How to Cite:
AL-Abedi, H. M. H., & Mansour, K. A. (2022). Effectiveness of an interventional program on nurses' knowledge concerning nursing management for patients with stroke. *International Journal of Health Sciences*, *6*(S2), 14448–14461. https://doi.org/10.53730/ijhs.v6nS2.8790

Effectiveness of an interventional program on nurses' knowledge concerning nursing management for patients with stroke

Haider Mohammed Haloob AL-Abedi, Ph.D.
Instructor. Department of Adults Nursing, Faculty of Nursing, University of Kufa
Corresponding author email: hayderm.alabadi@uokufa.edu.iq

Khalida Alwan Mansour, Ph.D.
Professor. Head of Department of Fundamentals of Nursing, Faculty of Aturath University
Email: khalida_mansour@yahoo.com

***Abstract*---**Background: 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 disorders that can result in death or chronic neurological impairment. Objective: this study aimed to determine the effectiveness of interventional program on nurses' knowledge concerning nursing management for Patients with Stroke. Methodology: Quasi–experimental study design was used with the application of pre and posttest approach for both studied and controlled groups at Al-Sadder Medical City, the study has been carried out during the period 1st September 2021 to 1st May 2022. A non-probability (purposive) sample of (60) nurses was split into two groups: (30) nurses were exposed to the nursing interventional program as the study group, and (30) nurses were not exposed to the program. Results: The majority of nurses in both groups are between the ages of (25 - 29), with a significant proportion of female participants (53.3 percent) in both the study and control groups. Overall assessment of study group knowledge regarding management of patients with stroke at the Pre-test was moderate with (0.52) mean of score and Post-test was good with (0.92) mean of score. Conclusion: The current study revealed the effectiveness of the interventional program where nurses' knowledge, improved significantly as compared before implementing the program. Recommendation: Development and implementation of regular educational and training courses for nurses on stroke management.

***Keywords*---**knowledge, 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 (Allsassmah, 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 (Catangui, 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 controlled groups at Al-Sadder Medical City in Al-Najaf Al-Ashraf City. The study was carried out during the period from 1st September 2021 to 1st 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 an interventional program. The final instruments consisted of (2) 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: Self-administered questionnaire sheet related to nurses' knowledge of managing patients with stroke. It consists of three parts: anatomy and physiology; general knowledge about stroke; and information about nursing management for stroke. The knowledge test is composed of (38) multiple-choice questions. The test covered relevant points from the major content areas of the interventional program. There are four multiple-choice options for each question. Correct questions received one point, while wrong questions received zero points. 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). The interventional program is designed to provide the nurses with information related to the definition, type, causes and risk factors, diagnosis, treatment, complications, and management of the patient with a stroke.

2-The implementation was carried out in the emergency unit, and neurological word 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 with the nurses or other staff members who may have verbalized it to the nurse. 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, 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 Area	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%

Table 1 shows the statistical distribution and differences in socio-demographic characteristics between the research and control groups. According to this table, most nurses in both categories are between the ages of 25 and 29. In addition, the study and control groups each had a significant proportion of female participants (53.3 percent), as can be seen in the table.

In terms of education, the study and control groups both graduated from nursing institutions and colleges (46.7 percent and 43.3 percent, respectively). The table reveals that 50% of the study group's sample has 1–3 years of experience, whereas (33.3%) of the control group's sample has 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.

Regarding involvement in stroke management training courses, (3.3%) of the study group had one training course, whereas (10%) of the control group had just three training courses. However, none of the participants in either group had attended a training session outside of Iraq, and all of the training courses are held within Iraq.

Table (2): Evaluation of the Study and control Group Knowledge Regarding Management of Patients with Stroke at the Pre-test and Post-test level

Main studied domains	Group	Period	Level						Overall / Mean level
			Poor		moderate		Good		
			F	%	F	%	F	%	
Anatomy and Physiology of the Brain	Study	Pre	4	13.3	18	60.0	8	26.7	.53 Moderate
		Post	0	0.0	0	0.0	30	100.0	.93 Good
	Control	Pre	7	23.3	19	63.3	4	13.3	.46 Moderate
		Post	5	16.7	21	70.0	4	13.3	.46 Moderate
General information about Stroke	Study	Pre	0	0.0	20	66.7	10	33.3	.60 Moderate
		Post	0	0.0	0	0.0	30	100.0	.94 Good
	Control	Pre	4	13.3	22	73.3	4	13.3	.51 Moderate
		Post	1	3.3	18	60.0	11	36.7	.52 Moderate
Nursing Management of Patients with Stroke	Study	Pre	12	40.0	16	53.3	2	6.7	.41 Moderate
		Post	0	0.0	2	6.7	28	93.3	.89 Good
	Control	Pre	9	30.0	16	53.3	5	16.7	.45 Moderate
		Post	9	30.0	14	46.7	7	23.3	.47 Moderate

Poor (mean of scores 0-0.33), Moderate (mean of scores 0.34-0.67), and Good (mean of scores 0.68 and more).

Table 2 displays the study group's pre-test scores and an assessment of their answers to questions about managing patients with a stroke. It reveals that the study group reported moderate knowledge. This table illustrates that the study group's post-test good knowledge has also improved significantly. The means of scores and assessment of control group responses to the questions related to managing patients with stroke (pre-test assessment) show that the control group recorded moderate knowledge. The result was the same in the post-test moderate knowledge.

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

Group	Period	Level						Overall level
		Poor		Moderate		Good		
		F	%	F	%	F	%	
Overall Nurses' Knowledge of the study group	Pre	4	13.3	24	80.0	2	6.7	0.52 Moderate
	Post	0	0.0	1	3.33	29	96.67	0.92 Good
Overall Nurses' Knowledge of the control group	Pre	4	13.3	25	83.3	1	3.3	0.47 Moderate
	Post	4	13.3	25	83.3	1	3.3	0.48 Moderate

Poor (mean of scores 0-0.33), Moderate (mean of scores 0.34-0.67), good (mean of scores 0.68and more)

The results of this table show the overall assessment of study group knowledge regarding the management of patients with stroke at the pre-test was moderate with a (0.52) mean score, and the post-test was good with a (0.92) mean score. The overall assessment of control group knowledge regarding the management of patients with stroke at the pre-test was moderate with a (0.47) mean score, and the post-test was moderate with a (0.48) mean score, according to the study results.

Table (4): Overall Mean Difference (Paired T-Test) of the Study and Control Group Knowledge at Two Periods of Measurements (Pre-test and Post-test)

Main Studied Domains	Group	Periods of Measurements	M.S.	Std. Dev.	t-value	d.f.	p-value
Overall Nurses' Knowledge	Study	Pre-test	.52	.15	14.79	29	.0001 HS
		Post-test	.92	.08			
	Control	Pre-test	.47	.12	1.120	29	.272 NS
		Post-test	.48	.11			

M.S.= Mean of Score; Std. Dev. = Standard deviation; d.f = degree of freedom, P = probability value. NS= Non Significant at (P > 0.05), HS: High Significant at (P< 0.01).

This table demonstrates the differences in knowledge assessment between the pre-test and post-test study groups; it indicates a highly significant difference (P <0.01) between pre-test and post-test assessment in the study group. This suggests the program improved the nurses' knowledge. The pre-test and post-test control group assessments of nurses' knowledge demonstrate no significant difference at a P-value larger than (0.05).

Table (5): Overall Mean Difference (Independent Sample T-Test) of the Study and Control Groups knowledge at Two Periods of Measurements (Pre-test and Post-test)

Studied domains	Periods of measurements	Groups	Mean	Std. Deviation	t-value	d.f.	p-value
Overall Nurses' Knowledge	Pre-test	study	.52	.146	1.223	58	.226 NS
		control	.473	.123			
	Post-test	study	.92	.150	12.162	58	.0001 HS
		control	.481	.109			

This table demonstrates that there are statistically non-significant differences between the study and control groups in the pre-test for most domains of nurses' knowledge. On the other hand, this table shows that there are statistically highly significant differences between the study and control groups in all domains of the nurses' knowledge after applying for the interventional program.

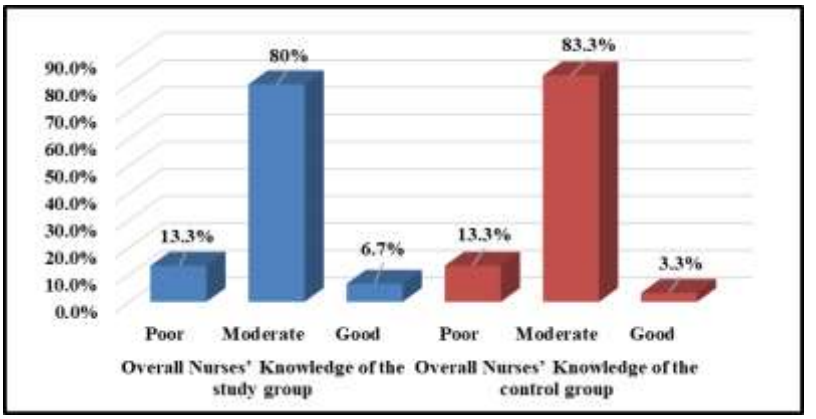

Figure (1) overall assessment of nurses' knowledge at both study and control groups at the pre-test

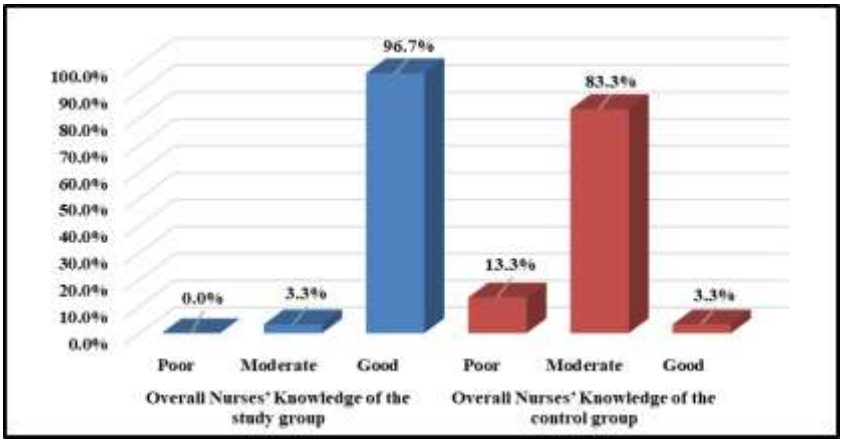

Figure (2) overall assessment of nurses' knowledge at both study and control groups at the post-test

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.

In terms of involvement in stroke management training courses, (3.3 percent) of the study group had just one, whereas (10 percent) of the control group had three. However, none of the nurses in both groups had attended a training course outside of Iraq, and all of the courses had been conducted within Iraq. Additionally, the majority of the nurses (96.7%) had not previously engaged in training or interventional programs related to stroke care, and only (3.3%) had attended the interventional program previously described. According to research by Mohammed et al. (2015), the majority of nurses (92 percent) did not get any training programs, conferences, or workshops about the management of stroke. According to Abou El Enein et al. (2012), the majority of nurses (97.5%) had never attended any previous stroke management training program. In contrast, Karadeniz and Ylmaz (2021) discovered that the majority of nurses (63.3%) had received training in stroke care. According to another study, the majority of nurses (82%) had not completed training courses in stroke nursing management (Mahdy, et al., 2016). When compared to the findings of prior research, the findings appear to be more generalizable to recently graduated nurses with fewer than three years of experience in critical care units, who are often lacking in expertise. For new nurses, incorporating training or educational programs on stroke management is critical. In order to improve their knowledge, nurses require further training or educational programs. Also, one of the most important things about critical care units is that nurses must be very skilled and able to think critically in order to minimize problems and solve health problems that come up out of the blue.

The findings of nurses' knowledge regarding three domains (anatomy and physiology of the brain, general information and nursing management of patients with stroke) showed that overall mean level in both groups (the study and the control) had a moderate level of knowledge in the pre-test. While; at the post-test the study group improved to good knowledge. This improvement in nurses' knowledge indicated the effectiveness of the provided educational program. Nurses need continuous educational or training program to raise their level of knowledge as well as follow up with the most recent evidence-based nursing practices. Encouraging nurses to be self-learners is one of the most crucial strategies to provide safe and high-quality nursing care. Overall knowledge assessment regarding the management of patients with stroke for study and control groups at the pre-test was moderate with a mean score of (0.52) and (0.47), respectively.

In the statistical analysis, the paired t-test was employed to compare the same group's findings over two measurement intervals (pre-test and post-test). The results show that there is no significant difference between pre-test and post-test

assessments in the control group at a P-value greater than (0.05). However, there is a very statistically significant difference (P <0.01) between pre-test and post-test assessments in the study group. This suggests that the nurses' knowledge has improved following the program. In comparison, an independent t-test was used to compare the results of the study group with the control group. The study found a highly statistically significant difference between the pre-test and post-test This result is consistent with a Chinese study done by Yang et al. (2015). Their study results showed that the correct rate of answering questions about stroke management knowledge was as low as 24%, while the correct rate of secondary stroke prevention knowledge was only 38%. McDaniel (2016) reported that a significant improvement in the knowledge scores from pretest to posttest was about 16.79%.

Another study conducted by Malaika (2017) to assess the factors that affect the management of hemorrhagic stroke patients in the ICU found that the nurses' knowledge of hemorrhagic stroke patients is low and that the nurses need continuous education in the nursing management of stroke patients. Abd El-Hay et al. (2018) study "Effect of implementing a designed educational training program for neurological nurses on clinical outcomes of stroke patients" reported that the most of the studied nurses (60%) had a poor level of knowledge pre-implementation of the designed educational training program, whereas they scored good levels of knowledge immediately and 2 months later post-implementation of the educational program for about (85.7% and 77.1%), respectively, with p-value ≤ .01.

According to Albini et al. (2013), professionals in both groups had adequate knowledge about the definition and complications of dysphagia, but they did not know about the stages, causes, and specific care related to nutrition, medication, and hygiene in cases of dysphagia, and the self-assessment reported a lack of training in performing some procedures on stroke patients. Nursing care needs continuing education, especially in intensive care. Zaman and Afroze (2016) stated that there is no developed national stroke-nursing program in Bangladesh. A national program based on research that could be used in nurse-led clinics would be very helpful. Research done in South Africa by Knight et al. (2020) reported that nurses across all levels of healthcare had only moderate knowledge regarding the identification and management of stroke-related oropharyngeal dysphagia. Interdisciplinary collaboration between nurses and speech-language therapists may improve nurses' knowledge of the identification and management of stroke-related oropharyngeal dysphagia in lower-middle-income settings such as South Africa.

The nurses' knowledge of the guidelines for the acute stage of ischemic stroke was not satisfactory. Therefore, the provision of evidence-based continuing education courses and the mandatory attendance of emergency nurses in these courses is recommended (Yeganeh et al., 2019). These results may be related to a decrease in the number of training sessions regarding stroke management, a lack of desire to learn by nurses, and multiple levels of education in nurses. On the other hand, the overall results in the current study revealed that the excellent improvement in the study group at post-test with a good level of knowledge was maintained while the overall mean scores (0.47) of the control group at pre-test moderate showed

the same in the post-test (Table 4.4). In addition, the overall mean scores (0.92) of the post-test after the interventional program showed improvement in the level of nurses' knowledge. However, the results demonstrated high significant improvement in knowledge with a p-value (0.001). The reason behind these results could be the didactic approach and consequential process of the intervention program.

These results correspond with a study conducted by Olaiya et al. (2017), which revealed that overall knowledge of risk factors for stroke or transient ischemic attack was better in the intervention than in control groups. Lou et al., (2020) study the Stroke Association guidelines for clinical management of cerebrovascular disorders. Their results showed that the guidelines give people who have had a stroke a way to organize their care, which could help a lot. Jordin research conducted by Rababah et al., (2021) to measure the effectiveness of an educational program on improving healthcare providers' knowledge of acute stroke: The results of a randomized block design study showed that the implemented educational program had a positive effect on increasing the level of stroke knowledge among health care providers (HCP's). The implemented intervention can increase the HCP's knowledge regarding stroke.

Ibrahim and Mokhtar, (2020) claimed that the assessment before the intervention of the nursing training indicated an inappropriate level of nurses' knowledge and practice toward prevention and management of pressure ulcers among stroke patients. But evaluations done right after the training and 3 months later showed that the total mean scores of knowledge and practice had gone up in a way that was backed up by statistics. Bjartmarz et al. (2017) conducted research in Iceland. Their findings demonstrated that the stroke nursing guideline (SNG) is useful, improving and providing consistency in care. The implementation process was found to be successful because the study group was able to identify and include in daily care the most important parts of nursing rehabilitation. The researcher attributed that the educational intervention with a face-to-face discussion approach has been effective in improving the nurses' knowledge concerning stroke. Nurses must keep up to date with developments and know-how to provide the best, evidence-based nursing care.

Conclusions

Based on the findings of the current study, it can be concluded that nurses' knowledge regarding the management of stroke was moderate before implementing the program and significantly improved after implementing the program.

References:

1. Abd El-Hay, S. A., Abed Allah, A. K., & Tag El Din, E. A. (2018). Effect of implementing designed educational training program for neurological nurses on clinical outcomes of stroke patients. Clini Nurs Stud, 6(4), 121.
2. Abou El Enein, N. Y., Abd El Ghany, A. S., & Zaghloul, A. A. (2012). Knowledge and performance among nurses before and after a training programme on patient falls.

3. Ahmed MM, Younis NM, Hussein AA. Violence towards nurses staff at teaching hospitals in Mosul City. Indian J. Forensic Med. Toxicol 2020;14(3):2598-603.
4. Albini, R. M. N., Soares, V. M. N., Wolf, A. E., & Gonçalves, C. G. D. O. (2013). Knowledge of nursing professionals about the care to dysphagic patients in intensive care units. Revista CEFAC, 15(6), 1512-1524.
5. Alexandrov, A. W. (2019). Acute stroke nursing management. Stroke Nursing, 75-102.
6. Allsassmah, E. A. A. (2020). Measuring Knowledge of Jordanian Nurses Working in Critical Care Units toward Stroke Patients. World Science, 8 (60).
7. Baatiema, L., Otim, M. E., Mnatzaganian, G., Aikins, A., Coombes, J., &Somerset, S. (2017). Health professionals' views on the barriers and enablers to evidence-based practice for acute stroke care. Implementation Science, 12(74).
8. Bjartmarz, I., Jónsdóttir, H., & Hafsteinsdóttir, T. B. (2017). Implementation and feasibility of the stroke nursing guideline in the care of patients with stroke: a mixed methods study. BMC nursing, 16, 72.
9. Castillo, A. (2021). Improving nurses' knowledge of aspiration pneumonia prevention for stroke patients with dysphagia: A quality improvement project.
10. Catangui, E. (2015). Specialized stroke nursing program using an inter-professional approach: A nurse-driven education initiative of one stroke hospital in Saudi Arabia. Journal of Nursing Education and Practice, 5(11).
11. Clare, C. S. (2018). Role of the nurse in stroke rehabilitation. Nursing Standard, 33(7).
12. Farrag, M. A., Oraby, M. I., Ghali, A. A., Ragab, O. A., Nasreldein, A., Shehata, G. A., ... & Abd-Allah, F. (2018). Public stroke knowledge, awareness, and response to acute stroke: Multi-center study from 4 Egyptian governorates. Journal of the Neurological Sciences, 384, 46-49.
13. Hage, A., 2013. Activating a Stroke Alert: A Neurological Emergency available at www.NURSE.com.
14. Hisaka, Y., Ito, H., Yasuhara, Y., Takase, K., Tanioka, T., & Locsin, R. (2021). Nurses' Awareness and Actual Nursing Practice Situation of Stroke Care in Acute Stroke Units: A Japanese Cross-Sectional Web-Based Questionnaire Survey. International journal of environmental research and public health, 18(23), 12800.
15. Ibrahim, M. M., & Mokhtar, I. M. (2020). Effect of nursing training on identification, prevention and management of pressure ulcer among stroke patients and its outcomes. Egypt J Health Care, 11(3), 391-416.
16. Islam, S. (2018). Factors influencing performance of stroke management among nurses in Bangladesh (Doctoral dissertation, Graduate School, Yonsei University).
17. Jarva, E., Mikkonen, K., Tuomikoski, A. M., Kääriäinen, M., Meriläinen, M., Karsikas, E., ... & Oikarinen, A. (2021). Healthcare professionals' competence in stroke care pathways. Journal of Clinical Nursing, 30 (9-10): 1206-1235.
18. Karadeniz, H., & Yılmaz, N. M. (2021). Evaluation of Nurses' Knowledge Levels on Evidence-based Acute Stroke. Turkish Journal of Neurology/Turk Noroloji Dergisi, 27(4).
19. Knight, Kerry, Pillay, Bhavani, van der Linde, Jeannie, & Krüger, Esedra. (2020). Nurses' knowledge of stroke-related oropharyngeal dysphagia in the

Eastern Cape, South Africa. South African Journal of Communication Disorders, 67(1), 1-7.
20. Liao, H. C., Peng, Y. H., Chen, Y. P., Huang, L. C., Liang, W. M., Hsu, C. Y., ... & Tseng, C. H. (2018). Reduced Risks of Both Ischemic and Hemorrhagic Strokes in Nurses: A Population-Based Cohort Study in Taiwan. International Journal of Environmental Research and Public Health, 15(12), 2615.
21. Lou, M., Ding, J., Hu, B., Zhang, Y., Li, H., Tan, Z., Wan, Y., Xu, A. D. (2020). Chinese Stroke Association guidelines for clinical management of cerebrovascular disorders: executive summary and 2019 update on organizational stroke management. Stroke and vascular neurology, 5(3), 260–269.
22. Mahmood Mohammed Ahmed, Nasir Muwfaq Younis, Nawaf Mohammed Dhahir, Kareem Nasir Hussain. Acceptance of Covid-19 vaccine among nursing students of Mosul University, Iraq. Rawal Medical Journal: Apr-Jun 2022. Vol. 47, No. 2,pp:254_258.
23. Mahmoud Mohammed Ahmed, Nasir Muwfaq Younis and Ahmed Ali Hussein. Prevalence of Tobacco use among Health Care Workers at Primary Health care Centers in Mosul City. Pakistan Journal of Medical and Health Sciences, 2021, 15(1), pp. 421–424.
24. Malaika A. (2017). Assessment of nurses'attitudes and knowledge regarding management of hemorrhagic stroke in ICU and HDU at King Faisal hospital, Rwanda.
25. McDaniel, J. T. (2016). Improving Nurse's Knowledge of Stroke (Doctoral dissertation, Walden University).
26. Mohammed, H. S. S., Mohammed, E. T., & Nadr, M. (2021). Nursing Performance Regarding Monitoring of patients with Ischemic stroke during administration of Tissue Plasminogen Activator Drug. Egyptian Journal of Health Care; Vol 12. no.4, 853-869.
27. Mohammed, S. R., Sultan, M. A., Elshamy, K. F., & Ahmed, H. H. (2015). ASSESSMENT OF EMERGENCY NURSES'KNOWLEDGE ABOUT EVIDENCE BASED NURSING PRACTICE FOR ISCHEMIC STROKE PATIENTS. Mansoura Nursing Journal, 2(1), 17-30.
28. Muwfaq Younis N , Efficacy of Health Beliefs Model-Based Intervention in Changing Substance Use Beliefs among Mosul University Students: A Randomized Controlled Trial. Revis Bionatura 2022;7(2) 35. http://dx.doi.org/10.21931/RB/2022.07.02.35.
29. Naga, M. S., Bedier, N. A., Salem, M. A., Ahmed, H. A. M., & Elhfnawy, A. M. (2021). Effect of Competency Based Program on Nurses' Knowledge, Skills and Attitude toward the Care of Patients with Stroke. Alexandria Scientific Nursing Journal, 23(2), 10-21.
30. Nagep, N. M., Mohammed, S. A., & Amr, E. F. (2020). Assessment of Nurses' Performance Regarding Care for Elderly Stroke Patients. NILES journal for Geriatric and Gerontology, 3(Geriatric nursing), 42-58.
31. Naji AB, Ahmed MM, Younis NM. Adherence the Preventive Measure Against for COVID-19among Teachers at University of Mosul. In J Med Tox Leg Med 2021;24(3&4).pp:273_277.
32. Nasir Muwfaq Younis ,Mahmoud Mohammed Ahmed, and Ahmed Ali Hussein.Nurses' knowledge, attitude and practice towards preparedness of disaster management in emergency of mosul teaching hospitals. Medico-Legal Update, 2020, 20(3), pp. 775–779.

33. Nasir Muwfaq Younis,Mahmoud Mohammed Ahmed and Nawaf Mohammed Dhahir. Prevalence of Covoravirus among Healthcare Workers. International Journal of Medical Toxicolgy&Legal Medicine.Volume 24,Nos.1-2,jan-jaune 2021.pp:267-269.
34. Olaiya, M. T., Cadilhac, D. A., Kim, J., Ung, D., Nelson, M. R., Srikanth, V. K., ... & Thrift, A. G. (2017). Effectiveness of an intervention to improve risk factor knowledge in patients with stroke: a randomized controlled trial. Stroke, 48(4), 1101-1103.
35. Rababah, J. A., Al-Hammouri, M. M., & AlNsour, E. (2021). Effectiveness of an educational program on improving healthcare providers' knowledge of acute stroke: A randomized block design study. World journal of emergency medicine, 12(2), 93–98. https://doi.org/10.5847/wjem.j.1920-8642.2021.02.002
36. Rodgers, M. L., Fox, E., Abdelhak, T., Franker, L. M., Johnson, B. J., Kirchner-Sullivan, C., ... & American Heart Association Council on Cardiovascular and Stroke Nursing and the Stroke Council. (2021). Care of the Patient With Acute Ischemic Stroke (Endovascular/Intensive Care Unit-Postinterventional Therapy): Update to 2009 Comprehensive Nursing Care Scientific Statement: A Scientific Statement From the American Heart Association. Stroke, 52(5), e198-e210.
37. Yang, J., Zhang, J., Ou, S., Wang, N., & Wang, J. (2015). Knowledge of Community General Practitioners and Nurses on Pre-Hospital Stroke Prevention and Treatment in Chongqing, China. PloS one, 10(9), e0138476. https://doi.org/10.1371/journal.pone.0138476
38. Yeganeh, M., Bagheri, Z., Mohammadi, T., Roshan, Z. and Pouralizadeh, M. (2019) “The Knowledge of Nurses about Evidence-based Guideline in Patients with Acute Ischemic Stroke”, Journal of Pharmaceutical Research International, 27(1), 1-10.
39. Zaman, N. U., & Afroze, N. (2016). Nurses’ Knowledge Regarding Risk Factors and Management of Stroke at Rajshahi Medical College Hospital, Bangladesh. Age (years), 30(40), 41-50.
40. Zidan, S., Youssef, W., Abd-Allah, F. O. A. D., & El-Feky, H. A. (2017). Impact of a Designed Acute Stroke Nursing Management Protocol on Nurse's Knowledge and Practices. ImpactJournals, 5(10), 23-40.
41. Rinartha, K., & Suryasa, W. (2017). Comparative study for better result on query suggestion of article searching with MySQL pattern matching and Jaccard similarity. In 2017 5th International Conference on Cyber and IT Service Management (CITSM) (pp. 1-4). IEEE.
42. Rinartha, K., Suryasa, W., & Kartika, L. G. S. (2018). Comparative Analysis of String Similarity on Dynamic Query Suggestions. In 2018 Electrical Power, Electronics, Communications, Controls and Informatics Seminar (EECCIS) (pp. 399-404). IEEE.