EFFECT OF AN EDUCATIONAL PROGRAM ON NURSES' KNOWLEDGE REGARDING CARE OF PATIENTS WITH CEREBRAL STROKE

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ABSTRACT

Background: Cerebral stroke is a pathological condition whereby normal blood flow to a specified part of the brain is obstructed, depriving it of nutrients and oxygen supply. Deprivation for 1 minute can lead to reversible symptoms, such as loss of consciousness. **Basic nursing education on neurologic problems constitutes one of the biggest challenges for critical care nurses**. **Aim of the study**: Explore the effect of an educational program on nurses' knowledge regarding the care of patients with cerebral stroke. **Subjects and method: Design**: A quasi-experimental design was utilized to conduct the study. **Setting**: The study was conducted in the intensive care unit at Port Said General Hospital. **Subjects:** convenient sample (50) nurse. **Tools**: Nurses' knowledge questionnaire. **The Results**: (30%) of studied nurses had satisfactory total knowledge pre-program compared to (92%) immediately post educational program implementation and (90%) of them follow up after educational program implementation. **Conclusion**: There was a statistically significant difference in nurses' knowledge between pre, immediately, and post-program implementation **Recommendations**: Providing ongoing educational program on nurses' knowledge regarding care of patients with cerebral stroke.

Keywords: Cerebral stroke, Educational program, Nurses' knowledge.

INTRODUCTION

Cerebral stroke is a pathological condition whereby the normal bloodstream to an identified part of the brain is obstructed, depriving it of nutrients and oxygen supply. As a consequence, the brain cells in the affected area succumb to death in a very small time frame, narrowing the therapeutic window. Of the two major causes of cerebral stroke, ischemia accounts for more than 85% of incidences, followed by hemorrhagic stroke. In cerebral ischemia, the blood in general is interrupted by cerebral artery occlusion because of atherosclerosis resulting from the formation of a cholesterol plug. Massive destruction is not caused by ischemia but instead results from the restoration of normal blood flow (Patnaik, Tripathi, & Dwivedi, 2019).

The term "stroke" usually refers either too cerebral infarction or to a non-traumatic cerebral hemorrhage. Although it will vary depending on the population you are seeing (ethnicity, age, comorbidities), the ratio of infarcts to hemorrhages is about 4 to 1. cerebral infarcts can be caused by several pathological processes, but all end with occlusion of a cerebral artery or vein. If the arterial occlusion results in a reduction of blood flow insufficient to cause the death of tissue (infarction), it is termed "ischemia."(Denny, Ramadan, Grotta, & Savitz, 2019)

Incidence and prevalence of stroke are the first cause of disability and the fifth cause of death. The overall prevalence of stroke ranges between 2% and 15%, with a higher prevalence in older patients. In the Western world, about 85% of all strokes are ischemic, and the rest are hemorrhagic. Disparities in acute ischemic stroke (AIS) rates and outcomes based on gender, race, and geographic location have been identified. Women have a higher lifetime risk of AIS and poorer outcomes. Black men have a higher incidence of AIS (Samaniego & Hasan, 2019)

Cerebral stroke affects many body functions, including motor activity, bladder and bowel elimination, spatial, and perceptual alterations, personality, affect, sensation, swallowing, and communication. The functions affected are directly related to the artery involved and the area of the brain affected (Pandit, Mathews, & Sangle, 2017)

Classification of strokes: the purpose of classifying strokes is to make a decision regarding the basic direction of treatments to be provided to the patient. Such classification is used to describe the characteristics of the patient's stroke. Despite the recent progress in diagnostic test technologies, it is still true that the causes of stroke are

not identified in 25–40% of the patients and are dependent upon the quality, completeness, and timing of the tests performed. As such, a stroke with an unrevealed cause is called a "cryptogenic stroke." When classifying stroke, certain overlapping risk factors need to be considered, making it difficult to determine which of the two or more subtypes is correct. For example, in the case of a patient who has severe carotid artery stenosis and atrial fibrillation (AF), it is difficult to determine which of the two conditions arouses the present stroke**.** (Lee, 2017)

The risk factors of a stroke may be modifiable or non-modifiabl, It should be recognized that risk factors are not direct causes of stroke, but instead are for the most part demographic factors, pre-existing diseases, or lifestyles of individuals that promote diseases of the heart or blood vessels. Hence, the main risk factors for stroke are the risk factors for atherosclerosis and heart disease non-atherosclerotic vasculopathies and primary hematological disease are much less common. Major risk factors for stroke are; age, hypertension, smoking, diabetes mellitus, atrial fibrillation, heart disease, dyslipidemia, alcohol, obesity, pregnancy, sickle cell anemia, and drug misuse. Carotid stenosis, and physical inactivity (Suzuki & Nakano, 2018).

Nurses have a very important role in, education, counseling, and prevention of cerebrovascular accident (CVA). In caring for stroke patients, nurses need specific educational competencies and abilities that go beyond general neurologic knowledge and experience. Nurses need to collaborate efficiently and effectively with multidisciplinary team members in their organization as well as across organizations (Buijck & Ribbers, 2018).

Assessment and care of a patient with a neurologic problem constitute one of the biggest challenges for critical care nurses. A nursing flow sheet is maintained for the documentation of a complete neurologic assessment. A systems approach to examining and documenting findings should include a mental status evaluation (orientation, affect, perception, memory, attention span, speech, and language), motor control, swallowing ability, hydration status, fluid output, skin integrity, and activity level. The ongoing nursing assessment continues to focus on alterations in cognition and functional impairment and directs the appropriate nursing diagnoses(Honan & Esposito, 2018).

Initial clinical assessment of patients with severe stroke should concentrate on the following issues: Vital functions (pulmonary function, heart rate, blood pressure), Neurologic symptoms, the severity of neurologic deficit based on validated stroke

scales, Time of symptom onset, potential eligibility for specific treatment (Urden et al., 2019)

Significance of the study:

The burden of stroke and the high prevalence of its risk factors in Egypt are alarming, a lot of studies internationally showed that there are a lot of irreversible complications occurred due to bad nursing knowledge related to cerebral stroke, and the situation is made worse as the national data on stroke statistics are very limited. Moreover in Egypt, found that most hospitalized patients with cerebral stroke have many complications due to a lack of nurses' knowledge (Asal, 2014).

AIM OF THIS STUDY

This study aims to evaluate effect of an educational program on nurses' knowledge regarding care of patients with cerebral stroke. This aim will be achieved through the following objective:

Research objectives:

1. Assess nurses' knowledge regarding cerebral stroke.
2. Develop an educational program regarding cerebral stroke.
3. Implement the educational program regarding cerebral stroke.
4. Evaluate the educational program immediately after implementation and a follow-up will be carried out after 3months.

Research Hypothesis:

The following research hypothesis was formulated to accomplish the aims of the research:-

Attending the educational program will improve nurses' knowledge regarding the care of patients with cerebral stroke

SUBJECT AND METHOD

Research Design:-

The design of this study is a quasi-experimental design done to evaluate the impact of educational program on nurses' knowledge related to the care of patients with cerebral stroke.

Setting:-

This study will be conducted in the intensive care unit at Port Said general hospitals (El-Zohor Hospital) medical units on the third floor include two-room (male's rooms have 8 beds and female's rooms have 6 beds) and intensive care units on the second floor include 2 rooms each room have 4 beds, Port Foaud general hospital: medical unit (male and female rooms in the second floor and intensive care unit in the second floor and Port Said general hospital: intensive care unit in the second floor and medical units have 2 partitions one for males and the other for females each part have 5rooms and each room have 4 beds.

Subjects:-

A convenient sample was used with available nurses in mentioned units (50 nurses).

Tools of data collection:

Tool I*:* Nurses' knowledge questionnaire

It will be developed by the researcher (Asal, 2014) to assess nurses' knowledge regarding the care of patients with cerebral stroke. It will be composed of two parts.

Part (1): It includes items related to demographic characteristics of the studied nurses as name, age, sex, and work-related data as years of experience and attending the training program.

Part (2): It includes groups of 64 questions: (26) the true and false statements, (37) multiple-choice statements regarding cerebral stroke; definition, types, risk factor, medication, complications, care of the patient with cerebral stroke, and connection question.

Scoring system:

As regards to nurse's knowledge, each correct answer scored one and the wrong answer was scored zero

The total nurse's answers scores were summed up and then converted into percent. Total nurse's knowledge is calculated as the following:

- All values ≥75% were considered satisfactory
- While value <75% were considered dissatisfactory .

Statistical analysis of data:

The collected data were organized, tabulated, and statistically analyzed using the statistical package for social science (SPSS) version 16 for windows, running on IBM compatible computer.

Qualitative data (categorical data) were expressed as relative frequency (number) and percent distribution, and for comparison between groups, the Chi-square (X^2) or Mann-Whitney test (Z) was calculated.

comparison between two means, the student (t) test was calculated. For interpretation of results, the p-value $\leq 0.001$was considered significant.

Operational design

The operational design includes the preparatory phase, content validity, pilot study, and fieldwork.

A-Preparatory phase

It includes reviewing the literature, different studies, and theoretical knowledge of various aspects of the problems using books, articles, the internet, periodicals, and magazines such as pub med, Cochrane database, MEDLINE

B-Content validity

Ascertained by 11 experts from academic medical-surgical nursing and medical and nursing staff that provides direct care to patients with cerebrovascular stroke, to review the tools for clarity, relevance, comprehensiveness, understanding, and applicability.

-Reliability:

it was done using the alpha Cronbach coefficient to assess the internal consistency of the tool and its value was (0.865) for knowledge.

C-Pilot study

A pilot study was conducted on 10% (5 nurses) to test the clarity, objectivity, and feasibility of the tools. It will be conducted before data collection to evaluate its applicability. Nurses who took part in the pilot trial were not included in the main sample.

D-Field work:

This study was conducted for nine months from the beginning of October (2019) to the end of June(2020). The study was carried out through the following phases:

1- Preparatory phase

2- Implementation phase

3- Evaluation phase

Phase I: preparation phase

Development of the educational program based on (Asal, 2014), the result of the assessment of nurses' knowledge related to care of patients with cerebral stroke, identified needs in the assessment phase, and review of related literature. During this phase the researcher prepared the following to facilitate data collection:

A- **Program objectives**:

- Improve nurses' knowledge related to the care of patients with cerebral stroke.

contents: covered all areas about caring for patients with a cerebral stroke which include the following: definition of cerebral stroke, the pathophysiology of stroke, types of stroke, risk factors of stroke, symptoms and warning signs of stroke, a diagnostic test of stroke, and complication of stroke.

B- **Planning of action**: in this step, the researcher designed a plan for educational program implementation. This plan included twelve sessions to be implemented in twelve-week. One session/ week for 30 minutes is to be repeated 3 times for each group. With 15 minutes break between each group.

C- **Permission for conducting the study** was taken from the head of nurses of intensive care unit medical units in Port Said general hospitals (El-Zohor Hospital, port foaud general hospital, and El-salam hospital after explaining the purpose, the time, and the place of the study.

Phase II: Implementation phase

- During the meeting the researcher:

a- Explain the purpose of the study

b- Give each nurse handout including theoretical content to facilitate remembering knowledge related to the care of patients with cerebral stroke.

- The content was presented in clear and concise form using different teaching methods such as discussions, and lectures.

- At the end of the researcher's lecture, nurses were asked about any unclear points which needed repetitions or explanation before the question.

Phase III: Evaluation phase

- Each nurse was evaluated two times for knowledge using the tool as the following:

-The nurses gathered in the conference room again immediately after the end of the implementation of the program, and after 3 months.

-The researcher distributes the tool. Then asked each nurse in the group to complete it without interference from the researcher.

- After 3 months after the implementation, of the program, the nurses gathered in the conference room again to evaluate the retention of information.

Ethical consideration:

Explain the aim of the study to each participant to be familiar with the importance of his /her participation, a brief explanation of the study will be given to assure patients that the information obtained will be confidential and used only for the study, the process of data collection will not disturb the harmony of the work. All data collected from the studied subjects will be processed in total confidentiality and .tell the nurse about his/her right to withdraw from the study anytime

RESULTS:

Table (1): Demographic characteristics of the studied nurses (n=50) shows that most of the studied nurses were in the age group from 20 to less than 30 years with a mean age was 29.26 years. Regarding their educational level, 52.0% of studied nurses have Technical Secondary school of nursing, 96.0% of them working at intensive care unit, regarding their experience ranged between 1 and 25 years, the median experience was 6 years and regarding courses, 84% of them had CPR course.

Table (2): Nurses' knowledge of definition, causes, and risk of stroke before, and 3 months after the program regarding the care of patients with cerebral stroke. Regarding nurses' knowledge about the definition, causes, and risk of stroke before and after the program, it was significantly different after the program when compared to corresponding values before the program regarding the definition of stroke, causes of stroke, and risk factors of stroke. The difference 3 months after the program, is still statistically significant. However, the difference at 3 months when compared to values after the program showed a non-significant difference indicating that, the program is still effective after 3 months

Table (3): Nurses' knowledge about signs and symptoms**,** diagnostic evaluation, and types of stroke before, and 3 months after the program regarding the care of patients with cerebral stroke. Regarding nurses' knowledge about signs and symptoms**,** diagnostic evaluation, and types of stroke before and after the program, it was significantly different after the program when compared to corresponding values before the program regarding the definition of stroke, causes of stroke, and risk factors of stroke. The difference 3 months after the program, is still statistically significant. However, the difference at 3 months when compared to values after the program showed a non-significant difference indicating that, the program is still effective after 3 months

Table (4): Nurses' knowledge of nursing care of stroke before, after, and 3monthes after the program regarding the care of patients with cerebral stroke
Furthermore, there was a significant difference after the program (directly and at 3 months) regarding nurses' knowledge related to the care of stroke before, after, and 3monthes after the program care of patients with cerebral stroke.

Table (5): Total score of nurse's knowledge regarding care of patients with cerebral stroke throughout all phases of the program (No=50) shows that 70.0% of the total nurses' knowledge was unsatisfactory before the program, while 92.0% of the total nurses' knowledge was satisfactory immediately after the program as well as, 90.0% of them shows a satisfactory knowledge in follow up 3 months after the program.

Table (6): Differences in the total score of nurse's knowledge regarding care of patients with cerebral stroke throughout all phases of the program (No=50) shows there was a significant difference in the total score of nurse's knowledge regarding cerebral stroke throughout the program between posttest and preprogram ($P<0.001$), follow up after 3months and preprogram ($P<0.001$). While there was no statistically significant difference between immediately post and follow up were ($P= 0.32$).

Table (7): Relation between total nurses' knowledge & Demographic characteristics during care of patients with cerebral stroke. illustrates that, there was a significant relation between demographic characteristics of the studied nurses and their knowledge related to gob and educational level pre, post immediately, and after 3 months of educational program implementation.

Table (1): Demographic and work data characteristics of studied nurses

Age (years):		
20<30	41	82.0
30<40	7	14.0
40-50	2	4.0
Mean±SD; Min:Max	29.26±4.42 23-45	
Education:		
Bachelor's degree in nursing	8	16.0
Technical institute of nursing	16	32.0
Technical Secondary school of nursing	26	52.0
Department:		
Internal Medicine	2	4.0
Intensive Care Unit	48	96.0
Experience (year):		
1<10	44	88
10<20	4	8.0
>20	2	4.0
(mean±SD); range; median	7.16±4.67; 1- 25; 6.0	
# courses:		
CPR	42	84
ICU	10	20.0
Infection control	6	12.0
Emergency	2	4.0
Burns	1	2.0
Pediatrics	1	2.0
Cardiac catheterization	1	2.0
BLS	34	68.0
Quality	1	2.0
Patient health and safety	2	4.0
Critical care	5	10.0
Total number of courses (mean±SD); range; median	2.1±1.09; 0-7; 2	

Table (2): Nurses' knowledge of definition, causes, and risk of stroke before, and 3 months after the program regarding the care of patients with cerebral stroke.

Definition of stroke		Before		After		At 3months		Z1, P1	Z2, P2	Z3, P3
		N	%	N	%	N	%			
- stroke is	**Incorrect answer**	34	68.0	2	4.0	2	4.0	5.56 <0.001*	5.56; <0.001*	0.001; 1.0
	Correct answer	16	32.0	48	96.0	48	96.0			
-if no complications Occur after stroke, it is Known as	**Incorrect answer**	49	98.0	0	0.0	0	0.0	1.00, 0.31	1.00, 0.31	0.001, 1.00
	Correct answer	1	2.0	50	100.0	50	100.0			
-If no other affections follow stroke, it is termed finished	**Correct answer**	0	0.0	50	100.0	50	100.0	0.001, 4.54	0.001, 5.24	0.001, 0. 34
	Incorrect answer	50	100. 0	0	0.0	0	0.0			
-After stroke, symptoms increased in first 2 days in progressive stroked	**Correct answer**	3	6.0	48	96.0	47	94.0	0.45, 0.64	,0.001 1.00	0.45, 0.64
	Incorrect answer	47	94.0	2	4.0	3	6.0			
Total		**5**	10%	49	98.0%	48	96.0%	5.24 <0.001	4.45 <0.001	1.00, 0.23
Causes and risk factors of stroke		Before		After		At 3months		Z1, P1	Z2, P2	Z3, P3
		N	%	N	%	N	%			
- Causes of stroke	**Incorrect answer**	50	100. 0	0	0.0	1	2.0	9.95; <0.001*	9.75; <0.001*	1.0, 0.31
	Correct answer	0	0.0	50	100.0	49	98.0			
-Stroke increased with increased age	**Incorrect answer**	39	78.0	0	0.0	1	2.0	9.25, <0.001*	9.07, <0.001*	1.0, 0.31
	Correct answer	11	22.0	50	100.0	49	98.0			
- Stroke increased in males Than females up to	**Incorrect answer**	46	92.0	1	2.0	3	6.0	8.23, <0.001*	8.05, <0.001*	0.44, 0.65
	Correct answer	4	8.0	48	96.0	47	94.0			
Non modifiable risk Factors is	**Incorrect answer**	48	96.0	0	0.0	0	0.0	1.42, 0.16	1.42, 0.16	0.001, 1.00
	Correct answer	2	4.0	50	100.0	50	100.0			
Pregnancy decreases stroke risk	**Incorrect answer**	45	90.0	12	24.0	13	26.0	1.00, 0.31	1.00, 0.31	0.001, 1.00
	Correct answer	5	10.0	38	76.0	37	74.0			
Smoke increase stoke risk	**Incorrect answer**	48	96.0	1	2.0	2	4.0	0.58, 0.56	0.001, 1.00	0.58, 0.56
	Correct answer	2	4.0	49	98.0	48	96.0			
Hypertension and cardiovascular diseases increase stroke risk	**Incorrect answer**	50	100. 0	0	0.0	0	0.0	0.001, 1.00	0.001, 1.00	0.001, 1.00
	Correct answer	0	0.0	50	100.0	50	100.0			
Contraceptive pills increase the Stroke risk	**Incorrect answer**	0	0.0	0	0.0	0	0.0	0.001, 1.00	0.001, 1.00	0.001, 1.00
	Correct answer	50	100. 0	50	100.0	50	100.0			
Reduced vegetables and increase cholesterol causes stroke	**Incorrect answer**	48	96.0	0	0.0	0	0.0	1.42, 0.15	1.42, 0.15	0.001, 1.00
	Correct answer	2	4.0	50	100.0	50	100.0			
Stroke increased if there is positive family history	**Incorrect answer**	34	68.0	4	8.0	5	10.0	2.98, 0.003*	2.68, 0.007*	0.34, 0.72
	Correct answer	16	32.0	46	92.0	45	90.0			
Addictive drugs is linked with stroke	**Incorrect answer**	50	100. 0	1	2.0	1	2.0	1.00, 0.31	1.00, 0.31	0.001, 1.00
	Correct answer	0	0.0	49	98.0	49	98.0			
Thalassemia increase stroke	**Incorrect answer**	48	96.0	0	0.0	0	0.0	1.42, 0.15	1.42, 0.15	0.001, 1.00
	Correct answer	2	4.0	50	10.0	50	100.0			
blood hemophilia increases risk of stroke	**Incorrect answer**	32	64.0	0	0.0	0	0.0	6.82, <0.001*	6.82, <0.001*	0.001, 1.00
	Correct answer	18	36.0	50	100.0	50	100.0			
Total		4	8.0%	49	98.0%	48	96.0%	4.25 <0.001**	3.45 <0.001**	1.00 0.32

More than one answer P1: comparison between before and after the program;
P2: Comparison between before program and three months after program:
P3: comparison between direct after program and three months after program,
* indicate significance the p-value ≤ 0.001was considered significant

Table (3): Nurses' knowledge about signs and symptoms, diagnostic evaluation, and types of stroke before, and 3 months after the program regarding the care of patients with cerebral stroke

Signs and symptoms of stroke		Before		After		At 3months		Z1, P1	Z2, P2	Z3, P3
		N	%	N	%	N	%			
Some symptoms appear and continue for	**Incorrect answer**	41	82.0	6	12.0	6	12.0	7.52, <0.001*	7.52, <0.001*	0.001, 1.00
	Correct answer	9	18.0	44	88.0	44	88.0			
Injury to right side, could Affect	**Incorrect answer**	50	100.0	0	0.0	0	0.0	0.001, 1.00	0.001, 1.00	0.001, 1.00
	Correct answer	0	0.0	50	100.0	50	100.0			
Stroke causes	**Incorrect answer**	38	76.0	4	8.0	5	10.0	2.17, 0.030*	1.85, 0.06	0.34, 0.72
	Correct answer	12	24.0	46	92.0	45	90.0			
The sensation of weakness and numbness is a red sign of stroke	**Incorrect answer**	48	96.0	0	0.0	0	0.0	1.42, 0.15	1.42, 0.15	0.001, 1.00
	Correct answer	2	4.0	50	100.0	50	100.0			
warning signs of stoke	**Incorrect answer**	48	96.0	19	38.0	20	40.0	4.32, <0.001*	4.15, <0.001*	0.20, 0.83
	Correct answer	2	4.0	31	62.0	30	60.0			
Total		5	10.0 %	45	90.0 %	44	88.0%	5.42, <0.001*	6.62, <0.001*	0.001, 1.00
Diagnostic evaluation and Types of stroke		Before		After		At 3months		Z1, P1	Z2, P2	Z3, P3
		N	%	N	%	N	%			
Most Precise diagnostic methods	**Incorrect answer**	49	98.0	0	0.0	0	0.0	1.40, 0.031*	1.40, 0.031*	0.001, 1.00
	Correct answer	1	2.0	50	100.0	50	100.0			
Types of stroke	**Incorrect answer**	47	94.0	0	0.0	1	0.0	1.02, 0.31	1.75, 0.08	1.00, 0.32
	Correct answer	3	6.0	50	100.0	49	98.0			
Total		2	4.0%	49	100.0%	49	98.0%	6.52, <0.001*	3.54, <0.001*	0.001, 1.00

P1: comparison between before and after the program;
P2: Comparison between before program and three months after program:
P3: comparison between direct after program and three months after program,
* indicate significance the p-value ≤ 0.001was considered significant

Table (4): Nurses' knowledge of nursing care of stroke before, after, and 3 months after the program regarding the care of patients with cerebral stroke

Nursing care for stroke		Before		After		At 3months		Z1, P1	Z2, P2	Z3, P3
		N	%	N	%	N	%			
when there is vomiting, For patient with stroke nurse must do	Incorrect answer	48	96.0	1	2.0	1	2.0	0.58, 0.55	0.58, 0.55	0.001, 1.00
	Correct answer	2	4.0	49	98.0	49	98.0			
to decrease complications, Treatment should be given within	Incorrect answer	31	62.0	0	0.0	0	0.0	7.09, <0.001*	7.09, <0.001*	0.001, 1.00
	Correct answer	19	38.0	50	100.0	50	100.0			
in hemorrhagic stroke, We must	Incorrect answer	39	78.0	0	0.0	1	2.0	8.52, <0.001*	8.43, <0.001*	1.00, 0.37
	Correct answer	11	22.0	50	100.0	49	98.0			
for protection against Stoke, we should eat	Incorrect answer	43	86.0	0	0.0	0	0.0	2.72, 0.006*	2.72, 0.006*	0.001, 1.00
	Correct answer	7	14.0	50	100.0	50	100.0			
care for comatose Patients with stroke include All except	Incorrect answer	34	68.0	1	2.0	2	4.0	7.03, <0.001*	7.21, <0.001*	0.09, 0.92
	Correct answer	16	32.0	49	98.0	48	96.0			
to prevent deep vein thrombosis	Incorrect answer	43	86.0	2	4.0	3	6.0	8.20, <0.001*	7.98, <0.001*	0.45, 0.64
	Correct answer	7	14.0	48	96.0	47	94.0			
to keep patent airway	Incorrect answer	50	100.0	0	0.0	0	0.0	0.001, 1.00	0.001, 1.00	0.001, 1.00
	Correct answer	0	0.0	50	100.0	50	100.0			
Hemodynamics must be Measured every	Incorrect answer	47	94.0	0	0.0	0	0.0	1.75, 0.080	1.75, 0.080	0.001, 1.00
	Correct answer	3	6.0	50	100.0	50	100.0			
of the side effects of Epanutin	Incorrect answer	49	98.0	0	0.0	0	0.0	1.00, 0.31	1.00, 0.31	0.001, 1.00
	Correct answer	1	2.0	50	100.0	50	100.0			
The dose of Neuril is	Incorrect answer	32	64.0	2	4.0	2	4.0	6.83, <0.001*	6.83, <0.001*	0.001, 1.00
	Correct answer	18	36.0	48	96.0	48	96.0			
the dangers of Neuril	Incorrect answer	40	80.0	4	8.0	5	10.0	7.85, <0.001*	7.67, <0.001*	0.34, 0.72
	Correct answer	10	20.0	46	92.0	45	90.0			
at aspiration, the position of the patient must be in	Incorrect answer	48	96.0	0	0.0	1	2.0	9.85, <0.001*	9.65, <0.001*	1.00, 0.31
	Correct answer	2	4.0	50	100.0	49	98.0			
measure to decrease bed sores	Incorrect answer	41	82.0	0	0.0	1	2.0	8.29, <0.001*	8.06, <0.001*	1.00, 0.31
	Correct answer	9	18.0	50	100.0	49	98.0			
for the patient who takes thrombolytic, The nurse should observe	Incorrect answer	48	96.0	4	8.0	4	8.0	8.76, <0.001*	8.76, <0.001*	0.001, 1.00
	Correct answer	2	4.0	46	92.0	46	92.0			
for convulsions, the nurse must do	Incorrect answer	45	90.0	0	0.0	1	2.0	9.00, <0.001*	8.78, <0.001*	1.00, 0.37
	Correct answer	5	10.0	50	100.0	49	98.0			
the important lab investigation	Incorrect answer	38	76.0	4	8.0	5	10.0	7.61, <0.001*	7.41, <0.001*	0.36, 0.71
	Correct answer	11	22.0	4	92.0	45	90.0			
Decadron harmful effects	Incorrect answer	41	82.0	3	6.0	4	8.0	8.78, <0.001	8.71, <0.001*	0.39, 0.61
	Correct answer	9	18.0	47	94.0	46	92.0			
Drawbacks of Heparin increase	Incorrect answer	47	94.0	3	6.0	3	4.0	2.43, 0.015*	2.43, 0.015*	0.001, 1.00
	Correct answer	3	6.0	47	94.0	47	96.0			
Drawbacks of increased aspirin	Incorrect answer	36	72.0	3	6.0	3	2.0	6.72, <0.001*	6.72, <0.001*	0.001, 1.00
	Correct answer	14	28.0	47	94.0	47	98.0			
when there is a speech Problem	Incorrect answer	43	86.0	2	4.0	3	2.0	8.33, <0.001*	8.12, <0.001*	0.46, 0.64
	Correct answer	7	14.0	48	96.0	47	98.0			
when there is alterations in Sensation and cognition levels	Incorrect answer	42	84.0	2	4.0	2	2.0	8.52, <0.001*	8.44, <0.001*	0.57, 0.56
	Correct answer	8	16.0	49	98.0	48	98.0			
when there is swallowing difficulties	Incorrect answer	43	86.0	0	0.0	1	2.0	9.22, <0.001*	8.99, <0.001*	1.00, 0.37
	Correct answer	7	14.0	50	100.0	49	98.0			
when there is Involuntary urination	Incorrect answer	36	72.0	1	2.0	1	2.0	3.62, <0.001*	3.62, <0.001*	0.001, 1.00
	Correct answer	14	28.0	49	98.0	49	98.0			
for care of urine catheter To prevent infection	Incorrect answer	40	80.0	0	0.0	1	2.0	3.31, 0.001*	2.85, 0.004*	1.00, 0.31
	Correct answer	10	20.0	50	100.0	49	98.0			
Input and output fluids Measured by	Incorrect answer	47	94.0	0	0.0	0	0.0	1.75, 0.080	1.75, 0.080	0.001, 1.00
	Correct answer	3	6.0	50	100.0	50	100.0			
to prevent abnormal limb abnormalities	Incorrect answer	35	70.0	0	0.0	1	2.0	4.18, <0.001*	3.80, <0.001*	1.00, 0.31
	Correct answer	15	30.0	50	100.0	49	98.0			
The stroke NIHSS measure is composed of	Incorrect answer	31	62.0	0	0.0	1	2.0	4.79, <0.001*	4.50, <0.001*	1.00, 0.31
	Correct answer	19	38.0	50	100.0	49	98.0			
Total		8	16.0%	48	98.0%	46	92.0%	9.42, <0.001*	7.42, <0.001*	0.57, 0.56

P1: comparison between before and after the program; P2: Comparison between before program and three months after program:

P3: comparison between direct after program and three months after program, * indicate significance the p-value ≤ 0.001was considered significant

Table (5): Total score of nurse's knowledge regarding the care of patients with cerebral stroke throughout all phases of the program (No=50)

Items	Before Program		Immediately After		3 months After	
	N	%	N	%	N	%
Satisfactory	15	30.0	47	92.0	46	90.0
Unsatisfactory	35	70.0	3	8.0	4	10.0
mean±SD	33.40±5.48		57.66±5.00		57.16±6.09	

Table (6): Differences in the total score of nurse's knowledge regarding the care of patients with cerebral stroke throughout all phases of the program (No=50)

Items	Before Program	Immediately After	3 months After
Post_ pre	t= 25.73, p < 0.001**		
F3_pre	t= 23.05, p < 0.001**		
F3_post	t = 1.0, p =0.32 (NS)		

t: paired sample t-test * significant P<0.05 ** significant P<0.01 **NS** = non-significant (p > 0.05)

N.B:- **Pre**= pre-program **Post**= immediately after program **Follow up** = F3 (after3 months)

Table (7): Relation between total nurses' knowledge & Demographic characteristics during care of patients with cerebral stroke.

Variables	Nurse's knowledge in different program phases								
	Before Program		χ^2 (P) value	Immediate post program		χ^2 (P) value	3 months after Program		χ^2 (P) value
	Unsatisfactory n=35	Satisfactory n=15		Unsatisfactory n=4	Satisfactory n=46		Unsatisfactory n=5	Satisfactory n=45	
Age (years): 20<30 30<40 40-50	 27(77.1%) 6(17.1%) 2(5.7%)	 14(93.3%) 1(6.7%) 0(0.0%)	 2.016 0.365	 3(75.0%) 1(25.0%) 0(0.0%)	 38(82.6%) 6(13.0%) 2(4.3%)	 0.576 0.750	 4(80.0%) 1(20.0%) 0 (0.0%)	 37(82.2%) 6(13.3%) 2(4.4%)	 0.368 0.832
Job: Nurse Technician Nurse Special Nurse	 1 (2.9%) 20(57.1%) 14(40.0%)	 2(13.3%) 2(13.3%) 11(73.3%)	 9.567 0.008**	 1(25.0%) 3(75.0%) 0(0.0%)	 2(4.3%) 19(41.3%) 25(54.3%)	 5.537 0.019*	 1(20.0%) 4(80.0%) 0(0.0%)	 2(4.4%) 18(40.0%) 25(55.6%)	 6.086 0.014*
Level of education: Higher [Bachelor] Middle Institute Secondary school [Diploma]	 7(20.0%) 14(40.0%) 14(40.0%)	 1(6.7%) 2(13.3%) 12(80.0%)	 7.112 0.029*	 3(75.0%) 1(25.0%) 0(.0%)	 5(10.5%) 15(32.7%) 26(56.5%)	 6.406 0.041*	 4(80.0%) 1(20.0%) 0(0.0%)	 7(8.9%) 12(33.3%) 26(57.8%)	 8.485 0.014*
Experience (year): 1<10 10<20 >20	 29(82.9%) 4(11.4%) 2(5.7%)	 15(100.0%) 0(0.0%) 0(0.0%)	 2.922 0.232	 3(75.0%) 1(25.0%) 0(0.0%)	 41(89.1%) 3(6.5%) 2(4.3%)	 1.828 0.401	 4(80.0%) 1(20.0%) 0(0.0%)	 40(88.9%) 3(6.7%) 2(4.4%)	 1.263 0.532

***Significant (P<0.05)** ****Significant (P<0.01)**

χ^2= chi-square test.

DISCUSSION:

The findings of the present study discussed basic issues: firstly; Demographic characteristics and work-related data of the studied nurses, secondary; nurse's knowledge about the care provided to patients with cerebral stroke throughout the educational program.

Regarding demographic characteristics and work-related data of the studied nurses in the present study, 50 nurses were included, and all of them were females. Concerning their age, more than three-quarters of them were 20 years and less than 30 years. Also nearly half of them had a technical secondary school of nursing. Regarding work-related data characteristics of the studied nurses, the present study shows that about three-quarters of them have experience from 1to less than 10years their median experience is 6 years. Regarding the training program, it was found that all of the studied nurses did not have any training program or written protocol related to cerebral stroke. Thus reflect bad knowledge was introduced to the patients before the programs.

Regarding nurses' knowledge before and after the program, it was significantly different after the program when compared to corresponding values before the program regarding the definition of stroke, causes of stroke, and duration of symptoms after stroke. However, the difference was non-significant concerning the most precise diagnostic method. The difference 3 months after the program, is still statistically significant for the same variables. However, the difference at 3 months when compared to values after the program showed a non-significant difference indicating that, the program is still effective after 3 months.

This could be attributed to lacking interest of in hospital administration in conducting educational programs, especially in critical care units caring for patients with CVS in ICU and critical care units is very important to improve their knowledge which affects positively the quality of care for such group of patients.

On the other hand, The level of knowledge immediately post and during follow-up educational program implementation pointed to the positive effect of theoretical sessions in the educational program on nurses 'knowledge. Also an improvement of the knowledge post educational program implementation may be due to the participation of studied nurses in the educational program through using multiple teaching methods

such as group discussion, handouts, the clarity and simplicity of its content, the development of nursing intervention based on nurses' needs and complete the source of the information with booklet. These help studied nurses to refresh and update their knowledge and to be oriented and acquainted with knowledge about the care of patients with cerebral stroke.

This study result is consistent with (Yeganeh et al., 2019) who found that the majority of the study nurses didn't attend any educational courses related to CVS, and go along with (Zidan, et al., 2017) who studied the Impact of a Designed Acute Stroke Nursing Management Protocol on Nurse's Knowledge.
And consistent with (Shehab, et al., 2018) who studied the impact of an educational program on nurses' knowledge regarding care of traumatic brain injury patients in the intensive care unit at Suez Canal University Hospital, and (Mohammad, 2018**)** who studied Intensive care unit nurses' knowledge regarding caring patients with head injury: an educational intervention.

And contradicted with (Abd Elmegeid, et al., 2020) who studied Emergency Nurses' Knowledge Regarding Care of Acute Ischemic Stroke Patients and (Yeganeh, et al., 2019) who stated that the most frequent educational degree was a bachelor's. and congruent with (Abd El-Hay, et al., 2018) who studied the effect of implementing a designed educational program for neurological nurses on clinical outcomes of stroke patients (Baatiema et al., 2017).

Regarding levels of nurses' knowledge related to the care of cerebral stroke patients**.** The current study revealed that there was no significant difference after the program (directly and after 3 months) when compared to the value before the program. and these findings agree with (Zidan, et al., 2017) who studied the Impact of a Designed Acute Stroke Nursing Management Protocol on Nurse's Knowledge.
These findings were in accordance with (Gurjar, 2019) and come in harmony with (Mia Ingerslev, Loft 2017)

Nurses' knowledge regarding stroke care is one of the important factors in providing quality care to patients with stroke. It has advantages on both sides that mean for the patient as well as for the nursing staff. When someone is having good knowledge then he or she will be able to perform better. Good knowledge make

favorable care of patients. It takes a long time to get recover from the disease but knowledge of nursing staff can prevent the patients from many unwanted problems or complications and can faster the recovery of the patient

Concerning total nurses' knowledge regarding cerebral stroke, the current study results show that there was a significant difference in the total score of nurses' knowledge regarding cerebral stroke throughout the program between post-test and preprogram($P<0.001$), follow up after 3months, and pre-program ($P<0.001$). This inadequacy of nurses' knowledge might be because of not attending a continuous educational program. This result goes along with (Khatab, et al., 2019), accordance with (Shehab, et al., 2020). Impact of an educational program on nurses' knowledge and practice regarding care of traumatic brain injury patients at the intensive care unit at Suez Canal University Hospital. International Journal of Caring Sciences. And is consistent with Abd Elkader, H. M., Sabry Shehab, M., & Ibrahim, N. M. (2020) who studied the Effect of an Educational Program on nurses 'knowledge regarding the care of Patients with Head Injuries

And (Abd El-Hay, et al., 2018) studied the effect of implementing a designed educational program for neurological nurses on clinical outcomes of stroke patients This result comes in to agrees with **(**Baatiema et al., 2017) who studied " Barriers to evidence-based acute stroke care in Ghana: a qualitative study on the perspectives of stroke care professionals" a reported that the staff had limited knowledge in acute stroke care and inadequate team collaboration and coordination.

CONCLUSION:

There was a significant improvement in nurses' knowledge between pre, and post-program implementation regarding the care of the patient with cerebral stroke. Also, there are differences in nurses' knowledge throughout the program implementation.

RECOMMENDATIONS:

1. Providing continuous in-service education for nurses to update their knowledge related to nursing care for patients with cerebral stroke.

2. Nurses should be encouraged to attend national and international conferences, workshops, and training courses related to nursing care for patients with cerebral stroke.

3. Replication of the current study on a large probability sample from different geographical areas of Egypt to raise the efficiency of nurses' performance in caring for patients with cerebral stroke. to achieve more generalized results.

4. Educational programs should be continued to perform for all ages, working experience, and education levels.

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تأثير برنامج تعليمي على معلومات الممرضات فيما يتعلق برعاية مرضى السكتة الدماغية

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الخلاصة

السكتة الدماغية هي حالة مرضية حيث يتم فيها إعاقة تدفق الدم الطبيعي إلى جزء معين من الدماغ ، مما يحرمه من العناصر الغذائية وإمدادات الأكسجين. يمكن أن يؤدي الحرمان لمدة دقيقة واحدة إلى أعراض يمكن عكسها ، مثل فقدان الوعي. يشكل تعليم التمريض الأساسي لمشكلة الأعصاب أحد أكبر التحديات التي تواجه ممرضات الرعاية الحرجة. هدف الدراسة: تقييم تأثير برنامج تعليمي على معلومات الممرضات فيما يتعلق برعاية مرضى السكتة الدماغية. وقد تم استخدام منهج شبه تجريبي لإجراء الدراسة. في وحدة العناية المركزة بمستشفيات بورسعيد العامة علي خمسين ممرضة وقد استخدمت في هذه الدراسة استمارة استبيان لتقييم معرفة ومعلومات الممرضات فيما يتعلق برعاية مرضي السكتة الدماغية وقد اظهرت الدراسة تحسن ملحوظ فيما يتعلق بمعلوماتهم تجاه العناية بمرضي السكتة الدماغية بعد تنفيذ البرنامج التعليمي. الخلاصة: كان هناك فرق معتد به إحصائيًا في معرفة الممرضات قبل وبعد البرنامج التعليمي . التوصيات: تقديم برنامج تعليمي مستمر لتحسين معلومات الممرضات فيما يتعلق برعاية مرضى السكتة الدماغية.

الكلمات المرشدة: السكتة الدماغية ، برنامج تعليمي ، معلومات الممرضات.