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Nursing rehabilitation intervention for post-stroke patients in Beni-Suef

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Abstract: **Stroke is a common, serious, and disabling global health-care problem and rehabilitation is a major part of patient care. The aim of the present study was to evaluate the impact of nursing rehabilitation intervention for post-stroke patients in Beni-Suef. Design: A quasi-experimental design with two groups (case & control group) pre/post assessment test was utilized to achieve this study aim. Sample and Setting: A convenience sample was selected under the inclusion & exclusion criteria (100 post stroke patients) were included in the study. The study was conducted in the outpatient in the outpatient clinics of the medical department and rehabilitation unit at Beni-Suef university hospital in Beni-Suef city, Egypt. Sampling technique: patients were consecutively recruited in the study sample according to the eligibility criteria. Tools: data collection tools include two parts: Part I: include questionnaire to assess: socio-demographic characteristics, functional abilities, daily living activity, level of knowledge, reported practice to regain physical ability, Part II: include observational scale that involve two sections; 1- physical abilities include language and motor assessment scale 2- mental abilities involves Hamilton depression rating scale and scale to assess mental activities as critical thinking, concentration and attention. The main results of the present study: the studied stroke patients had unsatisfactory knowledge, practice, and both groups didn't practice any of the fun activities that help them to regain their affected mental abilities before implementing nursing intervention, while there were significant improvements at studied compared to control group after implementing nursing intervention. Conclusion: the nursing rehabilitation intervention showed positive impact on improving patients' knowledge, practice, Physical & mental abilities and functional abilities and level of depression score among intervention group than control group. Recommendations: Improve educational system to provide adequate structured information to increase self-management in patients with stroke. Also there should be evidence to support rehabilitation in well-coordinated multidisciplinary stroke units or through provision of early supported provision of discharge teams.**

Keywords: Nursing rehabilitation intervention, post-stroke, physical ability, mental ability, functional abilities.

1. INTRODUCTION

The epidemiology of stroke changing rapidly and the global stroke burden continues to increase. According to the World Health Organization, around fifteen million people, world wide, suffer from stroke every year. Among these, five million die and another five million are permanentlydisabled. Four out of five strokes occur in the low- and middle-income countries, who can least afford to manage the effect of this disease**(Tallawy, et-al., 2015)**.

Different parts of the brain carry out different functions: seeing, sensation, balance, movement, understanding language, behaviour, problem solving, and emotion. A stroke occurs when the blood supply to part of the brain is cut off. If the blood supply is cut off to a part of the brain that carries out a particular function (such as seeing, moving arms and legs, or speaking), then these body parts or body functions will not work as they should. Stroke causes impairment-related functional limitations that may result in difficulties participating in ADLs independent of supervision, direction, or physical assistance (**Legg, et-al., 2017**).

Stroke can result in survival with the permanent sequelae impairing in physical, psychological, and social functions. Dependence in activities of daily life living, alteration of emotional and psychological status, and deterioration in social communication can influence the quality of life of patients with stroke (**Niemi, McErlane, &Tillett, 2013; Kim, Young and Kim, 2014**). The greatest health effect is usually caused by the long- term consequences for patients and their families. Although impressive developments have been made in the medical management of stroke, without a widely applicable or effective medical treatment most post-stroke care will continue to depend on rehabilitation intervention**(Langhorne, 2011)**.

Moreover stroke may result in physical disabilities such as spasticity or hemiplagia, aphagia, dysphagia, eyeproblems as vision trouble seeing things off to one side, eyeclosure and blinking, and double vision, in addition to trouble thinking and mooddisorders. As physical disabilities lead to functional disabilities suchdifficultiescarrying out daily activities as working, walking, talking, bathing, eating, with loss of appetite, speech, and vision and pain**(Ali, 2011)**.

Proper management of stroke risk factors, awareness of stroke warning signs and appropriate emergency action and rehabilitation efforts are critical for preventing stroke incidence, mortality, or morbidity. Rehabilitation is a process of overall efforts to pave the way for the obstacles in determining and maintaining the patient's physical, sensorial, mental, psychological, and social functional levels in disease, disability, and injury treatment. In rehabilitation process, by focusing on the capacity and the needs of the individuals, it is aimed to insulate individuals from physical and mental traumas that may be caused by disabilities and long-term diseasesas stroke. This is to ensure re-integration of the individuals with the family and community in providing healthcare which encourages independency and self-care in order to improve the quality of life in individuals **(Col &Purut, 2018).** Daily nursing intervention rehabilitation should continue to be part of the stroke patient's routine **(National Stroke Association, 2011).**

Nurses play a significant role in reducing death and disability in people who have suffered a stroke **(Mason-Whitehead, Rideway, & Barton, 2013).** The nurse in stroke recovery in particular is a key player in the wider rehabilitation team. Most nursing intervention have rehabilitative functions too, the aim being to help the patient to regain his/her independence. The nurse has essential roles in helping stroke patients return to daily life activities with best utilization of their remaining physical and functional abilities and preventing complications during the acute phase of the stroke patient's condition **(Liu, et-al., 2013)**.

Significance:

The burden of stroke and high prevalence of stroke risk factors in Egypt are alarming. Stroke is a leading cause of death and of adult disability. The World Health Organization (WHO) estimates that 85% of stroke deaths now occur in low and middle-income countries and that disability-adjusted life years lost to stroke are almost seven times that in high-income countries. Egypt is the most populated nation in the Middle East and the second most populous on the African continent. Stroke death in Egypt reached 52,166 or 14.37% of total deaths, ranking Egypt high in the world in disabilities as a result of stroke (**Abd-Allah and Moustafa, (2014)**).

This high incidence and prevalence can be prevented or reduced through effective nursing rehabilitation intervention focusing on helping patients return to normal life **(Abd- Allah, et-al., 2018)**.

Aim of the study

This study aimed to evaluate the impact of nursing rehabilitation intervention for post-stroke patients in Beni-Suef

Research hypotheses

1. Post-stroke patients who receive nursing rehabilitation intervention will have satisfactory knowledge than control group.

2. Post-stroke patients who receive nursing rehabilitation intervention will have satisfactory practice than control group.

3. Post-stroke patients who receive nursing rehabilitation intervention will have better Physical & mental abilities and functional abilities than control group.

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2. METHODOLOGY

Research Design:

A quasi-experimental design with two groups (case & control group) pre/post assessment test was utilized to achieve this study aim.

Research Setting:

The study was conducted in the outpatient clinics of the medical department and rehabilitation unit at Beni-Suef University Hospital in Beni-Suef city, Egypt.

Research participants and sample:

Sample size: A convenience sample of 100post-stroke patients was included in the study;these patients were divided equally into two groups: study and control, they were selected according the following inclusion & exclusion criteria:

Inclusion criteria:

- Fullyconscious& oriented patients.
- Male and female patients who suffered from a recent hemorrhagic stroke for the first time.
- Agree to participate in the study.
- Post- stroke patients in the first visit to outpatient clinic and rehabilitation unit.

Exclusion criteria:

- All those unable to communicate meaningfully (because of severe aphasia or cognitive dysfunction)
- All those with TIA (transient ischemic accident).
- Psychotic patients
- All those with other pathologies of neurological or orthopaedic nature.

Tools of data collection

To achieve the aim of the study, data collected by the following tools that include two parts:

Part I: The researchers prepared an interview questionnaire including fivesections to assess:

1. **Socio-demographic characteristics** such as age, gender, education, occupational status,marital status.

2. **Functional abilities** that consisted of two domains; family rolesinclude 5items as feeling a burden to family, etc. and the social roles domain has 6 items such as not seeing as many of your friends as would likeetc.

Scoring system:

Each item has 3 selections 1 for low function and 2 for average and 3 for high function level

3. **Daily Living Activity** by Katz index of independence (Katz, et-al., 1970) composed of six functions (bathing, dressing, going to toilet, transfer, continence, feeding).

Scoring system:

Clients were scored yes/no for independence in each of the six functions,each items has two selections 1 for independence and 0 for dependence.

4. **Level of knowledge** such as overview, risk factors, complication, prevention , healthy life style

Scoring system

Each item was scored 3 for correct and complete answer and 2 forincomplete correct answer and 1 for wrong answer. The total score of all questions will be represented in 100% and categorized into two levels, unsatisfactory (<60%) and satisfactory (≥ 60%).

5. Reported practice to regain physical ability, include some physical exercise related to speech and swallowing (include 6 sub-items), mobility and balance (include 7 sub-items), control of urine (include 5 include items), and transferring & preventing from falling (include 4 sub-items). The second part to improve mental ability and this part include fun mental activities regarding board and card games (include 4 sub-items) and creative activities (include 5 sub-items)

Scoring system

Each item was scored 3 for completely done and 2 forsome times done and 1 for not done. The total scores of all items will be represented in 100% and categorized into three levels, unsatisfactory (<60%), average (60%-75%) and satisfactory (>75%).

Part II: Observational scale: consists of two sections:

1. **Physical abilities** consist of two main domains:

A- The language domain has 10 items such as not understand much of what other people say, say only single words, speak with frequent pause and say words but mean different things. Each item has 3 alternative levels 1 for always, 2 for some times, 3 for rarely; the maximum score is 30 that reflect high function and the minimum is 10that reflect low function.

B- Motor assessment scale is composed of 8 items each item has 6 degrees from 1 that reflect low function to 6 that reflect maximum function

2. Mental ability:consists of two domains

A- The first involves 12 sub-items that assess mental activities as critical thinking, concentration and attention; each item has 3 alternative selection1 for unsatisfactory level,2 for average and 3 for satisfactory level.

B- The second involves Hamilton depression rating scale to measure the level of depression it include 21 items and the maximum score is 54 point**(Hamilton, 1960)**.

Approval:

An official permission was obtained from the official personnel in Beni-Suef University hospital to conduct the study and collect the necessary data. Simple explanation was given to them about the nature of the study, its aims, benefits and study data collection tools,full explanation of the nursing intervention and its benefits to patients.

Ethical considerations:

The study was conducted with careful attention to ethical standards of research and rights of participants. Oral consent was taken from each patient, they were informed that the data collected will be used for the research only, and confidentiality manner is assured, as well they informed that they can withdraw at any time from the study.

Data Collection Procedure

- **Tools developments:** tools were developed by the researcher after reviewing the literature to collect the necessary data. **The tool validity test** was done through five expertises. They were Faculty members of community health nursing department and medical surgical department and necessary modifications were done.

- **The Cronbach alpha** coefficient was calculated to assess the reliability of the tool used through its internal consistency. (0.78).

- **A pilot study:** was conducted on 10 post-stroke patients from the study setting to ensure the clarity, applicability, relevance and feasibility of the tools, to identify the difficulties that might be faced during implementation, and to estimate the time needed for completion of the study tools and, subsequently, final modifications were made to the tools. The patients involved in the pilot study were excluded in the main study sample.

Study maneuver

- This study was carried out through a period of data collection within 8 month from Feb. 2018 to August 2018.

- The study was carried out through assessment, planning, implementation, and evaluation phases.

- **The assessment phase** started with recruitment of patients according to eligibility criteria and with informed consent. The researchers collected baseline data using the finalized tools and these were taken as the pre-intervention baseline data. Every patient interview lasted 30–45 minutes. Researchers interviewed two patients per day.

- In **the planning phase**, the researchers designed plan for nursing rehabilitation intervention guided by relevant literature. It included theoretical as well as practical sections. The theoretical section included background about stroke, risk factors, management strategies and life style modification. The practical sections included **rehabilitation intervention that help regain daily living activities**andfun activities to regain mental abilities. Moreover, a colored booklet was designed by the researchers and distributed to each patient or their accompanying relatives.

- **Implementation phase:**each patient interviewed individually, together with a family member to help them follow the instructions at home, different teaching strategies were used, such as, mini-lectures, discussions, and media, such as posters, images, and videos.

- **The evaluation phase** included the post test assessment after one month to test the effects of the nursing rehabilitation intervention, using the aforementioned tools.

- The fieldwork was carried out three days weekly throughout a period of 8 months.

- **Statistical analysis:**

- The collected data were organized, revised, stored, tabulated and analyzed using the number and percentage distribution, statistical analysis was done by computer.Numerical data were expressed as mean ± SD. Qualitative data were expressed as frequency and percentage. Proper statistical test were used(chi square& t test) to determine whether there was a significant differences or not, using statistical package for social science program (SPSS) version 20. Statistical significance was considered at p-value < 0.05.

3. RESULTS

Table (1) shows the distribution of socio-demographic characteristics of studied stroke patients. The current study result shows that the mean age of studied stroke patients was 49.6±9.1 among intervention group compared to 48.2±7.3 among control group. There were no statistically significant differences between intervention and control group regarding to all items of sociodemographic characteristics (gender, education, occupation and marital status).

Table (2) demonstrate that there were no statistically significant differences between intervention and control group regarding tospeech, motor and mental abilities before implementing the nursing intervention (p>0.05).While there were statistically significant differences between intervention and control group after implementing the nursing intervention (p<0.05).

Table (3) clarifies that there were no statistically significant differences between both groups (case & control) regarding to all functional abilities (daily living activities, social role & family role) before implementing nursing intervention (p> 0.05). While there were statistically significant differences between both groups (case & control) regarding to all functional abilities after implementing nursing intervention (p< 0.05).

Table (4) clarifies the distribution of studied sample according to their practice to regain daily living activities before & after intervention, the data found that there were no statistically significant differences between both groups before intervention, (p> 0.05). While there were statistically significant differences between both groups (case & control) after implementing nursing rehabilitation intervention (p< 0.05). 14.0 % amongintervention group compared to 18.0%of control group had satisfactory practice before intervention, which increased to 58.0% among intervention group and 30.0 % among control group.

Figure (1) illuminates the distribution of studied sample according to their practice to regain mental abilities by fun activities before intervention, the data shows that both intervention and control groups didn't practice any of the fun activities that help them to regain their affected mental abilities due to stroke before implementing nursing intervention.

Table (5) illustrate that there was a highly statistically significant difference among both groups (intervention & control group) according to their practice to regain mental abilities by using fun activities after implementing the nursing intervention (p=00002). The data indicated that there was improvement in practicing fun activities to regain mental abilities among intervention group than control group; 60.0% of intervention group had satisfactory level of practice compared to 22.2% among control group, while only 18.0 % of intervention group compared to 62.0 % of control group had unsatisfactory practice.

Table (6) describes the distribution of studied sample according their knowledge about stroke before and after intervention. The results denoted that there was an improvement in level of knowledge among intervention group after implementing the nursing intervention than among control group; the percentage of satisfactory level of knowledge improved from 26.0% before intervention to 76.0% after intervention among intervention group compared to 22.0% of control group increased to 38.0%. There was a high statistically significant difference between both groups (intervention & control group) after implementing the intervention (P =0.0001), whereas there was no statistically significant difference between both groups (intervention & control group) before implementing the intervention (P =0.6).

Table (7) describes the distribution of studied sample according total score of practices (daily living activities and mental abilities) after intervention. The data showed that 70.0%of intervention group had satisfactory practice compared to 36.0% among control group. There was a high statistically significant difference between both groups (intervention & control group) in the total level of practice after implementing the intervention (P =0.002).

Table (8) reveals the distribution of studied sample according to physical and mental abilities after implementing nursing intervention, the data demonstrated that there were high statistically significant differences between intervention and control group according to their physical and mental abilities after implementing nursing intervention (p< 0.05).

Table (1) Distribution of studied sample according to their socio-demographic characteristics

Item	Intervention group (50)		Control group (50)		X^2	P
	N	%	N	%		
Age 49.6±9.1			48.2±7.3			
Gender						
Male	29	58.0	27	54.0	0.1	0.68
Female	21	42.0	23	46.0		
Educational level						
Illiterate	15	30.0	13	26.0	1.5	0.66
Primary	13	26.0	16	32.0		
Secondary	16	32.0	18	36.0		
University	6	12.0	3	6.0		
Occupational status						
Working	26	52.0	20	40.0	1.4	0.2
Not working	24	48.0	30	60.0		
Marital status						
Married	39	78.0	41	82.0	0.2	0.61
Not married	11	22.0	9	18.0		

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Table (2) Distribution of studied sample according to speech, motor and mental abilities before and after intervention

Items	Pre intervention		T	P	Post intervention		T	P
	Case	Control			Case	control		
	X^2± SD	X^2± SD			X^2± SD	X^2± SD		
Speech	17.8±2.3	17.1±2.9	0.8	0.4	25.3±1.5	21.1±.8	3.1	0.006
Motor assessment								
Supine to side lying	2.1±.6	2.2±.9	0.2	0.7	4.8±1.2	3.1±.3	4.4	0.0001
Supine to sitting over side of bed	2.3±.4	2.2±.2	0.78	0.41	4.7±.9	3.2±.2	3.6	0.003
Sitting to standing	2.2±.7	2.1±.8	0.3	0.6	4.6±.5	3.4±.8	3.3	0.005
Walking	1.9±1.2	1.7±1.5	0.74	0.43	4.2±1.6	2.7±1.5	4.3	0.0001
Upper arm function	2.1±.8	2.3±.4	0.32	0.5	4.3±1.8	3.1±.4	3.1	0.007
Advanced hand activities	1.6±.9	1.7±.3	0.71	0.47	4.1±.3	2.9±.3	3.9	0.001
Mental Abilities								
Mental activities	16.5± 3.6	17.8±3.2	0.9	0.3	28.7±1.9	22.8±2.2	5.6	0.001
Depression	31±1.1	33±1.3	1.3	0.19	46±3.1	39.3±2.6	4.8	0.00007

Table (3) Distribution of studied sample according to functional ability before & after intervention

Items	Pre intervention				Post intervention			
	Case	Control	T test	P value	Case	Control	T test	P value
Daily living activities	2.2±.7	2.5±.5	1.6	.06	4.3±.9	2.9±1.1	3.3	.01
Social role	6.5±.2	5.9±.8	0.1	0.9	12.2±.3	7.9±.7	1.2	0.009
Family role	4.9±.8	5.1±.5	.08	0.8	11.9±.8	7.1±.5	5. 8	0.007

Table (4) Distribution of studied sample according to their practice to regain daily living activities before & after intervention

Items	Before intervention				After intervention			
	Case		Control		Case		Control	
	N	%	N	%	N	%	N	%
Speech and swallowing								
Deep breathing before speaking	13	26.0	11	22.0	39	78.0	19	38.0
Tongue in and out	9	18.0	10	20.0	41	82.0	16	32.0
Tongue side to side	13	26.0	8	16.0	43	86.0	13	26.0
Tongue up and down	11	22.0	7	14.0	38	76.0	13	26.0
Practice kissy face	6	12.0	9	18.0	38	76.0	12	24.0
Saying cheese to control lips	3	6.0	5	10.0	35	70.0	14	28.0
Mobility and balance								
Knee extension	12	24.0	10	20.0	38	76.0	18	36.0
Seated matching	9	18.0	11	22.0	36	72.0	15	30.0
Knee to chest	14	28.0	12	24.0	39	78.0	17	34.0

Toe taps	4	8.0	5	10.0	37	74.0	11	22.0
Table top circle	8	16.0	10	20.0	29	58.0	16	32.0
Open arm movement	6	12.0	8	16.0	34	68.0	12	24.0
Use ankle foot orthoses	0	0.0	0	0.0	27	54.0	7	14.0
Control for urine and fecal incontinence								
Urgency control	11	22.0	9	18.0	38	76.0	16	32.0
Avoid coffee and fluids after	16	32.0	13	26.0	35	70.0	17	34.0
Dietary change to reduce constipation	21	42.0	23	46.0	45	90.0	27	54.0
Bladder bowel training	13	36.0	11	22.0	37	74.0	16	32.0
Pelvic floor training	9	18.0	7	14.0	31	62.0	13	26.0
Transferring and preventing falls or injuries								
Use compensation techniques	3	6.0	5	10.0	34	68.0	11	22.0
Use mobility aids	13	26.0	15	30.0	39	78.0	20	40.0
Use grab rails	9	18.0	6	12.0	42	84.0	9	18.0
Use shower transfer benches	6	12.0	8	16.0	38	78.0	18	36.0
Total level of practice								
Satisfactory	7	14.0	9	18.0	29	58.0	15	30.0
Average	11	22.0	12	24.0	13	26.0	9	18.0
Unsatisfactory	32	64.0	29	58.0	8	16.0	26	52.0
X^2 0.4 P=0.8					**X^2 14.7 P=0.0006**			

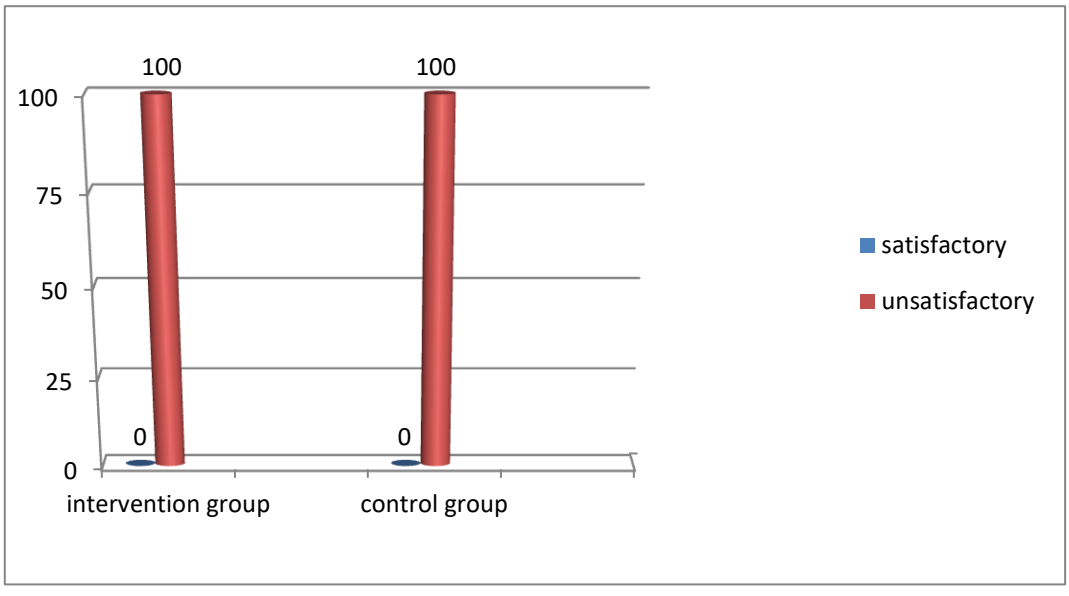

Figure (1) Distribution of studied sample according to their practice to regain mental abilities by fun activities before intervention

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Table (5) Distribution of studied sample according to their practice to regain mental abilities by fun activities after intervention

Items	Case		Control	
	N	%	N	%
Board and card games				
Cubes	38	76.0	7	14.0
Cochin	32	64.0	11	22.0
Domino	29	58.0	0	0.0
Practice counting	34	68.0	0	0.0
Creative activities				
Photography	29	58.0	3	6.0
Painting / Drawing	27	54.0	8	16.0
Rhyming / Match items	36	72.0	6	12.0
Memory cards	26	52.0	8	16.0
Word search (puzzle)	36	72.0	12	24.0
Total level				
Satisfactory	30	60.0	11	22.0
Average	11	22.0	8	16.0
Unsatisfactory	9	18.0	31	62.0
X^2 21.3		**p=00002**		

Table (6) Distribution of studied sample according their total level of knowledge about stroke before and after intervention

Items	Intervention group				Control group				X^2	P
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	N	%	N	%	N	%	N	%		
Before Intervention	13	26.0	37	74.0	11	22.0	39	78.0	0.2	0.6
After Intervention	38	76.0	12	24.0	19	38.0	31	62.0	14.7	0.0001

Table (7) Distribution of studied sample according total score of practices (daily living activities and mental abilities) after intervention

Items	Intervention group		Control group		X^2	P
	N	%	N	%		
Satisfactory	35	70.0	18	36.0	11.6	0.002
Average	10	20.0	20	40.0		
Unsatisfactory	5	10.0	12	24.0		

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Table (8) Distribution of studied sample according to physical and mental abilities after implementing nursing intervention

Items	Intervention group		Control group		T test	P value
	X	SD	X	SD		
Physical						
Speech	27.6	2.5	21.2	1.7	6.6	0.001
Upper extremities	13.5	2.4	10.4	2.5	4.7	0.003
Lower extremities	13.1	2.5	9.8	1.5	5.2	0.001
Mental						
Critical thinking	28.7	1.9	22.8	2.2	5.6	0.001
Concentration and attention	23.2	1.6	19.2	2.1	3.5	0.02

4. DISCUSSION

Stroke is a major health problem among Egyptian population. Stroke may result in many physical disabilities and severe functional problems affecting daily activities. In order to optimize patient recovery, a wide range of specific nursing rehabilitation intervention must be involved in the management process **(Theofanidis, 2016).**The nurse can help stroke patients with best utilization of their remaining physical and functional abilities by rehabilitation intervention. Therefore; this study aimed to evaluate the impact of nursing rehabilitation intervention for post-stroke patients.

The current study results showed that socio-demographic characteristics of studied stroke patients among both groups almost similar, the mean age of studied stroke patients was 49.6±9.1, more than half of both groups were male, and more than quarter of them was illiterate, while only 12.0 % of intervention group graduated from university compared to 6.0% in the control group. More than half of intervention group was working compared to 40.0% in control group, and most of both groups were married.

In order to measure the impact of the nursing rehabilitation intervention and exclude the influential factors related to the effect of stroke on both studied groups (intervention and control group), the results of current study demonstrated that both groups were affected similarly as regards their physical and mental abilities, the data showed that there were no statistically significant differences between intervention and control group regarding to physical (Speech, Upper extremities, Lower extremities) and mental abilities (Critical thinking & Concentration and attention) before implementing the nursing intervention ($p>0.05$). The results addedthat there were no statistically significant differences between both groups (case & control) regarding to all functional abilities (Daily living activities, Social role, Family role) and level of depression before implementing nursing intervention.

The current study results showed improvement in patients' knowledge, practice, Physical & mental abilities and functional abilities and level of depression score among intervention group than control group after receiving the nursing rehabilitation intervention, the findings lead to acceptance of the set research hypotheses.

According to the present study findings, there was significant improvement in level of knowledge among intervention group after implementing the nursing rehabilitation intervention than among control group; these results result was in agreement with **Bjartmarz, et-al., (2017)**, they reported that after the implementation of the stroke nursing guidelines there were significant improvement in the level of knowledge among patient and their care givers. Moreover **Hafsteinsdóttir, (2011) &Saengsuwan, Suangpho, and Tiamkao, (2017)** reported that health education about stroke improves knowledge of patients, increase patient satisfaction, and reduces patient depression scores. Also **McDaniel, (2016)** added that a priority in health care is the need for education regarding stroke.

Regarding to practice among studied patients to regain daily living activities, the data founded that there was significant improvement in level of practice among intervention group than control group after implementing the nursing rehabilitation intervention, these results were supported by results of **Rahul and Pandit (2017),** who studied caregivers' knowledge and practices, and mentioned that provision of regular training improve practices regarding care of cerebrovascular accident patients which would positively affect patient outcomes.In congruence with this study finding,**Bandi and Ward, (2012)** implemented specific rehabilitative techniques, such as training, exercises, and physical manipulation of the stroke patient's body with the intent of restoring physical ability; they found that there was significant improvement regarding level of practice among studied stroke patients after intervention. These results agreed with **Loupis& Faux, (2016)**&**Allen, et-al., (2016)** they mentioned in their study about stroke rehabilitation that there was improvement in daily living activities after receiving rehabilitation intervention for post stroke patients. **Saunders, et-al., (2014)** added thatparticipation in rehabilitations after stroke as physical activity or exercise improves physical fitness.

Moreover, the results of current study pointed out that, there was significant improvement in the physical and mental abilities among intervention group than control group after implementing the nursing rehabilitation intervention. The results of current study supported by **Zhiyan, et-al., (2017)** who aimed to research the value of extended nursing for cerebral stroke patients within a suitable recovery empty period, they stated that both the scores of motor and daily living activities increased after 3-months intervention, and improvement in the treatment group was greater than control group. The same findings were observed by **Bajaj, et-al., (2015)**conducted study titled with improved function after combined physical and mental practice after stroke,he showed that there were significant improvements regarding motor and mental abilities after intervention. Moreover **Van de Ven, et-al., (2017)** implemented training program for post stroke patients in Netherlands, and found that participants improved on training tasks and on several outcome tasks, with improvements persisting even 4 weeks after training completion.

The results of current study revealed that there was significant improvement among intervention group than control group regarding to daily living activities. The results of current study were in line with **Kasnakova&Mihaylova (2018)** studied Analysis of the recovery of patients with stroke, they reported that, better functional recovery is noticed in patients after receiving rehabilitation intervention and improved after second course of rehabilitation. These results supported by**Langhammer and Lindmark, (2012)** who studied the effect of functional exercise and physical fitness post stroke,they highlighted that both groups improved in all functional abilities but the intervention group showed more improvement than control. Additionally **Rensink, et-al., (2009)** studied task-oriented training in rehabilitation after stroke: systematic review in Netherlands, they denoted that implementation of nursing intervention (as functional balance training during reaching and standing up, walking training, arm training and exercises for physical fitness) after stroke was effective and relevant and lead to improvements in functional outcomes and overall health related quality of life**.** On the same line**Nunes&Queirós, (2017)** studied 'patient with stroke: hospital discharge planning, functionality and quality of life', they reported that a careful hospital discharge planning and rehabilitation intervention for patients and caregivers have an impact on the quality of life of stroke patients.

Post-stroke depression was strongly associated with the patient's inability to undertake activities of daily life and improved by regaining the physical abilities, the results of current study revealed that studied patients showed improvement in the level of depression after receiving the rehabilitation intervention, and there were statistically significant improvement at the intervention group than control group. These results supported by **Janice &Reime (2015)** who studied the effect of exercise for depression symptoms among stroke patients, they found that exercise appeared to have a positive effect on depressive symptoms. In the same line **Terese, et-al., (2016)** studied depression after stroke incidence, risk factors, and mortality outcomes, they found that post stroke rehabilitation have significant reduction in the level of depression score and have impact on the general health status. Additionally **Gyagenda, et-al., (2015)**&**Ibeneme, et-al., (2016)** stressed on the useful impact of rehabilitation management for reducing post-stroke depression among stroke survivors.

5. CONCLUSION

Thenursing rehabilitation intervention showed positive impact on improving patients' knowledge, practice, Physical & mental abilities and functional abilities and level of depression score among intervention group than control group. This program was effective in meetings its goals, purpose and objectives, therefore this program may be used as an ongoing, sustainable model for stroke center nursing education.

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6. RECOMMENDATIONS

- Future studies should seek to replicate these findings to assist in growing the body of knowledge regarding the most effective rehabilitation intervention for nurses to use.
- There should be evidence to support rehabilitation in well-coordinated multidisciplinary stroke units or through provision of early supported provision of discharge teams.
- More population-based studies are needed in Egypt to decrease the incidence and prevalence of stroke in Egypt.
- Adopting educational program as a sustainable learning opportunity for nurses in regards to stroke care.
- Developa nursingeducationalprogram to educate nurses in a stroke center about stroke.
- Improveeducational system to provide adequate structured information to increase self-management in patients with stroke.

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