

Effect of Tailored Nursing Program on Cognitive and Motor Status among Patients with Stroke

Dr. Dalia Salah El Deen El-Sedawy¹ & *Dr. Safaa M. Abdel Motaleb I. Hassanein²

^{1,2} DNS, Lecturers at Medical-Surgical Nursing Department, Faculty of Nursing, Cairo University-Egypt

Abstract:

Background: Cognitive-motor interference is evident when simultaneous performance of a cognitive and a motor task results in deterioration in performance in one or both of the tasks, relative to performance of each task separately.

Aim The aim of the study was to evaluate the effect of tailored nursing program on cognitive and motor status among patients with stroke.

Design: A quasi experimental design was utilized for conducting the study.

Research hypotheses: H1: Study group who received the tailored nursing program will have a significant higher mean score in cognitive status than control group who received routine hospital care.

H2: Study group who received the tailored nursing program will have a significant higher mean score in motor status than control group who received routine hospital care.

H3: Study group who received the tailored nursing program will have a significant higher mean score in activity of daily living than control group who received routine hospital care.

Sample: A convenient sample of 60 adult male and female patients diagnosed with stroke at two of medical departments affiliated to Kasr Al-Ainy Educational Hospital, Cairo University, Egypt was recruited, and randomly the sample divided into study and control groups (30 patients each).

Tools: Data were collected through five tools; demographic and medical data sheet, Glasgow Coma Scale, Mini-Mental State Examination, Motor Assessment Scale and Activity of Daily Living assessment (ADL).

Results: There were statistically significant differences regarding cognitive and motor status as well as activity of daily living in the study group after implementation of the tailored nursing program when compared to the control group.

Conclusion: The tailored nursing program enhanced the stroke patients' cognitive and motor status as well as improves their activity of daily living.

Recommendations: It is suggested to apply this tailored nursing program on patients with stroke in their early course of treatment, and to replicate the study on a larger study sample in different settings to generalize the results.

Keywords: Tailored nursing program, patients with stroke, cognitive status, motor status, ADL.

I. Introduction

Cerebrovascular stroke/accident (CVS/CVA) is a serious condition in which the brain is not receiving enough oxygen to function properly. (Right Diagnosis, 2016). Due to stroke the affected area of the brain is unable to function, leading to inability to move one or more limbs on one side of the body, inability to understand or formulate speech, or an inability to see one side of the visual field (Donnan, Fisher, Macleod, Davis, 2008).

Strokes can be classified into two major categories: ischemic and hemorrhagic (National Institute of Neurological Disorders and Stroke, 2009). **Ischemic strokes** are those that caused as a result of an obstruction within a blood vessel supplying blood to the brain. It accounts for 87 percent of all stroke cases. Also there is the transient ischemic attack (TIS) is caused by a temporary clot often called a "mini stroke", these warning strokes should be taken very seriously. While **hemorrhagic strokes** are the ones which result from a weak blood vessel ruptures. Two types of weakened blood vessels usually cause hemorrhagic stroke: aneurysms and arteriovenous malformations (AVMs). But the most common cause of hemorrhagic stroke is uncontrolled hypertension (high blood pressure) (American Stroke Association, 2016).

Furthermore and based on the National Caregivers Library (2016) mentioned that each stroke is different as it depends on the part of the brain injured, the severity of the injury, and the patient's general health status. Also they classified the major **physical complications** for patients with stroke as follows: paresis or plegia which may affect one whole side of the body, or just an arm or leg. Complications using language as have trouble understanding speech/writing or they may understand but be unable to think of the right words to speak/write. Vision and perception complications as may not eat food from one side of the plate because he/she does not see it. pain, numbness or odd sensations e.g., difficult to relax and feel comfortable. Swallowing

difficulty; dysphasia which interferes of getting enough food. Bowel or Bladder Control complications; the patients have to use other toileting devices. In addition to the depression as patients with CVS can begin soon after the stroke or many weeks later. While the **Cognitive complications**; as those problems with memory, thinking, attention, learning, and other mental activities start to appear. Also George, (2010) defined Cognitive function as the intellectual process by which one becomes aware of perceives or comprehends ideas. It includes all aspects of perception; recognition; conception; sensing; thinking; reasoning; remembering and imagining. Moreover the impact on memory and executive function is one of the most obvious problems associated with stroke. The cognitive dysfunction occurs when local tissue damage in the brain results in deficits in memory function, executive function, thinking speed, spatial orientation and speech function. Cognitive training may work to improve the intellectual function of those patients in a number of different ways as remembering the shape of cars and locations of signs that are located on the edge of the screen (Chin, 2016).

Obviously stroke can affect patients physically, mentally, emotionally, or a combination of the three. The results of stroke vary widely depending on size and location of the lesion. Furthermore, patients with stroke has a relative dysfunction of both motor, and some cognitive/intellectual functions for self-care ability so a designed program for early training with the aim to alleviate long-term self-care disability, correct assessment of motor and cognitive functions in the individual stroke patient is essential (Bernspang, Asplund, Eriksson & Fugl, 2010). For that reason, the aim of the current study was to evaluate the effect of the Tailored Nursing Program on motor and cognitive status among patients with stroke

Significance of The Study:

Cerebrovascular stroke is number two of causing death globally: more people die annually from cerebrovascular than from any other cause. Estimated 17.5 million people died from cerebrovascular in 2012, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease followed by while 6.7 million were due to stroke. Over three quarters of cerebrovascular deaths take place in low- and middle-income countries (WHO, 2015). Also (Sun, Tan, & Yu, 2014) added that in addition to the physical dysfunction; post-stroke cognitive impairment occurs frequently in the patients with stroke. The prevalence of post-stroke cognitive impairment ranges from 20% to 80%, and it varies based on the difference between the countries, the races, and the diagnostic criteria.

In order to include the physical and the cognitive perspectives of cerebrovascular stroke simultaneously; components of (Level-of-consciousness, stroke physical deficit, global cognition/intellectual, measures of disability/activities of daily living (ADL) must be measured. These elements were included to delight the utilization of the Tailored Nursing Program and it was anticipated that physical and cognitive exercise could improve patients with stroke condition. Thus it was crucial to conduct a tailored program on both cognitive and motor status for patients with stroke and evaluate their progression.

II. Material & Methods

The Aim:

The aim of the study was to evaluate the effect of tailored nursing program on cognitive and motor status among patients with stroke.

Research Hypotheses:

In order to accomplish the study, three hypotheses were formulated:

H1: Study group who received the tailored nursing program will have a significant higher mean score in cognitive status than control group who received routine hospital care.

H2: Study group who received the tailored nursing program will have a significant higher mean score in motor status than control group who received routine hospital care.

H3: Study group who received the tailored nursing program will have a significant higher mean score in activity of daily living than control group who received routine hospital care.

Operational Definitions:

Tailored Nursing Program: It is a program consists of two parts: a-Cognitive part: To enhance the cognitive function by questions, simple arithmetic calculation, draw shapes...etc. b-Motor part: by performing the Range of Motion Exercise for the patients with stoke to be *either* "passive or active or active assistive, or active resistive or isometric" that the patient needs related to the affected body part. Generally this was based on the initial (base line) cognitive and motor assessment as each patient differs from the others in his/her cognitive level and motor affected body part "*that is why it is called tailored*".

Research Design:

A quasi-experimental design was utilized to achieve the aim of the current study.

Setting:

The study was conducted at two of medical departments affiliated to Kasr Al-Ainy Educational Hospital, Cairo University, Egypt.

Sample:

All available patients who met the inclusion criteria over a period of one year were included in the study. *The inclusion criteria* were as follows: 1)-Adult male and female patients who were newly diagnosed with ischemic stroke for first time, 2)-Patients who were fully conscious as assessed by the Glasgow coma scale (GCS) and had scores (13 – 15), 3)-Patients who suffered from cognitive impairment as measured by Mini-Mental state examination and had scores (24 to 10 grades), and 4)-Patients with only paresis as a result of ischemic stroke. While *exclusion criteria* were: Patients with 1)-repeated CVS, 2)-severe aphasia, 3)-stroke associated with psychiatric problems, 4)-Patients who had scores 9 or less on the motor assessment scale, 5)-Patients who had history of alcohol or any substance abuse.

A sample of 78 patients were recruited in the study, 18 patients were dropped from the sample during the conduction of the study either because they had no interest to continue or because of the early discharge. 60 patients completed the study, patients were randomly equally assigned either to study group or control group (30 patients each).

Tools:

In order to achieve the aim of the study, five tools were utilized, in addition panel of three juries' expertise were revised the utilized tools for its validity; no modification was required.

1. **Demographic and medical data sheet:** Demographic data consisted of items seeking information about the background of the subject such as; age, gender, marital status, and educational level. Medical related information includes medical diagnosis, medications, past medical history and affected side.
2. **Glasgow Coma Scale (GCS):** is a neurological scale that aims to give a reliable, objective way of recording the conscious state of a person. The scale comprises three tests: eye response (1-4 scores), verbal response (1-5 scores) and motor response (1-6) with the lowest possible GCS (the sum) is 3 (deep coma or death), while the highest is 15 (fully awake person) Green, (2011). Regarding the reliability, Cronbach alpha was 0.97 (Vivek, Jayawant, Richard, Alexander, Jennifer, & Eelco, 2009).
3. **The Mini-Mental State Examination (MMSE) or Folstein test:** It is 30-points questionnaire test that is used to assess the cognitive status and the severity of cognitive impairment, it assesses areas of subscales: orientation (10 scores), registration (3 scores), attention and calculation (5 scores), recall (3 scores), and language (9 scores) with total scores ranged between 0-30. the interpretation of the scores were as follows: from 25-30 score represents intact cognitive status, 21–24 scores represents mild cognitive impairment, 10–20 scores represents moderate cognitive impairment, and ≤ 9 score indicates severe cognitive impairment. Interrater reliability was high=0.99. (Folstein, Folstein & McHugh 1975).
4. **Motor Assessment Scale (MAS):** This test is designed to assess the motor status following a stroke or other neurological impairment. The scale consists of 9 items each item had score ranged between (1-6) the higher the score; the higher functioning the patient is on the affected side. The MAS score system is as follows: 1= no resistance when body parts are handled with total scores (1>9); 2=some resistance felt as body parts are moved with total scores (9>18); 3=variable, sometimes flaccid, sometimes good tone, sometimes hypertonic with total scores (18>27), 4=Hypertonic 50% of the time with total score (27>36), 5= Hypertonic all of the time with total scores (36>45) & 6=Consistently normal response, with total scores (45>54). Reliability of the MAS was excellent $r = 0.92$ by Poole & Whitney, (1988). Regarding validity of (MAS): Tyson & DeSouza (2004) examined the validity of the MAS on 48 patients post-stroke. It was found that ($r = 0.54$).
5. **Activity of Daily Living (ADL) Assessment:** It considers the basic ADL items which suits patients with stroke. It consists of 9 items in order to measure the routine personnel daily activity. The scoring system of the tool was: dependent=1, with assistant=2, and independent=3. Although no formal reliability and validity reports could be found in the literature, the tool is used extensively as a flag signaling functional capabilities of adults in clinical environments. (Boltz 2008)

Ethical Consideration:

An official permission was taken from the hospital administrators. Each participant was informed about the nature and purpose of the study. Then consent was obtained from all patients for participation in the study. The researchers emphasized that participation in the study is entirely voluntary; anonymity and confidentiality are assured through coding the data. In order to achieve both principles of ethics and fairness among control and study groups, the flier regarding ROM exercise of the Tailored Nursing Program was given to the control group after fulfilling the study.

Pilot Study:

Once permission was granted to proceed with the proposed study, a pilot study was conducted before starting data collection on 10 patients to assess its feasibility and applicability as well as the clarity of the tools. Data which obtained from the pilot study was excluded from the study results. The result of the pilot study confirmed that the study was feasible.

Procedure:

An official permission to carry out the study was granted from the head manager of the medical departments to proceed with the study. The purpose of the study was explained to the subjects and those who agreed to participate were included in the study. From those patients whom accepted to participate in the study, the researchers performed the Glasgow coma scale and mini mental state examination and who had GCS = 13-15 scores and 24 to 10 grades mini mental score, and had scores 9 or more on motor assessment scale were recruited in the study. Once the selection of patients was determined; patients were randomly assigned into two groups (study & control), and the researchers precede the following phases:

Preparatory phase:

During the preparatory phase each patient was assessed to determine specific needs and problems in order to tailor the suitable nursing program which based on the assessment needs. The researchers filled in the demographic and medical data sheet, then mini mental state examination, followed by motor assessment scale and activity of daily living for both (study & control) groups in the initial meeting.

Implementation phase:

Both groups (control & study) were receiving the routine hospital care which included the treatment of (Brain stimulant, anti-hypertension, and anti-coagulant); however the both groups; did not receive any motor or cognitive interventions beside their routine hospital treatment. The control group received the routine hospital care while; the study group received the routine hospital care beside the tailored nursing program.

-The Tailored Nursing Program:

The Tailored Nursing Program was given three times a week. Apparently the recruited time for each session was based on each patient capability, but generally it took around (30-40) minutes. This program was conducted over six weeks. The Tailored Nursing Program was divided into: a-Motor intervention included range of motion exercise on the affected limb by the researchers, which based on each patient physical condition ROM can be "passive or active or active assistive or active resistive or isometric exercise". Each motor session took around 20 minutes. A flier was available for each patient, containing photos of ROM exercise.

In addition cognitive program designed by Michelon, (2006) which included the following points (Perception, attention, memory, language and visual processing) was applied; for example show him a photo and ask him to perceive what is it?, follow a three stages command, recall short 3 sentences as it is, draw a shape, copy the given design, and name three objects "taking one second to say each"...etc. It takes around 20 minutes. Hence; this scale was used firstly for assessment purpose, and also the researchers help them to correct their answers in case of mistakes then give them similar questions for training their cognitive abilities.

Evaluation phase:

It was done for each patient to evaluate the effectiveness of the Tailored Nursing Program. Regarding the study and the control groups; demographic data has been taken once before conducting the program in the 1st reading, measurements of (motor assessment scale and cognitive scales) have been taken three times; before program conduction as a base line data (1st reading), and at the middle time of the study after 3 weeks (2nd reading) of hospital stay and before patient discharge which was after another 3 weeks (3rd reading). While the measurement of the ADL was taken only twice; before program conduction as a base line data (1st reading) and before patient discharge this was after the 6 weeks (2nd reading). It takes 25 – 30 min to fill in the study tools. The overall data collection time was over one year (January-December/2015).

Data Analysis:

The data was coded and tabulated using a personal computer. Statistical Package for Social Science (SPSS) version 18 was utilized relevant descriptive and inferential statistics was obtained to analyze the data at p-value ≤ 0.05 .

III. Results

Findings of the current study presented in two sections. **Section I)** Presented the description of the study subjects' demographic characteristics, medical related information, cognitive status as well as motor status of the study and control groups. **Section II)** Highlighted the comparison of mean scores of cognitive status, motor status, and activity of daily living between study and control groups along the study period.

Section (I) descriptions of the study and control groups

Table (1) Frequency and Percentage distribution of the demographic data among study and control groups (n=60)

Variables	Study group		Control group		Test
	No.	%	No.	%	
Age:					t-test: 1.505
-20>35	1	3.3%	0	0%	
-35 > 50	7	23.3%	11	36.7%	
-50 > 65	13	43.4%	11	36.7%	
-65-	9	30%	8	26.6%	
Mean + SD	59.77 + 14.59		56.1 + 13.48		
Gender:					X ² : 0.618
-Male	16	53.3%	19	63.3%	
-Female	14	46.7%	11	36.7%	
Marital status:					X ² : 0.67
-Single	2	6.7%	3	10%	
-Married	22	73.3%	23	76.7%	
-Divorced \ widowed	6	20%	4	13.3%	

* *Significant ≤ 0.05*

Regarding age, 43.4% and 36.7% of the study and control groups had age ranged between 50 to 65 years with mean age 59.77 + 14.59 for the study group, and 56.1 + 13.48 for control group. Male gender represents 53.3% of the study group and 63.3% of the control group. In relation to marital status 73.3% and 76.7% of the study and control groups respectively were married. In addition, there was no statistical significant difference between study and control groups in relation to demographic data.

Figure (1) percentage distribution of the affected side of the body among study and control groups (n=60)

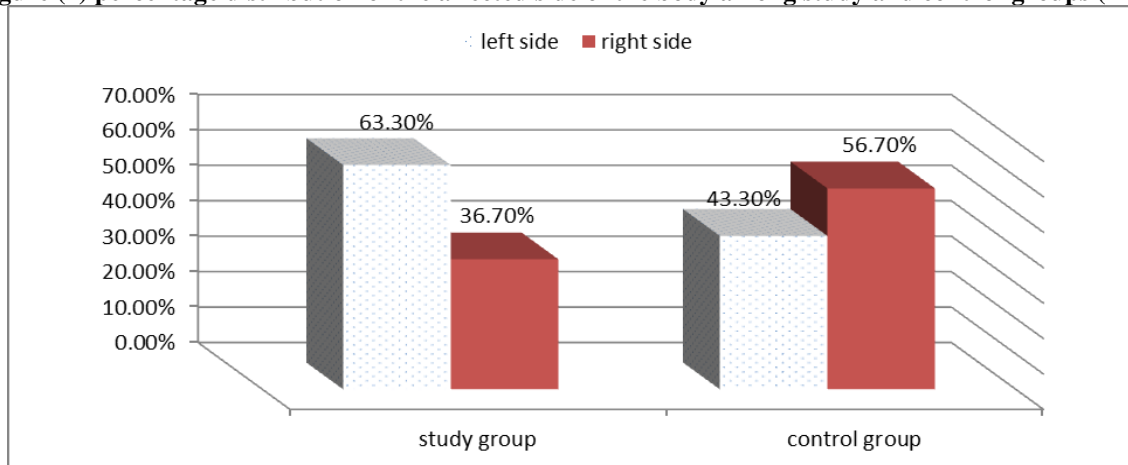
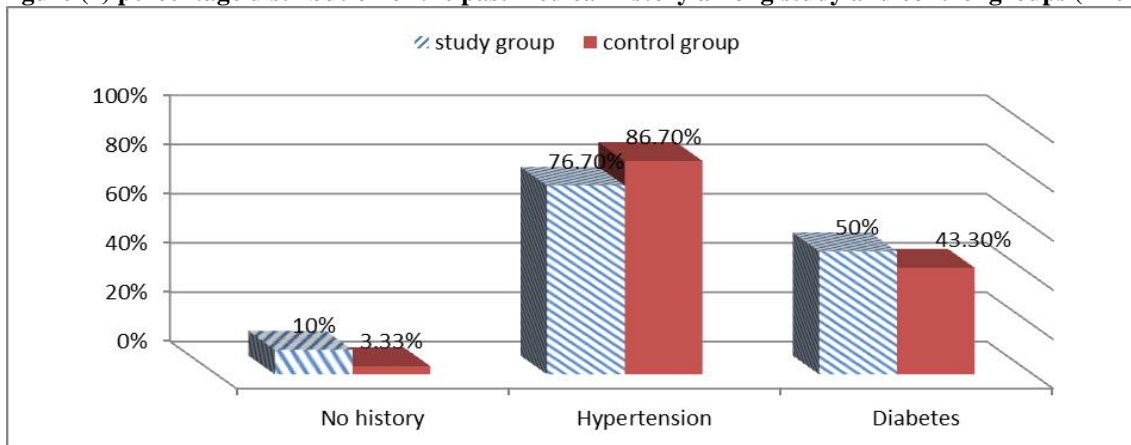


Figure (1) shows that 63.3% of the study group had left side affected body part, while 56.7% of the control group had right side affected body part. In addition, there was no statistical significant difference between both groups (X² = 2.4, p-value=0.100).

Figure (2) percentage distribution of the past medical history among study and control groups (n=60)



N.B.: Percentage is not mutually exclusive as the same patients could suffer from more than one medical disease.

Regarding past medical history, the study results shows that 76.7% and 86.7% of the study and control groups respectively suffered from hypertension while, 50% and 43.30% of the study and control groups respectively had diabetes. Moreover, there was no statistical significant difference between study and control groups regarding past medical history ($X^2=1.313$, $p\text{-value}=0.900$).

Table (2) Frequency and percentage distribution of the cognitive status of the study and control groups along the study period (n=60).

Study period	Study Group		Control Group	
	No.	%	No.	%
1st reading:				
-Intact ($30 \geq 25$)	0	0%	0	0%
-Mild ($24 \geq 21$)	6	20%	7	23.3%
-Moderate ($20 \geq 10$)	24	80%	23	76.7%
-Severe (≤ 9)	0	0%	0	0%
2nd reading:				
-Intact ($30 \geq 25$)	21	70%	14	46.7%
-Mild ($24 \geq 21$)	9	30%	12	40%
-Moderate ($20 \geq 10$)	0	0%	4	13.3%
-Severe (≤ 9)	0	0%	0	0%
3rd reading:				
-Intact ($30 \geq 25$)	28	93.3%	14	46.7%
-Mild ($24 \geq 21$)	2	6.7%	13	43.3%
-Moderate ($20 \geq 10$)	0	0%	3	10%
-Severe (≤ 9)	0	0%	0	0%

N.B. The scale used cut point of (25, 24, 20, 9) as there is no fraction result in the scale.

Table (2) shows that 80% and 76.7% of the study and control groups respectively had moderate score of cognitive status in the 1st reading, while in the 2nd reading patients who had intact cognitive status increased among study group to be 70% when compared to control group (46.7%). Moreover, 93.3% of the study group had intact cognitive status when compared to control group (46.7%) in the 3rd reading.

Table (3) frequency and percentage distribution of the motor status of the study and control groups along the study period (n=60)

Study period	Study Group		Control Group	
	No.	%	No.	%
1st reading:				
-1=(1>9)	0	0%	0	0%
-2=(9>18)	14	46.7%	17	56.7%
-3=(18>27)	16	53.3%	13	43.3%
-4=(27>36)	0	0%	0	0%
-5=(36>45)	0	0%	0	0%
-6=(45≥54)	0	0%	0	0%
2nd reading:				
-1=(1>9)	0	0%	0	0%
-2=(9>18)	9	30%	12	40%
-3=(18>27)	11	36.7%	10	33.3%
-4=(27>36)	10	33.3%	7	23.3%
-5=(36>45)	0	0%	1	3.3%
-6=(45≥54)	0	0%	0	0%
3rd reading:				
-1=(1>9)	0	0%	0	0%
-2=(9>18)	1	3.3%	8	26.7%
-3=(18>27)	1	3.3%	10	33.3%
-4=(27>36)	10	33.3%	5	16.7%
-5=(36>45)	18	60%	7	23.3%
-6=(45≥54)	0	0%	0	0%

Regarding motor status, 46.7% and 56.7% of the study and control groups respectively had motor score ranged 9>18 in the 1st reading. In the 2nd reading 33.3% of the study group and 23.3% of the control group had scores ranged 27 > 36. While, in the 3rd reading patients who had score ranged between 36>45 increased in the study group to reach 60% when compared to control group (23.3%).

Section (II) Comparison of mean scores of the cognitive status, motor status and activity of daily living between study and control groups.

Table (4): Comparison of mean scores of the cognitive status between study and control groups along the study period (n=60)

Study period	Study group Mean + SD	Control group Mean + SD	t-test	p-value
-1 st reading	18.73 + 1.86	17.6 + 3.59	1.426	0.165
-2 nd reading	25.3 + 2.32	23.4 + 2.74	2.713*	0.011
-3 rd reading	28.43 + 1.79	24.3 + 2.79	7.55**	0.000
ANOVA test	454.02**	95.7**		
p-value	0.000	0.000		

*P ≤ 0.05

Regarding cognitive status, there was a statistical significant difference among the study group (ANOVA test: 454.02, p-value: 0.000) and the control group (ANOVA test: 95.7, p-value: 0.000) along the study period. In addition, there was no statistical significant difference between study and control groups (t-test: 1.426, p-value: 0.165) in the 1st reading, While, there was a statistical significant difference between study group when compared to control group in the 2nd reading (t-test: 2.713, p-value: 0.011) and 3rd reading (t-test: 7.55, p-value: 0.000).

Table (5): Comparison of mean scores of the motor status among study and control groups along the study period (n=60)

Study period	Study group Mean + SD	Control group Mean + SD	t-test	p-value
-1 st reading	17.6 + 5.7	17.4 + 4.7	0.120	0.906
-2 nd reading	23.1 + 6.4	20.9 + 7.3	1.451	0.157
-3 rd reading	35.4 + 5.03	25.5 + 8.3	6.005**	.000
ANOVA test	785.5**	138.8**		
p-value	0.000	0.000		

*P ≤ 0.05

With reference to motor status, there was a statistical significant difference among the study group (ANOVA test: 785.5, p-value: 0.000) and control group (ANOVA test: 138.8, p-value: 0.000) along the study period. Meanwhile, there was no statistical significant difference between study and control groups in the 1st

reading with t-test= 0.021, p-value= 0.906, or in the 2nd reading with t-test= 1.451, p-value= 0.157. While in the 3rd reading, there was a statistical significant difference between both study and control groups (t-test: 6.005, p-value: 0.000).

Table (6) Comparison of mean scores of the activity of daily living among study and control groups along the study period (n=60)

Study period	Study group Mean + SD	Control group Mean + SD	t-test	p-value
-1 st reading (Base line)	16.47 + 1.38	16.73 + 1.87	1.114	0.274
-2 nd reading (After 6 weeks)	19.27 + 1.96	17.97 + 2.27	2.149*	0.040
t-test	7.167**	5.076**		
p-value	0.000	0.000		

* $P \leq 0.05$

Regarding activity of daily living, there was a statistical significant difference among the study group (t- test: 7.167, p-value: 0.000) and control group (t-test: 5.076, p-value: 0.000) along the study period. Moreover, there was no statistical significant difference between both groups (t-test: 1.114, p-value: 0.274) in the 1st reading. While after implementation of the Tailored Nursing Program the mean score of the study group at the 3rd reading indicated a statistical significant difference between both groups whereas t-test: 2.149, p-value: 0.040.

IV. Discussion

American College of Sports Medicine, (2016) reported that apparently half of patients who experienced stroke have long-term effects. Also they mentioned that (25 to 50) percent need cognitive rehabilitation and support with the activities of daily living (ADL). They highlighted that; designing exercise programs for those who have had a stroke is very crucial; also they examined the use of structured exercise with individuals diagnosed with stroke; these studies have indicated that the exercise can significantly improve performance of their motor and their cognitive activity as well.

The discussion concerned about answering the hypotheses of the current study which were related to the improvement of motor and cognitive status after the implementation of the Tailored Nursing Program. The discussion presented into two main sections. **Section I;** is concerned about the data distribution among patients with stroke related to the demographic and medical related information. While **Section II;** is related to cognitive, motor and activity of daily living status of the study and control groups, the mean of difference of the study group's readings and the control group's readings along the study regarding cognitive, motor and activity of daily living.

Regarding description of the demographic and medical related information, the whole sample had ischemic stroke as it was one of the sample inclusion criteria. It was found that more than one third of the sample for both the study and the control groups had age ranged between 50 to 65 years old. Male gender represents more than the half of the sample for the study and the control groups. While in relation to the marital status it was found that most of the sample of the study and the control groups were married and the most of the study and the control groups could read and write. In addition around half of the study and the control groups suffered from left side affected body part of hemiparesis. Regarding past medical history, the study results shown up that merely the majority of the study and the control groups suffered from hypertension while, half of the study and merely half of the control groups had diabetes. The research finding revealed that there was no statistical significance difference related to the demographic data and medical data, so homogeneity of the control and the study groups was achieved. A study was conducted by (Saleh, 2012) go along with the current research as based on his cohort study he reported that 60% was men, three quarters of all patients with stroke were diagnosed as having ischemic strokes. The most common past medical history were high blood pressure, diabetes and heart disease. Also another study reported that both the incidence and prevalence of stroke increases with age in both genders, with the incidence in males being generally higher than in females in the same age group. (Zhang, Chapman, Plested, Jackson, & Purroy, 2012).

Regarding the cognitive status of the study and control groups along the study period, the research finding reported that merely the majority of the study and the control groups had a moderate score of cognitive status at the 1st reading, this reading was recorded before the application of the Tailored Nursing Program, and both the study and the control groups were undertaken of the routine hospital treatment; while after application of the Tailored Nursing Program for the study group by three weeks, in the 2nd reading; patients who had intact cognitive status increased among the study group to be around three quarters of the study group compared to the control group who was less than two quarters. Moreover, the majority of the study group had intact cognitive status compared to the control group who was merely the half of the group in the 3rd reading and this result was after six weeks of the application of the Tailored Nursing Program. Moreover, there was a statistical significant difference between study group comparing to the control group in the 2nd and the 3rd readings.

Apparently it was clear that over time of application of the Tailored Nursing Program related to the cognitive intervention, the study group cognition status was improved as the researchers was training them on cognitive skills of simple calculation, draw few simple shapes as circle or square...etc. Generally the study group found that cognitive intervention exercise was interested. Also when train the patients with stroke on such cognitive exercise it keeps them alert. A recent study by (Chen, Mao, Li, Zhao & Zhang, 2015) was congruent with the current study finding; as they trained the patients with stroke through a cognitive improvement program. They were divided them into two equal study and control groups and after four weeks of intervention; the result revealed that, patients in the study group had a higher scores of attention, concentration, executive function, memory, visual skills, abstract thinking, calculation, and directional force comparing to the control group.

While related to the motor status, it was found that merely half of the study group and the control group had motor score "2" which ranged between 9>18 in the 1st reading. But in the 2nd reading was found that one third of the study group and merely quarter of the control group had score "4" ranged between 27 > 36. While, in the 3rd reading patients who had score "5" ranged between 36>45 increased in the study group to be more than the half of the sample comparing to the control group which was less than one quarter. Moreover, there was a statistical significant difference between the study group comparing to the control group at the 3rd readings only. The motor improvement was expected to take time. The researchers interpreted this finding as the given hospital care/regimen separately for the control group was not enough to improve their motor status when compare it with the study group. Whereas the given Tailored Nursing Program related to the motor exercises is inevitable to improve muscular status. A study of functional exercise and physical fitness post Stroke done by (Langhammer & Lindmark, 2012) supported the result of the current study as they performed exercise regimens and they reported that motor function, mobility and balance of the patients with stroke was improved and be maintained over months. Also (Pretrina & Kishner, 2016) added that by evidence; clinical trials support the principle that early initiation of motor therapy favorably influences recovery from stroke. When the initiation of motor therapy is delayed, patients may suffer from secondary complications, such as contractures. Also they reported that many studies show that stroke motor rehabilitation can improve functional ability even in elderly patients.

Based on both descriptive and inferential results; the researchers assumed a link between cognitive and motor status as it was observed that both the cognitive and the motor status was improved parallel along the study process, whereas the motor status improved slower than the cognitive status as by the end of the study the researchers revealed that around two thirds of the study group reached up to score "5" which is (hypertonic all the time) while regarding the cognitive status the most of the study group scored the intact level which is the highest cognitive score. A study done by (Nehring, 2012) through a systematic review related to the effect of exercise and the improvement of the cognitive functions, he proved that there is a correlation between improvement of the cognitive and the motor function.

Moreover, related to the ADL; there was a statistical significance improvement among the study group when compared to the control group in the 6th week. Also, this finding explained the link between the motor status and the ADL as an entire process, as the improvement of the motor function related to the affected part could not be measured only by the improvement of doing the range of motion exercise, but also it measured by the achievement and the uses of this motor function to be reflected on the improvement of the ADL. A study congruent with the current findings by Zaky, Mohammad, EL-Labban & Ahmed, (2015) as they revealed that the patients with stroke their ADL was improved after application of a physical rehabilitation program. Also Debbie & Janice, (2012) added that patient rehabilitation programs may enhance an individual's functional ability for stroke patients and a significant improvement of mobility accompanied by an increasing of activity of daily living.

Based on the improvement of the cognitive and the motor status of patients with stroke which revealed from the current study; it was crucial to focus on the cognitive and the motor programs for those patients category in order to decrease the risk of the future complications as deterioration of cognitive function, contractures which might affects those patients. So hopefully this study plays a corner stone in the nursing future chain of stroke program support.

Conclusion of the Study:

The majority of the study and the control groups who diagnosed with stroke experienced moderate cognitive status, and some resistance in the affected body part related to motor status in the 1st reading. And after the implementation of the Tailored Nursing Program the study group improved significantly more than the control group regarding the motor, cognitive status and the ADL. So by that finding; the study results supported the three research hypotheses.

Recommendations of the Study:

Based on the study results, the following recommendations were concluded:

1. Cognitive & motor nursing program must be endorsed as a nursing role for patients with stroke.
2. Replicate the study on a larger study sample in different settings to generalize the results.
3. Further studies may be needed to determine the stability of the effect of the Tailored Nursing Program on the cognitive and motor status of patients with stroke.

Nursing Implication:

The nurse is the health staff member who contact with the patients for the longest period. Patients with stroke suffer from tremendous complications after stroke attack. Thus the nurse must act as a proactive member by applying nursing programs in order to improve patients' cognitive and motor status. So the endorsement of the Tailored Nursing Program in the routine hospital care is crucial in providing a reference nursing practical framework for the patients with stroke.

References

- [1]. American College of Sports Medicine, (2016). Endurance Exercise Following Stroke. <https://www.acsm.org/docs/current-comments/enduranceexerciseandstroke.pdf>
- [2]. American Stroke Association. (2016). http://www.strokeassociation.org/STROKEORG/AboutStroke/TypesofStroke/Types-of-Stroke_UCM_308531_SubHomePage.jsp
- [3]. Bernspang B, Asplund K, Eriksson S and Fugl AR –Meyer Motor and perceptual impairments in acute stroke patients: effects on self-care ability. Retrieved at 13/11/2010. Department of Physical Medicine, University Hospital, Umea, Sweden.
- [4]. Boltz M. (2008). Katz Index of Independence in Activities of Daily Living (ADL). *Journal of Best -Practices in Nursing Care to Older Adults*. April 2008, Vol. 108, No. 4.
- [5]. Chen C., Mao R., Li S., Zhao Y.& Zhang M., (2015). Effect of visual training on cognitive function in stroke patients. *International Journal of Nursing Sciences*. Volume 2, Issue 4, December 2015, Pages 329–333.
- [6]. Chin J (2013). Rehabilitation Theory Practice Advance in rehabilitation for post-stroke executive dysfunction. 19 (1), pp. 50–52.
- [7]. Debbie R and Janice JE. (2012): Disparity between Functional Recovery and Daily Use of the Upper and Lower Extremities during Subacute Stroke Rehabilitation. *Neurorehabil Neural Repair* January, 26, 76-84.
- [8]. Donnan G., Fisher M., Macleod M., Davis S., (2008). Stroke. *Journal of Lancet*. Volume 371, No. 9624, p1612–1623.
- [9]. Folstein MF, Folstein SE, McHugh PR (1975). "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician". *Journal of psychiatric research* 12 (3): 189–98.
- [10]. George C, <http://www.drgeorgepc.com/MEDMemoryCognitive.html>. Retrieved at 14/11/2010.
- [11]. Green S. M. (2011). "Cheerio, Laddie! Bidding Farewell to the Glasgow Coma Scale". *Annals of Emergency Medicine* 58 (5): 427–430.
- [12]. Langhammer B. & Lindmark B., (2012). Functional Exercise and Physical Fitness Post Stroke: The Importance of Exercise Maintenance for Motor Control and Physical Fitness after Stroke. *Stroke Research and Treatment*. Volume 2012, Article ID 864835, 9 pages.
- [13]. Michelon P., (2006). What is the cognitive ability, what are the cognitive abilities. <http://www.sharpbrains.com/blog/2006/12/18/what-are-cognitive-abilities/>
- [14]. National Caregivers Library (2016). *AHCPR Publication No. 95-0664, prepared by the Agency for Healthcare Policy and Research*. <http://www.caregiverslibrary.org/caregivers-resources/grp-diseases/hgrp-stroke/physical-and-mental-effects-of-stroke-article.aspx>.
- [15]. National Institute of Neurological Disorders and Stroke, (2009). <http://www.ninds.nih.gov/>
- [16]. Nehring J., (2012) The Effects of Aerobic Exercise on Cognitive Function in Patients Post Stroke. Theses, Dissertations and Capstone Projects. Pacific University Oregon.
- [17]. Poole, J. L., Whitney, S. L. (1988). Motor assessment scale for stroke patients: concurrent validity and interrater reliability. *Arch Phys Med Rehabil*, 69(3), 195-197.
- [18]. Pretrina A., Kishner S., (2016). Motor Recovery In Stroke. MedScape. <http://emedicine.medscape.com/article/324386-overview>.
- [19]. Right diagnosis. (2016) http://www.rightdiagnosis.com/c/cerebrovascular_accident/intro.htm.
- [20]. Saleh A., (2012). Demographic characteristics of stroke patients in developing countries: Example from Jordanian government hospitals. *Journal of Public Health and Epidemiology*. DOI: 10.5897/JPHE11.176 Vol. 4(5), pp. 110- 116.
- [21]. Sun J., Tan L., & Yu J., (2014). Post-stroke cognitive impairment: epidemiology, mechanisms and management. *Ann Transl Med*. 2014 Aug; 2(8): 80.
- [22]. Tyson SF1, DeSouza LH. (2004). Reliability and validity of functional balance tests post stroke. *Journal of Clinical Rehabilitation*. 18(8):916-23.
- [23]. Vivek N. Iyer, Jayawant N. Mandrekar, Richard D. Danielson, Alexander Y. Zubkov, Jennifer L. Elmer, and Eelco F. M., (2009). Validity of the FOUR Score Coma Scale in the Medical Intensive Care Unit. *Mayo Clin Proc*. August; 84(8): 694–701.
- [24]. World Health Organization (WHO), (2015). <http://www.who.int/mediacentre/factsheets/fs317/en/>
- [25]. Zaky H., Mohammad Z., EL-Labban A. & Ahmed G., (2015). Strategies of Daily Living Rehabilitative Activities for Post Stroke Patients at Minia University Hospital. *Journal of Education and Practice*. Vol.6, No.5.
- [26]. Zhang Y., Chapman A., Plested M., Jackson D., & Purroy F., (2012). The Incidence, Prevalence, and Mortality of Stroke in France, Germany, Italy, Spain, the UK, and the US: A Literature Review. *Stroke Research and Treatment*. Volume 2012 (2012), Article ID 436125, 11 pages.