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Effect of Educational Guidelines on Compliance with Lifestyle Modifications among Patients with Recurrence Cerebrovascular Stroke

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Abstract: **Stroke is a common, serious, and disabling global health-care problem and patients must compliance to life style modifications for preventing potential complications as recurrence of cerebrovascular stroke. This study aimedto evaluate the effect of educational guidelines on compliance to life style modification for cerebral vascular stroke patients through the following1- assess patients' compliance with life style modifications among patients with recurrent, 2- plan and implement educational guidelines for patients with cerebrovascular stroke3- Evaluate effect of education guidelines on compliances for patients' with cerebrovascular stroke. Research hyposis: educational guidelines will affect positively on compliances with life style modifications among patients with recurrent cerebrovascular stroke. Design: A quasi experimental design. Setting: stroke out patients' clinic at Ain Shams University Hospitals/ Egypt. Subject: A purposive sample of 70 adult patients, and divided in two group study and control group with recurrence cerebrovascular stroke. Tools: 1) Stroke patients' structured interview questionnaire. 2) Patients' compliance with life style modifications assessment tool. Results: there were highly statistically significant relation between knowledge and compliance to life style modifications between study and control group. Conclusions: there was significant relation between total level of patients' compliance and both of their level of knowledge. Recommendation: Establishing cerebrovascular stroke educational program to provide knowledge about recurrent cerebrovascular stroke and its associated life style modifications.**

Keywords: **Cerebrovascular stroke, Compliance, Life styles modifications.**

1. INTRODUCTION

Cerebrovascular stroke (CVS) is a devastating disease and a medical emergency situation sometimes called a brain attack. It is the second leading cause of death and the major cause of long-term, physical, psychological and social disability in the elderly around the world. Nearly 17 million people worldwide are affected with CVS annually with a mortality rate among them up to 6 million and another 6 million had left with permanent disability. Nearly about; one stroke occurs every 2 seconds with about 25% of all CVS are recurrent stroke ***(World Health Organization (WHO), 2017).***

More than 70% of cerebrovascular stroke survivors are incapable of return fully normal to their prior occupation as well as having longer times of disability before death with significant costs for individuals and society including the costs of health care services, medicines to treat stroke and missed days of work. Stroke is an injury to the brain that has significant effects that extend far beyond the health of individual to the family and the community ***(National Stroke Association, 2017).***

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The types of Cerebrovascular stroke (CVS) was: ischemic stroke about 87% occurs when the blood supply to the part of the brain is suddenly interrupted, and hemorrhagic stroke about 13% occurs when a blood vessel in the brain bursts and spilling blood into the spaces surrounding the brain cells. Both types of stroke may result in brain tissue damage and neurological deficits that persist for longer than 24 hours ***(American Stroke Association, 2017).***

Stroke affects patient through a wide variety of neurologic deficits, depending on the location of the lesion (which vessels are obstructed), the size of the areas of inadequate perfusion, and the amount of collateral blood flow. Also stroke can have an effect on many body functions including; motor activity, intellectual function, spatial perceptual alterations, bladder and bowel elimination, personality, affect, sensation, swallowing and communication***(National Stroke Association, 2017).***Cerebrovascular stroke is a complex disease, and about 80% of CVS can be prevented, but it requires efforts and skills of all members of the multidisciplinary team, where nurses play a pivotal role in all phases of CVS care as regard health education and prevention of disease ***(Linton, 2015).***

Compliance with life style modifications is known as the-extend to which patients' behavior changed or directed toward improvement of health after following medical instructions. Nurses serve as an educator for patients about the importance of compliance with life style modifications, and also their family members to support and encourage health behavior for better out comes and health promotion. Also; assist patients and families to take responsibility for coping with illness related functional impairment by adding to their knowledge through health education ***(Kamal, et al., 2015).***

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. So nurses should determining and maintaining the patient's physical, sensorial, mental, psychological, and social functional levels in disease, disability, and injury treatment which encourages independency and self-care in order to improve the quality of life in individuals***(Col &Purut, 2018).***

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. Patient need continuous education regarding compliance is the most essential aspect of nursing care for overall better outcomes after stroke, as it determine how well patients and families able to maintain and improve health status, restore health and cope with functional impairment, and improving decision making, self-care and patient safety***(Mahrous, 2015).***

Significance of the study

Stroke isthe second leading cause of death around the world and nearly 17 million people worldwide are affected with CVS annually with a mortality rate among them up to 6 million and another 6 million had left with permanent disability In Egypt, there is no doubt that cerebrovascular stroke is a major health concern. Whereas, there is 14.8% of total number of population are suffering from stroke, and 1600 cases died annually from it. Stroke deaths in Egypt reached 56,710 or 11.04% of total deaths. About 47% of patients had at least two or more modifiable risk factors such as (smoking, physical inactivity, hypertension, diabetes and hypercholesterolemia (***World Health Organization (WHO), 2017).*** So that, it's important to evaluate the effect of educational guidelines in compliance to life style modifications among patients suffering from recurrent cerebrovascular stroke is very important for preventing further potential complications as recurrence of cerebrovascular stroke and facilitating recovery for those patients.

AIM OF THE STUDY

This study aimed to evaluate the effect of educational guidelines on compliance with life style modifications among patients with recurrence cerebrovascular stroke through:

1. Assessing patients 'level of knowledge and level of compliance to lifestylemodifications.

2. Develop and implement educational guidelines for compliance to life style modifications among patients suffering from recurrence of cerebrovascular stroke.

3. Evaluate the effect of educational guidelines on compliance to life style modifications among patients suffering from recurrence of cerebrovascular stroke.

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Research hypothesis:

Educational guidelines will improve level of knowledge for patient suffering from recurrence of cerebrovascular stroke

Educational guidelines will affect positively on patient compliance with life style modifications among patients suffering from recurrence of cerebrovascular stroke

2. SUBJECTS AND METHODS

The present study portrayed under the four main designs as follows:

1. Technical design.

2. Operational design.

3. Administrative design.

4. Statistical design.

1. Technical design:

It included: research design, setting, subjects and tools for data collection.

-Research design:

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

-Setting:

This study was conducted at stroke out patients' clinic at Ain Shams University Hospitals / Egypt, consist of 3 clinic rooms; each clinic room had one bed.

-Subjects:

A purposive sample of 70 adult patients, with recurrence cerebrovascular stroke follow in the previous mentioned setting were recruited in this study. The study subjects divided into two groups 35 patients for each group, study group who had the educational guidelines and routine care, and control group who had only routine care. ***Inclusion criteria;*** patients who suffering from recurrent cerebrovascular stroke and also who able to comprehend the instructions, free from another neurological disorders as (aphasia, mythenia gravis, traumatic brain injuries and disturbed in level of consciousness).

The sample size was determined considering the total number of patients (400) who had admitted during the year 2018 in the previous mentioned setting, based on the power analysis that indicate 70 patients would be enough to conduct this study. Considering alpha type I error (α) = 5% with confidence level 95% and significance level (α) at 0.05 and power of study (power of test) 90% with type II beta error (β)= 10%.

-Tools of data collection

1) Stroke patients' structured interview questionnaire:

This tool was developed by the researcher and written in a simple Arabic language after reviewing the relevant literatures and it was divided into the following four parts:

Part I: This part used to assess demographic characteristics of the studied patients such as age, gender, marital status, level of education, residence place, and occupation.

Part II: This part was concerned with assessing patients' medical data. It was developed by the researcher based on the related literature; ***Mahmoud &AbdElaziz,2016, Lewis, et al., 2015, Linton, 2015 and Hinkle & Cheever, 2014.*** It was composed of14 close ended questions about type of current stroke, associated symptoms in last hospital admission, current stroke frequency and drug therapy.

Part III: It was designed by the researcher to assess patient's learning needs about recurrent cerebral vascular stroke and associated therapeutic regimen, based on the related literature **(*Grotta, et al., 2016, Ignatavicius& Workman, 2015, and Chapman &Bogle, 2014*).**The sheet constructed to assessandevaluate the effectiveness of educational guidelines on

patients' knowledge about recurrent cerebral vascular stroke and the associated therapeutic regimen. It was comprised of 64 question distributed on 11 items as definition (1 question), risk factors (8 questions), clinical manifestations (5 questions), complications (5 questions), and diagnostic studies (5 questions), different methods of prevention (7 questions), Coping with life stressors (6 questions), medication (5 questions), nutrition (9 questions), exercises (9 questions) and Sleeping and comfort regimen (4 questions).

Scoring system of the knowledge

The correct response was scored "1" and the incorrect was scored zero. The total score was 64 grades distributed on its eleven items.

It was considered that:

≥60% (≥ 38 grades) was satisfactory.

< 60% (< 38 grades) was unsatisfactory.

II- Patients' compliance with life style modifications assessment tool:

This tool was used to evaluate compliance with life style modifications among patients suffering from recurrence of cerebrovascular stroke. It was developed by the researcher after reviewing the recent related literatures; ***WorldHealth Organization (WHO), 2017, American Stroke Association 2016, National Institution of Health Stroke Scale (NIHSS) 2016, and Health Promotion & Stroke Prevention, 2014.*** It included 55 statements which grouped into(6) subtitles as the following:

Drug regimen.	(11 item).
Diet regimen.	(12 item).
Exercise regimen.	(7 items)
Sleepingandcomfortregimen.	(8 items).
Coping with life stressors regimen.	(9 items).
Follow up regimens.	(8 items).

Scoring system:

The response for these statements was either Compliant which was given one score or Incompliant which was given zero score. The total score for every item were calculated by summing the patients' responses and categorized into compliant or incompliant, total grades were 55 which distributed as the following:

Drug regimen.	(11 grades)
Diet regimen.	(12 grades)
Exercise regimen.	(7 grades)
Sleeping and comfort regimen.	(8 grades).
Coping with life stressors regimen.	(9 grades).
Follow up regimens.	(8 grades).

Based on statistical cut of point, it was considered as the following:

>60 % was considered compliant, whenthe total grades were >33grades.

<60 % was considered incompliant,whenthe total grades were < 33 grades.

-Educational guidelines about compliance with life style modification:

It was be developed by the researcher after reviewing the related literature (***WorldHealth Organization (WHO), 2017, American Stroke Association 2016, National Institution of Health Stroke Scale (NIHSS) 2016, and Health Promotion & Stroke Prevention, 2014***) it will be written in simple Arabic language and composed of two parts

Part 1: it consisted of knowledge related to cerebrovascular stroke as definition, casus, signs and symptoms, complication and drug therapy and its side effect.

Part 2: consisted of knowledge and practice related to how patient compliance with life style modification as medication regimen, diet regimen, exercise, sleep and rest, coping with stressors and follow up regimen.

2. Operational design:

The operational design included preparatory phase, validity, pilot study and field work.

Preparatory phase:

It included reviewing of related literature, different studies and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to the theoretical part of the study and tools for data collection

Validity and reliability:

Testing ***validity*** was ascertained by a group of 5 experts in medical surgical nursing department faculty of nursing Ain Shams University(2professor and 3 assistant professor) to determine face and content validity of the tool. The expertise reviewed tools for clarity, relevance, applicability, comprehensiveness, simplicity and minor modifications were done. While, ***reliability*** of the study tools was done byAlpha Cronbach test. The reliability scores for patients' knowledge, and patients' compliance with lifestyle modifications were 0.809- 0.859. Consequently, these values indicate high internal consistency of the used tools.

Ethical consideration:

Ethical approval was obtained from the scientific ethical committee in the faculty of nursing at Ain Shams University before starting the study. The researcher clarified the objective and aim of the study to the patients included in the study. The researcher assured maintaining anonymity and confidentiality of the subject data. Patients were informed that they allowed choosing to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reasons. Values, culture and beliefs were respected.

Pilot Study:

The pilot study was conducted on 6 patients (10% of the total study sample) to test clarity, feasibility, validity, reliability and applicability of the tools used in this study. The patients who were included in the pilot study were included to the sample because no modification was done after conducting pilot study.

Field work:

Filed work included two phases: implementation phase and evaluation phase.

I- Implementation phase: this included:

The patients in the stroke clinic who met the study criteria were included in the study after explaining the purpose of the study and obtaining their consent before any data collection. The first 35 patients were selected to be a control group, while the second 35 patients were selected to be a study group.

For the control group, data collection started from the beginning of August2019 to the end of February 2020. The researcher starting the interviewing process by filling demographic and clinical data sheet which took about 10 minutes then filling interview questionnaire which took about 15 minutes, lastly compliance to life style modification for patient with CVS questionnaire which took about 15 minutes. The researcher reviewed each point in front of patient to be sure that no points are missed. After one month from pre test the patient fill the post test and after three months from pre test the patients fill follow up test.

While for the Study group data collection the researcher starting the interviewing process by filling the data collection tools as the control group which took also approximately the same time to be filled. The patient was given the educational guidelines about compliance to life style modification after explaining its purpose, content, how to go through the educational guidelines and it was given in **three session**: first session for knowledge about disease second session discussed compliance regimen for drug, diet and exercise and third session for discussed compliance regimen regarding

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sleep and comfort, coping with stressors and follow up regimen. After one month from pre test and giving educational guidelines for the patient was fill the post test and after three months from pre test the patients was fill follow up test.

Evaluation phase:

This phase included evaluation of the effect of educational guidelines on patients' knowledge, and compliance to life style modification by comparing the result pre - post and follow up educational guidelines implementation by using the same data collection tools which was done twice and between control and study group. Immediate post implementation of educational guidelines after one month from pre test and follow up after 3 month from pre test.

Administrative design

An official approval to carry out the study was obtained from the Dean of the faculty of Nursing, Ain Shams University, and Medical director of the stroke out patients' clinic at Tanta University Hospitals. An official letter was issued to medical director of the stroke out patients' clinic at Tanta University Hospitals from the Faculty of Nursing, Ain Shams University explaining the aim of the study and objectives of the research, as well as, to obtain permission for conducting this study and get better cooperation during the implementation phase of the research.

Statistical design:

The collected data were organized, tabulated, graphically and statistically analyzed using the Statistical Package for Social Science (SPSS). Descriptive statistics including frequency, distribution, mean median, standard deviation and inter-quartile range were used to describe different characteristics. The statistical analysis was done using percentage, range, chi square (X^2), and Pearson correlation coefficient (r). Also; Z test conducted to show correlation between knowledge score and compliance score among the studied patients suffering from recurrence of cerebrovascular stroke.

Significance of results was considered as follows:

Non significant (NS) P > 0.05

Significant (S) P < 0.05*P< 0.0

Highly Significant (HS) P < 0.01**

3. RESULT

Table (1): Frequency and percentage distribution of Socio-demographic characteristics of patients in the study and control groups.

Items	Groups				X^2	P value
	Study group (n=35)		Control group (n=35)			
	No.	%	No.	%		
Age (years)						
< 30	8	22.9	3	8.6%	3.31	0.347
40-	8	22.9	7	20%		
50-	8	22.9	12	34.3%		
≥ 50	11	31.4	13	37.1%		
Mean±SD	40.91±12.552		45.20±10.726			
Gender						
Female	10	28.6	15	42.9	1.56	0.212
Male	25	71.4	20	57.1		
Education						
Read & write	11	31.4%	13	37.1%	4.55	0.103
Moderate	5	14.3%	11	31.4%		
High	19	54.3%	11	31.4%		
Job						
Working	19	54.3%	21	60%	0.23	0.629
Not working	16	45.7%	14	40%		

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Marital status						
Single	9	25.7%	11	31.4%	1.12	0.292
Married	26	74.3%	24	68.6%		
Residence						
Rural	15	42.9%	16	45.7%	0.037	0.312
Urban	20	57.1%	19	54.3%		

Table (1) showed that, the mean age of the patients in the study group was 40.91±12.552, while that of the patients in the control group was 45.20±10.726, while in relation to gender, the result showed that 71.4% &57.1% were males in the study and control groups respectively.

As regards educational level, the results showed that, 31.4% of the patients in the study group and 37.1% of those in the control group can only read and write, but 54.3% of the study group and 31.4% of the control group had high education. While, considering job, the results revealed that, 54.3% of the patients in the study group and 60% of the patients in the control group were working.

In relation to marital status, 74.3% of patients in the study group and 68.6% in control groups were married. While, concerning residence, results revealed that, 57.1% & 54.3% in both the study and control groups respectively were from urban areas.

Table (2): Percentage distribution regarding present medical history of patients in the study and control groups.(n. =70).

Items	Groups				X^2	P value
	Study (n=35)		Control (n=35)			
	No.	%	No.	%		
Type of stroke					4.55	0.103
Ischemic stroke	15	50	20	57.1		
Hemorrhagic stroke	15	50	15	42.9		
Associated Symptoms						
Loss of balance	12	34..3	16	45.7%	0.95	0.329
Difficulty in speaking	3	8.6	7	20	1.87	0.172
General weakness in upper and/or lower limbs	29	82..9	27	77.1	0.36	0.55
Convulsions	27	77.1	19	54.3	4.06	0. 044
Hypertension	10	28.6	8	22..9	0.3	0.584
High blood sugar	25	71.4	28	80	0.7	0.403
Stroke frequency						
Once	10	28.6	7	20	1.43	0.232
Twice	11	31.4	10	28.6	1.2	0.274
More than twice	14	40	18	51.4	2.1 4	0.143
Current medical treatment						
Anticoagulants	30	85.1	29	82.9	0.07	0.788
Anticonvulsants	29	82..9	27	77.1	0.36	0.55
Cholesterol drugs	27	77.1	19	54.3	4.06	0. 044
Anti-platelet	10	28.6	8	22.9	0.3	0.584
Antihypertensive	25	71.4	28	80	0.7	0.403
Diabetic drug	25	71.4	28	80	1.43	0.232

P>0.05 not significant *P<0.05 Significant** P<0.001 highly significant

Table (2) illustrated that, 50% of patients in the study group and 57% of patients in control group had ischemic stroke.Regarding to associate symptoms of patients with recurrence stroke there were 82.9% of patients in study group and 77.1% of patients in control group had generalized weakness in upper and lower limb.Also, (77.1%) of patients in study group and (54.3%) of patients in control group had convulsion.

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Regarding to stroke frequency, the result reveled that, 40% of the patients in study and 51.4% of patient in control group had more than twice stroke attack.Concerning with medical treatment there were (85.1%) in study group and (82.5%) in control group use anticoagulant, while, (82.9%) in study group and (77.1%) in control group use anticonvulsants drug.

Table (3): Frequency and percentage distribution of learning needs for patients' in the study and control groups in relation to their concerned knowledge regarding the compliance to life style modification pre implementation of educational guidelines.

Items	Groups				X^2	P value
	Study (n=35)		Control (n=35)			
	No.	%	No.	%		
Knowledge						
Definition & Causes	9	25.7	18	51.4	1.64	0.102
Symptoms	11	31.4	18	51.4	2.14	0.143
complications	11	31.4	20	57.1	1.9	0.132
Investigations	12	34.3	21	60	1.20	0.231
smoking	16	45.7	26	74.3	3.45	0.324
Medication	35	100	35	100	equal values	
Diet	35	100	35	100	equal values	
Exercise	35	100	35	100	equal values	
Sleep and comfort regimen	35	100	35	100	equal values	
Coping with life stressors regimen	35	100	35	100	equal values	
Follow up	35	100	35	100	equal values	

P>0.05 not significant *P<0.05 Significant** P<0.001 highly significant

Table (3)revealed that, the more learning needs of knowledge for both study and control group (100%) were related to activity, diet and medication regimen, and sleep and comfort, coping with stressors and follow up. Also, three was no statistically significant differences between study and control group pre implementation of educational guidelines.

Table (4): Comparison between patients total knowledge of patients with cerebral vascular stroke in study and control group pre, post and follow up of implementation of educational guidelines(no=35)

Items	Pre				Post				Follow up				X^2	P value
	Control		Study		Control		Study		control		study			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition & Causes	17	48.6	26	74.3	18	51.4	35	100	15	42.9	34	97.1	7.4	0.041
Symptoms	17	48.6	24	68.6	24	68.6	33	94.3	21	60.0	33	94.3	4.8	0.012
complications	15	42.9	24	68.6	8	22.9	32	91.4	12	34.3	31	88.6	6.4	0.031
Investigations	14	40.0	23	65.7	10	28.6	32	91.4	13	37.1	28	80.0	5.91	0.053
prevention	5	14.3	30	85.7	8	22.9	34	97.1	8	22.9	35	100.0	12.5	0.000
smoking	9	25.7	19	54.3	7	20.0	34	97.1	11	31.4	33	94.3	10.7	0.000
Medication	10	28.6	15	42.9	10	28.6	34	97.1	6	17.1	31	88.6	13.2	0.000
Diet	2	5.7	2	5.7	2	5.6	34	97.1	8	22.8	33	94.3	18.0	0.000
exercises	4	11.4	11	31.4	8	22.9	31	88.6	9	25.7	33	94.3	26.7	0.000
Coping with stressors	1	2.9	15	42.9	0	0.0	35	100.0	1	2.9	34	97.1	33.5	0.000
Total knowledge	0	0.0	18	51.4	0	0.0	35	100.0	1	2.9	35	100	36.2	0.000

Table (4) showed that, there were highly statistically significant differences among pre- post and follow up - implementation of educational guidelines regarding total level of knowledge between study and control group.

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Table (5): Frequency and percentage distribution oftotal knowledge of patients' with cerebral vascular stroke in study group pre, post and follow up implementation of educational guidelines(no=35)

Total knowledge	Pre		Post		Follow up		Z test	
	No	%	No	%	No	%	Pre- post	Pre- follow up
Satisfactory	**18**	**51.4**	**35.00**	**100.0**	**35.00**	**100.0**	**4.74** 0.00**	**4.74** 0.00**
Unsatisfactory	**17**	**48.6**	**0**	**0.0**	**0**	**0.0**		

P>0.05 not significant *P<0.05 Significant** P<0.001 highly significant

This table revealed that, there was highly statistically significant difference between total knowledge in study group pre- post & pre- follow up of implementation of educational guidelines (Z= 4.74 at P=0.001 &Z= 4.74 at P=0.001respectively).

Table (6): Comparison between total compliance to life style modifications of patients with cerebral vascular stoke in study and control group pre, post and follow up of implementation of educational guidelines

Items	Pre				Post				Follow up				X^2	P value
	Control		Study		Control		Study		control		study			
	No	%	No	%	No	%	No	%	No	%	No	%		
Medication regimen	0	0.0	0	0.0	0	0.0	31	88.6	0	0.0	27	77.1	15.65	0.000**
Diet regimen	0	0.0	0	0.0	0	0.0	33	94.3	0	0.0	30	85.7	12.63	0.000**
Exercise regimen	0	0.0	2	5.7	0	0.0	31	88.6	0	0.0	31	88.6	9.31	0.002**
Sleep and comfortregimen	0	0.0	0	0.0	0	0.0	22	84.6	0	0.0	26	100	26.7	0.000**
Coping with stressors regimen	0	0.0	0	0.0	0	0.0	34	97.1	0	0.0	32	91.4	15.84	0.000**
Follow up	0	0.0	0	0.0	0	0.0	33	94.3	0	0.0	31	88.6	14.7	0.000**
Total adherence	0	0.0	0	0.0	0	0.0	34	97.1	0	0.0	32	91.4	15.84	0.000**

Table (6)showed that, there were highly statistically significant differences among pre- post and follow up - implementation of educational guidelines of patients' total compliance to life style modification between study and control group.

Table (7): Frequency and percentage distribution of total compliance with life style modification of patients with cerebral vascular stroke in the study group pre, post and follow up of implementation of educational guidelines

Total compliance to life style modification	Pre		Post		Follow up		Z test	
	No	%	No	%	No	%	Pre- post	Pre- follow up
Satisfactory	**0**	**0.0**	**34**	**97.1**	**32**	**91.4**	**8.13** 0.001**	**7.68** 0.001**
Unsatisfactory	**0**	**0.0**	**1**	**2.9**	**3**	**8.6**		

P>0.05 not significant *P<0.05 Significant** P<0.001 highly significant

This table revealed that, none of patients' in study group had satisfactory total compliance to life style modification pre implementation of educational guidelines, while (97.1% & 91.4%) of them had satisfactory total compliance post and follow up implementation of educational guidelines respectively, there was highly statistically significant difference between total compliance to life style modification in study group pre& post and pre& follow up of implementation of educational guidelines (Z= 8.13 at P=0.001 & Z= 7.68 at P= 0.001 respectively).

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Table (8): Correlation between total knowledge and total compliance to life style modification of patient's in the study and control groups pre, post and follow upof implementation of educational guidelines

Total knowledge	Total compliance to life style modification					
	Pre		Post		Follow up	
	R	p-value	r	p-value	r	p-value
Study group	-.162	.354	.754	.001**	.513	.014*
Control group	-.056	.749	-.168	.334	-.048	.784

P>0.05 not significant *P<0.05 Significant** P<0.001 highly significant

This table revealed that, there was no significant correlation between total compliance to life style modification and total knowledge in control group pre, post and follow up implementation of educational guidelines. Also, there was no significant correlation between total compliance to life style modification and total knowledge in the study group pre implementation of educational guidelines, while,there was a highly statistically significant correlation in study group post and a statistically significant correlation in follow up of implementation of educational guidelines only.

Table (9): Relation between total compliance to life style modification and demographic characteristics of patients in the study and control groups' post implementation of educational guidelines.

Items	Total compliance to life style modification			
	Control Group		Study Group	
	Mean	SD	Mean	SD
Sex				
Female	74.50	10.75	161.04	11.39
Male	80.80	10.62	159.30	11.63
	t=-1.72		t = 0.41	
	P = 0.093		p = 0.69	
Educational level				
Basic	75.77	9.41	160.27	13.57
High school	77.09	13.56	164.20	12.60
University	79.00	10.73	159.74	9.99
	0.25		0.740	
	0.78		0.001**	
Residence				
Rural	74.40	12.04	157.93	12.59
Urban	79.30	9.95	162.50	10.14
	t = -1.32		t = -1.19	
	p=0.20		p = 0.024*	
AGE	r = -0.12		r = 0. 51	
	p = 0.5		p = 0.05*	

P>0.05 not significant *P<0.05 Significant** P<0.001 highly significant

This table revealed that, in the study group, there was no statistically significant relation between total compliance to life style modification and demographic characteristics regarding sex post implementation of educational guidelines, but, there was highly statistically significant relation regarding educational level and a significant correlation regarding age and residence. While, in the control group there was no significant relation between total compliance to life style modification and demographic characteristics post implementation of educational guidelines.

4. DISCUSSION

Stroke can result in survival with the permanent squeal 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. 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**(Niemi, McErlane, &Tillett, 2013; Kim, Young and Kim, 2014).**

The finding of the present study revealed that more than one third of the study and control group patients their age were more than 50 years, from the researcher point of view this result may be due to increase risk factors with old age associated disease as hypertension, diabetes mellitus andblood vessels diseases which predisposing to increase risk for stroke. Supporting these findings by **Cecily,(2016**), in his study about knowledge onprevention of cerebrovascular accident among patients with diabetes and hypertension in Indiawho reported that recurrence of cerebrovascular stroke increased with age, additionally the chance of having a stroke doubling every 10 years after age of 55 years.

Also the result of the present study supported with **Mitchell, et al., (2015)** who found that most of the studied patients were between the age of 15 and 49 years, in their study about obesity increases risk of ischemic stroke in young adults.

Regarding to gender, the present study indicated that less than three quarter of the study group and more than half of the control group were male, from the researcher point of view this result may be due to excessive exposure to stresses of daily life and working stress. This result was contracted with**Panício, Mateu,Ricarte and Figueiredo, (2014)**, who carried out study regarding the influence of patient's knowledge about stroke in Brazil: across sectional study, and represented that males had a majority incidence of CVS than females as they more vulnerable for daily stressors.

Also, it was contracted with **Mahmoud, (2016)**, who carried out study about factors affecting quality of life for patients with cerebrovascular stroke, and found that more than half of the study samples were females.

The result of the present study showed that less than three quarter of the study group and more than two third of the control group were married, from the researcher point of view this result may be due to stressful events between partners predisposing to increase risk of cerebrovascular stroke recurrence. This result agreed with **Aziz, (2017)**, who carried out study regarding quality of life of cerebrovascular stroke patients, and found that majority of the studied patients were married as a result of early time engagement of all studied patients.

The result of the present study indicated that more than half of the study and more than one third of control group patients were high education, from the researcher point of view this may be due to increase awareness for importance of education in our society. This result accepted with **Mahmoud and Abdel Elaziz, (2016)**,their own study title was the impact of stroke on life satisfaction and psychological adjustment among stroke patients during rehabilitation, who found that more than half of studied patients were illiterate.

The result of the present study revealed that more than half of the study and control patientshad residence in urban area. This result was not in agreement with **Morsy,Elfeky and Ahmed, (2013)**,their own study title was cerebrovascular stroke recurrence among critically ill patients at a selected university hospital in Egypt, who represented that majority of the studied group admitted from rural area.

Regarding to occupation, the present study revealed that more than half of the study group and two third of control group was working. This result was contracted with **Aziz,(2017)**, who represented that two third of the studied patients were unemployed and need to participate in rehabilitation programs to promote health functions and enhance quality of life, in his study about quality of life of cerebrovascular stroke patients.

Regarding the stroke type, the result of the present study revealed that, halfof the study and more than three quarter in control group patients had ischemic stroke type, from researcher point of view this result may be due to advanced patients' age as well as multiple complicated risk factors in both developed and developing countries such as hypertension, diabetes mellitus. This result accepted with **Mahmoudand Abdel Elaziz, (2016),** who carried out study about the impact of stroke on life satisfaction among stroke patients during rehabilitation, and found that most of the studied patients were suffered from ischemic stroke type.

The result of the present study showed that majority of the study group and more than three quarter of the control group had general weakness in upper and/or lower limbs followed by high blood sugar as associated symptoms at last hospital admission. The result was not in contrast with **Faiz, Sundseth, Thommessen and Ronning, (2018)**,who found that majority of the studied patients were having hypertension and blurred vision followed by aphasia as a main cause for previous hospitalization, in their study about patient knowledge on stroke risk factors, symptoms and treatment options.

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The result of the present study indicated that two fifth of the study group andmore than half of the control group had more than twice recurrent cerebrovascular stroke attack which may be due to advanced patients' age, having chronic diseases andmany risk factors, lack of health care facilities and lack of compliance with life style modifications. This result agreed with **Cabral. et al. (2015),** who carried out study about three-year survival and recurrence after first-ever stroke: the Joinville stroke registry Brazil.

The result of the present study revealed that majority of the study and control group had received anticoagulant as a main medical treatment, this result may be due to most of studied patients had suffered from ischemic stroke type. This result accepted with **Brewer, et al.(2015),** who carried out study about secondary prevention after ischemic stroke: the ASPIRE-S study, and reported that most of the studied patients were on anticoagulant therapy to prevent development of stroke recurrence. In contrast, **Panício, et al.(2014)**, who carried out study about the influence of patient's knowledge about stroke in Brazil: across sectional study, and found that majority of the studied patients had taken antihypertensive drugs as a main medical treatment.

Regarding to the educational needs assessment for patients pre implementation of educational guidelines. The result of the present study revealed that all of the study and control group were having lack of knowledge regarding compliance regimen as medication, diet, exercise, sleep and comfort, coping with stressors and follow up regimen.From researcher point of view; this result may be due to multiple factors such as: advanced age and low level of education of majority of the studied patients, low socioeconomic status, lack of health care services and health education in society as well as poor compliance of the studied patients with life style modifications once feeling of being well. Furthermore, health care providers have a critical and significant role in educating patients and their families about cerebrovascular stroke and its recurrence, causes and risk factors, and prevention. This result agreed with previous study of **El baqury, (2017)**, who carried out study about factors affecting adherence to therapeutic regimens among patients with recurrent cerebrovascular stroke, and represented that overall of the studied patients had unsatisfied level of knowledge about therapeutic regimen.

The result of the present study revealed that there was statically significant relation between satisfactory level of knowledge post and follow up implementation of educational guidelines for compliance of therapeutic regimen between the study and control group. this funding with in agreement with **panicio, et al. (2014),** who carried out study about the influence of patient's knowledge about stroke in Brazil: across sectional study, and found that majority of the study patients had satisfactory level of knowledge regarding cerebrovascular stroke,its recurrent attack and therapeutic regimen.

The result of the present study revealed that there was a highly statistically significant relation between total level of compliance with life style modifications among patients' suffering from recurrent CVS post and follow up of educational guidelines implementation.This result was in contrast with **Awad, et al. (2015),** who found that majority of the study patients, had satisfactory level of compliance and it was affect positively on patient quality of life.

The result of the present study revealed that generally; there was significant relation between total level ofknowledge and total compliance to life style modification post and follow up implementation of the educational guidelines. This may be due to knowledge positively affected compliance and good compliance. This result accepted with **Elbaqury, (2017)**, who carried out study about factors affecting adherence to therapeutic regimens among patients with recurrent cerebrovascular stroke, and found that there was a significant correlation between total adherence score and health care system related factors affecting adherence score.

Also, This result accepted with **El-Khawaga and Abdel-Wahab, (2015)**,who carried out study about knowledge, attitudes, practice and compliance of diabetic patients in Dakahlia, Egypt, and represented that there was a negative weak significant correlation between patients' knowledge and practice and this could be explained on basis of knowledge practice gap as adequate knowledge didn't necessarily determine good practice especially in developing countries where many culture factors play a role.

The result of the present study revealed that there was a highly statistically significant relation between total level of compliance with life style modifications and their residence post implementation of educational program. This result accepted with **Cevik, Tekir and Kany,(2018)**, who carried out study about stroke patients' quality of life and compliance with the treatment, and found that there was a significant relations between compliance with treatment and place of residence as well as the rate of compliance with treatment was higher in those living in urban areas than rural areas due to high level of education and availability of health services.

The result of the present study revealed that there was a significant relation between total level of compliance with life style modifications among patients' suffering from recurrent CVS and again the study group post implementation of the educational guidelines. This result was agreement with finding of **Kaddumukasa, et al.(2015)**, who carried out study about knowledge, attitudes and perceptions of stroke: a cross - sectional survey in rural and urban Uganda, and found that there was significant relation between patients' total level of compliance with life style modifications among patients' suffering from recurrent CVS and patients' age.

5. CONCLUSION

Based on the findings of the present study, it can be concluded that: The results of the current study supported all hypotheses. There was a statistical significant difference between study and control group in relation to knowledge, and compliance to life style modifications post educational guidelines implementation. Educational guidelines affect positively on patients' knowledge, and compliance to life style modifications.

6. RECOMMENDATIONS

Based on the results of the present study, the following recommendations are suggested:

-Education programs for patients with cerebral vascular stoke for improving the patients' compliance to life style modification should be started from the first day of their admission to the hospital or follow at out-patient stroke clinic by a community health nurse should be done periodically.

-Design a systematically continuous education for patients with cerebral vascular stoke in hospitals in addition to media such as: newspapers, television, and radio to help in improving the health status of these patients.

-An Arabic guided images booklet about cerebral vascular stoke should be distributed for each newly admitted patient diagnosed with cerebral vascular stoke.

Replication of the study on a large probability sample is recommended to obtain more generalized findings in relation to this problem.

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