

# Effectiveness of an Interventional Program on Nurses' Practices Concerning Nursing Management for Patients with Stroke

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## ABSTRACT

**Background:** Stroke is the major cause of adult disability and mortality in the United Kingdom. A stroke can have a deleterious effect on patients, their families, and their caregivers.

**Objective:** This study aimed to determine the effectiveness of the interventional program on nurses' practice concerning nursing management for patients with stroke.

**Methodology:** A quasi-experimental research design was utilized. Data was gathered from Al-Sadder Medical City's neurological wards and emergency department in Al-Najaf Al-Ashraf City. All nurses (n = 60) were divided into two groups; thirty nurses in the study group were exposed to the nursing interventional program; thirty nurses were not exposed to the program. The researcher constructed an educational program and instruments to reach the aims of the present study. The program deals with 9 main domains related to nursing management for patients with stroke. Two tools were used to measure the effectiveness of the education program: the first tool was a self-administered questionnaire sheet related to socio-demographic data; the second tool: Observational checklist to evaluate nurses' practice regarding the management of patients with stroke.

**Results:** The majority of the nurses in both groups are those with an age range of 25–29 years old, and the high percentages of participants in both groups (53.3%) are females in the study and control groups. Overall evaluation of study group practices regarding the management of patients with stroke at the pre-test was poor with a (0.522) mean score, and the post-test was good with a (1.762) mean score.

**Conclusion:** The current study revealed the effectiveness of the interventional program where nurses' practice improved significantly as compared to before implementing the program.

**Recommendation:** The study recommended generalizing implementation of the designed interventional program for nurses as routine hospital management for patients with stroke.

**Keywords:** Practices, Nursing Management, Stroke.

## INTRODUCTION

Stroke is a devastating disease that has a high mortality, morbidity, disability, and healthcare cost impact in the United States. Stroke is one of the most serious brain conditions that can result in death or long-term neurological dysfunction and impairment (Zidan, et al., 2017). A stroke is an abrupt change in brain function caused by a disruption in brain blood flow caused by blockage (87%) or hemorrhage (13%) that causes brain cell destruction and loss of function in the affected region (Hage, 2013).

In the United Kingdom, stroke is the greatest cause of death and disability among adults. A stroke can have serious consequences for individuals, their families, and caregivers. While better stroke care has resulted in lower mortality and better rehabilitation results (Clare, 2018), According to the World Health Organization (WHO), low- and middle-income countries account for 85 percent of stroke fatalities (Farrag et al., 2018).

Stroke is a leading cause of disability in the world. After a stroke, 45 percent of Medicare patients are sent home, 24 percent are transferred to inpatient rehabilitation centers, and 31 percent are transferred to skilled nursing facilities. Home healthcare services are required by 32% of stroke patients who return home (Alijanpour et al., 2020; Aslani et al., 2016).

Nurses will continue to play an important role in the care of stroke patients by coordinating care across the continuum (Rodgers, et al., 2021). Nurses are the medical personnel that see the full impact of a stroke and should be equipped with the ability to help patients recover more quickly (Allsasmah, 2020).

Jarva et al. (2021) stressed the importance of multidimensional competence in nurses' work in stroke units, defining nursing competency as the mix of skills, knowledge, and attitudes required for successful or outstanding performance.

In order to offer high-quality care and assist patients in achieving the best possible results, nurses in stroke care units must have relevant information, competent abilities, and a positive attitude. Therefore, people need enough education to improve their knowledge and skills in the real world (Catanguí, 2015).

As a result, nurses caring for stroke patients need substantial education and training to provide patient-centered care. As a result, it's critical to build a competency-based educational program for nursing staff that keeps them up to date on new information and guides them in developing skills and providing competent patient care (Naga, et al., 2021).

Acute stroke patients are managed according to a set of priorities, which include early diagnosis, stabilization, and patient safety (Alexandrov, 2019).

## METHODOLOGY

The quasi-experimental study design was used with the application of a pre and post-test approach for both the studied and control groups at Al-Sadder Medical City in Al-Najaf Al-Ashraf City. The study was carried out during the period from 1<sup>st</sup> September 2021 to 1<sup>st</sup> May 2022. A non-probability (purposive) sample consisted of (60) nurses, divided into two groups, (30) nurses in the study group were exposed to the nursing interventional program; (30) nurses who were not exposed to the program were considered in the control group and were randomly assigned to each one. The criteria for the selection of the study sample were nurses who are working in the emergency department and neurological ward, both genders, with one year of service, and more nurses who are working in two shifts (morning and night) A questionnaire was constructed to determine the effectiveness of the interventional program. The final instruments consisted of two parts: Part I: Self-administered questionnaire sheet related to socio-demographic and occupational information of the nurses. This part is concerned with the collection of basic demographic data obtained from the nurses by self-administration sheets such as (age, gender, marital status, education level of nursing, years of service in nursing, workplace, years of general service, years of service in the current workplace, and training session in nursing).

Part II: An observational checklist for nurse's practice: The researcher constructed an observational checklist based on the following studies (Abd El-Hay, et al., 2018; Zidan, et al., 2018) to evaluate the nurse's practice with respect to procedures of patient

assessment regarding the management of the patient with stroke. The researcher observed and checked for correct and incorrect performance. The nurses' practices checklist was composed of (53) items divided into nine domains: (initial assessment, neurological assessment, fluids & electrolytes, oral hygiene, skin care, nutrition, elimination, safety and security, and general management).

The levels of practice are scored as (0) for never performing the practices, (1) for some time performing the practices, and (2) for always performing the practices. The present study was conducted in the following steps: 1- Designing and Construction of the Interventional Program based on the results of the nurse's needs assessment; and information gained from reviewing the relative scientific literature, previous studies, and the researcher's

experience (Abd El-Hay, et al., 2018; Zidan, et al., 2018). 2- The implementation was carried out in the emergency unit, and neurological ward throughout the period from October 13th, 2021 to January 13th, 2022. In the implementation of the program that was introduced to the study, nurses in the control group had regular methods of communication and information from the nurses or other staff members who may have verbalized it to the nurses. The Statistical Package for Social Sciences (SPSS) version (24) was used to analyze the data. For analyzing and judging the results of the study, the following statistical data analysis methods were used: frequency, percentage, mean, standard deviation, chi-square, Fisher's Exact, T-Test Independent Sample, and T-Test Paired.

## RESULTS

Table 1: Distribution of Socio-Demographic and Occupational Characteristic for both study and Control Groups Participants (N=60; 30 for each Group)

Demographic data	Rating and Intervals	Groups			
		Study group		Control group	
		Freq.	%	Freq.	%
Age / years	20-24	4	13.3	5	16.7
	25 - 29	16	53.3	9	30.0
	30 - 34	3	10.0	7	23.3
	35 - 39	3	10.0	5	16.7
	40+	4	13.3	4	13.3
Gender	Male	14	46.7	14	46.7
	Female	16	53.3	16	53.3
Levels of Education	Secondary School	2	6.7	4	13.3
	Technical Institute	14	46.7	13	43.3
	College of Nursing	13	43.3	11	36.7
	Post-Graduate	1	3.3	2	6.7
Workplace	Wards	18	60.0	17	56.7
	Emergency	12	40.0	13	43.3
Years of Experience in the Nursing field	1-3	15	50.0	10	33.3
	4 - 6	8	26.7	7	23.3
	7 - 9	2	6.7	6	20.0
	10 - 12	1	3.3	2	6.7
	13+	4	13.3	5	16.7
Years of Experience in Current Ward	1-3	28	93.3	25	83.3
	4 - 6	2	6.7	4	13.3
	7+	0	0.0	1	3.3
Participation in Training Courses	No	29	96.7	27	90.0
	Yes	1	3.3	3	10.0
Place training courses	None	29	96.7	27	90.0
	Iraq	1	3.3	3	10.0
Number of the Training Courses	None	29	96.7%	27	90.0%
	1	1	3.3%	3	10.0%

%= percentage, freq. = frequency, C.S: comparison significance, p- value= probability value, NS= non-significance.

Table (1) explains that the majority of the nurses in both groups are those in the age group between (25-29) years old and the high percentages of participants in both groups (53.3%) are females for the study and control groups.

Concerning the level of education, (46.7%) and (43.3%) of the study and control groups, respectively, graduated from nursing institutes and nursing colleges. Regarding the years of experience in the nursing field, the table shows that (50%) of the sample in the study group and (33.3%) of the sample in the control group have (1-3) years of experience. As for years of experience in the current area, (93.3%) and (83.3%) for the study and control groups, respectively, are for both groups that have (1-3) years of experience in the current area.

In relation to participation in training courses in stroke management, (3.3%) of the study group had one training course, and (10%) of the control group had only three training courses. However, no one of the participants in both groups has taken a training course outside Iraq, and all the courses are inside Iraq.

Table 2: Evaluation of Study Sample (Study Group) Practices Regarding Management of Patients with Stroke at the Pre-test and Post-Test

Main Studied Domains	Levels	Pre-Test			Post-Test		
		Freq.	%	Overall mean	Freq.	%	Overall mean
Initial Assessment	Poor	18	60	.648 (Poor)	0	0	1.719 (Good)
	Moderate	12	40		0	0	
	Good	0	0		30	100	
Neurological Assessment	Poor	30	100	.156 (Poor)	0	0	1.756 (Good)
	Moderate	0	0		2	6.67	
	Good	0	0		28	93.33	
Fluids & Electrolytes	Poor	10	33.33	.667 (Poor)	0	0	1.933 (Good)
	Moderate	20	66.67		2	6.67	

Oral Hygiene	Good	0	0	.348 (Poor)	28	93.33	1.630 (Good)
	Poor	20	66.67		0	0	
	Moderate	10	33.33		4	13.33	
Skin Care	Good	0	0	.562 (Poor)	26	86.67	1.857 (Good)
	Poor	14	46.67		0	0	
	Moderate	16	53.33		0	0	
Nutrition	Good	0	0	.317 (Poor)	30	100	1.767 (Good)
	Poor	22	73.33		0	0	
	Moderate	8	26.67		2	6.67	
Elimination	Good	0	0	.317 (Poor)	28	93.33	1.767 (Good)
	Poor	22	73.33		0	0	
	Moderate	8	26.67		2	6.67	
Safety and Security	Good	10	33.33	1.033 (Moderate)	0	30	1.950 (Good)
	Poor	12	40		0	0	
	Moderate	8	26.67		0	100	
General Practice Management	Good	10	33.33	.700 (Moderate)	0	0	1.833 (Good)
	Poor	18	60		0	0	
	Moderate	2	6.67		2	6.67	
	Good	10	33.33		28	93.33	

Poor (mean of scores 0-0.66), Moderate (mean of scores 0.66-1.32), good (mean of scores 1.33 and more)

Table (2) shows that the practices regarding the nursing management of patients with stroke, based on the overall statistical mean of scores at the pre-test were poor in all domains except (safety and security), and (the general practice management) domain was moderate. While at the post-test, the results indicated that those nurses' practices were good in all domains. The overall evaluation of study group practices at the pre-test was poor (0.522) mean score and the post-test was good (1.762) mean score

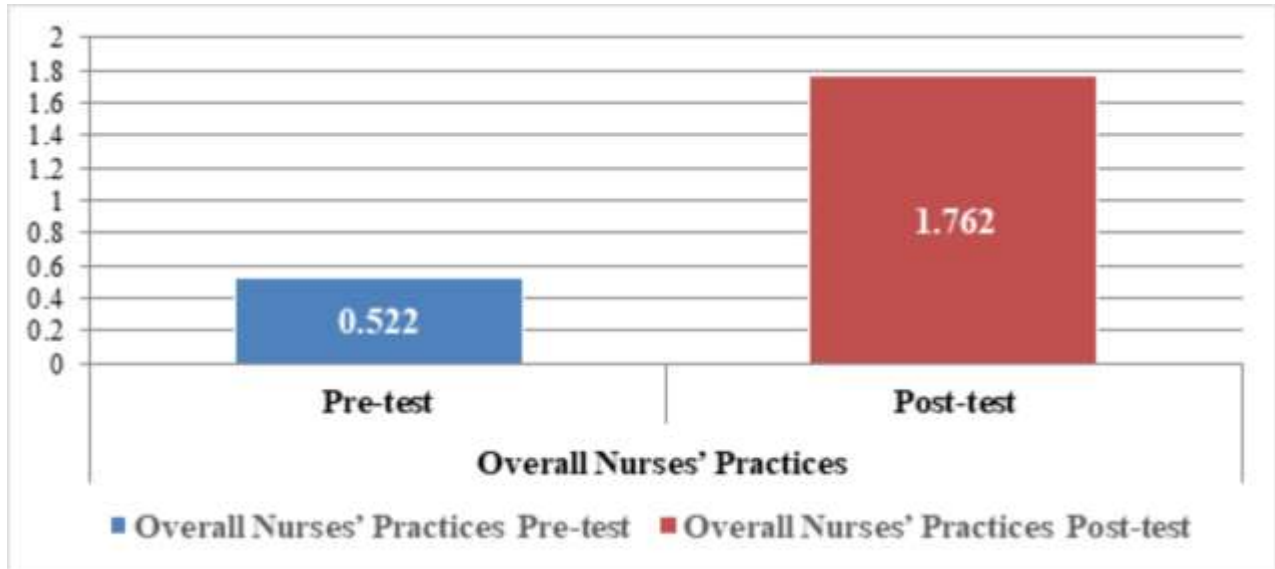


Figure 1: Overall Study Group Practices at Two Periods of Measurements (Pre-test and Post-test) according to the Statistical Mean

Table 3: Evaluation of Study Sample (Control Group) Practices Regarding Management of Patients with Stroke at the Pre-test and Post-Test

Main Studied Domains	Levels	Pre-Test			Post-Test		
		Freq.	%	Overall mean	Freq.	%	Overall mean
Initial Assessment	Poor	16	53.33	0.667 (Poor)	16	53.33	0.667 (Poor)
	Moderate	12	40		12	40	
	Good	2	6.67		2	6.67	
Neurological Assessment	Poor	30	100	0.156 (Poor)	28	93.33	0.200 (Poor)
	Moderate	0	0		2	6.67	
	Good	0	0		0	0	
Fluids & Electrolytes	Poor	12	40	0.600 (Poor)	12	40	0.600 (Poor)
	Moderate	18	60		18	60	
	Good	0	0		0	0	
Oral Hygiene	Poor	28	93.33	0.267 (Poor)	26	86.67	0.400 (Poor)
	Moderate	2	6.67		1	3.33	
	Good	0	0		3	10	
Skin Care	Poor	20	66.67	0.341 (Poor)	20	66.67	0.340 (Poor)
	Moderate	10	33.3		10	33.3	
	Good	0	0		0	0	
Nutrition	Poor	15	50	0.538 (Poor)	15	50	0.533 (Poor)
	Moderate	15	50		15	50	

Elimination	Good	0	0	0.308 Poor	0	0	0.308 Poor
	Poor	23	76.67		23	76.67	
	Moderate	7	23.33		7	23.33	
Safety and Security	Good	0	0	1.017 Moderate	14	46.67	1.000 Moderate
	Poor	13	43.33		6	20	
	Moderate	7	23.33		10	33.33	
General Management	Good	10	33.33	0.633 Poor	19	63.33	0.633 Poor
	Poor	19	63.33		4	13.33	
	Moderate	4	13.33		7	23.33	

Poor (mean of scores 0-0.66), Moderate (mean of scores 0.66-1.32), good (mean of scores 1.33and more)

Table (3) shows the assessment of the control group according to their practices pre-test and post-test. Based on the overall statistical mean of scores (1.33), the study results indicated that the practices regarding the management of patients with stroke at the pre-test and post-test were poor in all domains except the safety and security domain, which was moderate.

Table 4: Overall Evaluation of Study Sample (Control Group) Practices Regarding Management of Patients with Stroke at the Pre-test and Post-Test

Main Studied Domain	Levels	Periods Of Measurements				
		Pre-Test		Post-Test		
		Freq.	%	Freq.	%	
Overall Evaluation Nurses' Practices	Poor	20	66.67	20	66.67	
	Moderate	10	33.33	10	33.33	
	Good	0	0.00	0	0.00	
Overall mean / evaluation	0.567 Poor			0.563 Poor		

Poor (mean of scores 0-0.66), Moderate (mean of scores 0.66-1.32), good (mean of scores 1.33and more)

Table 5: Mean Difference (Paired T-Test) of the Study Group Practices at Two Periods of Measurements (Pre-test and Post-test)

Main Studied Domains	Periods of Measurements	Mean	Std. Deviation	t-value	d.f.	p-value
Initial Assessment	Pre-test	.648	.339	17.655	29	.0001 HS
	Post-test	1.719	.117			
Neurological Assessment	Pre-test	.156	.169	26.382	29	.0001 HS
	Post-test	1.756	.360			
Fluids & Electrolytes	Pre-test	.667	.479	15.425	29	.0001 HS
	Post-test	1.933	.254			
Oral Hygiene	Pre-test	.348	.350	18.573	29	.0001 HS
	Post-test	1.630	.243			
Skin Care	Pre-test	.562	.429	15.929	29	.0001 HS
	Post-test	1.857	.191			
Nutrition	Pre-test	.317	.314	22.699	29	.0001 HS
	Post-test	1.767	.300			
Elimination	Pre-test	.317	.314	22.699	29	.0001 HS
	Post-test	1.767	.300			
Safety and Security	Pre-test	1.033	.776	6.388	29	.0001 HS
	Post-test	1.950	.190			
General Management	Pre-test	.700	.744	9.374	29	.0001 HS
	Post-test	1.833	.303			
Overall Nurses' Practices	Pre-test	.522	.266	25.347	29	.0001 HS
	Post-test	1.762	.218			

The results of this table show a highly significant mean difference among the study groups concerning their pre-test and post-test scores at a p-value (0.001).

Table 6: Mean Difference (Paired T-Test) of the Control Group Practices at Two Periods of Measurements (Pre-test and Post-test)

Main Studied Domains	Periods of Measurements	Mean	Std. Deviation	t-value	d.f.	p-value
Initial Assessment	Pre-test	0.667	.373	.220	29	.827 NS
	Post-test	0.667	.373			
Neurological Assessment	Pre-test	0.156	.169	1.000	29	.326 NS
	Post-test	0.200	.207			
Fluids & Electrolytes	Pre-test	0.600	.498	.718	29	.478 NS
	Post-test	0.600	.498			
Oral Hygiene	Pre-test	0.267	.314	1.682	29	.103 NS
	Post-test	0.400	.563			
Skin Care	Pre-test	0.341	.339	1.682	29	.103 NS
	Post-test	0.340	.339			
Nutrition	Pre-test	0.538	.423	1.000	29	.326 NS
	Post-test	0.533	.416			
Elimination	Pre-test	0.308	.306	1.000	29	.326 NS
	Post-test	0.308	.306			
Safety and Security	Pre-test	1.017	.782	1.000	29	.326 NS
	Post-test	1.000	.788			
General Management	Pre-test	0.633	.700	1.120	29	.272 NS
	Post-test	0.633	.700			
Overall Nurses' Practices	Pre-test	0.567	.343	1.000	29	.326 NS
	Post-test	0.563	.344			

The results of the above table show that there is no significant mean difference among the control group relative to their pre-test and post-test scores at a p-value ( $P > 0.05$ ).

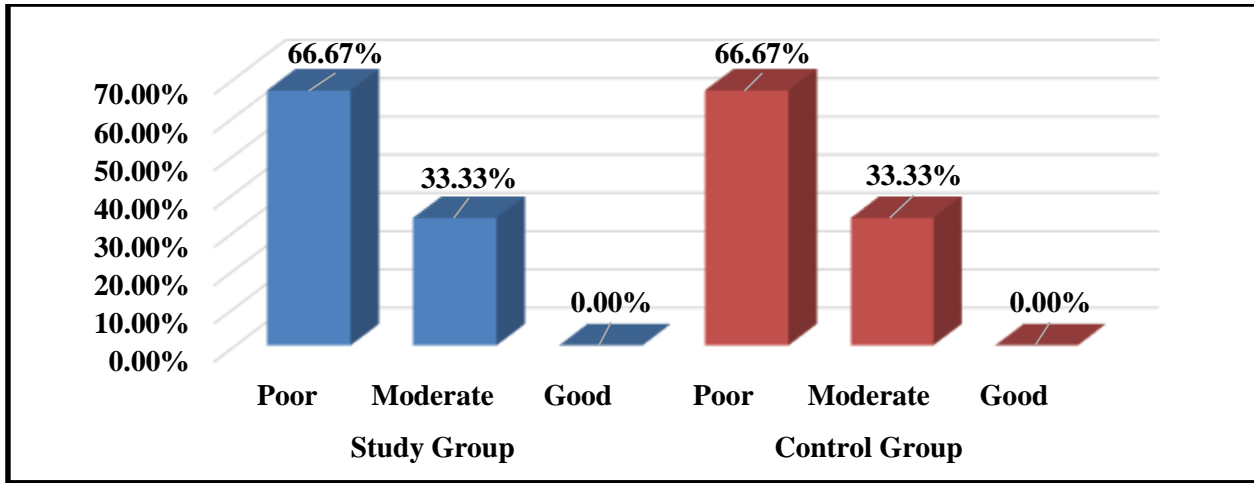


Figure 2: overall evaluation of the study and control groups practices at the pre-test

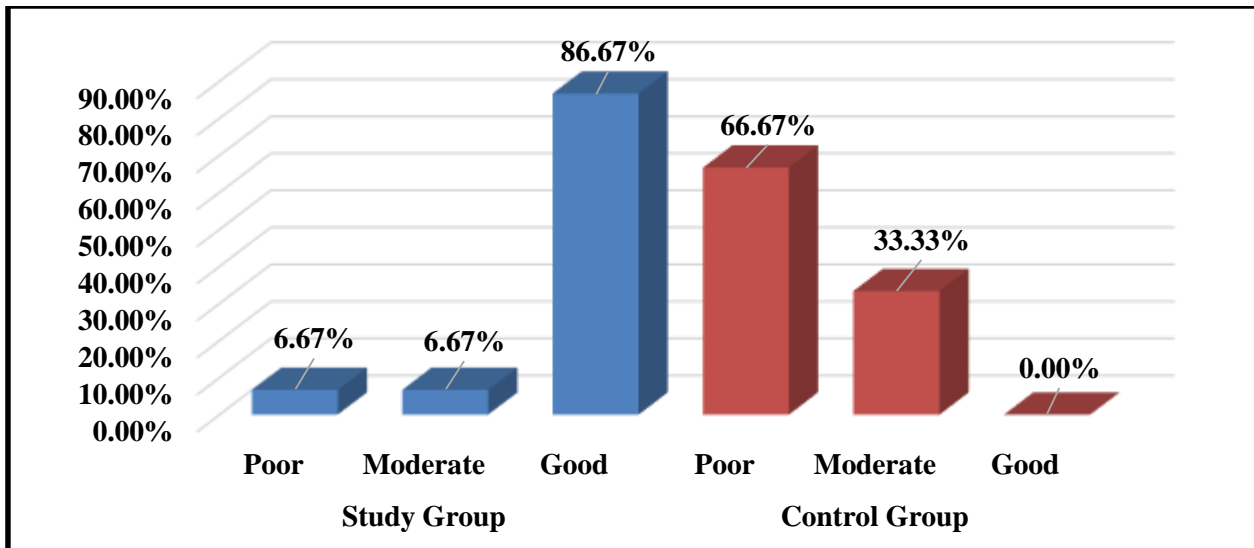


Figure 3: overall evaluation of the study and control groups practices at the post-test

Table 7: Mean Difference (Independent Sample T-Test) of the Study and Control Groups Practices at Two Periods of Measurements (Pre-test and Post-test)

Studied domains	Periods of measurements	Study		Control		t-value	d.f.	p-value
		Mean	S.D	Mean	S.D			
Initial Assessment	Pre-test	.648	.339	.667	.373	.207	58	.837)NS(
	Post-test	1.719	.117	.667	.373	14.756	58	.0001 (HS)
Neurological Assessment	Pre-test	.156	.169	.156	.169	0.000	58	1.000 (NS)
	Post-test	1.756	.360	.200	.207	20.504	58	.0001 (HS)
Fluids & Electrolytes	Pre-test	.667	.479	.600	.498	.528	58	.599 (NS)
	Post-test	1.933	.254	.600	.498	13.061	58	.0001 (HS)
Oral Hygiene	Pre-test	.348	.350	.267	.314	.949	58	.347 (NS)
	Post-test	1.630	.243	.400	.563	10.980	58	.0001(HS)
Skin Care	Pre-test	.562	.429	.341	.339	2.216	58	.031 (S)
	Post-test	1.857	.191	.340	.339	21.346	58	.0001 (HS)
Nutrition	Pre-test	.317	.314	.538	.423	2.298	58	.025 (S)
	Post-test	1.767	.300	.533	.416	13.160	58	.0001 (HS)
Elimination	Pre-test	.317	.314	.308	.306	.104	58	.917 (NS)
	Post-test	1.767	.300	.308	.306	18.637	58	.0001(HS)
Safety and Security	Pre-test	1.033	.776	1.017	.782	.083	58	.934 (NS)
	Post-test	1.950	.190	1.000	.788	6.420	58	.0001 (HS)
General Management	Pre-test	.700	.744	.633	.700	.357	58	.722 (NS)
	Post-test	1.833	.303	.633	.700	8.614	58	.0001 (HS)

Overall Nurses' Practices	Pre-test	.522	.266	.567	.343	.573	58	.569 (NS)
	Post-test	1.76	.384	.563	.344	11.755	58	.0001(HS)

This table demonstrates that there are statistically non-significant differences between the study and control groups in a pre-test in all domains of nurses' practices. Only one domain (Skin care) was significant. In addition, the table shows that after applying for the interventional program, there are statistically very important differences between the study group and the control group in all domains of the practices.

## DISCUSSION

The results of the study presented the nurses' socio-demographic characteristics. The findings of the study indicate that more than half of the study participants are in the age group (25 – 29), which represents (53.3%) of nurses in the experimental group and (30%) of the control group. This result was also found in a study conducted by Nagep et al. (2020), who found that most nurses in both study and control groups were between the ages of 18 and 30 years old. Studies conducted by Liao, et al., (2018) and Bjartmarz, et al., (2017) found that more than half of nurses were in the age group of less than 35 years old.

Concerning the sample gender, the results of the present study demonstrated that the highest percentage of nurses in both groups was female (46.7%). Findings in a research study conducted by Liao, et al., (2018) showed that female nurses were more than male nurses.

Hisaka et al., (2021); and Islam, et al., (2021) found that the majority of participants (89.4% and 78.4%, respectively) were female nurses. Traditionally, female nurses rather than males dominate the nursing profession.

Another study results by Abd El-Hay, et al., (2018) indicated that female nurses' percentage was greater than male nurses' percentages in both groups. These results are reflecting the gender distribution of the nursing profession.

According to the subjects' educational qualifications, less than half of the nurses (46.7%) for the study group and (43.3%) for the control group, hold a technical institute degrees in nursing. This agrees with Mohammed et al. (2021) found that half of the nurses (50%) had technical nursing institutes' degree. Hence, this may impact the level of nurses' knowledge and practices in terms of providing high-quality nursing care. Critical care units require more qualified nurses with at least a Bachelor of Science in Nursing degree to provide high-quality nursing care and achieve better patient outcomes. Patients who are critically ill, especially those who need critical nursing care require effective nursing management to avoid any potential complications. However, none of the nurses had a postgraduate degree. Nurses who have a higher education can implement an education program regarding common procedures based on evidence-based recommended practices. Thus, nurses can update their knowledge and practices to provide effective care.

Concerning the workplace, (60.0%) of nurses in the study group and (56.7%) of nurses in the control group worked in medical wards. The results of the study conducted by Islam (2018) showed that the characteristics of the study sample showed a most of the nurses (63.7%) working in the medical wards.

In the current study, nurses working in critical wards reported higher levels of performance than nurses working in other settings did. Nurses who work with the stroke patients, the treatment is linked to high levels of performance. Nurses require special education and training, as well as administrative support and equipment with study materials, to avoid subsequent stroke issues.

The results of a study done by Bhowmik et al., (2016) claimed that there was no in-service instruction or training for stroke patients, nor were there enough stocks of equipment accessible. A device to prevent deep vein thrombosis, for example, does not exist.

Regarding years of experience in the nursing field, 50% of the nurses' in the study group and (33.3%) of the nurses' in the

control group have (1-3) years. Similarly, years of experience in neurological wards & emergency departments, (93.3%) of the nurses in the study group and (83.3%) in the control groups have (1-3) years of experience. These numbers of years of experience mean nurses have a low level of experience in the nursing field or specific areas. Nurses who have less than three years of experience in certain areas may exhibit a low level of knowledge and clinical performance (Castillo, 2021). This means that nurses have to be experts in the content area in terms of providing high-quality nursing care for critically ill patients. Mahdy, et al. (2016) reported that year of experience in the nursing field, (44%) had experienced less than 5 years.

Concerning participation in training courses in stroke management, (3.3%) of the study group had only one training course, meanwhile (10%) of the control group had three training courses. However, no one of the nurses in both groups has taken a training course outside of Iraq, and all the courses were inside Iraq.

Furthermore, findings from this study demonstrated that the majority of the nurses (96.7%) had not participated previously in training or interventional programs regarding stroke management, and only (3.3%) had attended the interventional program as mentioned earlier. These findings were found in Mohammed, et al., (2015) study that stated that the majority of nurses (92%) did not receive any training programs, conferences, or workshops regarding the management of stroke. Another study by Abou El Enein, et al., (2012) also reported that the majority (97.5%) of nurses had not attended any previous training program in the management of stroke. Contrastingly, Karadeniz and Yilmaz, (2021) found that the most of nurses (63.3%) had received training regarding care for stroke. Other researchers have also reported that the majority of nurses (82%) had not completed training courses regarding nursing management of stroke (Mahdy, et al., 2016). A comparison with previous studies' results reveals that the findings could be more generalized to newly graduated nurses with less than three years of experience in critical care units, commonly without an adequate level of knowledge. Integrating training or educational program regarding the management of stroke is essential for novice nurses. Nurses require more training or educational programs in terms of raising their knowledge. In addition, one of the most important things about critical care units is that nurses must be very skilled and able to think critically to avoid complications and solve sudden health problems.

The Observational checklist of practice was divided into nine domains for the management of a patient with stroke. The domains represented as initial assessment, neurological assessment, fluids and electrolytes, oral hygiene, skin care, nutrition, elimination, safety and security, and general management.

According to the mean of the practices, the present study results showed that most nurses had a poor level of practice during pre-test periods in both study and control groups in all domains. Furthermore, during the pre-test period, nurses had poor performance regarding initial and neurological assessments. For example, most nurses did not perform Glasgow Coma Scale or identify abnormal findings (signs and symptoms) of patients with stroke. The lack of nurses' knowledge could be because hospitals did not offer training or instructional programs for nurses. In other subdomains such as fluids and electrolytes, oral hygiene, skin care, nutrition, and elimination, nurses demonstrated a poor level of practice. On the other hand, only two subdomains (Safety and Security; General Management) showed that nurses had moderated levels of practice regarding patients with stroke. These results correspond well with a study conducted by Zidan et al., (2017) who found that most nurses did not have proper clinical performances when they were giving nursing care to patients with either ischemic or hemorrhagic stroke.

Based on the overall statistical mean of scores the results of the current study showed that the study group and the control group did a poor performance in taking care of stroke patients before the intervention program. Moreover, the study results indicated that the post-test study group practices, in general, were good in the overall mean of management of patients with stroke (table 4.6 and 4.8). This improvement in nurses' practices could be due to the effectiveness of the interventional program on nurses' practices, while the nurses' practices in the control group at post-test remained poor. This result agreed with study one in Egypt (2021) by Mohammed et al., and their results claimed that 100% of the studied nurses have an unsatisfactory level of total practices regarding nursing care.

The results of a study done by Hamdy et al. (2022) claimed that all of the nurses had unsatisfactory practices regarding caring for patients with stroke and traumatic head injury pre-program.

Zidan et al. (2017) found that the mean total scores for ongoing practices before and after the test were statistically different in pre-test and post-test. The author mentioned that most nurses had enhanced their clinical skills after participating in the instructional stroke program. This indicates that nurses should be encouraged to engage in the training or educational program to be competent in providing nursing care specifically for those patients with stroke.

In comparison among the two-period tests for the study group changed in nursing practices domains. Statistical analysis revealed that there are highly statistically significant differences between the pre-test and post-test. While there was no significant relationship between pre-test and post-test for the control group in all domains as well as in overall practices (table 4,7, 4.10)

Mahdy et al. (2016) stated that there were non-statistically significant differences between the control and study groups in the pretest regarding the practices and attitudes of the studied nurses regarding the management of stroke patients.

The Egyptian study by Shehab et al. (2011) stated that nurses' level of care for patients with traumatic brain injuries and strokes was not satisfactory before the providing program. While after the program, satisfactory results appeared which indicated nurses had learned how to perform certain procedures appropriately.

Stroke nurses can ensure that future research truly reflects the nature of nursing care and is of particular relevance to stroke nursing practice. The development of a research evidence-base in stroke nursing will lead to enhance practices, a better quality of care, and ultimately better outcomes for patients (Rowat et al., 2009).

Rawlins, (2015) entitled "National Institutes of Health Stroke Scale (NIHSS) and Tissue Plasminogen Activator (TPA) Education for All Critical Care Nurses." The results showed that nurses improved their skills after being introduced to an educational training program. Nurses' compliance with NIHSS improved by approximately ninety percent. Nurses' adherence to practical guidelines plays an important role in patient health status. Hence, improving nurses' practices will positively influence patient outcomes.

Naga et al., (2021) study showed that the nurses' skills, competencies, and attitudes all changed in a way that was statistically significant before, right after, and two months after the competency-based program was put in place.

Zagad and Madhale (2012) did a study to look at the "efficacy of the learning package among staff nurses regarding neurological assessment on patients with altered sensorium." They found that the nurses' post-observation practice score for neurological assessment was higher than it was before the learning program was put into place and that the difference was significant.

Moreover, Ahamed and Dutta (2016) claimed in their study entitled "Effectiveness of Planned Teaching Program on Nurses' Knowledge and Practice Regarding Glasgow Coma Scale for Neurological Clients of a Selected Hospital, Kolkata". The mean

practice score of nurses after exposure to the educational program is higher than before.

Abd-Alla et al. (2016) reported that most of the study sample had shown statistically significant improvement in their knowledge and practices regarding caring for patients with CVS post-program implementation (89.2% and 78.4%, respectively). This improvement was slightly reduced at the three-month follow-up (83.8% and 62.2%, respectively).

Nurses who deal with critical patients for instance patients with a stroke need to be knowledgeable, competent as well as have adequate psychomotor skills to achieve the most favorable outcomes. Nurses' clinical performances can be enhanced through training sessions that focused on an area that needs improvement. Generally, patients with stroke need immediate care to avoid potential or actual complications. Therefore, quick and urgent nursing intervention could save a patient's life. For example, ischemic stroke needs to be treated with TPA within three hours, while TPA is contraindicated for the patient with hemorrhagic stroke.

## CONCLUSIONS

Based on the findings of the current study, it can be concluded that the total mean practice scores of the studied samples improved after implementing the interventional program and that all of the studied samples had unsatisfactory practice levels before implementing the interventional program.

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