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Effectiveness of an Educational Program on Nurses' Knowledge about Nursing Care for Patient after Craniotomy

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ABSTRACT

Objective(s): To determine the effect of an educational program on nurses' knowledge about nursing care for patient with craniotomy patients, and to find out the relationship between nurses' knowledge and their demographic characteristics

Methods: A quasi-experimental design was carried out from February, 2020 to July, 2023. A non-probability purposive sample of (60) nurses working in neurosurgical wards. The questionnaire and the program contents' validity were determined by a panel of (12) experts to evaluate their clarity, relevance, and appropriateness for the accomplishment of the reliability. Descriptive and inferential data analysis were used to analyze the study data: frequency, percentage, mean of score t-test through SPSS ver. 22.

Results: The nurse's knowledge about the nursing care of patient after craniotomy in study group before applying the program were poor in most items with mean score of (1 .0808), while their knowledge increased after applying the program with mean score of (1 .7313).

Conclusions: The study concluded that there was an improvement to high level of nurse's knowledge in study group which proves the positive effect of educational program concerning patients with a craniotomy.

Recommendations: Neurosurgical ward should have assessment sheets for their skills as well as daily nursing reports and increase the awareness of nurses about the important of postoperative physiotherapy.

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فاعلية البرنامج التعليمي في معارف الممرضين حول العناية بالمريض بعد اجراء عملية فتح القحف

المستخلص

الأهداف: تحديد فاعلية البرنامج الإرشادي في معارف الممرضين على المريض بعد اجراء فتح القحف ومعرفة العلاقة بين معارف الممرضين وخصائصهم الديموغرافية.
المنهجية: تصميم شبه تجريبي استخدم لدراسة الحالية لتقييم فاعلية التداخل الارشادي في معارف الممرضين حول المريض بعد اجراء عملية فتح القحف بدأت الدراسة من شباط ٢٠٢٢ الى حزيران ٢٠٢٣ لأنجاز اهداف الدراسة، تم اختيار عينة غرضية متكونة من ٦٠ ممرض تم تقسيمهم الي قسمين وهما مجموعة الدراسة ومجموعة الضابطة. تم تحليل البيانات بالطرق الوصفية والاستدلالية.
النتائج: اظهرت نتائج البيانات أن جميع الممرضين في وحدة الجراحة العصبية الذي تم التطبيق البرنامج عليهم لم يكن لديهم مستوى ملائم من المعارف في الاختبار القبلي مع متوسط ١.٠٨٠٨، بينما كانت نتائج الاختبار بعد تنفيذ البرنامج كافية وتشير الى تحسين في مستوى معارف الممرضين متوسط.١.٧٣١٣
الاستنتاجات: البرنامج الأرشادي بعد تطبيقه كان له تأثير ايجابي وفعال على معارف الممرضين في وحدة الجراحات الجملة العصبية. بينما كان هناك تغيير واضح نحو الأفضل في نتائج أدائهم بعد تنفيذ البرنامج.
التوصيات: وفقا لنتائج الدراسة، يجب أن يكون في ردهة جراحة الأعصاب تقييم لمهارات الممرضين بالإضافة إلى تقارير تمريضية يومية وزيادة وعي الممرضات بأهمية العلاج الطبيعي بعد العملية الجراحية
الكلمات المفتاحية: فاعلية, البرنامج الأرشادي ، الممرض ، المعارف ، المريض ، فتح القحف.

Introduction

A craniotomy performed to remove a subdural hematoma, drilled multiple holes in the bone flap under general anesthesia. Intraoperatively, the hematoma was observed as meconium which had a thick envelope. Besides, it was confirmed that the volume of the hematoma matched the CT results. The goal of surgery was to completely remove the hematoma and its envelope; following the recovery of the bone flap, the loss of the skull could be avoided. Then through several bone holes the scalp could form several flesh-like structures [(1)].

Based on the results of an epidemiological study of primary malignant brain tumors done in northeast India in 2021, 1025 people were diagnosed with these tumors out of a total of 82832 participants. This study also indicated that the incidence rates of tumors in males are two times higher than those in females[(2).]

The nurse should be familiar with changes and trends providing early recognition of increased intracranial pressure. Nurse should administer prescribed medication such as mannitol to reduce postoperative increased intracranial pressure. Postoperative increased intracranial pressure caused by postoperative hematoma formation or postoperative hydrocephalus usually treated surgically to relieve the cause [(3).]

The surgical technique has become one of the most important operations in modern neurological care. Many patients were unable to endure illnesses that are now treated on a regular basis before the invention of this method. Brain tumors, vascular diseases, and trauma are all commonly treated, and if access to the cerebral space is limited, the patient could suffer severe consequences. The technique has been updated, and it will continue to be updated when new technology becomes available [(4).]

Some brain tumors are benign, and surgery may be able to remove them. In some cases, surgery to remove a brain tumor may not be able to cure the patient, but it does give a more accurate diagnosis than a needle biopsy, relief from symptoms by lowering intracranial pressure (ICP), and, in theory, a better response to other treatments like chemotherapy and radiation [(5).]

Methods

This study utilized a quasi-experimental approach to evaluate the effectiveness of an educational program on nurses' knowledge. for patients who had craniotomy after discharge from the hospital.

A non-probability sample (purposive sample) of 60 nurses, both male and female. Study sample was split into two groups: one group, consisting of 30 nurses, was given access to the educational program (study group), while the other group, consisting of 30nurses, was not given access to the educational program (control group).

Ethical Considerations

It was made clear to the nurses that their participation in the study was entirely optional. The researcher provided an explanation of both the study's objective and its potential advantages. After they had already given their consent to take part in the study.

Inclusion Criteria

1. Nurses that work in a neurological ward
2. Nurse have worked in morning shifts for at least one year and above.
3. Nurses who scored less than 60% in pre- test and accepted to take part in research.

Exclusion Criteria

1. Nurses who had experience less than one years in neurosurgical ward
2. Nurses who scored at least >60% on the pre-test.

Instrument

The nurses shave signed a consent form to acknowledge their voluntary participation with no coercion and the confidence that their data will be used for research purposes only. Direct interview was used in data collection from the study sample through the use of a questionnaire composed of two parts to achieve the aims of the study:

Part I:

Self-administered evaluation form applicable to the nurses' demographic characteristics.

Part II:

Evaluation of the nurse's knowledge about nursing care for Patient with craniotomy. The nurses completed the questionnaire form; Prior to receiving the questionnaire, the purpose of the study was discussed. Respondents were given 20 minutes to complete the questionnaire. a total of 33 multiple-choice questions, each of which was assigned a score of 2 for a correct answer and 1 for an incorrect answer. All participants were asked to fill the questionnaires before applying the educational program(pre-test), then the program has been presented and discussed through (3) sessions.

First session was about introductions of nervous system; second session was about types and complication of craniotomy and third session was about nursing care about patient after craniotomy.

After one month, the participants were asked to refill the forms (post-test) to determine the effectiveness of the nursing care on patient after craniotomy program.

Validity of the Questionnaire

One of the most crucial parts of research is its validity. Errors of type 2 are less likely to occur when valid measures are employed. To maintain the instrument's validity, the questionnaire was distributed to thirteen experts in the subject.

Reliability of the instruments

The researcher identified six nurses' reliability, the instrument's internal consistency co-observer reliability, and each finding's correlation coefficient. The correlation coefficient for all 33 items was 0.85, which is appropriate from a statistical standpoint.

Statistic Methods

Descriptive method (Frequencies, percent, and mean score).

Results

Table 1. Nurses Sociodemographic Characteristics

Demographic items	Groups	Study Group		Control Group	
		Frequency	**percent**	**Frequency**	**percent**
Age / Years	18-22	3	10.0	3	10.0
	23-27	9	30.0	14	46.7
	28-32	5	16.7	2	6.7
	33-37	5	16.7	5	16.7
	38-42	3	10.0	4	13.3
	43 or more	5	16.7	2	6.7
	Total	**30**	**100.0**	**30**	**100.0**
Gender	Male	11	36.7	9	30.0
	Female	19	63.3	21	70.0
	Total	**30**	**100.0**	**30**	**100.0**
Educational level	secondary nursing school graduate	8	26.7	10	33.3
	Bachelor degree	4	13.3	0	0
	Diploma degree	18	60.0	20	66.7
	Post graduated	0	0	0	0
	Total	**30**	**100.0**	**30**	**100.0**
Number of years of employment in hospitals	1-5	10	33.3	12	40.0
	6-10	12	40.0	12	40.0
	11-15	2	6.7	3	10.0
	16-20	2	6.7	0	0
	21-25	1	3.3	3	10.0
	26 or more	3	10.0	0	0
	Total	**30**	**100.0**	**30**	**100.0**
Number of years of experiences in in neurosurgical ward	1-5	16	53.3	14	46.7
	6-10	8	26.7	15	50.0
	11-15	2	6.7	1	3.3
	16-20	2	6.7	0	0
	21-25	0	0	0	0
	26 or more	2	6.7	0	0
	Total	**30**	**100.0**	**30**	**100.0**
Have you attended any educational	Yes	2	6.7	1	3.3
	No	28	93.3	29	96.7

training program regarding care of patient with craniotomy	**Total**	**30**	**100.0**	**30**	**100.0**
training session intra or exit Iraq	No	28	93.3	29	96.7
	Intra Iraq	2	6.7	1	3.3
	Total	**30**	**100.0**	**30**	**100.0**
Number of trainings course	No	28	93.3	29	96.7
	One	2	6.7	1	3.3
	Total	**30**	**100.0**	**30**	**100.0**

F=Frequency; **%**= Percentage.

Table (1) reveals that ages of the nurses ranged from around 23 to 27 years old, and 63.3% of study group nurses and 70% of control group nurses were female. Diploma degrees were more common in the study group (60.0%) and control group (66.7%). The study group had 12 years of hospital work, while the control group had 6–10 years. The study group had 53.3 percent with 1–5 years of neurosurgical ward experience, while the control group had 50.0 percent with 6-19 years. Educational program on craniotomy care, 93.3 percent of nurses in the study group and 96.7 percent in the control group did not have any training, while 6.7 percent and 3.3 percent had training in Iraq.

Table (2): Effectiveness of an educational Program on Nurses' Knowledge About Nursing Care for Patient after Craniotomy for the Study Group at Pre-teat and Post-test Periods

Overall assessment for study group	**Pre-test**				**Post-test**			
	F	**%**	**MS**	**SD**	**F**	**%**	**MS**	**SD**
Fail	30	100	1.0808	.04455	0	0	1.7313	.07827
Pass	0	0			30	100		
t-value (-46.000), d.f. (29), p-value (.000)								

F=Frequency**; MS=** Mean of scores**; SD**=Standard deviation**; %=** Percentage.

The pre-test and post-test responses of the study group were significantly different, and the p-value was less than 0.01. The pre-test also enhanced nurses' general knowledge, according to the Study.

Table 3. Effectiveness of an educational Program on Nurses' Knowledge About Nursing Care for Patient after Craniotomy for the Control Group at Pre-teat and Post-test Periods

Overall assessment for control group	**Pre-test**				**Post-test**			
	F	**%**	**MS**	**SD**	**F**	**%**	**MS**	**SD**
Fail	27	90	1.2354	.14339	28	93.3	1.2354	.14339
Pass	3	10				6.7		

F=Frequency**; MS=** Mean of scores**; SD**=Standard deviation**; %=** Percentage.

The study found no statistically significant difference between the control group's pre- and post-test responses and the statistical mean (p-value > 0.05). So, the study found

that nurses' knowledge did not improve from the pre-test to the post-test.

Table 4. Significant difference in the post-test knowledge of patients with craniotomy between the study and control groups.

Overall assessment of craniotomy	Post test case				Post-test control			
	F	%	MS	SD	F	%	MS	SD
Fail	0	0	1.7313	.07827	28	93.3	1.2354	.14339
Pass	30	100			2	6.7		
t-value (16.247), df= (58), p-value (.000)								

F=Frequency**; MS=** Mean of scores**; SD=**Standard deviation**; %=** Percentage, **df**= Degree of freedom, **P value**= 0.001.

When comparing the pre- and post-test results of the study group to the mean, the results show a highly significant difference. The results also show that the nurses' knowledge has risen when compared to their scores on the pre-test, their post-test scores improved significantly.

Table 5. The Relationship between Nurses' Knowledge and their Demographic characteristics

Items		Sum of Squares	df	Mean Square	A	P value
Sex	Between Groups	4.300	10	.430	4.085	.004
	Within Groups	2.000	19	.105		
	Total	6.300	29			
Age	Between Groups	32.917	10	3.292	1.951	.101
	Within Groups	32.050	19	1.687		
	Total	64.967	29			
Education level	Between Groups	8.217	10	.822	2.974	.020
	Within Groups	5.250	19	.276		
	Total	13.467	29			
Number of years of employment in hospitals	Between Groups	32.450	10	3.245	6.456	.000
	Within Groups	9.550	19	.503		
	Total	42.000	29			
Number of years of experiences in neurosurgical ward	Between Groups	5.567	10	.557	2.783	.026
	Within Groups	3.800	19	.200		
	Total	9.367	29			
A. Have you Attended any educational Training program Regarding care of Patient with Craniotomy	Between Groups	.467	10	.047	1.773	.136
	Within Groups	.500	19	.026		
	Total	.967	29			
Training session intra or exit Iraq	Between Groups	.467	10	.047	1.773	.136
	Within Groups	.500	19	.026		
	Total	.967	29			
Number of training course	Between Groups	.467	10	.047	1.773	.136
	Within Groups	.500	19	.026		
	Total	.967	29			

A= Anova**, df=** degree of freedom**, P value=** 0.001.

This table shows that there is no correlation between nurses' levels of knowledge and demographic variables such as age, education, years of hospital experience, years of experience in the neurosurgical ward, location of training (within or outside Iraq), and number of training courses ($p > 0.05$).

Discussion

The majority of nurses in both the study group and the control group were female, with 70 percent of the control group and 63.3 percent of the study group being female. The result conducted in Iraq at 2022, regarding the gender of the study participants, more than half of the subjects are female, females made up a significant portion of the population (60%). Most of the study participants were ages between 23-27 years old [(6)]. These findings agreed with who shows that twenty-year-old and twenty-nine-year-olds make up 52.5 percent of oncology nurses. Stated that the majority of the sample in their study was diploma [(7)]. Another study showed that high school graduates who went on to become nurses made up 50%. Most of them (40%) had been nurses for one to five years, and most of the people in the control group had been nurses for one to five years and had worked in the neurological ward [(8)]. These findings are comparable to those obtained in an investigation which showed that most nurses (98%) had not been trained in the care of unconscious patients or in the care of patients in the intensive care unit [(9).]

the study result shows that the study-control groups' performance on a pretest was based on the replies of the study samples. The study group did not demonstrate sufficient knowledge about craniotomy patients following discharge from neurosurgical units on the pretest. Findings from a study titled "Effectiveness of an Education Program on Nursing Staffs' Knowledge of Infection Control Measures at the Intensive Care Unit in Al-Diwaniya Teaching Hospital" showed that while nurses' pre-test knowledge of infection control measures was adequate, their post-test knowledge improved significantly [(10)].

Based on the results, the study group's post-test looked at the sample responses. The results show that after the test, the nurses in the study group knew more about patients who had a craniotomy and is higher than that of the control groups. The bulk of significant changes in questionnaire items were indicating that the researched educational program was successful in raising the level of knowledge among the nurse staff in the study group. Following the implementation of the designated educational program, the nurses' levels of knowledge increased noticeably when compared to their levels of knowledge before the program was implemented. In the study group of nurses, an increase in knowledge was found to be positively correlated with an increase in knowledge on what to do following a craniotomy. Neurosurgical wards should have access to ongoing education programs. In a study conducted during the golden hour, tested the knowledge of 50 nurses working in neurosurgical hospital critical care units about developed educational programs geared toward traumatic head injury. There was a significant correlation (P .0001) between the study group's knowledge gains and their performance on performance on this study's post-test as compared to the pre-test scores of the control group. In the comparison of the pre- and post-test scores of the control group, no significant correlation is seen. Value of $P > 0.005$; $P= 0.733$ [(11)].

During an Educational program, there was a correlation between the nurses' levels of

knowledge and their ages, years of experience, and total number of years spent
working in the profession. This association was found to be statistically significant., but there are no significant differences in nurses' levels of education and sex. The study conducted in Iraq who evaluated how well an interventional program affected patients' ability to do self-care after undergoing craniotomy surgery, found no According to the study on the knowledge of comminuted fracture among nurses working in academic hospitals in Baghdad, found that nurses had a low knowledge about care of patient with craniotomy. p-value > 0.05 indicates that age, sex, are not significantly associated with nurses' knowledge. In addition, at a significance level of 0.05, The level of knowledge among nurses was highly correlated with their level of education, year of experiences and number of raining course.[12].

Conclusions

The program confirmed its effectiveness on nurse's knowledge about nursing care of patient after craniotomy. After the program was put into place, there was a noticeable improvement in the nurse's overall level of knowledge, which was significantly higher than it had been before.

Recommendation

1. To ensure that nurses have adequate knowledge and can collaborate in a secure manner while caring for patients who have undergone craniotomies, it is important to develop care protocols that are documented and kept up to date.
2. Implement the current educational program for all nurses working at the neurological units in Iraqi hospitals.

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