



Effectiveness of Self-care Support Program on the Quality of Life and Resilience of Family Caregivers of Stroke Patient; A Randomized Controlled Trial

Ahmad Nooreddini¹, Efat Sadeghian  ^{2,3,*}, Seyed Reza Borzou ^{2,4}, Masoud Ghiasian ⁵, Ali Reza Soltanian  ⁶

¹ Student Research Committee, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran

² Chronic Diseases (Home Care) Research Center, Institute of Cancer, Avicenna Health Research Institute, Hamadan University of Medical Sciences, Hamadan, Iran

³ Department of Nursing, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran

⁴ Department of Medical-Surgical, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran

⁵ Clinical Research Development Unit of Farshchian Hospital, Hamadan University of Medical Sciences, Hamadan, Iran

⁶ Modeling of Noncommunicable Diseases Research Center, Institute of Health Sciences and Technologies, Avicenna Health Research Institute, Hamadan University of Medical Sciences, Hamadan, Iran

*Corresponding Author: Chronic Diseases (Home Care) Research Center, Institute of Cancer, Avicenna Health Research Institute, Hamadan University of Medical Sciences, Hamadan, Iran. Email: sadeghianefat@gmail.com

Received: 17 May, 2024; Revised: 27 October, 2024; Accepted: 3 November, 2024

Abstract

Background: Family caregivers of stroke patients often experience a decline in quality of life (QOL) and resilience due to the challenges posed by the patient's disability, inadequate support systems, and difficulty adapting to the new circumstances.

Objectives: This study investigated the impact of a self-care support program (SSP) for stroke patients and their family caregivers on improving their QOL and resilience.

Methods: This randomized controlled trial was conducted in Beesat Hospital, Hamadan, Iran, in 2022, involving stroke patients and their family caregivers. A total of 80 patients and 80 family caregivers were randomly assigned to either the intervention group or the control group. The intervention group received the SSP, which included four weeks of continuous face-to-face and telephone follow-up. The control group followed the routine care program provided by the neurology ward. The patients' quality of life was assessed using the stroke specific quality of life (SS-QOL) tool, while family caregivers' QOL and resilience were evaluated using the Short Form-12 and Sixbey 2005 tools, respectively, both before and after the intervention. Data were analyzed using descriptive and inferential statistics, including chi-square, paired *t*-tests, independent *t*-tests, and Fisher's exact test. The significance level was set at 0.05.

Results: Among patients, the difference in the control group's total QOL score before and after the intervention was not statistically significant ($P = 0.065$), with scores of 83.77 ± 3.39 and 86.70 ± 8.25 , respectively. Conversely, in the intervention group, the total QOL score significantly improved from 83.95 ± 1.43 to 119.72 ± 4.54 ($P < 0.0001$). For family caregivers, the total QOL score in the control group showed no significant improvement, increasing from 17.30 ± 1.60 to 18.17 ± 2.45 ($P = 0.096$). However, the intervention group experienced a significant increase in QOL scores, from 17.70 ± 1.11 to 25.37 ± 2.31 ($P < 0.0001$). Additionally, the resilience score in the control group slightly decreased from 129.15 ± 3.40 to 124.25 ± 5.31 ($P = 0.12$). In contrast, the resilience score in the intervention group increased significantly, from 130.25 ± 2.81 to 194.20 ± 2.15 ($P < 0.0001$).

Conclusions: The findings of this study demonstrate the effectiveness of the SSP in improving the QOL of stroke patients and their family caregivers while significantly enhancing the resilience of family caregivers. It is recommended that medical and treatment teams prioritize involving family caregivers in care plans for debilitating diseases such as stroke and consider integrating SSPs into standard care protocols.

Keywords: Family Caregivers, Quality of Life, Resilience, Self-care, Stroke

1. Background

Stroke ranks first among chronic neurological diseases in adults in terms of importance (1). By 2030, the number of new stroke cases is projected to rise to 23 million (2). The sudden onset of clinical symptoms associated with this disease can lead to complications in

multiple bodily systems (3). The impact of stroke often results in significant changes to an individual's mental state, cognition, mobility, self-care ability, body image, activity level, and overall sense of recovery (4).

Family caregiving is common due to the lack of sufficient supportive systems for stroke rehabilitation and care (5). The quality of life (QOL) of family caregivers

is at risk, as they bear the mental and physical strain of providing post-discharge care (6).

The QOL of family caregivers is closely linked to their resilience, a crucial trait that facilitates effective adaptation to challenging living conditions and stressful situations (3). Nurses can play a supportive role for stroke survivors and their families by tailoring training to meet their specific needs, thereby improving their QOL (7). A support program has been developed to encourage collaboration between nurses and family caregivers in the care of stroke patients (8). The program's primary goal is to foster a collaborative care approach that promotes responsibility and cooperation among nurses, patients, and family caregivers. This initiative enables home care nurses to provide ongoing support at home with the assistance and training of family caregivers and stroke patients (9).

Nursing theories can enhance the comprehensiveness of nursing interventions. One valuable model for the care of stroke patients is Orem's self-care model (10). The self-care deficit theory, a core component of Orem's model, provides a foundation for nursing interventions and care plans aimed at supporting family caregivers of stroke patients (11).

The primary target group for stroke patient care is family caregivers, as stroke often leaves patients unable to care for themselves. The self-care support program (SSP) aims to empower patients and their family caregivers by helping them recognize and address their specific care needs based on their capabilities (12). For patients with debilitating disorders such as stroke, self-care that involves identifying the educational needs of family caregivers is as crucial as medical treatment (13).

The dimensions of self-care for family caregivers of stroke patients include assisting patients with eating, mobility, medication management, physical activities, prevention of acute and chronic complications, care of other bodily systems, and prevention of wounds and other health deviations (14).

The use of self-care programs based on Orem's model is a well-established approach for supporting family caregivers. These programs provide safe, non-pharmacological, non-invasive, and cost-effective methods for delivering care. Family caregivers are a cornerstone of stroke patient care, and Orem's model offers a structured framework to guide their efforts (15).

This study focuses on a SSP designed for stroke patients and their family caregivers. The program includes components such as assessing caregivers' self-care needs, implementing nursing diagnoses, and evaluating the program's effectiveness. Stroke can significantly affect the physical, mental, and social well-being of patients, leading to a loss of independence and an increased care burden. This study was conducted with the hypothesis that the SSP, based on Orem's model, positively impacts the QOL of stroke patients, enhances the QOL of their family caregivers, and improves caregivers' resilience.

2. Objectives

This study aims to investigate the effectiveness of SSPs on the QOL and resilience of family caregivers of stroke patients.

3. Methods

3.1. Study Design

The present study was a clinical trial with a two-group pre-test-post-test design conducted at Besat Hospital of Hamadan in Iran from May to September of 2022. The sample size, under the supervision of the statistics professor, including 10% sample loss, 95% test power, and type 1 error and type 2 error, resulted in a total sample of 80 patients and 80 family caregivers who were placed in two groups of 40 intervention and control (16).

The intervention and control groups who met the inclusion and exclusion criteria were divided into intervention and control groups through 3-block randomization (Figure 1).

3.2. Inclusion Criteria

The inclusion criteria for this study were: (1) Family caregivers who have completed at least primary education, are over 18 years old, and have a family relationship with the patient (daughter, son, sister, brother, father, mother, or spouse); (2) caregivers must be the primary caregivers for the patient in the family, providing care for at least four days a week for a minimum of 2 months; (3) caregivers should not have a history of specific psychiatric disorders and should not be employed or associated with medical centers; (4) the

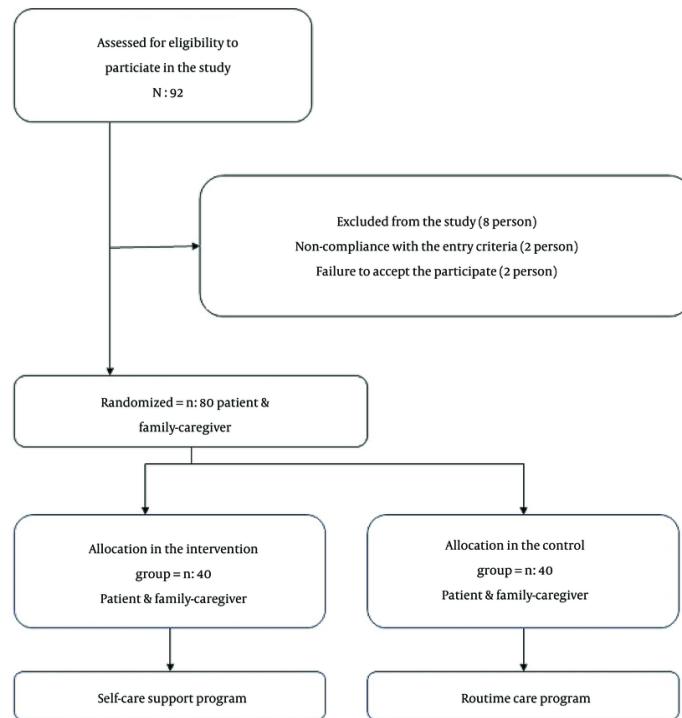


Figure 1. Follow-up of participant in the research evolution and consort diagram

family caregivers must remain the same in the hospital and at home and have access to a mobile phone; (5) patients who have experienced a stroke for the first time have a moderate level of dependency according to the Barthel criteria (including the ability to speak); (6) patients should currently be hospitalized in the neurology department; (7) patients should not have a history of mental illness based on medical documentation; (8) patients should not receive home care from a nurse other than the family caregiver; (9) at least two months must have passed since the use of the tissue plasminogen activator and the acute phase of the stroke.

3.3. Exclusion Criteria

The exclusion criteria for this study were as follows: (1) Any problem that leads to the termination of participation from the study at any time (such as death or transfer to another city); (2) lack of desire to continue participating in the study.

3.4. Data Collection

In this study, patients diagnosed with stroke and their family caregivers were admitted to the neurology department. The purpose and method of participation were explained to the participants to ensure their privacy. A questionnaire was used to collect demographic information and evaluate the functional abilities of patients and caregivers. After two months, Follow-Up Questionnaires were completed to assess the QOL of patients and caregivers, as well as caregivers' resilience. Self-care examinations were also performed.

The participants were divided into two groups: (1) An intervention group, and (2) a control group, based on their scores in the Barthel Index. The intervention group received face-to-face sessions at the neurology clinic to assess and support caregivers and patients in self-care. The control group followed the routine care program of the neurology ward. A total of 160 questionnaires were distributed, with a 100% response rate (Table 1).

Table 1. Self-care Support Program

The Self-care Support Program	Context
Assessment	In this study phase, the self-care needs of stroke patients and family caregivers were investigated. The findings from the evaluation were used to prepare a plan for the self-care program (17).
Design	The self-care program is designed as an education plan, which includes selecting the appropriate type of education and nursing care (17).
Implementation	Depending on the patient's condition, after discharge, two training sessions were held at the time of visiting the clinic or at home. These 30-minute sessions were conducted based on the needs of patients and family caregivers (17).
Evaluation	Based on the achievement of goals in the field of reducing needs and increasing abilities, scoring was done, and re-completion of quality of life and resilience questionnaires was done for the target group based on their desire, face to face or by phone (17).

3.5. Instruments

3.5.1. Barthel Index

The first part of the study focused on the patients, including demographic information and a questionnaire based on the Barthel Index, which evaluates ten basic activities of daily living (3). The scoring range for the Barthel Index is from 0 to 100, with 100 indicating complete independence. Scores between 100 and 60 suggest partial dependence, scores from 55 to 40 indicate moderate dependence, scores from 35 to 20 indicate severe dependence, and scores below 20 indicate total dependence.

Participants selected for this study were those with moderate dependence scores and the ability to speak. This questionnaire was completed upon the patient's entry into the study, prior to randomization. The validity and reliability of the Barthel Index have been confirmed in previous research by Tagharrobi et al. The agreement coefficient between evaluators for each item was above 0.6 (kappa). The internal consistency coefficient of the tool was calculated to range from 0.96 to 0.99, and reliability was also confirmed through correlation methods with the Overall Scale (17, 18).

3.5.2. Stroke Specific Quality of Life Scale

Stroke patients completed the SS-QOL Questionnaire, which uses a Likert Scale ranging from 1 to 5. The total score is calculated by summing the scores from all 12 dimensions and 49 items, yielding a range of 49 to 245. Patients completed this questionnaire upon entering the study and before random allocation. The validity of

the SS-QOL was confirmed by Ewert et al. in a 2007 study conducted in America. Additionally, Pedersen et al. in Norway evaluated the internal consistency of the questionnaire using Cronbach's alpha, which resulted in a coefficient of 0.89 (19, 20). In Iran, Azimi et al. assessed the reliability of the questionnaire, reporting a Cronbach's alpha coefficient of 0.95 and a retest correlation rate of 0.68 after three weeks (21).

3.5.3. SF-12 Quality of Life

This questionnaire consists of 8 subscales. The overall QOL score is categorized as good (37 - 48), average (25 - 36), or poor (12 - 24) based on the total score. Kontodimopoulos et al. confirmed the construct validity and reliability of the SF-12 in Greece, reporting Cronbach's alpha coefficients of 0.85 and 0.75, respectively (22). In Iran, Montazeri et al. also validated the questionnaire, with the test-retest method confirming its desirable reliability (23).

3.5.4. Family Caregivers' Resilience Scale

The Resilience Questionnaire consists of 66 items that assess family resilience across three areas: Communication and problem-solving, social and religious resources, and acceptance. This tool uses a Four-Point Likert Scale ranging from strongly disagree (1) to strongly agree (4). The total score, summing all dimensions, ranges from 66 to 264. Sadat Hosseini and Hosseini chari standardized this scale in Iran, reporting a Cronbach's alpha coefficient of 0.93 for the entire scale and subscale alpha coefficients ranging from 0.76 to 0.93 (24). Before the study commenced, the questionnaires were reviewed by faculty members, and their validity was confirmed by 10 nursing faculty members. The reliability of the questionnaires was tested by calculating the correlation coefficient, which was $\alpha > 0.9$ in all cases.

3.6. Ethical Statement

This study is part of an approved thesis with the code 140106014209 at Hamadan University of Medical Sciences. Ethical approval was obtained from the Research Deputy Ethics Committee of Hamadan University of Medical Sciences (code: IR.UMSHA.REC.1401.240). Additionally, approval was secured from the Iranian Clinical Trials Center

Table 2. Demographic Characteristics of The Participants

Variables and Groups	Intervention	Control	Chi-square Test	P-Value ^a
Patients				
Sex			2.212	0.263
Male	23 (57.5)	18 (45)		
Female	17 (42.5)	22 (55)		
Marital status			2.354	0.154
Married	33 (82.5)	38 (95)		
Single	7 (17.5)	2 (5)		
Income			2.412	0.372
Low	14 (35)	20 (50)		
Medium	5 (12.5)	3 (7.5)		
Much	21 (52.5)	17 (42.5)		
Disease along			2.520	0.392
HTN	10 (25)	7 (17.5)		
DM	2 (5)	4 (10)		
HPL	6 (15)	10 (25)		
HF	3 (7.5)	3 (7.5)		
Multiple disease	18 (45)	12 (30)		
Non-disease	1 (2.5)	4 (10)		
Disabilities			3.413	0.881
Right hemiplegia	7 (17.5)	6 (15)		
Left hemiplegia	7 (17.5)	6 (15)		
Visual disorder	5 (12.5)	7 (17.5)		
Mobility disorder	6 (15)	7 (17.5)		
Urinary disorder	6 (15)	3 (7.5)		
Multiple disorder	9 (22.5)	11 (27.5)		
Family caregivers				
Sex			1.251	0.371
Male	22 (55)	17 (42.5)		
Female	18 (45)	23 (57.5)		
Family relationship			2.546	0.770
Spouse	8 (20)	8 (20)		
Brother	1 (2.5)	0		
Sister	1 (2.5)	0		
Parents	1 (2.5)	1 (2.5)		
Children	23 (57.5)	26 (65)		
Others	6 (15)	7 (17.5)		
Education level			2.654	0.265
High school	26 (65)	22 (55)		
Diploma	3 (7.5)	8 (20)		
Master's & bachelor's degree	11 (27.5)	10 (25)		
Income			3.738	0.154
Low	10 (25)	10 (25)		
Medium	20 (50)	21 (52.5)		
Much	10 (25)	9 (22.5)		
Care days			2.421	0.930
< 2 days in week	4 (10)	6 (15)		
2 - 5 days in week	1 (2.5)	6 (15)		
> 5 days in week	35 (87.5)	28 (70)		

Abbreviations: HTN, hypertension; DM, diabetes mellitus; HPL, hyperlipidemia; HF, heart failure.

^a Significant: P < 0.05.

(registration number: [IRCT20220903055859N1](https://www.irctc.ir/IRCT20220903055859N1)) before any intervention began.

3.7. Statistical Analysis

A database was created using Excel, and statistical analyses were performed with SPSS version 16. Mean and

standard deviation were used to describe quantitative variables, while frequency and percentage were used for qualitative variables. Chi-square and Fisher's exact tests were employed to compare qualitative variables between groups. For data with a normal distribution, independent *t*-tests were used to compare means between the two groups, and paired *t*-tests were used to

Table 3. Mean and Standard Deviation of Quality of Life Variable of Stroke Patients and Its Subscales

Variables	Intervention		Control		P-Value		F ^a	Statistical-Test ^b
	Before Intervention	After Intervention	Before Intervention	After Intervention	Intervention	Control		
Energy	5.42 ± 0.54	7.00 ± 1.10	5.42 ± 0.67	5.67 ± 0.82	< 0.0001	0.057		
Family role	5.02 ± 0.89	7.02 ± 1.04	5.17 ± 0.95	5.32 ± 1.04	< 0.0001	0.061		
Speaking	8.72 ± 0.81	12.80 ± 1.28	8.82 ± 1.05	8.87 ± 1.11	< 0.0001	0.076		
Mobility	10.35 ± 0.62	15.65 ± 1.40	10.27 ± 0.64	11.10 ± 1.15	< 0.0001	0.081		
Creation	8.40 ± 0.49	12.67 ± 1.34	8.15 ± 0.69	8.15 ± 0.92	< 0.0001	0.077		
Personality	4.87 ± 0.51	7.25 ± 1.12	5.15 ± 0.86	4.5 ± 1.19	< 0.0001	0.056		
The self-care	8.62 ± 0.74	11.57 ± 1.33	8.35 ± 0.80	7.55 ± 1.19	< 0.0001	0.069	1.312	48.162
Social role	10.37 ± 0.62	15.02 ± 1.40	10.45 ± 0.93	9.72 ± 1.39	< 0.0001	0.051		
Thinking	8.62 ± 0.80	12.27 ± 0.93	8.45 ± 0.84	11.10 ± 1.42	< 0.0001	0.082		
Upper limb function	4.82 ± 0.67	7.90 ± 1.00	4.90 ± 0.63	5.52 ± 1.35	< 0.0001	0.059		
Visual	4.72 ± 0.45	7.92 ± 1.07	4.70 ± 0.51	5.20 ± 0.93	< 0.0001	0.078		
Working power	3.97 ± 0.15	5.62 ± 0.92	3.92 ± 0.26	3.97 ± 0.27	< 0.0001	0.056		
Total score	83.95 ± 1.43	119.72 ± 4.54	83.77 ± 3.39	86.70 ± 8.25	< 0.0001	0/065		

^a Homogeneity of variance test.^b Independent t-test.**Table 4.** Mean and Standard Deviation of Quality of Life Variable of Family Caregivers

Variables	Intervention		Control		P-Value		F ^a	Statistical-Test ^b
	Before Intervention	After Intervention	Before Intervention	After Intervention	Intervention	Control		
General understanding of your health	1.62 ± 0.49	2.20 ± 0.66	1.52 ± 0.50	1.62 ± 0.49	< 0.0001	0.074		
Physical performance	2.50 ± 0.87	4.10 ± 1.27	2.60 ± 1.03	3.10 ± 1.35	< 0.0001	0.053		
Physical health	3.00 ± 0.90	3.45 ± 0.56	2.87 ± 0.85	3.05 ± 0.84	< 0.0001	0.068		
Emotional problems	3.12 ± 0.64	3.65 ± 0.50	3.00 ± 0.78	2.97 ± 0.65	< 0.0001	0.071		
Physical pain	1.45 ± 0.50	2.55 ± 0.51	1.42 ± 0.50	1.50 ± 0.50	< 0.0001	0.082	46.841	46.841
Social performance	1.15 ± 0.36	2.12 ± 0.57	1.12 ± 0.33	1.22 ± 0.42	< 0.0001	0.069		
Vitality and vital energy	1.52 ± 0.50	2.22 ± 0.61	1.47 ± 0.50	1.50 ± 0.50	< 0.0001	0.323		
Mental health	3.32 ± 0.52	4.95 ± 1.01	3.27 ± 0.50	3.20 ± 0.82	< 0.0001	0.520		
Total score	17.70 ± 1.11	25.37 ± 3.31	17.30 ± 1.60	18.17 ± 2.45	< 0.0001	0.096		

^a Homogeneity of variance test.^b Independent t-test.

compare pre- and post-intervention means within each group. A homogeneity of variance test was also conducted due to the lack of significant differences in pre-test scores between the two groups.

4. Results

4.1. Participant General Information

The two study groups showed no statistically significant differences in terms of age, gender distribution, marital status, income, co-morbidities, and disabilities among patients. Similarly, there were no significant differences in gender, relationship with the patient, income, care days, and education level among family caregivers ($P > 0.05$). Specific data are presented in [Table 2](#).

4.2. Scores of Stroke Specific Quality of Life, SF-12, and Resilience

In the control group, certain aspects of the patients' QOL improved before and after the intervention; however, these improvements were not statistically significant. A decrease was observed in various dimensions, including personality, self-care, and social roles. The total QOL score in the control group before and after the intervention was 83.77 ± 3.39 and 86.70 ± 8.25 , respectively, with no statistically significant difference ($P = 0.065$). Conversely, the intervention group experienced significant improvements across all quality-of-life dimensions. The total QOL score in the intervention group before and after the intervention

Table 5. Mean and Standard Deviation of Resilience Variable of Family Caregivers

Variables	Intervention		Control		P-Value		F ^a	Statistical-Test ^b
	Before Intervention	After Intervention	Before Intervention	After Intervention	Intervention	Control		
Communication and problem-solving	87.37 ± 2.28	132.3 ± 6.70	86.97 ± 2.55	81.30 ± 3.42	< 0.0001	0.078		
Social religious resources	25.75 ± 1.56	44.2 ± 1.86	25.35 ± 1.58	25.92 ± 2.45	< 0.0001	0.063	1.436	47.758
Accepting the problem	17.12 ± 0.82	27.7 ± 1.99	16.82 ± 1.11	17.02 ± 1.21	< 0.0001	0.059		
Total score	130.25 ± 2.81	194.20 ± 9.15	129.15 ± 3.40	124.25 ± 5.31	< 0.0001	0.12		

^a Homogeneity of variance test.

^b Independent t-test.

was 83.95 ± 1.43 and 119.72 ± 4.54 , respectively ($P < 0.0001$). Detailed data are shown in [Table 3](#).

As shown in [Table 4](#), there were no statistically significant differences in the quality-of-life dimensions for family caregivers in the control group. For instance, emotional problems and mental health showed a decline, and the total QOL score before and after the intervention was 17.30 ± 1.60 and 18.17 ± 2.45 , respectively ($P = 0.096$). However, in the intervention group, all quality-of-life dimensions improved significantly. The total QOL score before and after the intervention in this group was 17.70 ± 1.11 and 25.37 ± 2.31 , respectively ($P < 0.0001$).

As shown in [Table 5](#), a decrease was observed in the control group of family caregivers in dimensions such as communication, problem-solving, and religious and social resources.

Additionally, the total resilience score in the control group decreased from 129.15 ± 3.40 to 124.25 ± 5.31 after the intervention ($P = 0.12$). However, in the intervention group of family caregivers, all dimensions of resilience, including the total score, showed significant improvement. The resilience score in this group increased from 130.25 ± 2.81 before the intervention to 194.20 ± 9.15 after the intervention ($P < 0.0001$).

5. Discussion

The results of this study showed that QOL scores for patients in the control group exhibited no statistically significant difference before and after routine care. However, in the intervention group, QOL scores significantly improved across all dimensions, enhancing the patients' overall QOL. Family caregivers' QOL scores did not show a statistically significant

difference in the control group, with declines observed in aspects like emotional problems and mental health. Conversely, in the intervention group, QOL scores significantly improved across all dimensions, suggesting that the SSP effectively enhanced caregivers' overall QOL.

In terms of resilience, family caregivers in the control group exhibited no significant changes in resilience scores before and after the intervention, with some decline observed. In contrast, resilience scores significantly improved in the intervention group, demonstrating the effectiveness of the SSP in enhancing caregivers' resilience.

These findings are consistent with those of Zangbari et al., who reported a statistically significant improvement in QOL scores following SSP intervention ($P < 0.001$) in the intervention group, while no significant differences were observed in the control group (25). Similarly, Yadegarfard demonstrated that proper education significantly improved QOL in stroke patients (26).

Pitthayapong et al. supported the idea that family caregivers participating in post-stroke care intervention programs acquired essential caregiving skills, improving work efficiency and reducing stroke complications in patients (9). Amraei et al. also found that educational programs for hemiplegic stroke patients reduced caregiver stress, anxiety, and depression, increasing their awareness and ability to adapt to caregiving roles (27). This enhanced their communication with patients and improved their QOL.

Behzadi et al. noted that caregiver resilience improves after support program interventions, influenced by factors like knowledge, social support,

and family structure (28). Similar supportive programs for chronic conditions like mental disorders and heart failure have demonstrated improved long-term resilience for caregivers, reducing caregiving pressure and enhancing QOL. Fathani's study also confirmed that SSP interventions improve QOL for caregivers of heart patients (29).

The independent variable in this study was the SSP, with QOL as the dependent variable and resilience as an intermediate variable. A structural equation model was established to analyze and verify the causal relationships between these three variables. The results showed that family QOL had a direct positive effect on caregivers' QOL and could also indirectly affect it through resilience. Resilience itself had a direct positive effect on caregivers' QOL. Acting as an intermediary variable, resilience played a significant dual role by mediating the relationship between family QOL and caregiver QOL. In the process of adaptation and acceptance among stroke patients, resilience played a positive role during the self-psychological adjustment stage, serving as a source of strength for psychological transformation (30). Resilience, recognized as a protective factor for individual psychological well-being, has been identified as a mediating variable in numerous research studies (31, 32). This study further demonstrated that resilience had a practical intermediary effect, reinforcing its potential as a focus for nursing interventions.

The limitations of this research include non-cooperation from some caregivers and stroke patients during data collection, personal challenges when answering the questionnaire, unconscious biases in responses, and insufficient attention to cultural conditions. Despite these challenges, this study concludes that SSP significantly improves resilience and QOL for family caregivers, offering a practical framework for better caregiving outcomes.

5.1. Implications

This randomized controlled trial demonstrates SSP effectiveness for caregivers of stroke patients, with implications for nursing practice, research, policy, and education. The program improves QOL, resilience, and outcomes for patients while reducing caregiver burden. The findings highlight the need for resource investment and SSP integration into nursing practice.

The study recommends conducting additional clinical trials to evaluate SSP's impact on caregivers of other chronic diseases. Strategies such as practical training sessions and psychological support should be developed to foster family caregiver involvement, enhance their awareness, and ensure attention to cultural contexts. Healthcare managers should use these findings to design effective caregiver support strategies. The program developed in this study should be applied to patients and caregivers with similar conditions to maximize its benefits.

5.2. Conclusions

The findings indicate that implementing an SSP for family caregivers of stroke patients is effective in enhancing the well-being of both caregivers and patients. The program provides essential support, training, and guidance, enabling caregivers to manage daily activities and address mental, emotional, physical, and psychological challenges effectively. This study emphasizes the importance of family participation in patient care and underscores the value of nursing theories like Orem's self-care theory.

Footnotes

Authors' Contribution: Conception and design: A. N., S. R. B., and E. S.; Drafting the article: M. Gh. and A. S.; Critically revising the article: E. S.; Approved the final version of the manuscript: All authors.

Clinical Trial Registration Code:
IRCT20220903055859N1

Conflict of Interests Statement: The authors have no potential financial conflicts of interest related to this manuscript.

Data Availability: Due to the sensitive nature of the questions asked in this study, survey respondents were assured raw data would remain confidential and would not be shared. Data is not available and the data that has been used is confidential.

Ethical Approval: The ethical code is IR.UMSHA.REC.1401.240 at Hamadan University of Medical Sciences.

Funding/Support: The content of this article is derived from a Ph.D. in nursing, which was conducted as part of research code 140106014209, as determined by the Research and Research Committee of Hamadan University Medical Science

Informed Consent: Written informed consent was obtained from patients and their family caregivers.

References

- Tajvidi M, Dalvandi A, Sahaf R, Rahgozar M. [Relationship Between General Health and Demographic Characteristics of Family Caregivers of Stroke Survivors]. *Salmand J.* 2018;12(4):494-505. FA. <https://doi.org/10.21859/sija.12.4.494>.
- Liu Z, Zhou X, Zhang W, Zhou L. Resilience is an independent correlate of the course of quality of life in patients with first-ever ischemic stroke. *Int Psychogeriatr.* 2021;33(6):567-75. [PubMed ID: 32418551]. <https://doi.org/10.1017/S1041610220000587>.
- Blessing M, Oluwagbemiga O. Effectiveness of Social Support in Coping with Stroke by Medically Ill Patient in Ibadan. *Int J Neurorehab.* 2017;4(4). <https://doi.org/10.4172/2376-0281.1000281>.
- Wu M, Yang Y, Zhang D, Zhao X, Sun Y, Xie H, et al. Association between social support and health-related quality of life among Chinese rural elders in nursing homes: the mediating role of resilience. *Qual Life Res.* 2018;27(3):783-92. [PubMed ID: 29124499]. <https://doi.org/10.1007/s1136-017-1730-2>.
- Jia Y, Shi J, Sznajder KK, Yang F, Cui C, Zhang W, et al. Positive effects of resilience and self-efficacy on World Health Organization Quality of Life Instrument score among caregivers of stroke inpatients in China. *Psychogeriatr J.* 2021;21(1):89-99. [PubMed ID: 33295027]. <https://doi.org/10.1111/psyg.12635>.
- Azizi A, Khatibian M, Mollai Z, Mohammadi Y. [The Effect of Informational Support on Satisfaction of Family Caregivers of Patients with Hemiplegic Stroke from Receiving Information]. *Avicenna J Nurs Midwif Care.* 2018;26(4):211-8. FA. <https://doi.org/10.30699/sjhnmf.26.4.211>.
- Mores G, Whiteman RM, Ploeg J, Knobl P, Cahn M, Klaponski L, et al. An Evaluation of the Family Informal Caregiver Stroke Self-Management Program. *Can J Neurol Sci.* 2018;45(6):660-8. [PubMed ID: 30430966]. <https://doi.org/10.1017/cjn.2018.335>.
- Naziyah N, Suharyanto T, Pratiwi IA. The Coloration of Family Support With Self Care Patients Non Hemoragic Stroke Inpatient at Cempaka Putih Islamic Hospital Jakarta. *Jakarta Islam Hosp.* 2019;2019.
- Pitthayapong S, Thiangtam W, Powwattana A, Leelacharas S, Waters CM. A Community Based Program for Family Caregivers for Post Stroke Survivors in Thailand. *Asian Nurs Res (Korean Soc Nurs Sci).* 2017;11(2):150-7. [PubMed ID: 28688501]. <https://doi.org/10.1016/j.anr.2017.05.009>.
- Irshad Ali BH. Application of Orem self care deficit theory on psychiatric patient. *Ann Nurs Pract.* 2018;5(1):1093. <https://doi.org/10.47739/2379-9501/1093>.
- Widayati D, Rachmania D, Dewi RI. Muscle Strength and Self Care Ability (SCA) of Post Stroke Patients through Induced Movement Therapy (CIMT) Based on Self Care Theory. *2nd Joint International Conferences.* East Java. 2018. p.137-46.
- Ansari F. [The Relationship between Burden of Stroke and Burden of Caregiver with Quality of Life in Survivors of Stroke Patients and their Care-Givers in Clinics of Tabriz University of Medical Sciences] [dissertation]. Tabriz University of Medical Sciences, School of Nursing and Midwifery; 2016. FA.
- Ganjiwale D, Ganjiwale J, Parikh S. Association of quality of life of carers with quality of life and functional independence of stroke survivors. *J Family Med Prim Care.* 2016;5(1):129-33. [PubMed ID: 27453857]. [PubMed Central ID: PMC4943119]. <https://doi.org/10.4103/2249-4863.184637>.
- Hekmatpou D, Mohammad Baghban E, Mardanian Dehkordi L. The effect of patient care education on burden of care and the quality of life of caregivers of stroke patients. *J Multidiscip Healthc.* 2019;12:211-7. [PubMed ID: 30936715]. [PubMed Central ID: PMC6430991]. <https://doi.org/10.2147/JMDH.S196903>.
- Steiner V, Pierce L, Drahuschatk S, Nofziger E, Buchman D, Szirony T. Emotional support, physical help, and health of caregivers of stroke survivors. *J Neurosci Nurs.* 2008;40(1):48-54. [PubMed ID: 18330410]. [PubMed Central ID: PMC2442227]. <https://doi.org/10.1097/01376517-200802000-00008>.
- Jennifer RG, Susan KG. *Burns and Grove's The Practice of Nursing Research.* 9th ed. New York: Elsevier; 2020.
- Tagharrobi Z, Sharifi K, Sooki Z. [Psychometric evaluation of Shah version of modified Barthel index in elderly people residing in Kashan Golabchi nursing home]. *Feyz Med Sci J.* 2011;15(3):213-24. FA.
- Lobo EH, Frolich A, Abdelrazek M, Rasmussen LJ, Grundy J, Livingston PM, et al. Information, involvement, self-care and support-The needs of caregivers of people with stroke: A grounded theory approach. *PLoS One.* 2023;18(1). e0281198. [PubMed ID: 36719929]. [PubMed Central ID: PMC9888718]. <https://doi.org/10.1371/journal.pone.0281198>.
- Rezaei M, yousefi H, Sabouhi F, Shahnazari J. [Investigating the Effect of Providing a Spiritual Care-Educational Program in the form of WhatsApp and Telephone Follow-up on the Quality of Life of Stroke Patients and Their Caregivers after Discharge]. *J Nurs Edu.* 2023;12(4):99-112. FA. <https://doi.org/10.22034/jne.12.4.99>.
- Pedersen SG, Heiberg GA, Nielsen JF, Friberg O, Stabel HH, Anke A, et al. Validity, reliability and Norwegian adaptation of the Stroke-Specific Quality of Life (SS-QOL) scale. *SAGE Open Med J.* 2018;6:2050312117752030. [PubMed ID: 29344360]. [PubMed Central ID: PMC5764138]. <https://doi.org/10.1177/2050312117752031>.
- Azimi R, Mohammadi F, Hosseini M, Farzi M. [The effect of home-based stroke rehabilitation on quality of life of stroke survivors and their family caregiver's strain]. *Evid Base Care J.* 2013;3(1):77-85. FA. <https://doi.org/10.22038/ebcj.2013.729>.
- Kontodimopoulos N, Pappa E, Niakas D, Tountas Y. Validity of SF-12 summary scores in a Greek general population. *Health Qual Life Outcom J.* 2007;5:55. [PubMed ID: 17900374]. [PubMed Central ID: PMC2140054]. <https://doi.org/10.1186/1477-7525-5-55>.
- Montazeri A, Vahdaninia M, Mousavi SJ, Omidvari S. The Iranian version of 12-item Short Form Health Survey (SF-12): factor structure, internal consistency and construct validity. *BMC Public Health J.* 2009;9:341. [PubMed ID: 19758427]. [PubMed Central ID: PMC2749829]. <https://doi.org/10.1186/1471-2458-9-341>.
- Sadat Hosseini F, Hosseinichari M. [Examining the evidence related to the validity and reliability of the family resilience scale]. *Family*

Counsel Psychother J. 2013;3(2):181-208. FA.

25. Zangbari S, Ahmadzadeh J, Hemmati Maslak Pak M, Aghakhani N. [The Effect Of Home Care Education To Caregivers On Depression And Quality Of Life In Stroke Patients In Imam Khomeini Educational And Treatment Center, Urmia, 2019-2020]. *Nurs Midwif J.* 2021;19(3):193-206. FA.
26. Yadegarfar G. [The effect of e-learning on the quality of life of patients with stroke]. *J Health Care.* 2017;19(1):30-8. FA.
27. Amraei A, Anoosheh M, Kazemnejad A. [The Effect of a designed Care Program for Hemiplegic Stroke Patients on Family Caregivers' Stress, Anxiety and Depression]. *Health Monitor J Iran Inst Health Sci Res.* 2020;19(4):405-14. FA. <https://doi.org/10.29252/payesh.19.4.405>.
28. Behzadi H, Borimnejad L, Mardani Hamoleh M, Haghani S. [Evaluating the Effect of Virtual Network-Based Education on Resilience and Caregiver Burden in Parents of Children With Cancer.]. *Iran J Nurs.* 2022;35(136):118-33. FA. <https://doi.org/10.32598/ijjn.35.2.247.4>.
29. Fathani M, Afzal Aghaee M, Tadayonfar M. Evaluation of the Effect of Designated Educational Intervention on the Improvement of Quality of Life in Caregivers of Patients with Chronic Heart Failure. *J Babol Univ Med Sci.* 2016;18(5):20-5. <https://doi.org/10.22088/jbums.18.5.20>.
30. Fernandes S, Silva A, Barbas I, Ferreira R, Fonseca C, Fernandes MA. Theoretical Contributions from Orem to Self-care in Rehabilitation Nursing. In: García-Alonso J, Fonseca C, editors. *Gerontechnology.* Cham: Springer; 2020. p. 163-73. https://doi.org/10.1007/978-3-030-41494-8_16.
31. Gurudut P, Welling A, Chodankar A. Effect of self- care exercises in forward head posture on craniovertebral angle and craniocervical flexion endurance: A pilot study. *India J Physic Ther Res.* 2020;2(1). https://doi.org/10.4103/ijptr.ijptr_48_19.
32. Chavapattanakul P. The Relationship between Resilience Quotient, Social Support and Spiritual Well-Being of Caregivers of Patients with Hemiplegia. *Siriraj Med J.* 2020;72(3):245-52. <https://doi.org/10.33192/smj.2020.33>.