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Effect of a Designed Nursing Intervention Protocol on Neurological Outcomes among Acute Stroke Patients, Cairo- Egypt

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ABSTRACT

Background: Literature review cited that, stroke is one of the leading causes of death and disability in developing countries. The focus in the acute phase appears to be on the "time is brain" principle. It is important that nurses be able to recognize stroke manifestations as early as they can to ensure that patients can receive appropriate treatment within its time windows.

Purpose: The aim of this study is to examine the effect of a designed nursing intervention protocol on neurological outcomes among acute stroke patients at Cairo, Egypt. To achieve this aim, four research hypotheses were formulated.

Methods: 60 matched adult male and female acute ischemic stroke patients (30 for each study and control groups) were recruited within a quasi- experimental research design. National Institutes of Health Stroke Scale modified Rankin scale, Gugging Swallowing Screen Test and the Hemodynamic Follow up Data Sheet were used to collect data pertinent to this study. Patients were assessed three times; pre-intervention, post interventions and pre-discharge to examine the stated research hypotheses.

Results: Hypothesis one can be supported as a statistical difference was put into evidence between the study and the control groups (**χ2:** 5.27, P value: 0.00) as regards to the severity of stroke. As well, hypothesis two can also be supported as a significant statistical difference was found between the study and the control groups (**χ2:** 4.49, P value: 0.01) regarding degree of disability. In addition, hypothesis three can't be supported in relation to hemodynamic parameters including temperature, pulse, blood pressure and random blood sugar. As regards to risk for aspiration, a significant statistical difference was found between both groups (**χ2:** 5.79, P value: 0.02) so, hypothesis four can be also supported.

Conclusion: Neurological outcomes of acute ischemic stroke patients can be improved when applying a designed nursing intervention protocol through reducing severity of stroke, level of disability and a risk of aspiration.

Keywords: acute stroke patients, designed nursing intervention protocol, neurological outcomes.

1. INTRODUCTION

The World Health Organization (WHO) indicates that approximately 80% of stroke deaths occur in low- and middle-income countries (LMICs).[1] Africa has up to 2–3 fold greater rates of stroke incidence and higher stroke prevalence than Western Europe and the USA.[2] Stroke is still a deadly disease that is on the rise because of an aging population worldwide, The incidence and prevalence of stroke in Egypt are high.[3]

Acute ischemic stroke is a medical emergency caused by decreased blood flow to the brain, which results in damage to brain cells. [4] Signs and symptoms of stroke may include sudden-onset numbness or weakness in an arm or leg, facial droop, difficulty speaking or understanding speech, confusion, trouble with balance or coordination, and loss of vision.[5] acute strokes, also known as cerebrovascular accidents, are broadly classified as either ischemic or hemorrhagic.[6]

Although the absolute death rate is much smaller for individuals aged between 55 and 75, the percentage reduction in mortality in this age group has been similar. [7] Both non-modifiable (such as age, gender, race or ethnicity, and heredity) and modifiable (such as diabetes, atrial fibrillation, smoking, dyslipidemia, and hypertension) risk factors for stroke have been widely investigated. [8] Hypertension and diabetes are two of the more important risk factors for stroke; however, their association with stroke risk appears substantially less at older ages. [9]

It is recommended that stroke diagnosis must be recognized within 25 minutes. The reason is that every minute of delay in treating stroke may result in an average of 1.8 days of healthy life lost. Delays in timely recognition and management of stroke could be attributed to at least two factors. Firstly, the process of conducting a proper assessment is lengthy and requires time. Secondly, it is common to misdiagnose stroke and confuse stroke with other common neurological conditions, such as seizures and migraine, which may lead to an unnecessary delay in providing proper treatment. Therefore, early and timely intervention by healthcare providers (HCPs) is vital to significantly reduce the severity and impact of stroke and reduce long-term disabilities. [10]

Interventions that combine prevention strategies and stroke care have been found to reduce stroke incidence and mortality rates. The management of acute stroke patients in a stroke unit by an organized multidisciplinary team has been found to impact positively on outcomes. There is robust evidence to show that the stroke unit model of care has favorable effects on patient outcomes, lowers the risk of death and reduces requirements for institutionalized care.[11]

A core role for stroke nurses is the monitoring and management of neurological status. This is often very frequent in hyper-acute stroke care where observations may be needed every 15 minutes. The aim of neurological observations is to identify any early deterioration and institute management to prevent long term consequences. They need to know inclusion and exclusion criteria and be able to do a basic structured neurological assessment, including the Glasgow Coma Score and National Institute of Health Stroke Score (NIHSS).[12]

Evidence from the QASC trial (Quality in Acute Stroke Care) reported that use of the fever, sugar, swallowing clinical protocols for the management of fever, hyperglycemia, and swallowing dysfunction in the first 72 hours of acute stroke unit admission significantly reduced mortality and dependency by 16%.[13]Additional assessments to be undertaken by nurses within 4 hours of admission of a patient with stroke to the hospital include comprehensive assessments for nutrition and hydration status, deep vein thrombosis risk, mobilization needs, falls risk, pressure ulcer risk, and oral care.[14]

Therefore, the aim of the current study was to examine the effect of a designed nursing intervention protocol on neurological outcomes among acute stroke patients. To achieve the aim of the study the following research hypotheses were formulated:

H1. Severity of stroke among the study group subjects who are exposed to the designed nursing intervention protocol will be significantly lesser than that among a matched control group ones

H2. Disability level among the study group subjects who are exposed to the designed nursing intervention protocol will be significantly lesser than that among a matched control group ones

H3. Acute ischemic stroke patients who are exposed to the designed nursing intervention protocol will exhibit more stable hemodynamic parameters than a matched control group patients.

H4: Risk for aspiration among the study group subjects who are exposed to the designed nursing intervention protocol will be significantly lesser than that among a matched control group ones

Operational Definitions:

-**Designed nursing intervention protocol:** A group of nursing interventions designed toward caring of acute ischemic stroke patient for a purpose of enhancing patients' outcomes and preventing complication as aspiration.

-**Neurological outcomes:** Includes level of consciousness, severity of stroke (measured by NIHSS), degree of disability level of dependency, rate of death (measured by Modified Rankin Scale), risk for aspiration as one of the major complications (measured by GUSS) and hemodynamic states (measured by nursing follow up data sheet).

-**Acute Stroke Patients:** All patients having acute ischemic stroke attack within 12 hours eligible for the study.

Description of the designed nursing intervention protocol:

The designed nursing intervention protocol in this study covers the following set of actions: early mobilization and range of motions regimens, optimal positioning, oral care, hemodynamic parameters monitoring and control including blood sugar level, deep venous thrombosis prophylaxis, optimal hydration and nutrition. Safety measures against aspiration and falling.

2. METHODS

2.1 Research design

A quasi experimental (control and study groups) research design was utilized in this study.

2.2 Setting and samples

The study was carried out at a stroke neurological care department affiliated to Cairo University Hospitals, on patients with acute ischemic stroke can be allocated.

A purposive sample of adult male and female acute ischemic stroke patients were selected. They were matched then, divided randomly and equitably to both study and control groups. Inclusion criteria: adult Patients with acute ischemic stroke within the first 12 hours of the attack regardless of their consciousness level, exclusion criteria: patients diagnosed with chronic ischemic and hemorrhagic stroke and matching criteria: age, gender, severity of stroke, level of disability, level of consciousness and r-TPA administration.

2.3 Measurement and data collection

Five tools were utilized to collect data pertinent to the current study. Three tools adopted and two were developed by the researcher and reviewed by a panel of five critical care nursing and medical experts. These tools are as follow:

1. Patient's characteristics and medical data sheet (tool I): it composed of two parts; first, demographic data that comprised age, gender and marital status. Second, medical data sheet that comprised history, medical data, comorbidities, chief complaints, onset of stroke, First Medical Contact, Initial management provided (receiving r-TPA or not), type of diet, anthropometric measurement and lab investigations (lipid profile, coagulation profile, electrolyte panel).

2. Acute Ischemic Stroke Nursing Interventions Follow up Data Sheet: include monitoring of temperature, pulse, blood pressure, position and random blood sugar.

3. National Institutes of Health Stroke Scale (NIHSS): This tool was developed by (Brott et al, 1989) and last reviewed by (Lyden et al, 2001). It is a scored, assessment tool that identifies neurological deficits and can be used as a measure of patient outcomes. It consist of eleven items that include level of consciousness (LOC), LOC questions, LOC commands, gaze abnormality, visual loss, facial weakness, motor weakness in arm and leg, limb ataxia, sensory loss, aphasia, dysarthria, and extinction or inattention. [16] Scoring system of this tool (0: no stroke symptoms, 1- 4: Minor stroke symptoms, 5-15: Moderate stroke, 16- 20: Moderate to severe stroke and 21- 42: Severe stroke). Inter-rater reliability was excellent, with an intra-class correlation coefficient of 0.82.

4. Modified Rankin scale: This tool was developed by Rankin, (1957) and last reviewed by (Weisscher et al., 2008). It consists of seven items. It is a commonly used scale for measuring the degree of disability or dependence in the daily activities of people who have suffered a stroke. [17] Scoring system of this tool (0: No symptoms, 1: No significant disability, 2: Slight disability, 3: Moderate disability, 4: Moderately severe disability, 5: Severe disability, 6: Dead). Reliable indicator for assessing stroke functional outcomes even when implemented by non-medical staff. Varied from weighted κ=0.27 to κ=0.81.

5. Gugging Swallowing Screen (GUSS): This tool was developed 2006 at the neurological department of the "Landesklinikum Donauregion Gugging" in cooperation with the Department of Clinical Neurosciences and Preventive Medicine and last modified by (Trapl et al., 2007). It determines the severity of dysphagia and the risk of aspiration in acute-stroke patients. It consists of 4 subtests and is divided into 2 parts: the preliminary assessment or indirect swallowing test and the direct swallowing test, which consists of 3 subtests. These 4 subtests must be performed sequentially. In the indirect swallowing test: 1. vigilance; 2. voluntary cough and/or throat clearing; 3. saliva swallowing (swallowing, drooling, voice change) are assessed. The direct swallowing test assesses the deglutition, involuntary cough, drooling and voice change within the semi-solid swallowing, liquid swallowing and solid swallowing trial. [18] Scoring system (0-9: Severe dysphagia and high aspiration risk, 10-14: Moderate dysphagia and moderate risk of aspiration, 15-19: Mild dysphagia with mild aspiration and 20: Normal swallowing ability). It had a pooled sensitivity of 0.97 (95% confidence interval: 0.93-0.99), a pooled specificity of 0.67 (95% confidence interval: 0.59-0.74), and an area under the receiver operating characteristic curve of 0.9381.

2.4 Intervention

Two phases were included:

1. Preparatory phase: Involved preparation of the intervention protocol of care, study tools and permission to conduct the study.
2. Implementation phase: Once permission are granted to proceed with the proposed study, the researcher approached the head nurse of critical care unit to obtain a list of patients diagnosed with acute ischemic stroke then the researcher reviewed those patients against inclusion and exclusion criteria to select patients eligible for the study. Head nurse was asked to contact the researcher for such new admission. All nursing staff was informed about the nature and purpose of the study. Frequency of admission was nearly one to two patients admitted per week eligible patients. The eligible first thirty patients were considered study group subjects. Then, patient or relatives who agreed to participate in the study were interviewed individually for a period of 20 minutes each, during morning/ afternoon shift by the researcher to explain the nature and purpose of the study and to establish rapport and cooperation. Written consents were obtained from patients/ relatives. Study group patients

were exposed to the routine hospital in addition to the component of the designed nursing intervention protocol on daily basis according to individualized condition during morning and afternoon shifts applying the component of the intervention protocol. First assessment was obtained as baseline information (pre-intervention phase) utilizing tools 1, 2, 3 and 4. Researcher consumed nearly two to four hours per day for each patient all through hospitalization period which was ranged between five to eight days. During which the second assessment was done on daily basis for each study and control group patients and the mean observation was calculated (post-intervention phase) utilizing tools 2, 3 and 4. Third and final assessment was done immediately before discharge. Nursing and medical staff were cooperative. Patient' medical and nursing records were utilized in data collection.

Each of the study group subjects was matched by a control group one considering, predetermined matching criteria. Control group patients were exposed to the routine hospital care only and assessed same as the study group patients. Thus, researcher visited control group subject on daily basis until discharge and consuming the same period exactly as study group subject except for intervention. Implementation of this study was fulfilled over a period of six months.

2.5 Data analysis

The collected data were categorized, tabulated and analyzed using SPSS software (version 21.0). Descriptive and analytical statistics were applied to test the study hypotheses (i.e. Mean, Standardized deviation, Chi square test and Pearson's correlation coefficient. Probability of 0.05 or less was adopted as a level of statistical significance.

2.6 Ethical considerations

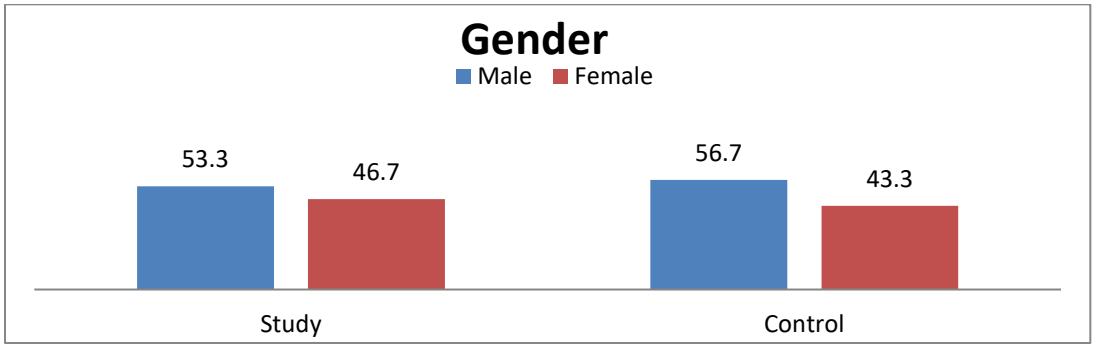
An official permission to conduct the proposed study was obtained from the ethical committee and hospital directors. Participation in this study was voluntary; each potential subject was informed about the purpose, procedure, benefits, and nature of the study and that he/she had the right to withdraw from the study at any time without any rationale, then written consent obtained from them. Subjects were informed that obtained data will not be included in any further researches without second consent. Confidentiality and anonymity of each subject were assured through coding of all data and all information has taken was protected and didn't affect their annual appraisal.

3. Results

3.1 Finding related to demographic characteristic data and medical data:

Figure1 showed that, 53.3% of the study group was male and 46.7% was female. As well, 56.7% of the control group was male and 43.3% was female with no significant statistical difference.

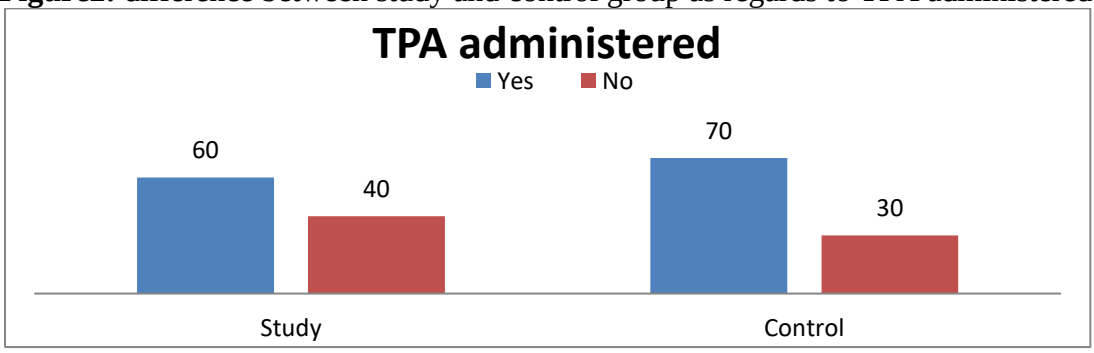
Figure1: difference between study and control group as regards to gender (n=60)



(Chi-square: 1.76, p value: 0.13)

Figure2 showed that, 60% of the study group subjects administered Tissue Plasminogen Activator (TPA) and 40% doesn't administer. As well, 70% of the control group subjects administered Tissue Plasminogen Activator (TPA) and 30% doesn't administer with no significant statistical difference.

Figure2: difference between study and control group as regards to TPA administered (n=60)



(Chi-square: 1.43, p value: 0.49)

Table1 showed that, about 40% of both study and control subject had a range age from 61 to 70 years with no significant statistical difference. Concerning onset of stroke, majority of both study and control group subjects had stroke incidence from 0 to 6 hours (70%, 76.7% respectively) with no significant statistical difference. As well, majority of both study and control group subjects (46.6%, 73.3% respectively) had a normal body mass index with no significant statistical difference.

Table (1): difference between two studied groups as Regards to age and onset of stroke and body mass index (BMI) (n=60).

Variable	Variable category	Groups				χ2/ p value	
		Study		Control		Chi Square Test	
		No.	%	No.	%	χ2	p value
Age	31-40	2	6.7	2	6.7	12.33	0.20
	41-50	2	6.7	3	10		
	51-60	12	40	10	33.3		
	61-70	12	40	12	40		
	70 +	2	6.7	3	10		
onset of stroke	0-6 hours	21	70	23	76.7	1.69	0.43
	7-12 hours	9	30	6	20		
	12-18 hours	0	0	1	3.3		
Body Mass Index (BMI)	Under weight	3	10	0	0	6.52	0.09
	Normal	14	46.6	22	73.3		
	Over weight	11	36.7	7	23.4		
	obese	2	6.7	1	3.3		

Table 2 showed that, regarding presence of patients' comorbidities and patients' habits; (40%) for both groups had diabetes and hypertension with no significant statistical difference. Concerning habits i.e. smoking, half of the study group subjects were smoker with a percentage (50%) versus (73.3%) of the control group subjects were none smokers with no significant statistical difference.

Table (4): difference between the study and control group subjects in relation to comorbidities and habits (n=60)

Variable	Variable category	Groups				χ2/ p value	
		Study		Control		Chi Square Test	
		No.	%	No.	%	χ2	p value
Comorbidities	DM	2	6.7	2	6.7	17.9	0.41
	HTN	5	16.7	4	13.3		
	Cardiac	3	10	0	0		
	Respiratory	2	6.7	5	16.7		
	DM+ HTN	12	40	12	40		
	DM+HTN+ Cardiac	5	16.7	3	10		
	HTN+ Cardiac	0	0	4	13.3		
	None	1	3.3	0	0		
Habits	Smoker	15	50	8	26.7	3.46	0.06
	None Smoker	15	50	22	73.3		

3.2 Finding related to testing the research hypotheses:

H1. States that:

Severity of stroke among the study group subjects who are exposed to the designed nursing intervention protocol will be significantly lesser than that among a matched control group ones. (Table 3 is related to this hypothesis)

Table 3 showed that, both study and control group subjects were in a moderate stroke level (80% and 83.3 % respectively) during the pre-intervention assessment phase with no significant statistical difference between the two groups. However, during the second assessment, (mean Post intervention) 73.3% of the control groups were in moderately severe stroke severity level as compared to 33.3% of the study group ones. With a significant statistical difference between them ($\chi 2$: 5.27, p value: 0.0). As well, during the third assessment, (immediately pre-discharge) 50% of the control groups were in a moderately severe stroke severity level as compared to 16.7% of the study group ones. With a significant statistical difference between them ($\chi 2$: 9.22, p value: 0.03). Therefore, the first hypothesis can be supported.

Table 3: difference between study and control group as regards to severity of stroke all through the hospitalization period

Assessment phases	Level of stoke severity	Groups				$\chi 2$/ p value	
		Study Group		Control Group		Chi Square Test	
	Severity levels	No.	%	No.	%	$\chi 2$	P
Pre-intervention	Minor	3	10	3	10	1.02	0.80
	Moderate	24	80	25	83.3		
	Moderately severe	2	6.7	2	6.7		
	Severe	1	3.3	0	0		
Mean Post Intervention	Minor	6	20.0	0	0	5.27	0.00
	Moderate	14	46.7	7	23.3		
	Moderately severe	10	33.3	22	73.3		
	Severe	0	0.0	1	3.3		
Pre-Discharge	Minor	11	36.7	7	23.3	9.22	0.03
	Moderate	14	46.7	7	23.3		
	Moderately severe	5	16.7	15	50		
	Severe	0	0.0	1	3.3		

H2. States that:

Disability level among the study group subjects who are exposed to the designed nursing intervention protocol will be significantly lesser than that among a matched control group ones. (Table 4 is related to this hypothesis)

Table 4 showed that, both study and control group subjects were in a moderate disability level (50% and 53.3 % respectively) during the pre-intervention assessment phase with no significant statistical difference between the two groups. However, during the second assessment, (mean Post intervention) 50% of the study groups were in moderate disability level as compared to 23.3% of the control group ones. With a significant statistical difference between them ($\chi 2$: 4.49, p value: 0.01). As well, during the third assessment, (immediately pre-discharge)

43.3% of the study groups had no symptoms of disability as compared to 23.3% of the control group ones. With a significant statistical difference between them ($\chi 2$: 7.55, p value: 0.01). Therefore, the first hypothesis can be supported.

Table 4: difference between study and control group as regards to level of disability all through the hospitalization period

Assessment phase	Level of disability	Groups				$\chi 2$/ p value	
		Study Group		Control Group		Chi Square Test	
	Disability category	No.	%	No.	%	$\chi 2$	P
Pre-intervention	No Symptoms	0	0	0	0	1.25	0.16
	No Significant	1	3.3	1	3.3		
	Slight	0	0.0	0	0.0		
	Moderate	15	50	16	53.3		
	Moderately severe	9	30	11	36.7		
	Severe	5	26.7	2	6.7		
	Dead	0	0.0	0	0.0		
Mean Post Intervention	No Symptoms	0	0.0	0	0.0	4.49	0.01
	No Significant	1	3.3	1	3.3		
	Slight	2	6.7	1	3.3		
	Moderate	15	50.0	7	23.3		
	Moderately severe	10	33.3	13	43.3		
	Severe	2	6.7	8	26.7		
	Dead	0	0.0	0	0.0		
Pre-Discharge	No Symptoms	13	43.3	7	23.3	7.55	0.01
	No Significant	7	23.3	4	13.3		
	Slight	5	16.7	2	6.7		
	Moderate	4	13.3	4	13.3		
	Moderately severe	1	3.3	7	23.3		
	Severe	0	0.0	6	20		
	Dead	0	0.0	0	0.0		

H3. States that:

Acute ischemic stroke patients who are exposed to the designed nursing intervention protocol will exhibit more stable hemodynamic parameters than a matched control group ones**.** (Table 5 is related to this hypothesis)

Table 5 showed that, no significant statistical differences regarding maintaining hemodynamic parameter (temperature, pulse, blood pressure and random blood sugar) in a normal state for both group subjects during pre-intervention phase. As well, during post-intervention phase no significant statistical difference. In addition, in pre-discharge phase no

significant statistical difference was found between two groups subjects. So, hypothesis three can't be supported.

Table 5: difference between study and control group as regards to hemodynamic parameters all through the hospitalization period (n=60)

Assessment phase	hemodynamic parameter	Groups				χ2/ p value	
		Study Group		Control Group		Chi Square Test	
	Hemodynamic stability	**No.**	**%**	**No.**	**%**	**χ2**	**P**
Pre-intervention	RBS (Normal)	25	83.3	26	86.7	0.13	0.72
	RBS (Above Normal)	5	16.7	4	13.3		
	Temperature (Normal)	30	100	30	100	0.0	1.0
	Temperature (Above normal)	0	0.0	0	0.0		
	Pulse (Normal)	29	96.7	29	96.7	0.0	1.0
	Pulse (Tachycardia)	1	3.3	1	3.3		
	Pulse (Bradycardia)	0	0	0	0		
	Blood Pressure (Normal)	16	53.3	19	63.3	0.62	0.43
	Blood Pressure (High)	14	46.7	11	36.7		
Mean Post Intervention	RBS (Normal)	27	90	28	93.3	0.22	0.64
	RBS (Above Normal)	3	10	2	6.7		
	Temperature (Normal)	30	100	30	100	0.0	1.0
	Temperature (Above normal)	0	0.0	0	0.0		
	Pulse (Normal)	28	93.3	27	90	2.02	0.37
	Pulse (Tachycardia)	1	3.3	3	10		
	Pulse (Bradycardia)	1	3.3	0	0.0		
	Blood Pressure (Normal)	26	86.7	25	83.3	0.13	0.72
	Blood Pressure (High)	4	13.3	5	16.7		
Pre-Discharge	RBS (Normal)	27	90	28	93.3	0.22	0.64
	RBS (Above Normal)	3	10	2	6.7		
	Temperature (Normal)	30	100	30	100	0.0	1.0
	Temperature (Above normal)	0	0.0	0	0.0		
	Pulse (Normal)	30	100	29	96.7	1.02	0.31
	Pulse (Tachycardia)	0	0	1	3.3		
	Pulse (Bradycardia)	30	100	29	96.7		
	Blood Pressure (Normal)	0	0	1	3.3	1.02	0.31
	Blood Pressure (High)	30	100	29	96.7		

H4. States that:

Risk for aspiration among the study group subjects who are exposed to the designed nursing intervention protocol will be significantly lesser than that among a matched control group ones. (Table 6 and 7 related to this hypothesis)

Table 6 showed that, both study and control group subjects were incorrectly lying in bed during pre-intervention phase (70%, 66.7% respectively) with no significant statistical difference. However during the second assessment, (mean Post intervention) all patients in the study group lying correctly in bed as compared to 30% of the control group ones. With a significant statistical difference ($\chi 2$: 7.57, p value: 0.00). As well, during the third assessment, (immediately pre-discharge) all patients in the study group lying correctly as compared to 36.7% of the control group ones. With a significant statistical difference ($\chi 2$: 9.26, p value: 0.01).

Table 6 difference between study and control group as regards to positioning in bed all through the hospitalization period (n=60)

Assessment phase	Positioning	Groups				$\chi 2$/ p value	
		Study Group		Control Group		Chi Square Test	
Pre-intervention	Position state	No.	%	No.	%	$\chi 2$	P
	Correct	9	30	10	33.3	3.27	0.43
	Incorrect	21	70	20	66.7		
Mean Post-Intervention	Correct	30	100.0	9	30	7.57	0.00
	Incorrect	0	0.0	21	70		
Pre-Discharge	Correct	30	100.0	11	36.7	9.26	0.01
	Incorrect	0	0.0	19	63.3		

Table 7 difference between study and control group as regards to risk of aspiration all through the hospitalization period (n=60)

Assessment phase	Risk for aspiration category	Groups				$\chi 2$/ p value	
		Study Group		Control Group		Chi Square Test	
Pre-intervention	Swallowing Ability/ Aspiration Risk	No.	%	No.	%	$\chi 2$	P
	Slight / No dysphagia with no or minimal risk of aspiration	0	0.0	0	0.0	2.80	0.26
	Slight dysphagia with aspiration risk	26	86.7	25	83.3		
	Moderate dysphagia with aspiration risk	0	0	1	3.3		
	Severe dysphagia with high risk of aspiration	4	13.3	4	13.3		
Mean post intervention	Slight / No dysphagia with no or minimal risk of aspiration	26	86.7	15	50	5.79	0.02
	Slight dysphagia with aspiration risk	1	3.3	3	10		
	Moderate dysphagia with aspiration risk	1	3.3	4	13.3		
	Severe dysphagia with high risk of aspiration	2	6.7	8	26.7		
Pre-Discharge	Slight / No dysphagia with no or minimal risk of aspiration	24	80	16	53.3	5.20	0.03
	Slight dysphagia with aspiration risk	2	6.7	4	13.3		
	Moderate dysphagia with aspiration risk	2	6.7	3	10		
	Severe dysphagia with high risk of aspiration	2	6.7	7	23.4		

Table 7 showed that, both study and control group subjects had Slight dysphagia with aspiration risk (83.7%, 83.3% respectively) during pre-intervention phase with no significant statistical difference. However, during the second assessment, (mean Post intervention) 86.7% of the study group subjects had slight/no dysphagia with no or minimal risk of aspiration as compared to 50% of the control group ones. With a significant statistical difference ($\chi 2$: 5.79, p value: 0.02). As well, during the third assessment, (immediately pre-discharge) 80% the study group patients had slight / no dysphagia with no or minimal risk of aspiration as compared to 53.3% of the control group ones. With a significant statistical difference ($\chi 2$: 5.20, p value: 0.03). Based on finding of (table 6, 7) hypothesis four can be supported.

Table 8 donated that, a positive correlation was put into evidence between level of disability and age among both study and control group subjects (r: 0.53/ p value: 0.02, r: 0.46/ p value: 0.03 respectively). As well, a positive correlation was put into evidence between level of disability and comorbidities among both study and control group subjects (r: 0.50/ p value: 0.03, r: 0.50/ p value: 0.03 respectively). However, no relation was found between level of disability regarding gender and body mass index (BMI) among both group subjects.

Table 8 Correlation between level of disability in relation to age, gender, comorbidities and BMI for both group subjects (N=60)

Disability level / Variable	Study group		Control group	
	r	p	r	p
Age	0.53	0.02	0.46	0.03
Gender	0.13	0.49	0.10	0.62
Comorbidities	0.50	0.03	0.50	0.03
BMI	0.07	0.72	0.20	0.29

4. DISCUSSION

The present study delineated that, one third of the study sample's age was ranged between ages 61 to 70 years old and the mean age of the control group was 60.97±3.25 versus 59.43±2.89 in the study group. In accordance with these results, Simmons, et al, (2023) in a study titled "Age Stratification and Stroke Severity in the Tele-stroke Network" reported that aged stroke patients have higher morbidity and worse functional recovery than young patients. About 75% of all strokes are predicted to occur in people > 65 years old. [19] Also a study from Reves, J. (2020) reported that about 75 percent of strokes occur in people 65 or older. In other words it is an increasing problem the older we get. It has been estimated that the chance of having a stroke double every decade after 55. [20]

Moreover, Yousufuddin, M., & Young, N. (2019) reported that approximately three-quarters of all strokes occur in persons aged ≥65 years. As the number of people aged ≥ 65 years is projected to grow, the number of incident strokes in older adults is expected to rise, presenting major challenges for clinicians and policy makers in the foreseeable future. [20] In addition, Teh,

et al, (2018) reported that Weighted stroke prevalence was 7.6% among older adults aged 60 and above. [22]

From the researcher point of view, stroke incidence increase with elderly patients as with increase in age people may develop other risk factors that increase incidence of stroke like diabetes, hypertension, cardiac problems and obesity in comparison with young age that have low incidence to have those risk factors. Also, decrease mobility level in older persons increase blood viscosity which increased risk of stroke incidence.

The present study showed that, there is no significant difference among gender regarding incidence of stroke. This finding agreed was Petrea, et al, (2009) in a study titled "Gender Differences in Stroke Incidence and Post-stroke Disability in the Framingham Heart Study" that showed, There was no significant difference in stroke subtype, stroke severity, and case fatality rates between genders. [23] Disagreed with Wang, et al, (2019) in a study titled "Sex difference in the incidence of stroke and its corresponding influence factors: results from a follow-up 8.4 years of rural China hypertensive prospective cohort study" that showed, The incidence of stroke was higher in men than that in women and this difference was partly explained by several traditional cardiovascular risk factors. [24]

Moreover, Rexrode, et al, (2022) in a study titled "the impact of sex and gender on stroke" showed that, there was no difference by sex in the index stroke rate but women experience worse outcomes after stroke than men regarding mortality, quality of life, post-stroke depression, and activity limitations. [24] Also Mpouzika, et al, (2023) showed that, the weight of the evidence appears to be against the presence of a significant difference in the representation of genders within the cohorts of stroke/COVID patients. [26]

From the researcher point of view, opinions vary regarding gender difference and incidence of stroke. Future research is needed to determine whether the pathophysiology of ischemic stroke actually differs between men and women to develop a better understanding of gender differences in stroke incidence, presentation, prevention, and treatment effectiveness.

The current study showed that, the majority of patients have a normal body mass index about two third of sample with no significant difference regarding incidence of stroke. Agreed with Shiozawa, et al, (2021) found that, overweight and obesity were associated with a higher incidence of total stroke and ischemic stroke in both sexes. Underweight was associated with a greater risk of future hemorrhagic stroke events in men, but not in women. [27]

Also, Zou, et al, (2021), in a study titled "Deciphering the Irregular Risk of Stroke Increased by Obesity Classes: A Stratified Mendelian Randomization Study" showed that, A higher risk of ischemic stroke could be linked to obesity classes I and II. A strong association between obesity was observed among all ischemic stroke subtypes in the obese population. [28]

Moreover, Wang, et al, (2022) in a study titled "The relationship between body mass index and stroke: a systemic review and meta-analysis" reported that, the risk of stroke was positively correlated with BMI, and the association was stronger in male and ischemic stroke. Lowering BMI can be used as a way to prevent stroke, and for people who are overweight or obese, lowering body weight can reduce the risk of stroke. [29]

From the researcher point of view, the current study showed that about two third of study group have a normal body mass index with no significant relation with incidence of stroke. This finding is negatively supported with many researches as obesity considering a strong risk factor related to increasing incidence of stroke. This is because carrying too much weight increases your risk of high blood pressure, heart disease, high cholesterol and type 2 diabetes which all contribute to higher stroke.

Regarding nursing care and the severity of stroke and level of disability, the current study showed that acute ischemic stroke patients who are exposed to the designed nursing intervention protocol will be significantly lesser than that among a matched control group patients. Agreed with Mariana de Aquino Miranda, et al, (2023) in a study titled "Early mobilization in acute stroke phase: a systematic review" reported that, The most important outcome assessed was the modified Rankin scale score (disability) after 3 months of stroke, and two studies showed that early mobilization improves functional capacity after stroke. The optimal time to start early mobilization is > 24 h of stroke according to hemodynamic stability and safety criteria. The duration of mobilization is recommended between 15 and 45 minutes, divided into one, two, or three times a day. The focus of early mobilization should be on sitting, standing, and walking activity. [30]

Another study supporting early mobility for stroke patient; Alamri, et al, (2019) titled "Effectiveness of an early mobility protocol for stroke patients in Intensive Care Unit" showed that, There were significant improvements in muscle strength of upper and lower extremities´ muscles after treatment ($p<0.05$) and quality of life, namely, Barthel Index and modified Rankin Scale ($p<0.01$). This study recommended that initiating an early mobility protocol is safe and effective for intensive care unit stroke patients. **[31]**

From the researcher point of view, the researcher conduct a nursing protocol for a study group including early mobility as immobility contributes to comorbidities in stroke including pneumonia, deep venous thrombosis, skin breakdown, and muscle atrophy. Early mobility improves gait instability and increases independence in a daily living activities.

Regarding range of motion exercises, the current study agreed with Hosseini, Z. S., Peyrovi, H., & Gohari, M. (2019) in a study titled with "The Effect of Early Passive Range of Motion Exercise on Motor Function of People with Stroke: a Randomized Controlled Trial" reported that, In acute phase, the intervention in the experimental group led to significant improvement of

motor function between the first and third month in both the upper and lower extremities. In control group, improvement was observed only in the muscle strength of upper extremity in the first and third month compared to pre-intervention measurement. It is recommended to use early passive range of motion exercise as part of care for people with stroke during the acute phase of the disease. [32]

Also, Asmur, A. N. (2018). In a study titled "the Effect of range of Motion (ROM) exercise on the level of stroke patient mobility" showed that, range of motion exercises including both passive and active improve the level of mobility of stroke patients. This study recommended the importance of range of motion (ROM) training on the level of mobility of stroke patients. **[33]**

Moreover, Srinayanti, ET AL, (2021) in a study titled "Range of Motion Exercise to Improve Muscle Strength among Stroke Patients: A Literature Review" reported that, the range of motion exercise method positively affected increasing muscle strength in stroke patients. Based on these results, it could be concluded that this nurse's independent intervention needed to be carried out in stroke patients to increase muscle strength. **[34]**

From the researcher point of view, range of motion exercise for patient with acute stroke can improve circulation, prevent muscle atrophy and joint stiffness or contractures, decrease dependent edema occurrence and reduce the risk of pressure ulcers, especially among bedridden patients. Although passive range of motion exercises does not require the survivor to be fully engaged, there are many benefits of active participation. Research has shown that mental practice, the process of visualizing oneself performing a movement, can result in improved functional outcomes. Therefore, combining passive range of motion exercises with mental practice can optimize adaptive changes in the brain (Hatem, et al, (2016). **[35]**

Regarding maintaining patient in upright position, the current study showed that maintaining patient in upright positioning prevent risk of aspiration agreed with Norvang, et al, (2018) in a study titled "Time spent lying, sitting, and upright during hospitalization after stroke: a prospective observation study" reported that, Increased time upright was associated with improved Modified Rankin Scale scores (− 38.09 min, 95% CI: -61.88, − 14.29) and higher Short Physical Performance Battery scores (6.97 min, 95% CI: 1.99, 11.95) recommended that Patients increased their daily time spent sitting and upright during the initial hospital stay after stroke. [36]

Also, the current study agreed with Ali, G. M., Ahmed, A. M., & Mohamed Zaky, H. E. (2021), in a study titled "Effect of Changing Selected body Positions on Oxygen Saturation among Patients with Acute Stroke" reported that, the semi-sitting position is the best position than other positions in improving oxygen saturation after one hour from positioning among stroke patients and Recommended using a semi-sitting position and implicate this positioning strategy in the future to improve arterial oxygen saturation in acute stroke patients. [37]

Moreover, American heart association, 2018 in a title "Head position after stroke: Up or down?" reported that, Keeping the head elevated is the favored head position for acute stroke patients, but some studies have indicated that lying flat may improve recovery. Some studies have indicated that lying flat might improve acute stroke recovery by increasing blood flow and oxygen to the brain, but some studies worry it could increase the risk of pneumonia. And sitting up may reduce pressure in the brain.

From the researcher point of view, positioning is a wide conflicting area of research; some prefer lying position as it increases blood supply to the brain with risk of increasing intracranial pressure and risk of aspiration. Others prefer upright position for a stroke patient as it decrease risk of aspiration. This area need to be investigated widely.

Regarding hemodynamic parameters stability, the current study showed that there was no significant difference between patients in both groups. Disagreed with Rodgers, et al, (2021) in a study titled "Care of the Patient With Acute Ischemic Stroke (Endovascular/Intensive Care Unit-Post interventional Therapy): Update to 2009 Comprehensive Nursing Care Scientific Statement: A Scientific Statement From the American Heart Association" The literature supports prompt fever treatment and includes nursing measures to reduce and maintain normothermia. [38]

Also, Hughes, P. A. (2011) in a study titled "Comprehensive Care of Adults with Acute Ischemic Stroke" reported that, Maintenance of perfusion to the ischemic area is the goal of blood pressure control. Studies have shown aggressive lowering of blood pressure can cause neurologic worsening; therefore a reasonable goal would be to lower blood pressure by 15% to 25% within the first day. [39]

Moreover, Guo, et al, (2022) in a study titled "Blood Pressure Goals in Acute Stroke" reported that, the blood pressure goal in acute ischemic stroke, however, is uncertain, and probably depends on the time window of treatment and the use of revascularization therapy. Further research is required to investigate the potential benefit of antihypertensive treatment in acute stroke, especially with regard to the possible reduction of blood pressure variability and more intensive blood pressure lowering in the acute and sub-acute phases of a stroke, respectively. [40]

The current study showed that, keeping the patient in upright position decrease the risk of aspiration among acute stroke patients. Agreed with Benjapornlert, et al, (2020) in a study titled with "The effect of reclining position on swallowing function in stroke patients with dysphagia" suggested that, patients with stroke who had dysphagia, a reclined position may be useful in reducing the risk of penetration and aspiration, and in decreasing the amount of residue in the pharyngeal area.

In addition, Anderson, C. S., & Olavarría, V. V. (2019) in a study titled "Head Positioning in Acute Stroke: Down but Not Out" stated that, A common concern is that respiratory function could be compromised when patients are lying-flat, either because of restriction of the diaphragm and sleep apnea in the obese patient, and of aspiration pneumonia.

Moreover, Palazzo, et al, (2016) in a study titled "Risk of pneumonia associated with zero-degree head positioning in acute ischemic stroke patients treated with intravenous tissue plasminogen activator" showed that, Zero-degree head of bed positioning in the first 24 hours following an acute ischemic stroke treated with IV-tPA was associated with acceptable rates of pneumonia. Rates for pneumonia may be further reduced by eliminating use of a 0° protocol in intubated/mechanically ventilated patients.

5. CONCLUSION

Based on the results of the current study, this study provides general recommendations to guide professionals who care for patients with acute stroke. Applying a designed nursing intervention protocol might reduce disability, shorten length of stay, and generally have been associated with improved patient outcomes. However, limited data are available on some aspects, showing the need for continued research on acute stroke management.

6. RECOMMENDATIONS

- Aspiration as a major life threatening complication has to be seriously monitored and managed on regular basis.
- Replication of the study on a larger probability sample from different geographical locations.
- Investigate areas of conflict widely for a goal of input evidence based information in the management of patients with acute stroke.

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8. CONFLICT OF INTEREST

No conflict of interest

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