

Effect of Family Centered Empowerment Program on Self Efficacy, Depression and Quality of Life in Geriatric Patients with Ischemic Stroke: A Quasi-experimental Study

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Abstract

Background: Elderly stroke survivors face great challenges namely living with disabilities which require long term support. In such situation, family involvement in care process is inevitable. Family centered empowerment program enhance patients' motivation to achieve optimum outcomes. **Aim:** This research aimed to determine the effect of family centered empowerment program on self efficacy, depression and quality of life in geriatric patients with ischemic stroke. **Design:** A Quasi-experimental research design was used. **Setting:** The study was conducted in the rehabilitation department at Mansoura University Hospital. **Subjects:** A total of 108 geriatric patients with ischemic stroke were included in the study and randomly assigned to two equal groups; the intervention group received the family centered empowerment program plus the routine care in the rehabilitation department, and the control group received only the routine care provided in the study setting. **Tools:** The data were collected through demographic and health related characteristics interview sheet, stroke self efficacy questionnaire, stroke-related knowledge, geriatric depression scale and stroke impact scale. **Results:** Study findings showed that the study outcomes including self efficacy, stroke-related knowledge, post stroke depression and quality of life were significantly better in the intervention group compared with the control group ($p < 0.001$). **Conclusion:** Implementation of the intervention based on family centered empowerment model is an effective strategy in improving self efficacy, depression level and quality of life among geriatric patients with ischemic stroke by giving them necessary information about caring principles with family involvement in care process. For such patients, this model is recommended to use in the educational program.

Keywords: Family centered empowerment model, Geriatric patients, Ischemic stroke, Quality of life, Self efficacy.

Introduction

Stroke is a major public health concern with significant economic and social consequences. Despite advances in the medicine field, healthcare quality and health promotion, stroke imposes the major cause of morbidity and mortality in all age groups especially older adults (World Stroke Organization, 2022). Globally, stroke is ranked as the second leading cause of death worldwide with an annual mortality rate of about 5.5 million and the major cause of disability, as, more than half of survivors being chronically disabled. The

burden of stroke is set to ascend over future decades due to changes in population demographics, particularly in developing countries, as, age is the strongest predictor of stroke and the risk of stroke doubles every decade above age 55 (Donkor, 2018). Egypt, is the most populated nation in the Middle East with a high overall crude prevalence rate of stroke (963/100,000 inhabitants), representing 6.4% of all deaths (Aref et al., 2021; GBD, 2016).

Ischemic stroke is the most leading subtype of stroke, which triggered by cerebral ischemia,

leading to dysfunction of the brain vascular tissues. It has been reported that a large number of ischemic stroke survivors faced serious post stroke consequences (Gao et al., 2022). worldwide, over 62% of all incident strokes are ischemic, approximately, 3.3 million victims die from ischemic stroke annually, and 81% of all deaths from ischemic stroke occur in people over 70 years old (World Stroke Organization, 2022).

Stroke survivors can experience long term residual impairment or physical disabilities because of neurological defect at different points in their recovery. Disabilities exist in more than 75% of stroke survivors, about 30% of survivors report a significant disability level mainly among older adults, females, and those with a history of diabetes mellitus (Bettger et al., 2014). Post stroke consequences can negatively affect the clinical outcomes of the disease, raise the risk of functional dependency and decrease quality of life (Gao et al., 2022), and have a significant impact on the community and family (Franco-Urbano et al., 2022). Therefore, patients will face new challenges that adversely affect their sense of self efficacy (Amiri et al., 2022).

Self efficacy is a psychological construct defined as one's self-confidence and beliefs in capabilities to perform specific tasks (Jones et al., 2008). High level of self efficacy is important for achieving maximum level of independence in acting basic daily activities and directly improves the quality of life in stroke survivors (Amiri et al., 2022). Therefore, assessing the self efficacy and working to improve its level can help stroke patients to overcome many aspects of their lives and improve their chances for better rehabilitation effects. There has been evidence that programs aimed to increase self efficacy have an important effect on the efficacy of chronic illness therapy, namely, stroke therapy (Szczeńska-Gieracha & Mazurek, 2020).

Psychological consequences caused by stroke can be devastating. Many stroke patients face this challenge after discharge from hospital. It is noticed that one-third of stroke patients suffer from post-stroke depression 1 year after stroke, which can adversely affect their quality of life and the process of recovery (Franco-Urbano et al., 2022). Depression after stroke is one of the unsolved problems in recovery of the elderly stroke survivors. It has been considered the most common psychiatric problem of stroke, which requires more careful intervention. The risk of mortality is more in stroke survivors with depression compared with others without depression (Xie et al., 2022). One of the major concerns posed by stroke survivors is how to diagnose and optimally treat this condition, which is more common in elderly patients than younger (Lokk & Delbari, 2010).

The impact of stroke on elders' life is an important concern for community. It affects various domains of life, not only physically but also through a range of social and psychological aspects. So, paying greater attention to the rehabilitation process and quality of life is important (Yu et al., 2021). Stroke can affect both the patients and their families, who are unprepared to deal with the rehabilitation and disabilities caused by stroke. As a result, many individuals are unable to cope with this situation (Izadi-Avanji et al., 2020). Therefore, the main goal of management of these patients is to minimize disabilities and improve their quality of life.

Post stroke is very important to get attention from health care providers and families, as, elderly stroke patients often stay in their home with their family after acute phase (Agianto & Nuntaboot, 2018). Elderly stroke patients usually unable to do their daily tasks. So, family is the main supportive individual for stroke patients. Patients often rely on their families to perform their daily tasks and help

them to complete the stroke rehabilitation (Nayeri et al., 2014; Liu & Guo, 2021).

Stroke patients and their families usually feel powerless and are worry about disabilities and consequences of stroke (Cholig et al., 2020). In this respect, empowerment after stroke is the best way to regain self confidence, as well as, learn and practice the skills of recovery and gradually restore physical functioning (Izadi-Avanji et al., 2020). Studies in the field of health promotion recommended the essential role of the family in the treatment of the diseases (Park et al., 2018; Qiu et al., 2018; Alhani et al., 2022), particularly elderly people (Masoudi et al., 2010). Families don't have the skills for caring patients at home, causing most of them feel powerless when providing care for their patients. The insufficiency of family caregivers' information about the disease may decrease their abilities to provide appropriate care for the patients and consequently affect the patients' quality of life (Dharma et al., 2018). Therefore, the empowerment ability of family caregivers, that is, the ability to help disabled elderly patients to gain the sense of confidence and create self support opportunities for them, is particularly important (Liu & Guo, 2021).

Family centered empowerment provides opportunities for caregivers to acquire information and skills to optimally manage patients' life (Deyhoul et al., 2020). Cooperation between the patient's family and the nurse to manage the patient's problems is one of the main goals of the empowerment model (Izadi-Avanji et al., 2020). Family centered empowerment model was developed by Alhani (2003) to improve chronic diseases patients' outcomes. This model of care has previously been validated and evaluated in several chronic disease (Vahedian-Azimi et al., 2015; Hedayati, 2018) and, particularly, stroke disease (Izadi-Avanji et al., 2020; Deyhoul et al., 2020). Empower the

patient and family to promote quality of health is the crucial goal of this model. It has four phases as (a) determining threat perception through group discussion; (b) self efficacy by problem solving; (c) improving self esteem by educational participation and (d) outcomes evaluation (Alhani, 2003). Family involvement in the process of rehabilitation may potentially have beneficial effects in physical and mental function, and can reduce the disease burden (Alhani et al., 2022).

Gerontological nurse as a member of interdisciplinary team play a crucial role in the process of rehabilitation of elderly patients with stroke through focusing on the empowerment of the family caregivers, as, they may experience problems when they undertake the caregiving role without any planning post stroke condition (Deyhoul et al., 2020). Thus, the family caregiver's information and skills in caring patients after stroke must be improved (Dharma et al., 2018). In view of this, there is an urgent need to change the focus of rehabilitation process from patient-centered to family-centered approach. Therefore, this study aimed to determine the effect of family centered empowerment program on self efficacy, depression and quality of life in geriatric patients with ischemic stroke.

Aim of the study

Determine the effect of family centered empowerment program on self efficacy, depression and quality of life in geriatric patients with ischemic stroke.

Research hypothesis

Geriatric patients with ischemic stroke who engage in the family centered empowerment program will have a better level of self efficacy, depression and quality of life than those who don't.

Subjects & Method

Research Design: A Quasi-experimental study was used

Research Setting:

The study was conducted in the rehabilitation department at Mansoura University Hospital. This department receives stroke patients 6 days a week; three days for men, alternating with women.

Subjects:

Initially, stroke survivors attending the Rehabilitation Department at Mansoura University Hospital were recruited. A total 140 stroke survivors were interviewed for eligibility. Those who met the inclusion criteria and agreed to participate in the study were recruited, resulting in a sample size of 108 elderly stroke survivors (figure 1).

To ensure statistical power and account for potential dropout, estimation of sample size was performed using open Epi <https://www.cdc.gov/epiinfo/index.html> to calculate sample size of two groups. Mean difference module was used, this module calculates sample size by comparing two means. Estimation based on previously reported improvement in total self efficacy of an intervention study (Sit et al., 2016). 45 participants in each group were needed to achieve 90% statistical power, alpha error level 5% (95% significance), and ratio of sample size of the two groups equal 1. So, the sample size was 90 elderly stroke patients. The sample size was adjusted to 108 participants to account for anticipated defaulters.

To be recruited in this study, the participants in both groups should meet the following criteria: 1) older adults (aged 60 years or more), 2) have ischemic stroke for the first time, 3) have no cognitive impairment (mini-

mental state examination score ≥ 24 (Folstein, 1975), 4) still unable to do fully self care after stroke 5) regular attendance at the rehabilitation center 6) not participating in other stroke-related intervention or similar intervention, 7) able to communicate and accept to participate in the research. While, patients with debilitating illness that interfere with the implementation of the program and affect the study outcomes, or diagnosed with mental disorders were excluded

Moreover, the family members who interest to engage in the study should be a constant participating member as family members or relatives who live at the same home with the patient and are aware of the patient's condition. This family member must also be involved in all patients' activities, and be able to attend the sessions from the beginning till the end of the study.

Eligible participants were divided into two equal groups; intervention and control group based on a random sequence of letters A and B, which were written on small cards and kept in an envelope. Then, at the beginning of each week, one card would be picked out to identify if the intervention should be conducted or it is the time for the control group. Accordingly, all eligible patients would be allocated to either the intervention or the control group. Furthermore, this approach would rule out the possibility of information disclosure among those patients in the study setting. Because of dropouts, this process continued until the required number of each group was achieved. Participants in the intervention group were enrolled to 5 sessions of program according the steps of the family centered empowerment model.

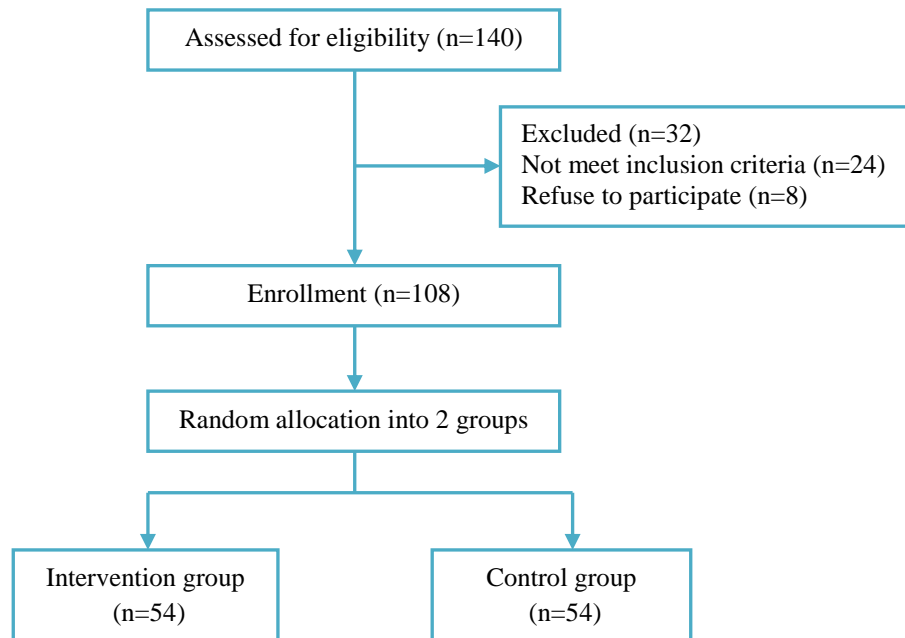


Figure 1: Flowchart of the participants enrolled in the study

Data collection tools

Tools of data collection were categorized as follow:

1. Demographic and health-related characteristics interview sheet:

After reviewing relevant literature, this tool was prepared by the researchers and included three parts:

Part I: Demographic data including sex, age, social status, education level, residence, income, living arrangement and caregiver's relationship with the patients.

Part II: Health-related characteristic including presence of any comorbidities.

Part III: History of stroke as onset of stroke, affected side, mobility condition.

2. Primary outcomes:

Self Efficacy: This outcome was measured by the Stoke Self Efficacy Questionnaire (SSEQ). It consists of 13 statements to measure self efficacy in two domains: activity (items 1 – 8) and self management (items 9 – 13). The

responses arranged in a 4-point scale. The lowest score option (0) was kept as not at all confident, score option 1 = some level of confident, score option 2 = moderate confident, and the highest score option (3) was kept as very confident. Subscale scores are obtained by summing the responses; possible range for activity domain was 0-24, for the self management domain was 0-15 and for the total perceived self efficacy was 0-39. Higher score indicates higher self confidence (Riazi et al., 2014).

3. Secondary outcomes:

a. Stroke- related knowledge: This was assessed using the Stroke Knowledge Test (SKT). This tool comprises 20 items in the form of multiple choice questions to assess patients' stroke-related knowledge. Incorrect responses were scored zero, and correct responses were scored one point each. By summing across items, the total score was calculated with 20 points as a maximum possible score (Sullivan & Dunton, 2004).

b. Post stroke depression: This was measured by Geriatric Depression Scale Short Form (GDS-SF). It comprises 15 items with “yes” or “no” responses. Of these items, 10 items indicate the presence of depression when answered “yes”, while questions number 1, 5, 7, 11 and 13 indicate depression when answered “no”. A score equal 5 or more suggest depression (Sheikh & Yesavage, 1986). By Elhusseini (2013), it was translated into Arabic language and tested for its reliability.

c. Quality of life: This outcome was assessed by using Stroke Impact Scale (SIS) version 3 (Duncan et al., 2003). It is a specific tool to measure multidimensional stroke outcomes. It comprises of 59 statements arranged in 8 subscales (strength, hand function, mobility, activities, memory, communication, emotion and social participation). Each statement is rated using a 5-point scale, where 1 equal inability to complete the task, while, 5 equal no difficulty experienced at all. Each domain scores are interpreted using an algorithm equivalent to the used in the SF-36 based on the following equation: domain score = $[(\text{Mean item score} - 1) / 5 - 1] \times 100$ (Ware & Sherbourne, 1992). The score for each domain range from 0-100, which a higher score indicates a higher QoL. Factor analysis of this tool revealed that sum of the first four domains together creates a physical domain score.

Also, this tool includes a single item of recovery to evaluate the patient’s global perceived recovery percentage by the form of visual analog scale of 0 to 100, with 0 indicates no recovery and 100 indicates full recovery.

Field work and Data collection

I- Preparatory phase

- Approval from the Faculty of Nursing, Mansoura University was issued. The permission was obtained from the director of the rehabilitation department at Mansoura

University Hospital to conduct the study after being informed about the purpose of the study and the time of data collection.

- After reviewing the relevant literatures, the study tool I (Demographic and health-related characteristics interview sheet) was developed by the researchers.

- The study tools (Stoke Self-Efficacy Questionnaire, Stroke Knowledge Test, and Stroke Impact Scale) were translated into Arabic language by the researchers. By an expert in English language, back translation was done to ensure the tools’ translation validity.

- Geriatric Depression Scale Arabic version was used in data collection.

- By numbers of experts in the related fields of the study, the study tools were tested for its validity. Accordingly, the required modifications were done.

- The educational content was prepared by the researchers based on the current evidence (Dennehy et al., 2019; Stroke Association, 2021). It was written in simple Arabic language with colored pictures to help the participants understanding its content. It was printed in colored large font. Then the credibility was determined by experts to verify the accuracy and the quality of the content.

- The reliability of the study tools (Stoke Self-Efficacy Questionnaire, Stroke Knowledge Test, and Stroke Impact Scale) was also tested to ensure internal consistency over repeated administrations. It was confirmed by means of r coefficient ($r=0.84, 0.81, 0.88$ respectively).

- To ascertain the applicability and clarity of the study tools and the educational contents, a pilot study was conducted on 10% (11) of elderly stroke survivors at the study setting before beginning of the data collection process and the necessary modifications were done. The study sample were not comprised those patients.

II- Implementation phase

In order to achieve the aim of this research, a family centered empowerment model was used. The intervention was implemented by two members of the research team to ensure that it was delivered with the same manner for all participants. The program was divided into three stages; pre intervention, intervention and post intervention.

Pre intervention:

- Based on the rehabilitation center schedule, the researchers visited the center six days/week.
- The researchers introduced themselves to the elderly patients and their family members and gave them a brief idea about the aim and the benefits of the research. In this respect, we used a psychological approach to build a trusting relation with the patient and their family members.
- Stroke elderly patients who fulfill the inclusion criteria and interest to complete the program sessions were enrolled in five training sessions of family centered empowerment program. The researchers conduct individual interviews in the study setting to collect the baseline data using the study tools.
- For the safety of the researchers and the study participants, infection control precautions were implemented as using facemasks, keeping physical distance, and using alcohol solution.

Intervention:

- The program of the study was implemented individually based on the family centered empowerment model. With the presence of the researchers, elderly stroke patients, and the active family members, the sessions were held.
- The sessions were implemented in three days a week (day after day) for each participant based on the schedule of the study setting. The researchers used power point presentation by lap

top using simple, brief, clear words during the sessions.

- According to concept of the model, the program was performed in four steps as follows; threat perception, problem solving, educational participation, and evaluation in five training sessions.

The first step: Threat perception

Session 1 and 2: In this step, the researchers focused on increasing the participants' perception of threat through enriching them and their families with overview about the ischemic stroke nature, risk factors, signs, complications, and effective strategies of prevention of recurrent stroke by adopting healthy behaviors, as well as, strategies to improve the physical and psychological quality of life. This step was conducted in two sessions (30-45minutes) using brief lectures, discussion and question-and-answer.

The second step: Problem solving

Session 3: At the beginning of this session, the researchers assessed what reserved from the previous sessions by directing questions to patients and their family members. In this step, the problem solving method was used, as, the researchers facing the study participants (patients and their family members) virtually with a possible problem occurs during the caring process and asking them to put suggested solutions, and select the best one for better management of the problem through face to face counseling and discussion. This method can improve self efficacy and self confidence of the study participants and help them to feel that they may assume a part in improving their condition. The problem solving session was held in one hour session with 5 minutes break every 20 to 30 minutes.

The third step: Educational participation

Session 4: This step aim to improve self esteem through educational participation method. It was held in a single one hour session. In this step, the stroke elderly patients were asked to be active in educating the family members and represent the discussed topics and what they learned in the previous sessions to the active members of family.

The fourth step: Evaluation

Session 5: This step was conducted during all phases of data collection and involved evaluating the effect of program at the end of each session. Also, all participants in the intervention group were evaluated by the researchers through asking questions about the content discussed in the previous sessions to ensure active involvement of patients and their families in the care plans. Evaluation was done by questions and answers and group discussion.

Finally, the remaining ambiguities were answered by the researchers and discussed the disease nature and the proposed care in the program to ensure that the participants understood the content delivered in the previous

sessions comprehensively. Such sessions continued till all questions were answered.

Post intervention:

- The intervention and control groups were evaluated at one and two months after the family centered empowerment program sessions to measure the study outcomes using the study tools. During this period, the researchers conduct a telephone call to the participants enrolled in the intervention group through their family members as a reminder and discuss any questions.

- With regard to participants enrolled in the control group, they received the routine care provided by the rehabilitation center. To comply with the research ethics, at the end of the research, stroke elderly patients and their family members were received condensed one session about the important topics being discussed in the intervention group and their questions were answered. Also, the educational booklet was given.

- Data collection conducted over a period of 6 months starting from the first of June 2021 till the end of November 2021.



Figure 2: Family-centered empowerment model executive steps (Alhani, 2003)

Ethical considerations:

The Research Ethics Committee - Faculty of Nursing -Mansoura University approved the study. Following an explanation of the study's nature and its potential benefits, written consent was obtained from the participants. The right to participate or withdraw at any time from the study, as well as, the participants' privacy and data confidentiality were all assured.

Data analysis:

Statistical Package for Social Science Version 20 was used to analyze the data. Continuous variables were presented as means and standard deviations, whereas categorical variables were presented as numbers and percentages. Two group comparisons related baseline data were performed using Chi-square test, independent t-test and Fisher's exact test. The repeated measures ANOVA test was used to compare differences in term of the study outcomes with different measures of the same

variable in the two groups. Additionally, t-test was used in intergroup comparison in terms of outcomes. The general linear model was used to compare changes in the different outcomes of the two study groups, adjusting demographic characteristics. The significant level was set at 0.05 or less.

Results

Table 1: A total of 108 stroke elderly patients enrolled in this study. The study participants' age ranged from 60 to 78 years with a mean age of 67.7 ± 4.61 for the intervention group and 60 to 81 years with a mean age of 66.9 ± 5.82 for the control group. Males constituted 57.4% of the intervention group and 64.8% of the control group. Of participants, 61.1% and 55.6% of the intervention and control group respectively were married. Illiteracy was prevailing among 51.9% and 59.3% of the intervention and control group respectively. The majority of the participants (90.7% and 83.3% for intervention and control group respectively) were live with their family. 90.7% and 87.0% of the intervention and control group respectively were suffered from chronic illness before stroke.

With regards to stroke history, Hemiparesis was common among 92.6% of the intervention group and 85.2% of the control group. More than half of the stroke patients (61.1% of the intervention group and 55.6% of the control group) have a problem on the left side of the body. The results confirmed that there were no meaningful variation between the two groups in term of demographic data and health profile ($p > 0.05$).

Table 2: The repeated measures ANOVA revealed a significant improvement in self efficacy related perceived confidence of activity subscale among participants in the two groups at different stages of evaluation ($p < 0.001$ for intervention group, $p = 0.032$, for control group). The intervention group showed a significant

better changes in self management subscale and overall self efficacy ($p < 0.001$). Also, independent t-test showed no significant variation between the total mean score of self efficacy in the two groups before the intervention ($p = 0.458$), whereas, the difference was significant at both 1 and 2 months after the intervention ($p < 0.001$), as the self efficacy mean score was significantly higher among participants in the intervention group than those in the control group.

Table 3: Overall, the intervention group showed more favorable improvement in total and all domains of quality of life score in the different time points of evaluation except for memory dimension ($p > 0.05$). Also, the control group showed significant improvement in quality of life namely in strength and emotion dimensions ($p < 0.001$).

It should be pointed out that, the total scores and all dimensions of quality of life did not show any significant variation between the intervention and control groups before implementing the program ($p > 0.05$), while the variation between the two groups were significantly change at both 1 and 2 months after the intervention ($p < 0.001$).

Figure 3: The baseline knowledge score in the intervention group was 8.8 ± 1.9 and increased significantly to 13.0 ± 1.5 at 2 months after the program ($p < 0.001$). Such difference not noticed on the control group. Additionally, there was no variation between the two groups before the program ($p = 0.208$) and the variation was significant at 1 and 2 months after the program ($p < 0.001$).

Figure 4: The intervention group showed significant lower level of depression at all time points of evaluation (8.1 ± 1.7 at baseline and 4.9 ± 1.02 at 2 months after the program) with $p < 0.001$. However, there was no variation detected between participants in control group ($p > 0.05$). The results of independent t-test

showed no variation between intervention and control groups at the start of the study concerning post stroke depression ($p=0.117$) but

the variation between the two groups change significantly at both 1 and 2 months ($p<0.001$).

Table 1: Demographic characteristics and health profile of studied participants

Variables	Participants (n=108)		Statistic test	P-value
	Study n=54 (%)	Control n=54 (%)		
Age Mean (SD)	67.7 (4.61)	66.9 (5.82)	0.751	0.454 ^a
Sex				
Male	31 (57.4)	35 (64.8)	0.623	0.430 ^b
Female	23 (42.6)	19 (35.2)		
Social status				
Married	33 (61.1)	30 (55.6)	0.343	0.558 ^b
Other#	21 (38.9)	24 (44.4)		
Education				
Illiterate	28 (51.9)	32 (59.3)	1.063	0.786 ^b
Below secondary	16 (29.6)	13 (24.1)		
Secondary and above	10 (18.5)	9 (16.6)		
Residence				
Rural	40 (74.1)	33 (61.1)	2.071	0.150 ^b
Urban	14 (25.9)	21 (38.9)		
Living arrangement				
With family	49 (90.7)	45 (83.3)	2.186	0.139 ^b
Alone	5 (9.3)	9 (16.7)		
Smoking habits				
Never smoker	21 (38.9)	27 (50.0)	1.385	0.501 ^b
Ex-smoker	20 (37.0)	17 (31.5)		
Smoker	13 (24.1)	10 (18.5)		
Presence of chronic illness	49 (90.7)	47 (87.0)	0.245	0.620 ^b
Mobility				
Hemiparesis	50 (92.6)	46 (85.2)	FET	0.221 ^c
Hemiplegia	4 (7.4)	8 (14.8)		
Affected side				
Left	33 (61.1)	30 (55.6)	0.698	0.705 ^b
Right	16 (29.6)	20 (37.0)		
Both	5 (9.3)	4 (7.4)		
Duration of stroke				
Less 3months	30 (55.6)	21 (38.9)	3.009	0.083 ^b
3months and more	24 (44.4)	33 (61.1)		
Caregiver's relationship with the patients				
Child	26 (48.1)	33 (61.1)	FET	0.115 ^c
Spouse	25 (46.3)	15 (27.8)		
Other	3 (5.6)	6 (11.1)		

Notes: ^a Student's t-test, ^b Pearson's chi-square test, ^c Fisher's exact test, # single, divorced, widow

Table 2: Changes in self efficacy outcome of the intervention and control groups across time

Outcome (Self efficacy)	Group	Baseline	Post 1	Post 2	Repeated Measures ANOVA P-value ^b
		Mean (SD)			
Activity	Intervention	8.4 (1.6)	13.2 (2.1)	13.5 (2.2)	<i>p</i> <0.001 P=0.032*
	Control	8.9 (2.7)	9.6 (2.6)	11.1 (2.1)	
	<i>P-value</i> ^a	0.898	0.001**	0.001**	
Self management	Intervention	4.1 (1.2)	8.4 (1.2)	9.1 (1.2)	<i>p</i> <0.001 <i>p</i> >0.05
	Control	3.9 (1.4)	5.1 (1.5)	5.6 (1.6)	
	<i>P-value</i> ^a	0.826	0.001**	0.001**	
Overall self efficacy	Intervention	12.5 (2.6)	21.5 (3.1)	22.5 (3.3)	<i>p</i> <0.001 <i>p</i> >0.05
	Control	12.8 (4.1)	14.6 (3.8)	16.5 (3.6)	
	<i>P-value</i> ^a	0.458	0.001**	0.001**	

Notes: ^a Student's t-test, ^b Repeated measures ANOVA, * *P*<0.05, ** *P*<0.01

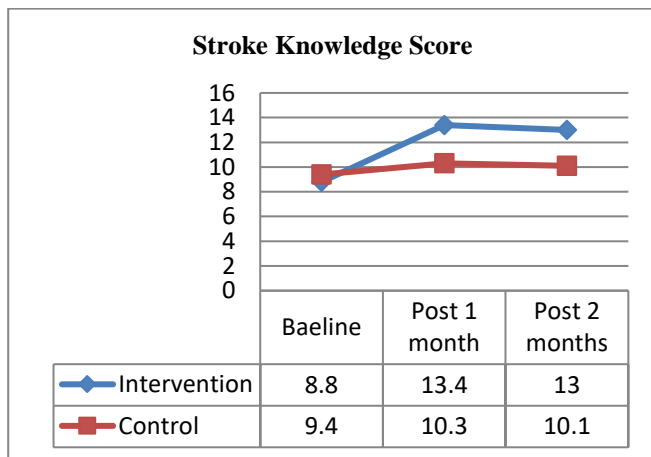


Figure 3: Changes in knowledge score in the intervention and control groups at different time points

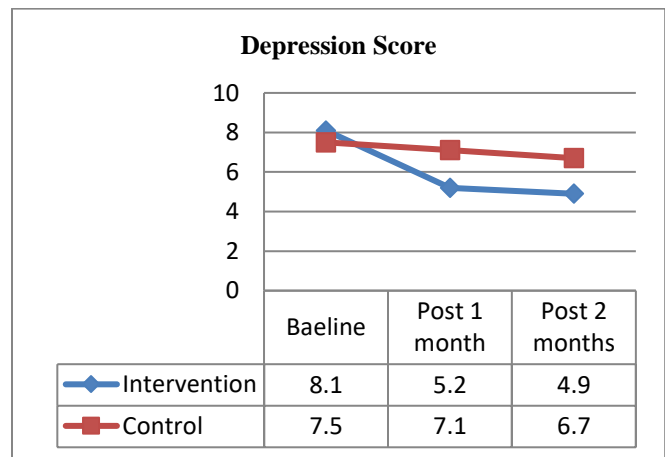


Figure 4: Changes in depression score in the intervention and control groups at different time points

Figure 5: Shows a significant strong negative correlation between self efficacy and post stroke depression at 2 months after the program among participants in the intervention group (*r*=-0.508). As, post stroke depression level was lower among participants who had high level of self efficacy.

Figure 6: Shows a significant strong positive correlation between self efficacy and quality of life at 2 months after the program among participants in the intervention group (*r*=0.617). As, quality of life score was better among participants who had high level of self efficacy.

Table 4: Outcomes comparison between the two study groups after adjustment of demographic variables by using the generalized linear model, the results showed that the self efficacy, post stroke depression and quality of life of participants in the intervention group after the program was 7.27, 1.91, and 10.65 times better than those in the control group respectively. Also, the results showed, the self efficacy was higher among highly educated patients (*p*= 0.029) and among those who had a stroke for more than three months (*p*=0.019). Additionally, stroke elderly men had higher quality of life than women (*B*=-1.678, *p*=0.51).

Table 3: Comparison of changes in quality of life of the intervention and control groups across time

Outcome (Quality of life)	Group	Baseline	Post 1	Post 2	Repeated Measures ANOVA <i>P-value</i> ^b
		Mean (SD)			
Strength	Intervention	24.9 (3.4)	39.8 (4.6)	41.8 (6.3)	<i>p</i> <0.001
	Control	25.2 (4.9)	26.5 (4.5)	30.1 (5.2)	<i>p</i> <0.01
	<i>P-value</i> ^a	0.651	0.001**	0.001**	
Hand function	Intervention	16.6 (3.3)	30.8 (3.1)	32.9 (3.1)	<i>p</i> <0.001
	Control	17.2 (4.3)	20.1 (4.2)	21.5 (3.4)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.473	0.001**	0.001**	
Mobility	Intervention	28.9 (3.9)	44.7 (4.5)	47.9 (5.4)	<i>p</i> <0.001
	Control	29.5 (4.8)	31.9 (5.6)	33.6 (5.7)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.458	0.001**	0.001**	
ADL/IADL	Intervention	32.1 (3.5)	47.9 (5.4)	51.6 (7.1)	<i>p</i> <0.001
	Control	33.4 (4.4)	37.2 (5.2)	39.5 (5.3)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.182	0.001**	0.001**	
Memory	Intervention	67.9 (8.2)	69.2 (9.1)	70.1 (9.4)	<i>p</i> >0.05
	Control	65.7 (8.4)	66.8 (9.8)	67.3 (8.8)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.105	0.001**	0.001**	
Communication	Intervention	79.2 (7.1)	82.7 (6.7)	84.2 (6.4)	<i>p</i> <0.001
	Control	77.1 (7.8)	79.6 (7.4)	79.9 (7.7)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.063	0.001**	0.001**	
Emotion	Intervention	56.5 (9.2)	62.0 (8.8)	63.3 (9.6)	<i>p</i> <0.001
	Control	54.7 (7.7)	56.8 (7.8)	59.9 (8.4)	<i>p</i> <0.01
	<i>P-value</i> ^a	0.268	0.001**	0.001**	
Social participation	Intervention	34.2 (3.5)	45.1 (5.1)	51.0 (4.7)	<i>p</i> <0.001
	Control	35.1 (4.9)	39.5 (5.5)	42.5 (6.3)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.137	0.001**	0.001**	
Physical domain	Intervention	25.6 (3.3)	40.8 (4.1)	43.5 (4.8)	<i>p</i> <0.001
	Control	26.2 (4.2)	28.3 (3.9)	30.6 (4.3)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.397	0.001**	0.001**	
Social domain	Intervention	59.2 (6.3)	65.7 (6.4)	68.4 (6.3)	<i>p</i> <0.001
	Control	57.8 (6.7)	59.9 (6.9)	61.1 (6.1)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.261	0.001**	0.001**	
Overall QoL	Intervention	42.4 (4.6)	53.1 (4.3)	56.1 (5.8)	<i>p</i> <0.001
	Control	42.1 (5.2)	44.7 (5.1)	45.8 (5.2)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.678	0.001**	0.001**	
Stroke recovery	Intervention	38.7 (10.2)	56.4 (8.4)	60.1 (7.9)	<i>p</i> <0.001
	Control	40.1 (9.6)	43.8 (9.1)	45.6 (8.8)	<i>p</i> >0.05
	<i>P-value</i> ^a	0.121	0.001**	0.001**	

Notes: ^a Student's t-test, ^b Repeated measures ANOVA, * *P*<0.05, ** *P*<0.01

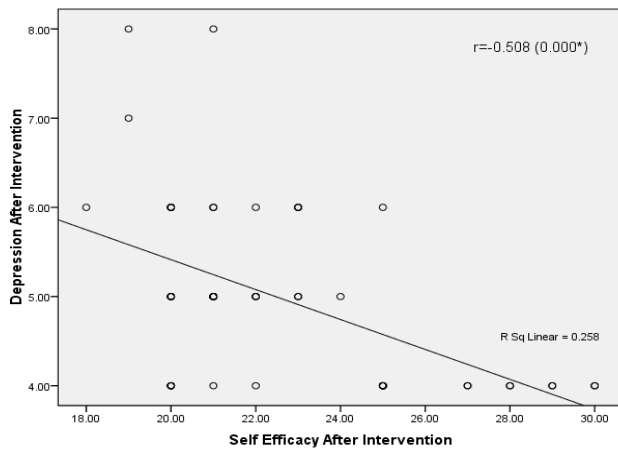


Figure 5: Correlation between self efficacy and depression of the intervention group after the program

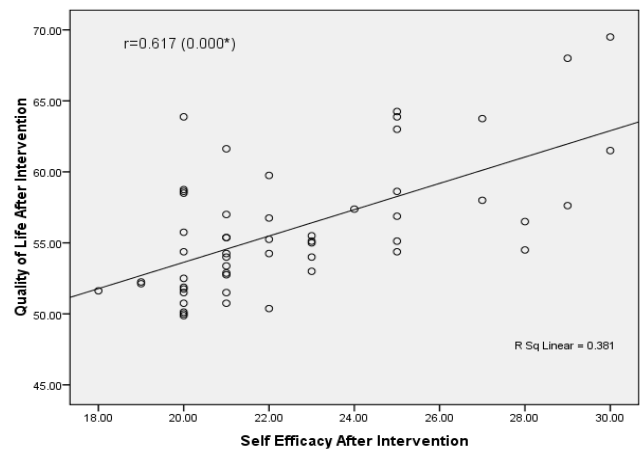


Figure 6: Correlation between self efficacy and quality of life of the intervention group after the program

Table 4: General linear model for outcomes comparison between the study groups after adjustment of demographic variables

Variables	Groups	Self efficacy		Depression		Quality of life	
		B (95% CI)	P	B (95% CI)	P	B (95% CI)	P
Group	Control	r	0.001*	r	0.001*	r	0.001*
	Intervention	-7.27 (-8.29—6.24)		1.91 (1.28-2.54)		-10.65 (-12.32—8.97)	
Age	-----	-0.151 (-0.378-0.076)	0.191	0.040 (-0.10-0.180)	0.575	-0.313 (-0.684-0.058)	0.098
Sex	Male	r	0.984	r	0.732	r	0.051*
	Female	-.011 (-1.050-1.028)		0.111 (-0.53-0.752)		-1.678 (-3.37-0.022)	
Social status	Married	r	0.678	r	0.455	r	0.492
	Un married	-0.234 (-0.881-1.349)		0.260 (-0.949-0.428)		-0.635 (-2.46-1.19)	
Education	-----	0.883 (0.092-1.67)	0.029*	-0.303 (-0.791-0.186)	0.222	1.115 (-0.181-2.41)	0.091
Living condition	Alone	r	0.093	r	0.773	r	0.245
	With family	-1.435 (-3.11-0.246)		0.151 (-0.886-1.18)		-1.623 (-4.37-1.12)	
Duration of stroke	-----	1.850 (0.311-3.39)	0.019*	-0.579 (-1.52-0.372)	0.230	1.565 (-0.955-4.08)	0.221

Notes: B, coefficient of regression; CI, confidence interval; r, reference category; * P<0.05

Discussion

Elderly stroke survivors face great challenges namely living with disabilities. Patients with physical or psychological disabilities after stroke need special rehabilitation program to achieve optimum

quality of life (Liao, 2020). Today, the number of stroke survivors who suffered from post stroke consequences not reduced although markedly improvement of survival rate of ischemic stroke (Zhang et al., 2019). Most patients return home immediately after discharge despite having disabilities, and are cared for by family members with limited training (Deyhoul

et al., 2020). Families actively involved in the rehabilitation programs feel more prepared for the new challenges of caring for the stroke survivors especially older adults (Creasy et al., 2015). To our knowledge, this is the first study conducted to analyze the effect of family centered empowerment program on self efficacy, depression and quality of life among geriatric patients with ischemic stroke in Egypt.

According to the interpretation of findings of this study, the self efficacy of the study participants was pointed at some level of confidence in both study groups before the program with no meaningful difference between the two groups in term of self efficacy. This confirms the assumption that homogeneity prevailed between the two groups of the study. In accordance with our results, a study in china which investigates the effectiveness of empowerment program during discharge planning on stroke survivors revealed, participants' self efficacy was moderate with no difference between the two study groups before the program (Chen et al., 2018). Another study that analyzed the effect of educational intervention on self efficacy of stroke patients in Germany reported the same finding as the present study (Sabariego et al., 2013).

Self efficacy enhancing strategies can help stroke survivors' especially older adults to gain more control over their condition and increase their chance for better sustained rehabilitation effects (Szczepańska-Gieracha & Mazurek, 2020). The results of the present study confirmed our hypothesis and showed that, the geriatric patients with ischemic stroke who received a family centered empowerment program noted a meaningful improvement in self efficacy than those in control group at different time points of evaluation. This reflects the effectiveness of the empowerment program. This could be attributed to the efficient of collaboration among patients, families, and

nurses with respect of planning, implementation, and delivery of health care which in turn increase in the self confidence of elderly patients. Also, analysis of variance used the repeated measures revealed a meaningful increase in self efficacy related perceived confidence in term of activity subscale among participants in the control group at different stages of evaluation, particularly at 2 months. A possible explanation for this improvement could be due to during the time of rehabilitation, stroke elderly patients with similar disabilities can motivate each other that task is possible, or, could be a result of the effect of treatment and the spontaneous recovery process over time after stroke. Despite, expected spontaneous recovery in both groups, the positive effect noticed in the intervention group indicates additional effect of our intervention on patients' outcomes.

In the same line with our results, randomized controlled trials conducted on stroke patients' predominately older adults in China revealed that, patients enrolled in the study group showed high level of self efficacy post intervention compared with control group (Sit et al., 2016; Chen et al., 2018; Xu et al., 2021). Another recent study in Iran which involved 72 patients with stroke with a mean age of 68 years revealed the appropriate effect of the self management program on self efficacy of the study participants (Amiri et al., 2022). Moreover, Lo et al., (2018) in Australia noted significant improve in self efficacy among the treat population at 8 weeks of follow up. In Egypt, Ibrahim et al., (2021) and Fouad et al., (2022) supported our results. However, a study in Germany contradicted this finding and showed that, the effectiveness of stroke patients' education program on self efficacy could not be confirmed when compared with control group and explained this result as patients' participation and self efficacy improved over time (Sabariego et al., 2013).

Also, the findings of the analysis revealed that, the highest self efficacy improvement was reported in participants with high educational background and who had a stroke for more than three months. Our finding reinforcing and supporting the assumption that those with higher education background can receive the information related their illness easily, translated it to adherence with the therapeutic plan and also influence their recovery process's expectations which contribute to better self efficacy. This is concordant with Szczepańska-Gieracha & Mazurek (2020) in Poland which concluded that, the high self efficacy was seen in participants with higher education.

Elderly stroke survivors face psychological challenges after stroke. One of the most common psychological consequences caused by stroke is depression in term of post stroke depression (Hamid & MacKenzie, 2017). Empowering family members to guide the elderly patient with stroke in applying effective psychological adapting strategies in the early stage of rehabilitation can contribute in improving the psychological status of patients and achieving better quality of life after stroke (Dharma et al., 2018). This achieved through the findings of the present study which showed the positive effect of the program on reducing post stroke depression at 1 and 2 months after the intervention among participants enrolled in the intervention group. This could be justified by the fact proven in the present study that self efficacy was negatively linked with post stroke depression, as participants who have high level of self confidence will achieve optimal psychological health status after stroke. This is similar with an evidence based nursing intervention study in china which revealed a meaningful improvement in anxiety, depression, and sleep quality among elderly patients with ischemic stroke (Gao et al., 2022). Also, nursing care post stroke showed a beneficial effect on emotional well-being when comparison to usual

care in Netherlands (Verberne et al., 2022). Other studies in Japan by Sakamoto et al., (2018) and in Indonesia by Handayani et al., (2020) supported the findings of this study.

Although the findings of the current study were consistent with many studies, the previous findings are in contrast with a study in Poland which showed no significant changes in respect to post stroke depression after 3 weeks from stroke rehabilitation program (Szczepańska-Gieracha & Mazurek, 2020). The contradiction may be related to the differences in terms of the nature of the intervention and the time of its evaluation. Also, that intervention was involved patients only in contrast to our study which involved patients and their active family members.

Long term consequences at different stages of post stroke recovery can affect patients' quality of life. Stroke survivors particularly older adults unable to carry out their life activities. Therefore, family is the main supportive individual for these patients to increase their quality of life (Nayeri et al., 2014). The present study confirmed its effectiveness in improving the quality of life of geriatric patients with stroke based on family centered empowerment program. Overall, the intervention group showed more favorable improvement in total and all dimensions of quality of life in the different time points of evaluation compared with control group except for memory dimension. This finding could be justified by the memory dimension in study participants already had a high score before implementation of the program and not altered significantly by the disease process like the physical function. The noticed improvement in total quality of life might be attributed to increase in participants' self confidence to perform the activities with less assistance due to the intervention. This justification was confirmed by the results presented above in the

current study, as, self efficacy was positively linked with quality of life. In this regard, a study in Iran by Izadi-Avanji et al., (2020) showed that, quality of life significantly changed immediately and 2 months after implementation of family based empowerment model and recommended this model to use in educational training for stroke patients. Similar finding was reported by Kanedtapilux et al., (2020) in Thailand which revealed that, empowerment sessions can increase the quality of life of elderly people with stroke. Moreover, another study in Indonesia concluded that the family caregiver empowerment program was effectively improve stroke survives' quality of life and functional capacity after the program compared with control group (Dharma et al., 2018). Moreover, Deyhoul et al., (2020), Yu et al., (2021) supported the present results. Additionally, the present study findings revealed, stroke elderly men had quality of life by 1.67 times higher than women after the intervention. One possible explanation of this finding is that, Women are more sensitive and apprehensive to stressful situation as stroke than men which consequently affect on their quality of life. This finding is similar to a research by Zamzam et al., (2020) who stated that female Patients have lower quality of life by 1.74 units than male patients.

Pointed to control group, the results showed meaningful improvement in quality of life in respect to strength and emotion dimensions particularly at 2 months of evaluation. This could be explained by the participants enrolled in control group received routine rehabilitative care during the study, and these slight changes in the two previous quality of life dimensions were predictable. But, these changes not considerable when compared with the changes occur in the intervention group. This finding was consistent with other researches, as showed that training with involvement of family member is effective in the improvement of quality of life among

stroke patients in both control and experimental groups (Abolfathi et al., 2018 & Li et al., 2021). Izadi-Avanji et al., (2020) found that family empowerment model had a positive effect in increasing quality of life of stroke patients in both groups.

According the findings of the present study, the research hypothesis was proved as stroke elderly patients enrolled in the intervention group showed a meaningful improvement in self efficacy, post stroke depression and quality of life than those in the control group. Therefore, the family centered empowerment program seems to be an appropriate intervention used by nurses in helping elderly patients suffered from ischemic stroke and their family members to improve their self efficacy and quality of life.

Conclusion

Implementation of the family centered empowerment program is an effective strategy in improving self efficacy, depression level and quality of life among geriatric patients with ischemic stroke by giving them necessary information about caring principles. Moreover, regarding the high incidence of ischemic stroke and its disabilities especially among elderly people, this model is a simple and understandable method recommended for nurses to enhance stroke outcomes.

Recommendations

- It is necessary to conduct in-service training program for nurses and health care providers in neurological units and outpatient clinics to help them in caring for elderly patients with stroke based on the family centered empowerment model in order to improve patients' outcomes.
- Further studies in this regard should be considered with large samples to validate our findings in order to increase the possibility of generalizing the results to the studied population.

Acknowledgments

The researchers would like to thank all the study participants as well as health care personnel for their participation to fulfill the study.

Conflicts of interest

The researchers declare that there is no conflict of interest.

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