outcomes[4,9]. Stroke often disrupts patients' daily lives and significantly affects their quality of life, underscoring the importance of comprehensive rehabilitation programs [7,10].

Research indicates that more than 60% of stroke survivors experience varying degrees of disability, emphasizing the need to integrate rehabilitation as a vital component of post-stroke care[11]. However, rehabilitation programs are often constrained by factors such as high costs, transportation challenges, and limited access to rehabilitation centers[9,12]. Consequently, developing and implementing home-based care models has become a practical and cost-effective alternative for long-term management[4].

In recent years, healthcare systems have increasingly shifted toward home-based management for patients requiring long-term and complex care, with family members serving as primary caregivers[4,13]. Family-centered care is a collaborative approach that engages patients, caregivers, and healthcare providers in planning, delivering, and evaluating care to promote overall well-being[14]. Given the enduring physical and emotional needs of stroke patients, the family serves as the most influential support system in facilitating recovery and rehabilitation[4,11]. Active involvement of family members in the care and rehabilitation process can significantly enhance the recovery and quality of life of stroke patients. Therefore, considering the growing importance of family participation in patient care and the limited evidence available, the present study was designed to evaluate the effectiveness of a family-based home care program on the health status of hemiplegic patients following stroke.

MATERIALS AND METHODS

Study Design and Setting

This randomized clinical trial was conducted from November 2015 to March 2016 at the Neurology Department of Farabi Hospital, Kermanshah, Iran, and registered under IRCT2015070214333n38. Eligible participants included patients diagnosed with hemiplegic stroke who consented to participate.

Participants and Sampling

Participants were selected based on inclusion criteria: willingness to participate, confirmed diagnosis of hemiplegic stroke, and the presence of a family caregiver meeting the following criteria—living with the patient, absence of mental disorders, ability to provide care, no use of psychotropic medication, and at least a third-grade high school education. Exclusion criteria included patient death, early discharge, or withdrawal from the study. Using data from previous studies [15], with 95% confidence and 90% power, the minimum required sample was nine per group. To strengthen statistical power and allow for dropouts, 20 participants were included in each group, totaling 40 patients. Subjects were randomly allocated to intervention and control groups using a coin-toss method.

Intervention Procedure

In the intervention group, caregivers received a structured family-based home care training program designed using standard sources[1,8,16–18]. The training content covered disease understanding, symptom management, nutrition, pressure ulcer prevention, mobility, bowel and bladder control, and psychological support. The program was validated by three neurologists, four nursing faculty members, and three neurology nurses. Training sessions lasted 50–60 minutes over four consecutive days (up to eight sessions if needed) during hospitalization. Caregivers practiced under supervision until achieving ≥95% competence on the care checklist, verified by experts. They then implemented the care plan at home for four weeks. Pamphlets and 24-hour contact access were provided for support. During the follow-up month, researchers contacted caregivers every 4–5 days to ensure continuity. Control group participants received only routine

hospital discharge instructions.

Data Collection Tools

Data were collected using a demographic questionnaire and the validated Health Status Questionnaire (SQ2/0) [19]. This 37-item tool assesses physical, psychological, and social health through subscales: general health, physical functioning, role limitations (physical and emotional), pain, vitality, mental health, social function, and health perception. Higher scores indicate better health status. Validity and reliability were confirmed in prior studies [17,20], with Cronbach's α values ranging from 0.79 to 0.94. In this study, overall reliability was re-assessed ($\alpha = 0.885$).

Data Analysis

Data were analyzed using SPSS version 21. Normality was tested with the Kolmogorov–Smirnov test. Depending on data distribution, appropriate parametric or nonparametric tests were used. A p-value <0.05 was considered statistically significant.

RESULTS

The study included a total of 40 participants, comprising 16 men (40%) and 24 women (60%), who were randomly assigned to either the intervention or control group. All participants completed the study, and no dropouts occurred during the research period.

The mean age of the patients was 66.20 ± 2.54 years (range: 16–92 years), while the mean age of caregivers was 37.28 ± 1.66 years (range: 16–57 years). Additional demographic characteristics of patients and caregivers are presented in Tables 1 and 2.

Before the intervention, the mean health status scores of both groups were comparable, showing no statistically significant difference ($p > 0.05$). However, after the intervention, the intervention group demonstrated a significantly higher mean health status score compared with the control group ($p < 0.05$). When analyzing the subscales of health status, no significant differences were found between the groups prior to the intervention. Following the intervention, significant improvements were observed across nearly all subscales in the intervention group, except for Role Limitations due to Emotional Problems and Social Function, where the differences remained nonsignificant.

Within-group analysis revealed that the control group showed no significant improvement in any subscale, except for Physical Functioning, which showed a minor change. In contrast, the intervention group exhibited significant improvements across most dimensions of health status after the intervention, except for Social Function and Energy/Fatigue, which did not reach statistical significance.

Table 1: Demographic characteristics of subjects in the experimental and control groups

Variables	Control n (%)	Experimental n (%)	Statistical Test	p-Value
Gender	-	-	$\chi^2 = 0.417$	0.519
Female	13 (65)	11 (55)	-	-
Male	7 (35)	9 (45)	-	-
Marital status	-	-	Fisher's exact test = 1.26	1
Single	0 (0)	1 (5)	-	-
Married	20 (100)	19 (95)	-	-
Place of residence	-	-	Fisher's exact test = 1.00	1
Urban	17 (85)	17 (85)	-	-
Rural	3 (15)	3 (15)	-	-
Job status	-	-	-	-

Unemployed	**0 (0)**	**1 (5)**	**-**	**-**
Housewife	13 (65)	10 (50)	-	-
Business	5 (25)	6 (30)	-	-
Retired	2 (10)	3 (15)	-	-
Economic status	-	-	$\chi^2 = 0.125$	0.723
Weak	5 (25)	6 (30)	-	-
Moderate	15 (75)	14 (70)		-
Previous illness history	-	-	$\chi^2 = 0.167$	0.192
Yes	10 (50)	14 (70)	-	-
No	10 (50)	6 (30)	-	

Table 2: Demographic characteristics of caregiver participants in the study

Variables	**Control Group n (%)**	**Experimental Group n (%)**	**Statistical Test**	**p-Value**
Gender			$\chi^2 = 0.44$	0.507
Female	12 (60)	14 (70)		
Male	8 (40)	6 (30)		
Job status				
Unemployed	3 (15)	4 (20)		
Clerk	8 (40)	9 (45)		
Employed	9 (45)	5 (25)		
Housekeeper	0 (0)	2 (10)		
Educational status			$\chi^2 = 0.404$	0.525
High school	10 (50)	12 (60)		
Higher education	10 (50)	8 (40)		
Relationship to the patient				
Parents	0 (0)	2 (10)		
Spouse	0 (0)	1 (5)		
Son/Daughter	18 (90)	18 (90)		
Sibling	1 (5)	0 (0)		

Table 3: Mean scores of health status and its aspects in experimental and control groups

Aspect	**Time**	**Experimental Group (Mean ± SD)**	**Control Group (Mean ± SD)**	**Statistical Test**	**p-Value**
General Health	Pre	3.20 ± 0.77	2.95 ± 0.95	Z = -1.005	0.315

	Post	**4.95 ± 0.69**	**3.70 ± 0.80**	**Z = -4.28**	**0.001**
Physical Functioning	Pre	10.40 ± 0.60	10.45 ± 0.83	T = -0.919	0.364
	Post	15.70 ± 1.25	14.10 ± 1.16	Z = -4.29	0.0001
Role Limitations (Physical Health)	Pre	3.65 ± 0.49	4.00 ± 0.00	Z = -1.91	0.06
	Post	4.65 ± 0.83	4.05 ± 0.22	Z = -2.93	0.003
Role Limitations (Emotional Problems)	Pre	4.00 ± 0.00	3.85 ± 0.04	Z = -1.78	0.075
	Post	3.95 ± 0.23	3.70 ± 0.57	Z = -1.88	0.06
Social Function	Pre	5.60 ± 0.60	5.50 ± 0.61	Z = -0.58	0.562
	Post	5.95 ± 0.69	5.75 ± 0.44	Z = -0.96	0.335
Bodily Pain	Pre	5.05 ± 0.69	4.75 ± 0.64	T = -1.39	0.16
	Post	6.90 ± 0.79	5.35 ± 0.69	Z = -4.61	0.001
Mental Health	Pre	16.65 ± 1.09	16.95 ± 1.19	T = 0.77	0.45
	Post	19.10 ± 1.25	16.70 ± 1.17	T = -5.75	0.001
Health Perception	Pre	9.75 ± 1.27	9.55 ± 1.36	T = 0.95	0.145
	Post	12.50 ± 0.88	10.25 ± 0.91	T = -9.83	0.0001
Energy / Fatigue	Pre	9.75 ± 0.91	9.70 ± 0.80	T = 1.50	0.148
	Post	10.60 ± 0.68	9.30 ± 1.13	Z = -2.62	0.009
Overall, Health Status	Pre	67.90 ± 2.73	67.75 ± 3.01	T = 0.055	0.956
	Post	84.10 ± 2.29	73.15 ± 2.77	T = -13.60	0.001

DISCUSSION

This study assessed the impact of a family-based care training program on the health status of hemiplegic stroke patients over a one-month follow-up period. The findings revealed that family-centered interventions, in which trained family members provided structured care at home, led to notable improvements in the overall health status of patients across most domains. These results support the value of engaging family members as active participants in post-stroke rehabilitation. The findings of this study are consistent with those of Cordun and Marinescu [12], who demonstrated that early rehabilitation interventions enhance balance and motor function in stroke patients. Similar improvements in patient well-being following caregiver training have been documented in prior studies [5,18]. Chuluunbaatar et al. [19] reported that stroke survivors often exhibit significant dependency in daily activities and experience compromised physical and mental health—an observation aligned with the current results. In another study, Chaiyawat and Kulkantrakorn [11] found that elderly stroke

patients suffer substantial impairments in both physical and social functioning. Kafami et al. [17] also observed significant improvements in all health subscales except pain and social function after implementing self-management training. These findings collectively emphasize the importance of education and rehabilitation in improving patient outcomes.

However, in the present study, the subscales of Social Function and Role Limitations due to Emotional Problems did not show statistically significant improvement. This may be attributed to reduced family social interactions during the caregiving period and the reluctance of families to discuss emotional or social challenges publicly. Social well-being is often influenced by cultural norms, economic conditions, and interpersonal relationships, which may require longer-term interventions to change effectively. The study by Clark et al. [9] similarly reported improved health status post-intervention in the control group, although the change was not statistically significant. Dunbar et al. [20], in a study on self-care education for heart failure patients with diabetes, found that physical function and quality of life significantly improved after the intervention, supporting the results of the current research.

In contrast, Forster et al. [21] found no significant reduction in dependence or caregiver burden after a one-year follow-up, suggesting that differences in intervention duration, content, and measurement methods could explain the variation in findings. Hebel et al. [22] also observed early improvements in functional status after three months of training, but these benefits diminished over a year, possibly due to decreased adherence to care routines or increased knowledge in control groups over time.

Given that stroke patients often experience significant physical limitations, this study focused on training caregivers rather than the patients themselves. A validated health status questionnaire was used to measure outcomes, with proven reliability in prior Iranian studies. Nonetheless, certain limitations should be noted. The inclusion criterion requiring literacy among caregivers may restrict the generalizability of the results. Moreover, the limited number of volunteers and the short follow-up period (one month) may have constrained the strength of the conclusions.

CONCLUSION

The results suggest that implementing a structured, family-based care and rehabilitation program for hemiplegic stroke patients can significantly enhance their overall health status. Involving family members as trained caregivers provides an effective, accessible, and sustainable approach to post-stroke rehabilitation. It is recommended that similar family-centered programs be integrated into rehabilitation plans for other patient populations with long-term care needs.

ABBREVIATIONS

IRCT: Iranian Registry of Clinical Trials
KUMS: Kermanshah University of Medical Sciences

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