

Effect of Educational Program on knowledge, Adherence and Self-Efficacy among Patients with Recurrent Cerebrovascular Stroke

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Abstract: Recurrent cerebrovascular stroke (CVS) is a catastrophic disease, known as an individual's history of a previous cerebrovascular stroke; more than 80% of CVS can be prevented, through effective Adherence with therapeutic regimen to enhance individual's self-efficacy.

The aim: was to evaluate effect of educational program on knowledge, adherence and self-efficacy among patients with recurrent cerebrovascular stroke.

Methodology: Setting: Neuropsychiatry department at Suez Canal University hospitals.

Design: a quasi-experimental research design.

Subject: a purposive sample of eighty four adult patients with recurrent CVS.

Tools: Assessment questionnaire to assess the patients' demographic characteristics, medical history and Interview questionnaire tool to assess the patients' level of knowledge regarding CVS, patients' level of adherence with therapeutic regimens among patients with recurrent CVS, Stroke Self-efficacy questionnaire to assess the strength of an individual's belief in own ability to respond difficult or new situations.

Result: All of the studied patients had an improvement of satisfactory level of knowledge and adherence with therapeutic regimens (medication, diet, rest & sleep, exercise and follow up) regarding recurrent cerebrovascular stroke at the study phases. There was statistical significant correlation between total knowledge score and total adherence scores, also between total adherence score and total self-efficacy scores among the studied patients at the study phases.

Conclusion: effective implemented educational program on the studied patients' level of knowledge, adherence and self-efficacy among patients with recurrent cerebrovascular stroke.

Recommendation: establishing centralized specialized units in the hospital to be concerned with teaching patients to modify their lifestyle "weight, diet, family relations..." to ensure the importance of adherence.

Key Words: Recurrent cerebrovascular stroke, Patient's adherence, Self-efficacy.

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I. Introduction

Cerebrovascular stroke "CVS", also known as cerebrovascular accident "CVA" or "brain attack": is an umbrella term of the common, crippling, and a deadly serious neurologic disease that causes a sudden loss of brain function followed by the neurological deficits CVS recurrence declared as an individual with a history of a previous CVS, registered with a new CVS event [1]. Cerebrovascular stroke is two types of stroke: ischemic stroke occurs due to a lack of oxygen supply to the brain caused by a blockage in normal brain perfusion, Hemorrhagic stroke is caused by bleeding from a burst blood vessel, ischemic stroke is the most prevalent approximately 87% of all strokes [14].

Regarding [2, 18], there are many hazard factors for recurrent stroke, especially where the majority of Egyptians are vulnerable to chronic diseases, one quarter of all the Egyptians are hypertensive, and so at greatest risk for cerebrovascular stroke complications, heart failure, renal failure, and so death, cerebrovascular stroke recurrent has been an important burden health problem, has led to a high rate of mortality, disability and causes a burden to the family, Therefore, the nurse has a crucial role in identifying quantity and quality of self-care deficits in patients, adherence to therapeutic regimen is known as the extent to which the patient's follow medical instructions, adherence to therapeutic regimens is important for this specific patient group as the risk of

recurrent stroke is strikingly higher for stroke survivors, therapeutic regimens including rehabilitation, medication and dietary regimen are the main parts of stroke management.

Stroke has been affected negatively on activities of daily living (ADL) in stroke patients and independence in ADL became a significant concern in the acute and continuing care, several factors influenced the independence in ADL, including personal characteristics (e.g., age and gender), stroke severity (e.g., physical and cognitive dysfunction), were strong predictor factors in addition to psychological disturbances affected behavior, mood, orientation, and overall health rating, one of the psychological concerns of stroke patients is self- efficacy [3].

Because Cerebrovascular Accident (CVA) recurrent is a complex disease, and 80% of CVS can be prevented, it needs the efforts and practice of the multidisciplinary team, of these are nurses who play a crucial role in all phases of CVS care to enhance patients' outcomes, decrease time of hospital stay, and decrease hospital costs and possible complications, nurses serve as an educator for the patient about the importance of adherence of the therapeutic regimen is an organized activity geared towards both the patient, and also their family members to support and encourage health behavior for active participation in all aspects of self-care to better outcomes and health promotion, patient education in nursing practice regarding adherence to the therapeutic regimen is essential for better outcomes [4, 5]

Significance of the study:

Regarding [6], the incidence and prevalence of cerebrovascular stroke in Egypt are high, the mean and median crude prevalence rates (CPRs) across the five studies, which were conducted in southern Egypt were 721.6/100,000 and 655/100,000, respectively, overall cerebrovascular stroke is the second driving reason for death for individuals over the age of 60, and the fifth driving reason for death in individuals matured 15 to 59 years of age, every year around 700,000 individuals encounter another or recurrent stroke, someone in the US has a stroke every 40 seconds on average, stroke accounted for about 1 of every 19 deaths in the United States, someone died of stroke every 3 minutes.

Approximately 3% of males and 2% of females reported that they were disabled because of stroke, there were 5.5 million deaths attributable to cerebrovascular disease worldwide (2.7 million deaths from ischemic stroke and 2.8 million deaths from hemorrhagic stroke), despite the evidence that CVS adherence to therapeutic regimens are imperative for the management and prevention of recurrent stroke, adherence is frequently suboptimal, it has been reported that adherence to stroke with therapeutic regimens may be less than 50%, furthermore, half of patients starting medication (antihypertensive and lipolysis) following stroke stop taking it within one year as well as two third of patients also stop follow up with physicians [7, 8].

II. Material And Methods

This quasi experimental research design was carried out on patients of Department of neuropsychiatric at Suez Canal University Hospitals, Ismailia Governate, Arab Republic of Egypt, from December 2017 to May 2018. Total 84 adult subjects (both male and females) of aged ≥ 20 , years were for in this study.

Study Design: A quasi experimental research design (one group pre-posttest)

Study Location: Department of neuropsychiatric at Suez Canal University Hospitals, Ismailia Governate, Arab Republic of Egypt.

Study Duration: December 2017 to May 2018.

Sample size: 84 patients.

Sample size calculation: A purposive sample of 84 cases as (50 males and 34 females) participated to conduct the current study at the time of hospitalization. The sample calculated based upon prevalence of adherence to therapeutic regimen which is $60 \pm 5\%$ [9]. equation is:

The estimated sample size is made at assumption of 95% confidence level and 80% power of study, with 20% dropout rate

$$\text{Sample size } n = \frac{[DEFF * N * p(1-p)]}{[(d^2 / Z^2)_{1-\alpha/2} * (N-1) + p * (1-p)]}$$

Results from OpenEpi, Version 2, open source calculator--SSPropor

Subjects & selection method: The study population was drawn from A purposive sample of "100" patients with recurrent cerebrovascular stroke, actually 16 cases as (9 males and 7 females) excluded for various limitations "life loss, deterioration of cases and voluntary withdrawal from the study. Actually 84 cases as (50 males and 34 females) participated to conduct the current study at the time of hospitalization at the studied patients' room, recovery room or lecture room which present in the front of the department to implement educational program as well as at the time of follow up clinical visit or through agreed mobile call to evaluate effect of implemented educational program.

Inclusion criteria:

1. Either sex
2. Adult patients more than or equal to 20 years.
3. With recurrent cerebrovascular stroke.
4. Did not receive any previous educational program or guidelines about adherence with therapeutic regimens of recurrent cerebrovascular stroke.

Exclusion criteria:

Patient who is unconsciousness, disoriented or/ and aphasic.

Tools for data collection:

Tool I, Assessment questionnaire: it was developed by the researcher based on the related literature and filled from patients' files, to assess the studied patients' socio-demographic characteristics, medical history at the time of before, which is the same at the time of immediately and post two months of program implementation phases[6, 10], consisted of three parts:

Part 1: was used to assess the studied patients' demographic characteristics, such as (age, gender, occupation, marital status, level of education, monthly income, ...).

Part 2: was used to assess the studied patients' present medical history (as time of admission, type & causes of cerebrovascular stroke recent, frequency of stroke, laboratory, non-laboratory diagnostic studies and medical management).

Part 3: was used to assess past medical history (as time of previous stroke, type & causes of old stroke and patients' family history).

Scoring system of body mass index:

The total score had been calculated by dividing total body weights per double individual's height by meter consequently calculated as:

-	Very thin.	If total BMI \leq 20%
-	Normally.	If total BMI \geq 20%: 25.
-	Obeys.	If total BMI \geq 26%: 30%.
-	Very obeys.	If total BMI \geq 31%.

Tool (II), Patients' structured interview questionnaire: it developed by the researcher based on the related literature and filled from patients at the time of interview pre, immediately and post two months of program implementation [10]. It consisted of two parts:

Part 1: included 25 questions as true or false and multiple choice questions, to assess the patients' level of knowledge regarding cerebrovascular stroke.

Scoring system: regarding[11], it was considered as the following:

- \geq 60% was considered a satisfactory level of knowledge, when the total grades were \geq 15 grades.
- $<$ 60% was considered an unsatisfactory level of knowledge, when the total grades were $<$ 15 grades.

Part 2: included 37 questions as multiple choices, to assess patients' adherence to the therapeutic regimen regarding patients with recurrent cerebrovascular stroke as medication, diet, exercise, rest & sleep and follow up regimen. Self-adherence scale with therapeutic regimens, which quoted from[10, 12]

Scoring system: The total score of adherence was ranged between 37 - 111 grades, as each item answered through the patient using three options were; Yes = 3, Sometimes = 2, No = 1.

Regarding [9, 12], it was considered as the following:

- \geq 60% was considered a satisfactory level of adherence behavior, when the total grades were \geq 66.6 grades.
- $<$ 60% was considered an unsatisfactory level of adherence behavior, when the total grades were $<$ 66.6 grades.

Tool (III), Stroke Self-Efficacy Questionnaire (SSEQ): it is one of the first measures of self-efficacy designed specifically for stroke patients and at the time of interview pre, immediately and post two months of program implementation. A 13- item self-report measure designed to assess the strength of an individual's belief in own ability to respond to difficult or new situations as well as Cronbach Alpha reliability coefficient for the 13-item SSEQ was 0.90, which suggests high internal consistency [13].

Scoring system:

Regarding [13], and adopted by the researcher: items rated on a likert scale from 1 to 10, as from 0:3 = weak self-efficacy (totally 13-50 grades), from 4:7= good self-efficacy (totally 51-100 grades) and finally 8:10= stronger self-efficacy (totally 101-130 grades).

Testing validity

This stage developed by seven experts from different academic categories (professor, assistant professor and senior lecturer) of Medical Surgical Nursing as well as Neuropsychiatric medicine, are four from Suez Canal University and three from Ain Shams University.

Content reliability

Coefficient of reliability of the evaluating tools II (knowledge about stroke and its recurrent, adherence to therapeutic regimen) was measured by Cronbach's α alpha. The reliability scores of the tool II as above were (0.863 and 0.862) consequently.

Indicate high tool internal consistency of the used tools. Coefficient of reliability of the evaluating tools iii for the 13-item questions was 0.90, which suggests high internal consistency.

Pilot study: was conducted on 10% of subjects to test whether tools of data collection are clear, understandable, feasible and valid. After piloting it, modification the study tools including rewarding or omissions was done.

Field work

Data collection of this study was carried out in the period from December 2017 to May 2018, through the following phases:

Assessment Phase (Pretest):

In this stage, the researcher assessed the actual educational needs by using pre-constructed tools; the researcher interviewed each patient throughout using (Tool I, Tool II & Tool III), at morning, afternoon and night shift.

Planning phase:

The researcher developed the educational program using the baseline information gathered in the assessment phase. This educational program study aimed to evaluate effect of educational program on knowledge, adherence and self-efficacy among patients with recurrent cerebrovascular stroke. The educational program included materials to improve patients' knowledge regarding the definition of cerebrovascular stroke recurrent, its types, clinical manifestations, predisposing factors, investigations and treatment. It also covered instructions to improve the studied patients' adherence with therapeutic regimens (medication, diet, exercise, rest & sleep and follow up), in addition to its role to Improve patients self-efficacy.

Implementation phase: The implementation of the educational program was carried out at neuropsychiatric departments as the study setting. The educational program was administered in three sessions; the duration of each session lasting average for 15 to 35 minutes during a period of data collection from December 2017 to May 2018. The sample was divided into small groups; each session of the educational program implementation included at least two patients. At the beginning of the first session of the educational program, patients were given an idea regarding program objectives, contents, and procedures.

The educational program was presented in a clear and concise form, following the principles of adult learning, focusing on interactive learning and active participation. It was implemented using different teaching methods and media such as short lectures, group discussion, in addition to different audiovisual materials were used as pamphlets, pictures, posters and video to facilitate the teaching of each topic.

Evaluation phase: The program outcome was evaluated by using Tool II and III, immediately after program implementation, the studied patients' theoretical knowledge regarding cerebrovascular stroke recurrent and its therapeutic regimen in addition to adherence' practice to therapeutic regimen, was evaluated by using **Tool II**. But the studied patients' level of self-efficacy by using **Tool III**. The second evaluation after two months from the educational program implementation, the researcher informed the studied patients that came to evaluate effectiveness of the program not to evaluate them and interviewed with them by the questionnaires at the time of clinical visit follow up or throughout previously registered mobile call under the researcher cost by using **Tool II** and **Tool III** for the previously mentioned purposes.

Ethical considerations:

Informed consent was obtained from participant after explaining the purposes of the study, no harmful methodology used with participant; they had right to withdrawal from the study at any time.

Statistics Analysis

Data was analyzed using SPSS version 20 as Student's *t*-test was used to ascertain the significance of differences between mean values of two continuous variables and confirmed by nonparametric Mann-Whitney

test. In addition, paired *t*-test was used to determine the difference between baseline and 2 years after regarding biochemistry parameters, and this was confirmed by the Wilcoxon test which was a nonparametric test that compares two paired groups. Chi-square and Fisher exact tests were performed to test for differences in proportions of categorical variables between two or more groups. The level $P < 0.05$ was considered as the cutoff value or significance.

III. Result

Table 1: Demographic characteristics:

Demographic characteristics	The Studied patients (n=84)	
	no.	%
Age (years)		
▪ 20-	16	19.04
▪ 56-	68	80.96
	Mean±SD 50±9	
Gender		
▪ Male	50	59.5
▪ Female	34	40.5
Employment		
▪ Not working	44	52.4
▪ Work	40	47.6
Marital status		
▪ Single	4	4.8
▪ Married	69	82.1
▪ Divorced/widow	11	13.1
Educational level		
▪ Illiterate	46	54.8
▪ Can read and write	38	45.2

Table (1) Revealed that more aged above 56 years (80.96), male (59.5%) and a mean age of 50 years (SD=9), ranging from 50 to 59 years. Most of the participants were not worker (52.9%), more married (82.1%) and lived in urban areas (100%). In addition, (54.8%) were illiterate.

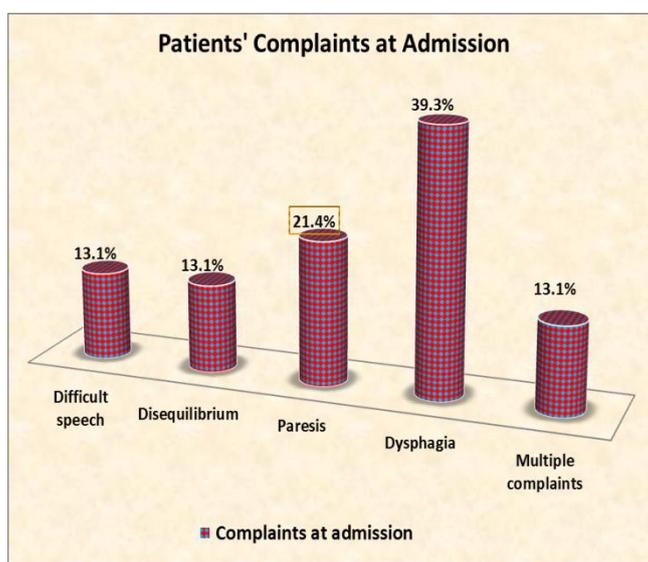


Figure 1: Distribution of patients' complaints at admission among the studied patients. (n=84)

Figure (1) Portrayed that 39.3% of the studied patients had dysphagia at admission, while 21.4% of them had parenthesis.

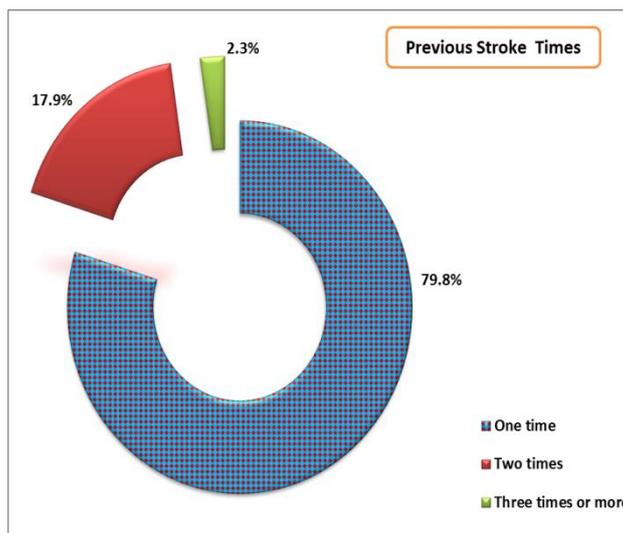


Figure 2: Distribution of previous stroke times among the studied patients. (n=84)

Figure (2) Illustrated that 79.8% of the studied patients had a onetime history of cerebrovascular stroke recurrent, 17.9% had two previous stroke times, while 2.3% of them had three times or more a past history of recurrent cerebrovascular stroke.

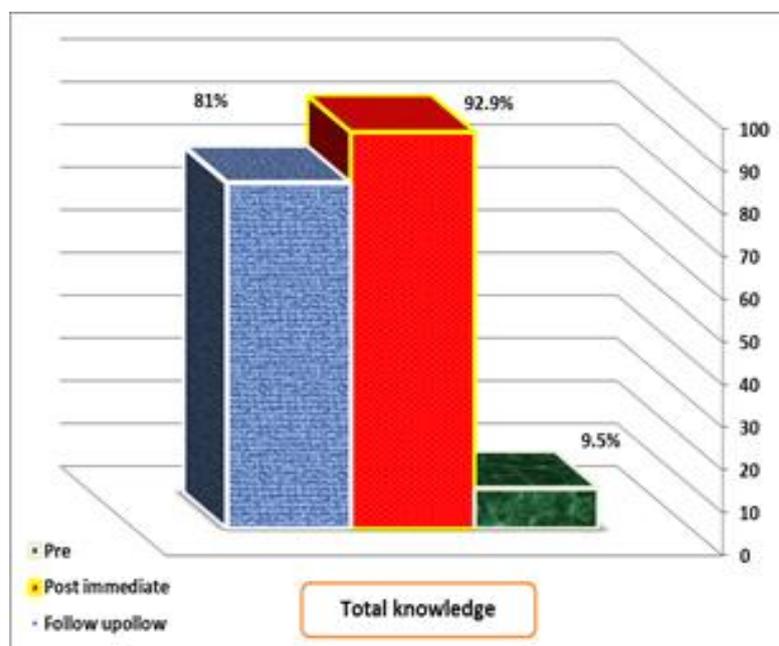


Figure 3: Total satisfactory level of knowledge among the studied patients at the study phases. (n=84)

Figure (3) Revealed that 9.5% had satisfactory level of knowledge regarding recurrent cerebrovascular stroke at pre phase and 92.9% at post phase, also 81% at follow up phase.

Table 2: Satisfactory level of adherence with therapeutic regimens among the studied patients at study phases.(n= 84)

Total adherence to therapeutic regimen Score	Total knowledge score					
	Pre		Post		Follow up	
	R	P	R	P	R	P
Medication	0.245	0.025*	-0.178	0.106	0.002	0.987
Diet	-0.210	0.055	-0.235	0.031*	-0.141	0.202
Sports	0.273	0.012*	-0.091	0.411	0.045	0.683
Sleep	0.022	0.842	-0.344	0.001*	-0.212	0.053
Follow up	0.182	0.097	-0.451	<0.0001*	-0.316	0.003*
Total adherence	0.154	0.162	-0.303	0.005*	-0.122	0.269

Table (2) Showed that 21.4% had a satisfactory level regarding medication adhere at pre phase, while 56% at post phase, as well as 32.1% had satisfactory level regarding sports at pre phase, while 60.7% at follow up. But 13.1% had satisfactory level regarding follow up at pre phase, while 61.9% at follow up.

Table 3: Correlation between the studied patients' level of knowledge and adherence scores among the studied patients at study phases.(n= 84)

Scores of adherence		Pre		Post		Follow up		χ ² test	P-value
		No	%	No	%	No	%		
Medication	Satisfactory	18	21.4	46	54.8	47	56.0	26.18	0.000 (HS)
Diet	Satisfactory	21	25.0	34	40.5	32	38.1	5.161	0.076 (NS)
Sports	Satisfactory	27	32.1	52	61.9	51	60.7	19.09	0.000 (HS)
Sleep	Satisfactory	25	29.8	44	52.4	43	51.	11.02	0.004 (HS)
Follow up	Satisfactory	11	13.1	52	61.9	52	61	53.77	0.000 (HS)
Total	Satisfactory	10	11.9	50	59.5	51	60	52.84	0.000 (HS)

Table (3) Clarified that there is positive significant correlation between total knowledge score and medication's adherence score with P value= 0.0025 and sport's adherence score with P value= 0.012 at pre phase, while there is negative significant correlation between total knowledge score and diet's adherence score with P value= 0.0031, sleep's adherence score with P value= 0.001 and follow up's adherence score with P value= 0.0001 at post phase. Totally there was positive significant correlation between total knowledge score and total adherence score at post phase with P value= 0.005, also there is negative significant correlation between total knowledge score and follow up's adherence score with P value= 0.003 at follow up phase.

Table 4: Correlation between the studied patients' adherence scores and total self-efficacy score at study phases. (n= 84)

Score of adherence to therapeutic regimen	Total self-efficacy score					
	Pre		Post		Follow up	
	R	P	R	P	r	P
Medication	0.117	0.288	0.171	0.121	0.123	0.266
Diet	0.229	0.036*	0.245	0.024*	0.213	0.052
Sports	0.235	0.031*	0.075	0.498	0.055	0.618
Sleep	0.068	0.537	0.169	0.125	0.154	0.161
Follow up	0.067	0.546	0.215	0.050*	0.201	0.067
Total adherence	0.187	0.089	0.227	0.038*	0.193	0.078

Table (4) Portrayed that there is positive significant correlation between diet's adherence scores and total self-efficacy score with P value=0.036 and sports' adherence score with P value=0.031 at pre phase, while there is positive significant correlation between diet's adherence scores and total self-efficacy score with P value=0.036

and follow up's adherence score with P value=0.050, also there is positive significant correlation between total adherence scores and total self-efficacy score with P value=0.038 at post phase.

IV. Discussion

The findings of the present study indicated that more than half of the studied patients; their age > 55 years old. Supporting these findings [14], own study title is Self-Care Performance of Middle-Aged Stroke Patients in Korea, stated that recurrent cerebrovascular stroke' incidence increased, so it is important for them to adhere to their self-care performance.

Contradiction to these findings [15], own study title is the impact of self-efficacy on self-care ability of patients with stroke, found that most of the studied patients more than half their age were < 63 years old. At the researcher point of view; this due to highly precipitating factors among this group age as physiological and physiological changes.

The result of the present study revealed that the majority of the studied patients were male. This result agreed with [16], his own study title is Effects of a web-based stroke education program on recurrence prevention behaviors among stroke patients: a pilot study. At the researchers point of view; this due to males are busier in daily stressors, lack of knowledge and health care services follow up.

Contradiction with [17], own study title is Risk Association between TNF- α -308 G>A and IL-6-174 G/C Polymorphisms and Recurrent Transient Ischemic Attacks, found more than half of the studied patients were female, also [18], own study title knowledge on Prevention of Cerebrovascular Accident among Patients with Diabetes and Hypertension in India .

The result of the present study revealed that more than half of the studied patients were not having work. This result agreed with [19], own study title is cerebrovascular stroke recurrence among critically Ill patients at a selected university hospital in Egypt. At the researchers' point of view; due to advance of age, and culture of business criteria among this group. Contradiction to these findings [18], his own study title is knowledge on prevention of cerebra-vascular accident among patients with diabetes and hypertension in India. Who found that more than the majority of studied patients were had a Coolie work.

The result of the present study revealed that more than half of the studied patients were illiterate. This result agreed with [20], own study title is knowledge, health-promoting behaviors, and biological risks of recurrent stroke among stroke patients in Korea. At the researchers' point of view; this due to increase awareness of our community regarding importance and necessary for education. Contradiction to these findings [21], own study title is the impact of stroke on life satisfaction and psychological adjustment among stroke patients during rehabilitation.

The result of the present study revealed that the studied patients had a satisfactory level of overall knowledge regarding recurrent cerebrovascular stroke (definition, causes & risk factors, types, clinical manifestation, diagnostic studies, treatment modalities, complication and causes of recurrent) at post and follow up phase of program implementation. Agreed to these findings [20], his own study title is Knowledge, health-promoting behaviors, and biological risks of recurrent stroke among stroke patients in Korea.

Also [22], own study title is Video-based educational intervention associated with improved stroke literacy, self-efficacy, and patient satisfaction. At the researcher point of view, this is a result motives to avoid recurrent of cerebrovascular stroke, effective educational skills, adequate suitable supplies and readiness of all associated factors. Contradicted to these findings [23], own study title is Identification of barriers to stroke awareness and risk factor management unique to Hispanics.

The result of the present study revealed that there was no significant relation between the studied patients' level of knowledge score and sociodemographic data variables (age, gender, employment, marital status and educational level) at pre, post and follow up phase. Contradicted with these finding [18], own study title is Knowledge on Prevention of Cerebrovascular Accident among Patients with Diabetes and Hypertension in India.

The result of the present study revealed that there was a significant correlation between the studied patients' level of knowledge score at pre post phase and post follow up phase. Agreed with [22], own study title is Video-based educational intervention associated with improved stroke literacy, self-efficacy, and patient satisfaction.

The result of the present study revealed that the studied patients had a satisfactory level of overall adherence with therapeutic regimens regarding recurrent cerebrovascular at post and follow up phase of program implementation. Agreed to these findings [8], his own study title is Effect of Adherence to Antihypertensive Medication on the Long-Term Outcome After Hemorrhagic Stroke in Korea, and [5], own study title is Adherence to Treatment in Stroke Patients.

At the researcher point of view, a this is a result necessities to maintain proper health status and avoidance of complications, also agreed with [24], own study title is The effectiveness of culturally tailored

video narratives on medication understanding and use self-efficacy among stroke patients: A randomized controlled trial study protocol, found that there is satisfied variance on adherence to therapeutic regimens.

The result of the present study revealed that there is significant correlation between pre, post and follow up phase regarding adherence to therapeutic regimens, agreed with [25], own study title is Stroke self-management support improves survivors' self-efficacy and outcome expectation of self-management behaviors. At the researcher point of view; result from effectiveness of program and readiness of the studied patient to maintain a health.

The result of the present study revealed that there is significant relation with their living condition at pre, post and follow up phase and gender at post and follow up phase and adherence score. Supported this finding [26], own study title is The effect of a locally adapted, secondary stroke risk factor self-management program on medication adherence among veterans with stroke/TIA, also [18], own study title is Knowledge on Prevention of Cerebrovascular Accident among Patients with Diabetes and Hypertension in India.

The result of the present study revealed that there is a significant correlation between total knowledge score and total adherence score at post phase. Agreed with these findings [27], own study title is Effects of a web-based stroke education program on recurrence prevention behaviors among stroke patients: a pilot study, also [24], own study title is The effectiveness of culturally tailored video narratives on medication understanding and use self-efficacy among stroke patient.

The result of the present study revealed that totally there is no significant correlation between pre, post and follow up phase of the study regarding stroke self-efficacy scale of the studied patients. unsupported this findings [28], own study title is Effectiveness of a self-efficacy enhancing stroke self-management program on promoting recovery of community-dwelling stroke survivors, also [24], own study title is The effectiveness of culturally tailored video narratives on medication understanding and use self-efficacy among stroke patients: A randomized controlled trial study protocol.

The result of the present study revealed that totally there is significant correlation between total adherence scores and total self-efficacy score at post phase. Supported this findings [5], own study title is Adherence to Treatment in Stroke Patients, also [29], own study title is The effect of self-management education following mild stroke: An exploratory randomized controlled trial. At the researcher point of view due to direct impact between these two variables.

The result of the present study revealed that totally there is significant relation with age, gender at pre phase and self-efficacy score, also marital status at post phase. Agreed with this findings [22], own study title is Video-based educational intervention associated with improved stroke literacy, self-efficacy, and patient satisfaction, also [30], own study title is Self-Efficacy to Perform Activities of Daily Living Predicts Independence in Activities of Daily Living in Sub acute Stroke Patients. Supported also by [31], own study title is Efficacy of a discharge educational strategy vs. standard discharge care on reduction of vascular risk in patients with stroke and transient ischemic attack: the DESERVE randomized clinical trial.

V. Conclusion

In the light of the study findings, effective implemented interventional educational program on the studied patients' level of knowledge, adherence among patients with recurrent cerebrovascular stroke. All of the studied patients had an improvement of satisfactory level of knowledge and adherence with therapeutic regimens (medication, diet, rest & sleep, exercise and follow up) regarding recurrent cerebrovascular stroke throughout the educational program phases. Totally, there was statistical significant correlation between total knowledge score and total adherence scores among the studied patients at phases of program. There was positive significant correlation between the studied patient's stroke self-efficacy score at the study phases. Totally, there was statistical significant correlation between total adherence score and total self-efficacy scores among the studied patients at phases of program.

VI. Recommendations

Based upon findings of the current study, the followings are recommended:

- Establishing recurrent cerebrovascular stroke's counseling, specialized professional teams to provide knowledge and how to be adherence with therapies to prevent recurrent cerebrovascular stroke.
- Emphasis on the role of centralized specialized units in the hospital concerns with education the patients to modify their lifestyle "weight, diet, exercise, smoking, medication abuse, family relations...", eradicate false habits and to ensure the importance of adherence.
- Submission of educational videos, handouts, posters, booklet, and brochure concerned with recurrent cerebrovascular stroke and its associated therapies.
- Periodical updating of the knowledge, the importance of adherence, how to get rids of the factors affecting adherence and survey of the population, especially those who had a previous history of stroke

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