

Tailored stroke self-management interventions: maximizing physical abilities

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Abstract: Stroke is the leading cause of global long-term adult disability. Individuals post-stroke are inactive, even during rehabilitation, contributing to ongoing disability and risk of secondary health conditions. So, the engagement of stroke survivors in self-management has become an emerging priority because of the increased recognition of the chronic nature of stroke and its related disabling consequences and post-stroke sequela. A possible strategy to improve the effectiveness of self-management interventions is to understand how best to tailor self-management interventions to the needs and circumstances of each participant. Aim: to evaluate the effectiveness of tailored stroke self-management interventions on physical abilities. Subjects& Methods: A quasi-experimental design was used to fulfil the aim of the study. Subjects: A purposive sample of (120) post-stroke patients were recruited equally divided into study and control (60 patients each) both of groups receiving the routine hospital care (ultraviolet rays and range of motion exercise) Moreover, the study group receiving tailored stroke self-management interventions. Study setting: Rheumatology and Rehabilitation Department of Minia University Hospital at Minia Governorate, Egypt. Tools of data gathering were; 1) Structured questionnaire for personal and medical data, 2) Barthel scale for the performance of activities of Daily Living (ADL) to detect physical abilities, 3) Ashworth scale for degree of spasticity to detect physical functions and 4) Patient's knowledge assessment sheet. Results: a significant improvement in physical abilities as well as physical functions in the study group than the control group at the 2 weeks and 12 weeks follow-up ($p<0.001$). Conclusion: The implementation of tailored stroke self-management interventions is effective in maximizing physical abilities. Recommendation: Rehabilitation nurses should be encouraged to incorporate tailored stroke self-management interventions to minimize post-stroke sequela.

Keywords: Stroke, tailored stroke self-management interventions, physical abilities.

1. INTRODUCTION

Stroke is a major cause of long-term disability worldwide, representing a substantial health care burden (World Health Organization, 2014). National Institute of Neurologic Disorder and Stroke (NINDS) and the World Health Organization (WHO) define stroke as a loss of the brain function related to inadequate cerebrovascular blood flow for a duration of at least 24 hours (Carison, 2015). Stroke contributed to 5.9 million deaths and 102 million severe adult disabilities globally in 2010. Up to 70% of stroke deaths and 78% of stroke associated disability-adjusted life-years (DALYs) lost occur in low- and middle-income countries (LMICs) (Feigin et al., 2014).

Stroke is the second most common cause of death and among the top five causes of morbidity in many developed and developing countries. The burden of stroke in developing countries has grown to epidemic proportions. Two-thirds of global stroke occurs in low- and middle-income countries. Egypt is classified by the WHO as a lower-middle-income country with a total expenditure on health per capita of \$309 (4.9% of gross domestic product). (Masoud et al., 2016 and the World Health Organization, 2020). Egypt shares the socio-economic challenges faced by most other developing countries, including inefficient service organization, scarce funding, and failing healthcare infrastructure. These factors have probably contributed to the clear divergence in stroke incidence trends seen between developed and developing countries (42% reduction vs. >100% increase) over the past four decades (Feigin et al., 2019).

The incidence of acute cerebrovascular stroke was highly significant in males compared to females. Acute cerebrovascular stroke was highly associated with hypertension, diabetes mellitus, smoking and atrial fibrillation, the incidence of cerebral infarction was highly significant intracranial hemorrhage. (Ayman et al., 2016).

The main types of stroke are: An Ischemic Stroke occurs when a clot or mass, often a fatty plaque deposit, clogs a blood vessel cutting off the blood flow to brain cells. It accounts for 87 percent of all stroke cases, A Hemorrhagic Stroke results from a weakened vessel that ruptures and bleeds into the surrounding brain tissue. The blood accumulates and forms a bruise within the brain tissue, compressing brain cells and causing them to die. (American Heart Association, 2020).

The risk factors of stroke can be divided into modifiable and non-modifiable risk factors. Awareness and control of modifiable risk factors can contribute to reducing the incidence and burden of stroke. (Lewis et al., 2015). Modifiable risk factors are that can potentially be altered through lifestyle changes and medical treatment, thus reducing the risk for stroke. From this factors hypertension, heart disease, smoking, excessive alcohol consumption, obesity, sleep apnea, metabolic syndrome, and lack of physical exercises, poor diet and drug abuse (American Heart Association, 2017).

Nonmodifiable risk factors include age, gender and family history/heredity. Stroke risk increases with age. Two third of all strokes occur in individuals older than 65 years, but stroke can occur at any age. (World Heart Federation, 2020).

Stroke is accompanied by paralysis and numbness, a decrease of sensation in the hands and feet of one side of the patient's body; inability to understand and produce speech as well as vision and balance disturbances (Ghandehari, 2015).

Stroke survivors are often deconditioned and predisposed to a sedentary lifestyle that limits the performance of activities of daily living, increases the risk for falls, and may contribute to a heightened risk for recurrent stroke and cardiovascular disease (Gordon et al., 2016). Clearly, self-management in stroke offers hope of providing ways of addressing these long-term consequences. It can broadly be defined as a process in which individuals acquire skills, strategies and knowledge to manage the physical, psychological, emotional and social effects of a chronic condition (Hinder & Greenhalgh, 2012).

Self-management interventions after stroke have been found to reduce disability and depression, and improve self-efficacy, quality of life and social participation based on evaluation of largely short-term measures (Jones & Riazi, 2017 and Warner et al., 2017). Over the past decades, many interventions have been developed and evaluated that may help to equip patients with these complex self-management competences. Most interventions provided (nurse-led) patient education and training skills to support self-management (Lainscak et al., 2014).

To optimize the effectiveness of self-management interventions across all adults with neurological conditions is to understand how best to tailor self-management interventions to the needs and circumstances of each person. In a tailored intervention, the patients are assessed and the intervention is customized based on the unique characteristics of that patients, in order to increase the relevance of treatment and to produce greater desired changes (Hawkins et al., 2016 and Kreuter et al., 2013).

Significant of the study:

Worldwide, stroke is the second leading cause of death and the third leading cause of disability. Each year, 15 million people worldwide suffer from a stroke. Of these, 5 million dies and another 5 million are left permanently disabled, placing a burden on family and community. Most of the burden of stroke worldwide is increasingly being carried by less developed and lower-income countries (World Health Organization, 2020).

Official national statistics indicate that diseases of the circulatory system, including stroke, are the primary cause of death in Egypt and account for one-third of all deaths. Stroke accounts for 6.4% of all deaths and thus ranks 3rd after heart disease and gastrointestinal (especially liver) diseases, and followed closely by cancer (6.1%) (Annual Bulletin of Mortality Statistics, 2020). According to the statistical records of Minia University Hospital in the year of 2016, about 125 patients with stroke were admitted to the inpatient physiotherapy department of El-Minia University Hospital with gait impairment (Statistical Office of El-Minia University Hospital, 2016).

Self-management in stroke offers hope of providing ways of addressing long-term consequences. It was noted previously that the core component of self-management including goal setting, action planning and problem-solving, and it affected a positive change in activities of daily living and a reduction in dependence/death after stroke. (Hinder & Greenhalgh, 2012 and Parke et al., 2015).

Research indicates that tailored interventions are only slightly more effective than non-tailored interventions in promoting healthy behaviors (Noar et al., 2013 and Krebs et al., 2014). In a tailored approach, treatment exposure is dynamic instead of the more fixed exposure in one-size-fits-all interventions (Kreuter et al., 2014). Patients prefer tailored interventions and view them as being more relevant to their needs (Richards et al., 2017). Understanding how best to tailor self-management interventions is effective in adults with neurological conditions (Hawkins et al., 2008 and Kreuter et al., 2013). So, this study concerned with the evaluation of the effectiveness of tailored stroke self-management interventions on physical abilities.

Aim of the study:

The aim of the current study was to evaluate the effectiveness of tailored stroke self-management interventions on physical abilities.

Research Hypothesis:

H (1). Study group's physical abilities will have a higher score than the control group.

H (2). knowledge of study group regarding stroke will have statistically significant scores than the control group.

2. MATERIALS AND METHODS

Research Design: The quasi-experimental design was utilized to achieve the aim of the current study.

Study setting: This study was conducted at the Rheumatology and Rehabilitation Department at El-Minia University Hospital in Minia Governorate, Egypt.

Sampling:

A purposive sample of one hundred and twenty adult post-stroke and their age ranged between >18-60 years. The researchers selected the patients according to the following inclusion and exclusion criteria: Post-stroke patients, free from severe physical, cognitive, and communication impairment and study of comorbidities such as diabetic neuropathy and musculoskeletal problem and didn't receive any several modalities to improve physical abilities. The cases were then randomly assigned to two equal groups (study and control group) 60 patients each. Both groups receiving the routine hospital care (ultraviolet rays and range of motion exercise) Moreover, the study group receiving tailored stroke self-management interventions.

The sample size: The total number was one hundred and twenty adult post-stroke. The researchers calculated the number of the target population based on the flow rate of the subjects with this specific inclusion and exclusion criteria. It was 125 patients with stroke in the year 2016 at the target hospital. Online sample size calculators have been searched, reviewed and checked for the calculated results based on known formulas for common research objectives (Meysamie et al., 2014). The researchers also calculated the sample size by using the creative research systems sample size calculator website. <https://www.surveysystem.com/sscalc.htm>. So, the sample size was equal to 110 adult patients with stroke. The researchers added 5 cases to replace case which may be dropped out during the study. So, the final total sample became 120 adult patients with stroke.

Instruments of data collection:

Four instruments were used to collect the data by the researchers as the following:

Instrument I: Structured questionnaire: by interviewing which included the following:

- A- Socio-Demographic characteristics such as age, sex, marital status, residence, education level, occupation, and address
- B- Medical data: - Which included questions about the patient's complaints, past and present medical history of chronic illness as well as risk factors for stroke.

Instrument II: Activities of Daily Living (ADL) performance to detect physical abilities: It was adopted from Mahony and Barthel (1965) to assess the performance of (ADL). It included ten variables for describing (ADL) (Mobility on level surfaces, Transfers (bed to chair and back), Stairs, Feeding, Toilet use, Bowels, Bladder, Grooming, Dressing, and Bathing) .

Scoring system, full credits have scored (100) when patient doesn't need or need minimal help or supervision during performance and physically independent, while a score of (75-90) is given when patient mildly disabled, subsequently, a score of (50-70) is given when patient moderately disabled, while a score of (25-45) severely disabled and a score of (0-20) is given when patient very severely disabled and cannot perform (ADL).

Instrument III: Ashworth Scale to detect physical functions: It assesses the degree of spasticity. It was adopted from Ashworth (1964) .

Scoring system was divided into score (0) for no increase in muscle tone, while score (1) for slight increase in tone giving a "catch" when affected part is moved flexion or extension, but score (2) for increase in tone but affected part is easily flexed, subsequently a score (3) for increase in tone; passive movement difficult and a score (4) is given when limb rigid in flexion or extension.

Instrument IV: Knowledge questionnaire: It was designed by the researchers in the Arabic language based on the recent literature in order to assess patients' knowledge regarding:

- A- Definition of stroke, its risk factors, its signs and symptoms, its diagnosis, its management, and prevention the recurrent of stroke.
- B- Activities of daily living performance after stroke.
- C- Nature of spasticity and what could exacerbate it.

Reliability test was done whereas Cronbach's Alpha equal 0.902.

Scoring systems

The total score of knowledge was 39 degrees. Each correct answer had one mark while the incorrect one had zero.

Validity and reliability:

For validity purposes, the researcher conducted an extensive literature review and developed the questionnaires from the previously used instruments and reviewing the pertinent reviews. Instruments I and IV were designed by the researchers and revised by five experts in the field of medical-surgical nursing (for content validity), while instrument II was adapted from Mahony and Barthel (1965) and III was adapted from Ashworth (1964). Reliability analysis was ascertained with Cronbach's alpha.

Pilot study:

A pilot study was conducted to assess the applicability of the instruments, the feasibility of the study and to estimate the time needed for data collection. It was conducted on 10 % of the total participants according to the selection criteria. All patients participated in the pilot study excluded from the study sample. Based on the results of the pilot study and expert's opinion, modifications and omissions of some details were done and then set the final fieldwork schedule.

Fieldwork:

This study was carried out through three consecutive phases: Preparatory phase, implementation phase and evaluation phase.

1- Preparatory phase:

To carry out the study, ethical approval was obtained from the Scientific Research Ethical Committee of Minia University. Official letters were issued to the hospital director and nursing director of Minia University Hospital from the faculty of nursing explaining the aim of the study to obtain permission for the collection of data.

The data collection period was for twelve months, starting from the beginning of March 2016 to the end of March 2017. Random assignments to the study subjects with 120 patients in each study & control group and homogeneity between groups were ensured. The researchers explained the nature & purpose of the study and filled the data collection tools within 60-90 minutes (sometimes filled into 2 days for the same patient).

2- Implementation phase:

In this phase, all recruited patients were interviewed by the researcher in the Physiotherapy room for Rheumatology and Rehabilitation Department at El-Minia University Hospital. Each patient was interviewed individually by the researcher. The number of sessions ranged from five to six sessions according to the patient's needs; each session lasted from 60-90 minutes (Only three to four patients were met every visit).

Four sessions concerning with practical & training part about moving of patients with hemiparesis and daily exercise, standing, or active or passive stretching, how to wear clothes after disabilities, mobility on level surfaces, transfer bed to chair and back, stairs, feeding, toilet use, bowels, bladder, grooming, and bathing.

Two sessions concerning the educational part about knowledge related to the definition of stroke, its risk factors, its signs and symptoms, its diagnosis, its management, and prevention the recurrent of stroke. Activities of daily living performance after stroke. Nature of spasticity and what could exacerbate it. Each session was divided into three parts.

Part one: Started by explaining the components of the tools, the importance of tailored stroke self-management interventions and the researchers filled the data collection tools.

Part two: Practice & training the patients, the practical part conducted through the demonstration and redemonstrations. Also, in this part, the researcher measured the level of independency by Barthel index and assessment degree of spasticity according to Ashworth Scale testing.

Part three: knowledge the patients with a definition of stroke, its risk factors, its signs and symptoms, its diagnosis, its management, and prevention the recurrent of stroke. Activities of daily living performance after stroke. Nature of spasticity and what could exacerbate it.

Moreover, the patients were also given hand-outs based on the researchers' booklet' after extensive literature review related to the disease and how to maximize physical abilities in clear Arabic language. This part was conducted through lecture, open discussion, demonstration and redemonstrations; an open channel of communication was achieved between the researchers and patient to assure understanding, answer any question and to verify the information.

3- Evaluation phase:

This phase was emphasized on estimating the effectiveness of the tailored stroke self-management interventions on the patient's level of knowledge, the performance of activities of daily living and degree of spasticity. Each patient was reassessed at two weeks and then 12 weeks after the first assessment by the researchers. Follow up for the patient was done by meeting them in the Physiotherapy room for Rheumatology and Rehabilitation, and then by telephone.

Ethical Considerations:

Permission to conduct the study was requested and obtained from the authoritative committee personal. Patients who voluntarily agreed to be involved in the study; following a thorough explanation of the purpose of the study. Informed oral consent was obtained from the patients to be interviewed. Also, the patient was assured that they could withdraw

from the study at any time, without penalty, if they so wished. Assigning codes rather than patients' names. The patients were allowed to ask questions. It was also explained that the study findings would be disseminated in the form of presentations at conferences and publication in an accredited journal.

Statistical analysis

The collected data were scored, tabulated and analyzed using (SPSS) version 20. The collected data were presented in tables and graphs using the actual numbers and percentages. Appropriate statistical tests were used to analyze the data as, chi-square test (X^2), independent sample t-test. The level of significance was set at $p < 0.05$.

3. RESULTS

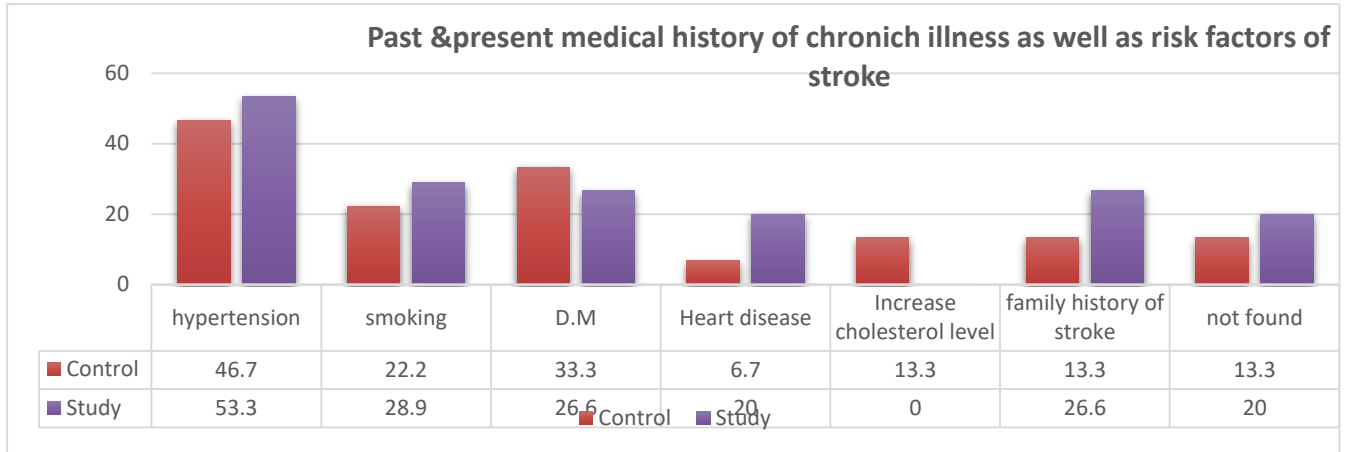
Part I: Socio-demographic characteristics of the studied patients

Table (1): Socio-demographic characteristic of the studies group, n= 120.

Socio-demographic characteristic	Study No (60)		Control No (60)		T. test	P. Value
	No	%	No	%		
Age						
<18-	0	00.0	0	00.0	0.222	0.825Ns
19-35	12	20.0	4	6.7		
36-50	12	20.0	20	33.3		
>51-60	36	60	36	60		
Mean±SD	51.20±11.33		50.03±14.04			
Sex						
Male	28	46.7%	28	46.7%	-0.509	0.613 Ns
Female	32	53.3%	23	53.3%		
Marital status						
Married	40	66.6%	34	56.6%	1.000	0.0001**
Widow	20	33.3%	26	43.3%		
Educational level						
Illiterate	52	86.7%	44	73.3%	1.350	0.182 Ns
Write and read	8	13.3%	12	20.0%		
Diploma	-	-	4	6.7%		
Occupation						
Farmer	24	40.0%	12	20.0%	0.0001	1.000 Ns
Worker	8	13.3%	8	13.3%		
Housewife	28	46.7%	28	46.7%		
Retirement	-	-	12	20.0%		
Residence:						
Urban	36	60.0%	44	73.3%	1.000	0.0001**
Rural	24	40.0%	16	26.7%		

Table (I) demonstrates that the mean age of the study sample was 51.20±11.33 years while the mean age of the control group was 50.03±14.04 years. More than 50% of them were females and were married. Live in the urban area. According to a level of education, 86.7% of the study group and 73.3% of the control group were illiterate.

Fig. 1. Percentage distribution of past and present medical history of chronic illness as well as risk factors for stroke, n= 120.



Answers are not mutually exclusive

Fig. 2. Percentage distribution of ADL which detect physical abilities measured by Barthel index in pre, posttest I, posttest II for both groups, n= 120.

Figure (2): Describe that there is an increase in patients' activities of daily living measured by Barthel index after application of tailored stroke self-management interventions (posttest II) than in pretest and posttest I in the study group than the control group.

Fig. 3. Mean and standard deviation of patients' knowledge before & after the application of tailored stroke self-management interventions, n= 1

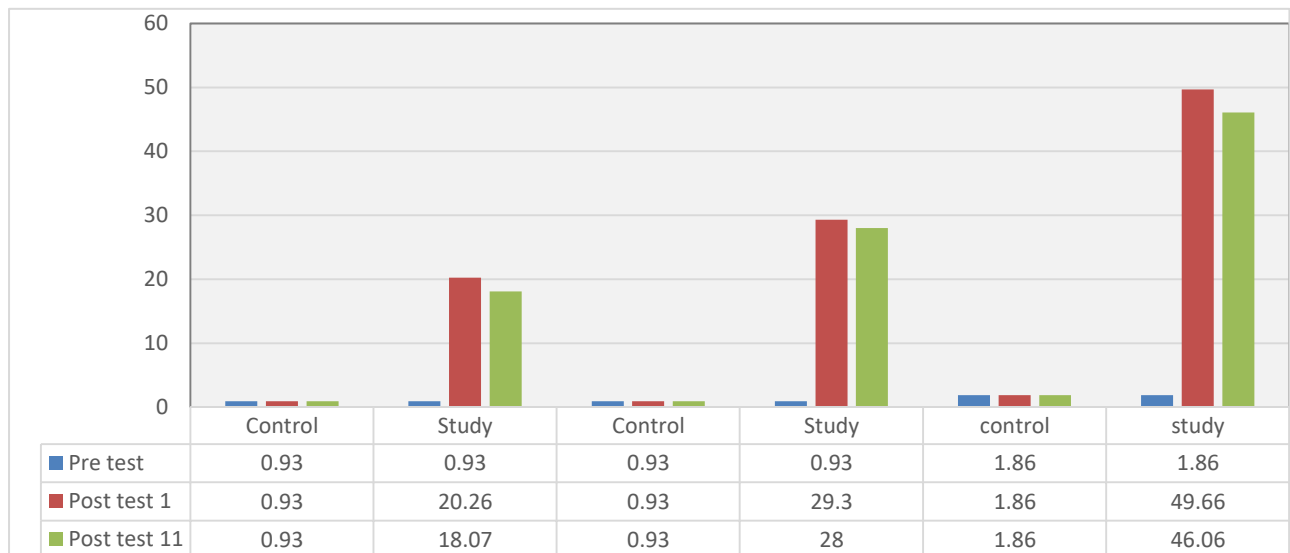


Figure (3): Illustrate that there is an increase in patients' knowledge among study group after application of tailored stroke self-management interventions (49.66±5.085) compared to (1.86±2.51) in control group with highly statistically significant (0.0001).

Table (3) Distribution of degree of spasticity which detects physical functions according to Ashworth scale among patients under study pre, posttest I, posttest II in both group, n= 120.

Ashworth Scale (Upper extremity)	Study group (60)						Control group (60)						T test	P value	
	Pre test		posttest I		posttest II		Pre test		posttest I		posttest II				
	No	%	No	%	No	%	No	%	No	%	No	%			
Elbow															
0	0	0	28	46.7	28	46.7	8	13.3	8	13.3	0	0	21.298	0.0001*	
1	16	26.7	16	26.7	24	40	12	20	12	20	20	33.3			
2	24	40	12	20	8	13.3	24	40	24	40	28	46.7			
3	20	33.3	4	6.7	0	0	12	20	12	20	12	20			
4	0	0	0	0	0	0	4	6.7	4	6.7	0	0			
Wrist															
0	28	46.7	28	46.7	28	46.7	4	6.7	4	6.7	0	0	49.613	0.0001*	
1	16	26.7	12	20	16	26.7	16	26.6	16	26.6	16	26.7			
2	12	20	16	26.7	16	26.7	24	40	24	40	36	53.3			
3	4	6.7	4	6.7	0	0	12	20	12	20	12	20			
4	0	0	0	0	0	0	4	6.7	4	6.7	0	0			
Fingers															
0	28	46.7	20	33.3	28	46.7	4	6.7	4	6.7	0	0	47.407	0.0001*	
1	12	20	24	40	20	33.3	16	26.6	16	26.6	16	26.7			
2	16	26.7	12	20	12	20	24	40	24	40	32	53.3			
3	4	6.7	4	6.7	0	0	12	20	12	20	12	20			
4	0	0	0	0	0	0	4	6.7	4	6.7	0	0			
Thumb															
0	20	33.3	20	33.3	32	53.3	4	6.7	4	6.7	0	0	48.114	0.0001*	
1	24	40	32	53.3	20	33.3	20	33.3	20	33.3	24	40			
2	12	20	4	6.7	8	13.3	20	33.3	20	33.3	24	40			
3	4	6.7	4	6.7	0	0	12	20	12	20	12	20			
4	0	0	0	0	0	0	4	6.7	4	6.7	0	0			

Cont. Distribution of degree of spasticity according to Ashworth scale among patients under study pre, posttest I, posttest II in both group, n= 120.

Ashworth Scale (Lower extremities)	Study group (60)						Control group (60)						T test	P value	
	Pre test		posttest I		posttest II		Pre test		posttest I		posttest II				
	No	%	No	%	No	%	No	%	No	%	No	%			
Hamstrings															
0	20	33.3	28	46.7	32	53.3	4	6.7	4	6.7	8	13.3	33.359	0.0001*	
1	32	53.3	20	33.3	24	40	28	46.7	28	46.7	40	66.7			
2	4	6.7	8	13.3	4	6.7	20	33.3	20	33.3	12	20			
3	4	6.7	4	6.7	0	0	8	13.3	8	13.3	0	0			
Quadriceps															
0	28	46.7	28	46.7	32	53.3	4	6.7	4	6.7	8	13.3	35.972	0.0001*	
1	20	33.3	20	33.3	24	40	28	46.7	28	46.7	44	73.4			
2	8	13.3	8	13.3	4	6.7	20	33.3	20	33.3	8	13.3			
3	4	6.7	4	6.7	0	0	8	13.3	8	13.3	0	0			

Gastrocnemius														
0	28	46.7	24	40	28	46.7	4	6.7	4	6.7	8	13.3	31.722	0.0001*
1	20	33.3	20	33.3	28	46.7	28	46.7	28	46.7	44	73.3		
2	8	13.3	12	20	4	6.7	20	33.3	20	33.3	4	6.7		
3	4	6.7	4	6.7	0	0	4	6.7	4	6.7	4	6.7		
4	0	0	0	0	0	0	4	6.7	4	6.7	0	0		
Soleus														
0	24	40	24	40	24	40	4	6.7	4	6.7	8	13.3	24.480	0.0001*
1	20	33.3	16	26.7	32	53.3	28	46.7	28	46.7	44	73.3		
2	12	20	16	26.7	4	6.7	20	33.3	20	33.3	4	6.7		
3	4	6.7	0	0	0	0	4	6.7	4	6.7	4	6.7		
4	0	0	4	6.7	0	0	4	6.7	4	6.7	0	0		

0- No increase in muscle tone.

1- Slight increase in tone giving a “catch” when the affected part is moved in flexion or extension.

2- More marked increase in tone but the affected part is easily flexed.

3- Considerable increase in tone; passive movement difficult.

4- Affected part is rigid in flexion or extension

Table (3): It is clear from the above table that there is decrease in patients' degree of spasticity according to Ashworth scale after application of tailored stroke self-management interventions (posttest II) less than in pre and posttest I in study group than control group and improvement in lower extremities more than upper extremities and some patient suffered from flaccidity immediately after stroke and convert to increase intensity of muscle tone.

Fig.4. Correlation between degree of spasticity according to Ashworth scale and Barthel index in pre & posttest I in both groups, n= 120.

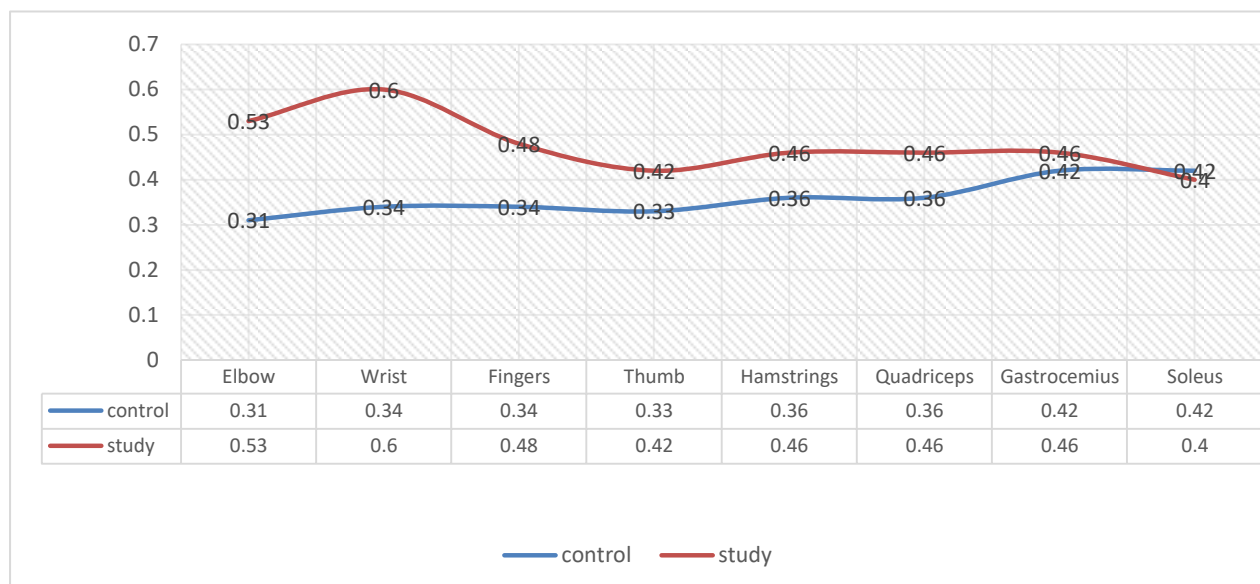


Figure (4): The figure shows that the correlation between degree of spasticity according to Ashworth scale and activities of daily living according to Barthel index in pre & posttest I in control group had negative statistically significant correlation in relation to (hamstrings, quadriceps, gastrocnemius and soleus) high of spasticity and low Barthel index based on table of percentage degree of spasticity and Barthel index. But study group in pre & posttest I had highest strong negative statistically significant correlation (Elbow, wrist, fingers, hamstrings, quadriceps, gastrocnemius) high of spasticity and low Barthel index based on a table of percentage degree of spasticity and Barthel index.

Fig.5. Correlation between degree of spasticity according to Ashworth scale and Barthel index in pre & posttest II in both groups, n= 120.

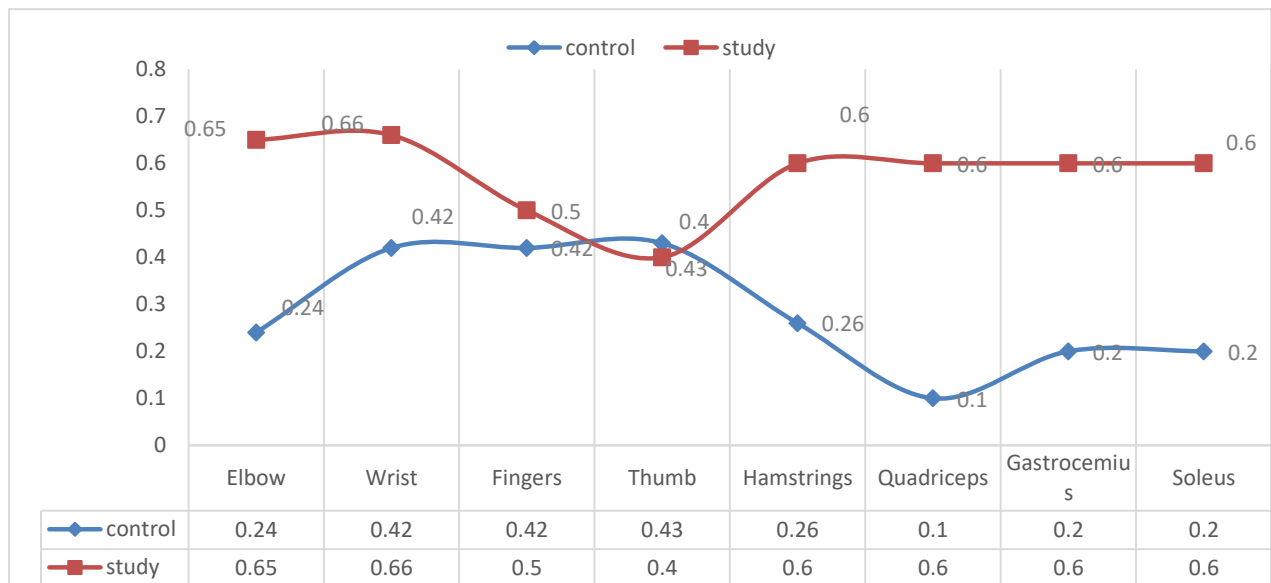


Figure (5): The figure shows that the total correlation between the degree of spasticity according to Ashworth scale and Barthel index in control group in posttest II test had negative statistically significant correlation in relation to (hamstrings, gastrocnemius soleus) high of spasticity and low Barthel index, improvement appears in lower extremities only. But in the study group had highest strong negative statistically significant correlation (Elbow, wrist, fingers, hamstrings, quadriceps, gastrocnemius, and soleus) improvement appear in upper and lower extremities. Low of spasticity and high Barthel index based on the table of percentage degree of spasticity and activities of daily living.

4. DISCUSSION

Stroke is a sudden health event that occurs when the blood supply to a part of the brain is compromised. Although stroke occurs as an acute event, the consequences lead to chronic health conditions for the stroke survivor (AIHW 2011). The majority of stroke survivors have chronic stroke-related disabilities and require ongoing lifetime support (AIHW 2013). It is an event followed by long-term treatments and supported self-management that help to prevent further stroke, facilitate rehabilitation, and help stroke survivors and their families to manage the complex longer-term consequences and ‘treatment burden’ associated with stroke (Fryer et al., 2016). A probable approach to improve self-management interventions is to tailor self-management interventions to the needs and conditions of each patient (Hawkins et al., 2008 and Kreuter et al., 2013). Therefore, the current study is conducted to evaluate the effectiveness of tailored stroke self-management interventions on physical abilities.

One hundred and twenty post-stroke patients were included in the study divided into 2 groups (study and control group) with a mean age of 51.20±11.33 & 50.03±14.04 respectively. More than half of the total subjects were females. This result agrees with Seana et al (2012), who reported that females had more severe strokes than male. Might be related to the fact that women are more concerned about their health, and thus use health-care services more often, than men.

Findings of the current study presented that, majority of the study group and less than three-quarters of the control group were illiterate. This finding was in line with Wessol (2017), who mentioned that most of the sample was low educational level; this might be due to the role of education in health awareness.

Concerning residence, in the present study, it was found that less than two-thirds of the study group and less than three-quarters of the control group were from an urban area. This finding in accordance with Abd-Allah (2016), who mentioned that most of their patients were from the urban area. This might be due to the ease of conductors and proximity to the hospital from the urban area.

As regards past and present medical history of chronic illness as well as risk factors of stroke, the result of the current study revealed that less than half of control group and more than half of the study group were having hypertension and one-third of control group and more than one-quarter of the study group were having diabetes mellitus this result supported with Jing, et al (2012), who corresponding that, hypertension and diabetes mellitus is the leading risk factor for stroke and are more prevalent in the southeastern region of the United States. In the same line Jane et al, (2013), stated that diabetes mellitus remains at greatly increased risk for stroke at all ages. One of the noticeable findings in this study is that less than one-quarter of the control group and more than one-quarter of the study group were smokers. This finding agreed with Gan et al., (2018), who suggests the increased odds of stroke in current cigarette smokers with a graded increase in prevalent risk that depended on how many cigarettes and how many years were smoked.

Regarding the type of current stroke, more than three-quarters of control and study groups were having an ischemic stroke. This was similar to the Mayo Foundation for Medical Education and Research (2020), which reported that ischemic stroke is the most common type of stroke. In this study, two-fifths of the study group and more than one-quarter of the control group had left side paresis. This finding was in accordance with Mehrholz et al (2012), who stated that at hospital admission after stroke more than two-thirds of all patients have paresis.

In the present study, less than three-quarters of the study group and less than two-thirds of the control group had physical disabilities which affect on the dominant hand. This finding was parallel with Harris & Eng (2016), who founded that the effect of the dominant hand being affected versus the non-dominant in individuals with chronic stroke. Individuals with the dominant hand affected demonstrated less impairment than those with the non-dominant hand affected.

The current study result revealed more than one-tenth of the study group and more than one-quarter of the control group used cane as an assistive device. This finding is not corresponding with Caro et al., (2018), who mentioned that, two-thirds of stroke patients using mobility assistive devices. The devices were wheelchairs, shower chairs, and canes. This might be related to the fact that less than two-thirds of study and control groups understudy had right side paresis and no one of the study group and less than one-tenth of the control group had right/left side paralysis.

Concerning patients' knowledge, the present study revealed that, a highly statistically significant improvement of knowledge after tailored stroke self-management interventions. This difference in knowledge found in the current study might be related to the knowledge acquired from the interventions. This finding was parallel with Sundararajan (2014), who affirmed that patients who received the educational program had continuous improvement of their knowledge.

Regarding activities of daily living measured by Barthel scale as fundamental skills to detect physical abilities, the present study referred that, a highly statistically significant improvement of patients' activities of daily living during the posttest as compared to the pretest for the study group after applying of Barthel scale. In contrast, there was a decrease in patients' activities of daily living during the posttest among the control group. This might be due to the effect of tailored stroke self-management interventions for a study group. This supported by Debbie and Janice (2012), who reported that the performance of (ADL) enhance an individual's functional ability after stroke. This comes in agreement with Chao et al; (2012), who mentioned that practices of different intensities of extremities training during rehabilitation period led to the improvement of this extremities.

In relation to patients' degree of spasticity according to Ashworth scale as an indicator to detect physical functions, the current study revealed that, decrease in patients' degree of spasticity during the posttest as compared to the pretest for the study group after applying of Ashworth scale. In contrast, there was an increase in patients' degree of spasticity during the posttest between the control group. This result is in agreement with Yocheved and Michal (2017), who concluded that all muscle strength improved after training except tone remained consistent but the end of the study during the follow-up showed complete improvement in their physical functions. This might be related to the effect of tailored stroke self-management interventions for a study group.

Considering the correlation of spasticity with activities of daily living for the study group after the application of tailored stroke self-management interventions. A highest strong negative statistically significant correlation was found in the upper and lower extremities (Elbow, wrist, fingers, hamstrings, quadriceps, gastrocnemius and soleus) low of spasticity & high Barthel index. while in the control group after application of tailored stroke self-management interventions had negative statistically significant correlation in lower extremities (hamstrings, gastrocnemius soleus) low of spasticity and high Barthel index due to progress on lower extremity more than upper extremity and treatment of spasticity progress by

use many modalities such as electrical stimulation to the antagonist muscles or vibrations. This finding is matched with Anthony (2012), who concluded that spasticity is a common feature of the upper motor neuron syndrome following stroke. It can have a disabling effect on the stroke survivor through reduced mobility, Spasticity can interfere with walking, sitting, and standing; and generally reduce a person's ability to undertake activities of daily living, also added that stroke is a major cause of chronic impaired arm function and may affect many activities of daily living.

To summarize, results of this study support the research hypothesis that study group's physical abilities and its functions (activities of daily living performance and degree of spasticity) will have higher score than control group and knowledge of study group regarding to stroke will have statistically significant scores than control group after applying tailored stroke self-management interventions. This is in agreement with Mehrholz et al (2012), who mentioned that at hospital admission after stroke more than two-thirds of all patients have arm paresis, resulting in reduced upper extremity function and six months after stroke the affected arm of approximately half of all patients remains without function. Therefore, to reduce this burden, many patients receive a multidisciplinary for nursing interventions for several modalities such as nursing practice and training for activities of daily living approach soon after a stroke. Thus, there still exists an urgent need for new inpatient and outpatient rehabilitation and training strategies that match the specific needs of patients and their relatives. Similarly, National Institute for Health and Clinical Excellence (2012) reported that, when the nurses give more attention for physical and functional disabilities during care of post-stroke patients in the first months following stroke, this will lead to prevention or reducing or control of physical disabilities, enhance patient's return to normal life as soon as possible, and prevent or eliminate the incidence of disabilities. This finding comes in agreement with, Nor et al (2015), who pointed to using different nursing care strategies that focus on helping stroke patients to relearn everyday activities can improve physical ability Kollen (2017). In the same line Bandi (2017), emphasized that using successful nursing interventions for stroke patients were reduced physical disabilities.

5. CONCLUSIONS

Improvement was obvious in the level of knowledge, physical abilities which detected by activities of daily living performance and physical functions which detected by the degree of spasticity of patients under study after attending the tailored stroke self-management interventions. So, the present study findings support the hypothesis that study group's physical abilities will have a higher score than the control group and knowledge of study group regarding stroke will have statistically significant scores than a control group after applying tailored stroke self-management interventions.

6. RECOMMENDATIONS

Taking into consideration the results of this study, it is highly recommended that:

- Rehabilitation nurses should be encouraged to incorporate tailored stroke self-management interventions to minimize poststroke sequela.
- Strengthen the nurses' role in providing multidisciplinary nursing interventions for stroke which considered a major cause of long-term disability.
- Nurses should be encouraged to implement different nursing care strategies to lessen stroke consequences.
- Replication of this study is recommended with several design changes such as the use of randomized selection to achieve appropriate representation of the population and large sample size.
- The study period should be extended for more than 3 months. Extending the follow-up period to 6 months will provide more comprehensive information about the effect of tailored stroke self-management interventions on the improvement of physical abilities and its functions.

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