

Effect of Nursing Educational Strategies Regarding Complications Post Meningioma on Nurses Knowledge and Practices

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Abstract

Background: Meningioma is a main frequent tumor of the central nervous system, which arises from arachnoid cap cells and forms approximately 30% of overall main adults' intracranial tumors. The aim of the research was to appraise the impact of Nursing Educational Strategies Regarding Complications Post Meningioma on Nurses Knowledge and Practices. **Research Design:** This study utilized design to investigate the research objectives. **Setting:** The research was performed in Department of Neurosurgery at the Zagazig Surgery Hospital. **Sample:** The sample consisted of all the 35 nurses employed at the Surgery hospital in Zagazig. **Tools:** Two tools were utilized to collect the Data: nurse knowledge questionnaire, and a practices observational checklist. **Results:** Revealed that before the nursing program; only 22.5 % of the surveyed nurses possessed a good overall knowledge, however after the nursing strategies intervention; good total knowledge score increased to 62.9%. Before nursing strategies intervention, 68.6% of the surveyed nurses exhibited inadequate practice, however after nursing strategies intervention, satisfactory practice score increased to 74.3. **Conclusion:** The findings underscore the nursing strategies effectiveness in enhancing nurses' knowledge, and practices toward complications post meningioma. **Recommendations:** Replication of the present research on a bigger group of nurses from various hospitals.

Keywords: Nursing Strategies, Complications, Meningioma

Introduction:

Meningioma is the main prevalent kind of primary brain tumor, which affects a variety of life aspects, including the social, psychological, and physiological ones. Even after meningioma patients have had surgery, some of them continue to suffer from aftereffects like headaches, limited mobility, activity interruption, and visual abnormalities (Ganefianty & Yona., 2019). Meningiomas represent the predominant category of intracranial tumors in adults and arise from the arachnoid cells of the middle layer of meninges. The World Health Organization (WHO) categorizes them into three categories: benign (grade I), atypical (grade II), or malignant/anaplastic (grade III), despite they typically exhibit slow growth and behave benignly in most cases (Salles et al., 2021).

Meningiomas are often more prevalent in females, except for higher-grade tumors, which tend to occur more frequently in males and older patients. The etiology of meningiomas remains unidentified. Nonetheless, exposure to radiation, particularly during childhood, may elevate an individual's risk of acquiring a meningioma. Individuals with the genetic disorder

Neurofibromatosis type 2 face a higher risk. Generally, the survival rate of five years for grade I meningiomas according to the World Health Organization surpasses 80%; but it decreases significantly in case of anaplastic meningiomas (Huntoon et al., 2020).

Utilization of advanced imaging technologies and molecular profiling may lead to improvement and revolution in the meningioma patients' diagnosis and therapy. Both advanced histopathological and molecular investigations and technological advancements could potentially deal with certain obstacles in meningioma treatment. Modern developed MRI and PET can evaluate the precise tumor delineation, tumor growth, and pathophysiological parameters (Nowosielski et al., 2017).

Meningioma symptoms and signs often include seizures and focal impairments, such as visual alterations and changes in mental status. The psychological symptoms may include mood disturbances, anxiety, anorexia, psychosis, memory impairments, and alterations in personality (Gyawali et al., 2019).

Surgery is often used for treatment, focused on attaining total resection, followed by adjuvant radiotherapy is the standard for grade III meningiomas. However, the adjuvant radiotherapy is contentious for grade II and is typically not recommended for entirely resected grade I meningiomas. Applying systemic therapies lacks standardization. (Maggio et al., 2021).

The risk of comorbidity and death following the intracranial surgeries is higher in senior patients than in younger ones due to the presence of age-associated complications (Ekaireb et al., 2021). The localized complications include cerebral edema, hematoma, hydrocephalus, and infection. Neural impairments might have long-term consequences following the surgical resection of meningioma. Despite careful compliance with sterilization protocols, infectious complications may occur significantly (Carretero., 2018).

Meningiomas proliferate rapidly, and their pressure and infiltration of cerebral tissue can result in several detrimental effects, such as high intracranial pressure, localized hypoxia, edema, and even brain tissue necrosis. If the tumor is in the skull, then an incision of bone is involved in order to reach the brain. Overall, the procedure is very painful after the surgery. Therefore, following the surgery, a specialist team of nurses is needed to assist the patient (Luo et al., 2022).

Meningioma can impact various aspects of life quality, including physiological, psychological, and social aspects. Zielinski et al. (2016) indicated that meningioma patients are experiencing neurological symptoms mostly including headache, visual impairment, seizures, cognitive deficits, speech abnormalities, and motor disorder. Anxiety and postoperative depression affect approximately 20–23% of patients, which lingers for six months following the surgery. Furthermore, the physical symptoms that meningioma patients endure frequently make it difficult for them to interact socially (Zielinski et al., 2016).

A professional neurological assessment indicated that nurses are essential for taking care of patients undergoing various stages of treatment for brain tumors and are vital to the patient's final outcome. Additionally, they are performing a crucial part in these patients' health education.

The nurses must be fully informed of patients' needs to provide optimal nursing care and education that improves the patient's well-being (Gaber et al., 2016).

The significance of the study:

Meningiomas are the main common intracranial tumors. For most meningiomas, the standard therapy is surgical removing the tumor completely together with its dural tail, then active therapy follow-up if needed such as chemotherapy or radiation therapy. This treatment approach controls the disease efficiently, but craniotomy has postoperative complications risk that could negatively affect the patient's condition (Lemée et al., 2019). The nurse must get nursing educational strategies to enhance knowledge, and practices about complications post meningioma.

Goal of the Study

To assess the impact of Nursing Educational Strategies concerning Complications Post Meningioma on Nurses Knowledge and Practices

Research hypothesis

Nursing educational strategies regarding complications post meningioma significantly influence nurses' knowledge and practices.

Subjects and Methods

Research Design

The present investigation adopted a quasi-experimental design.

Setting:

This investigation was conducted in the Department of Neurosurgery at the Surgery Hospital at Zagazig University. The Neurosurgery department resides on the sixth floor. It comprises two sections: a female section and a male section. Each section includes 9 rooms.

Subjects:

The sample consisted of the entire 35 nurses employed at the Surgery hospital in Zagazig

Tools for Data Collection

To achieve the investigation's objectives, two tools were employed for data collection:

Tool One: Self-Administered Knowledge Questionnaire

This tool was developed by researchers utilizing contemporary national and international research and literature. It includes two parts:

- **Part 1: Demographic Data Sheet:** This section collects participants' demographic information, containing age, marital status, gender, residence, educational level, and income.
- **Part 2: Nurse Knowledge Questionnaire:** This section includes 95 items covering various aspects of *meningioma*, such as its definition, causes, manifestations, complications, and nursing strategies.

Scoring System:

- Each correct response scores 1 point, while an incorrect response scores 0.
- Knowledge levels were classified as:
 - **Inadequate Knowledge:** Total score <60%
 - **Adequate Knowledge:** Total score ≥60%

Tool Two: observational Nurses' Practices Checklist

The tool was designed by researchers following the studying of relevant articles and research to evaluate nurses' strategies regarding complications may occur for patients after meningioma surgery. It consists of 20 steps including vital signs, pain assessment, neurological assessment, visual assessment, complications assessment, Communication and Cognitive Function assessment, and Disability assessment.

Scoring System:

- Each correct action scores 1 point, while an incorrect action scores 0.
- Practice levels were classified as:
 - **Unsatisfactory practice:** Total score <70%
 - **Satisfactory practice:** Total score ≥70%

Field work:

- The research was conducted as follows:
 1. Design for Administrative
- Authorized approval to perform the research had been acquired from the authority of

Zagazig surgery hospital. To guarantee the methods 'validity and reliability, they were revised as essential by experts in nursing.

Validity and Reliability

- Three expert professors in nursing and medicine reviewed the tools for clarity, relevance, comprehensiveness, comprehension, applicability, and ease of use; then based on opinion minor modifications were done and then the final form were developed.
- The Cronbach's alpha value of the nurses' knowledge about Meningioma and its complications is 0.899, and of the Observational checklist scale for nurse about nursing strategies regarding complications is 0.901

A pilot study

- An initial trial was executed in September 2022 to assess the practicality and suitability of the research methods. It included 10% of the sample, comprising 4 nurses. Furthermore, it offered an estimation of the duration necessary to finalize the tools.

Data collection process

Assessment phase

- In this phase, Assessment of nurse's knowledge, and practices will be done using the first study tool: Researcher started data collection by distributing knowledge questionnaire to collect data about nurses' characteristics and their knowledge about nursing strategies regarding complications post meningioma. Data was collected in the surgery hospital in the presence of the researcher to provide necessary explanations. Data was collected 3 days per week. Observational checklist were conducted for nurses practice using tool two was used to collect data about practice about nursing strategies regarding complications post meningioma. Data was collected by the researcher directly to the nurses. Data was collected during the morning and afternoon shifts.

Planning Phase

- The investigator studied both national and international literature related to this research, utilizing textbooks, papers, and scientific

publications. The intended research setting was assessed on the basis of the nurses at Zagazig surgery hospital. Booklet was developed. Nursing educational strategies was planned. The Nursing strategies aims to appraise the role of nurses in nursing care of patients with meningioma and complications post meningioma designed will be presented in Arabic language. It will be conducted in four sessions.

Implementation Phase

- Five groups of nurses were formed. Every group consisted of 7 nurses. Every group attended 2 sessions for assessment, 2 educational sessions, and 3 practical sessions. Each session lasting 30 to 45 minutes. Each nurse in the study sample received a printout of the designed nursing strategies booklet which comprised nursing care activities. The researchers teach each subgroup in the same manner using the same teaching methods and materials including posters, pictures and educational videos. At the beginning of each session, an orientation to the session objective took place. Teaching aids included posters, pictures and educational videos.
- Introductory sessions before the implementation of the nursing strategies will be done. This session aimed to clarify the aim of nursing strategies. The first session included the aim of the meeting and orientates nurses concerning the nursing strategies. The second and third sessions included: Introduction, simple note on the definition of meningioma, signs and symptoms, and treatment. The fourth session included: prevention, nursing intervention and complications. This was followed by three practical sessions that included applied nursing strategies covering critical practices such as measurement vital signs, pain assessment for patients, neurological assessment for patients, visual assessment, Complications may occur post meningioma, patients' communication and cognitive function assessment, and disability. The researcher used covert observation for nurses .

Evaluation phase:

- During this stage, evaluating the effectiveness of the nursing strategies will be done using knowledge, and practices questionnaire after implementation of the nursing strategies. All over the time of sessions application consolidation of the program was done directly to assess to which extent the participants remember the knowledge and apply the management practices with the target nurses.

Post intervention:

After completing the nursing educational strategies. Researchers redistributed the same questionnaires again for all the nurses to assess the impact of nursing strategies implementation and to ensure their understanding. The post-test was conducted a month later using the same data collection instruments.

Administrative and ethical considerations:

Each nurse gave informed oral consent after being informed about the study's purpose. Prior to the study's commencement, assumed privacy and the ability to withdraw at any time were realized. Confidentiality and Privacy were maintained during the data acquisition procedure. The study volunteers faced no risk during their participation in the research.

Analytical Statistics

SPSS for windows version 20.0 (SPSS, Chicago, IL) was employed to conduct the entire statistical analyses. Category-based data were presented in numbers and percentages, while the continuous data were normally distributed and were expressed in mean \pm standard deviation (SD). To compare more than two variables with continuous data, one-way analysis of variance (ANOVA) test was employed. While comparing the variables with categorical data, Chi-square test (or Fisher's exact test if appropriate) was employed. To assess the correlations between two variables with continuous data, correlation co-efficient test was employed. Finally, the reliability (internal consistency) test for the questionnaires utilized in the investigation was computed. The level of statistical significance was established at $p < 0.05$.

Results:

Table1. Demonstrates that 57.1% of the studied sample age less than 30 years and had insufficient income, and 82.9% of them were female. In addition, about two-thirds of nurses (62.9 %) obtained secondary school degree, and 74.3% of studied nurses were married and 80 % of them lived in the countryside.

Table 2 reveals a statistically significant difference in the nurses' knowledge level on meningioma and its post-operative complications, and nursing strategies at pre- and post-nursing strategies intervention.

Figure 1: shows that, before the nursing program, 22.5 % of the investigated nurses have good total knowledge, whereas 74.3 %

have poor total knowledge regarding meningioma. However after the nursing strategies intervention; good total knowledge score increased to 62.9%, while poor total knowledge decreased to 14.3%.

Table 3: shows statistically significant differences in nurses' practices concerning meningioma between the prior to and following intervention of nursing strategies.

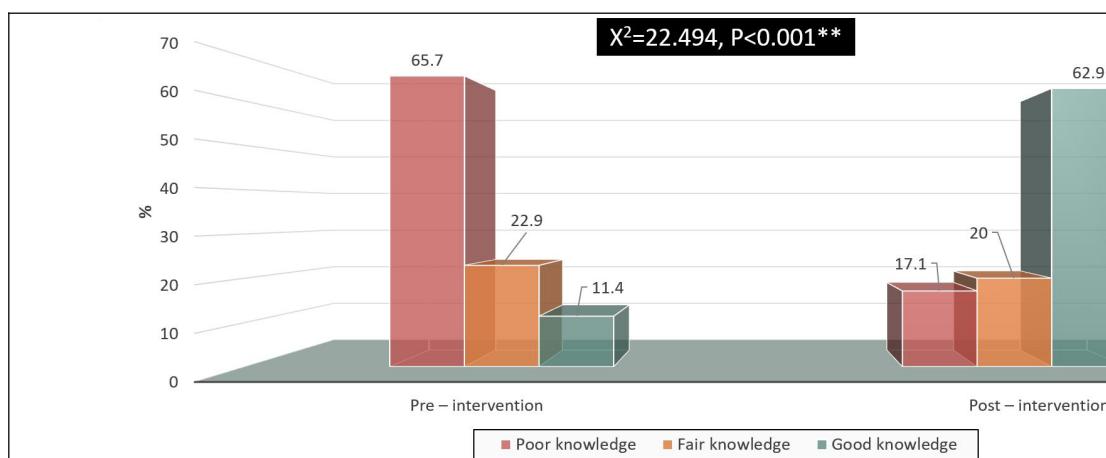
Figure 2: illustrates that, before nursing strategies intervention; 68.6% of the investigated nurses had inadequate practice, while 31.4 % had satisfactory practice, regarding meningioma. However after nursing strategies intervention; satisfactory practice score increased to 74.3%, while unsatisfactory practice decreased to 25.7%.

Table (1): demonstrates a positive correlation between nurses' knowledge, and practice concerning meningioma pre and post- nursing strategies intervention.

Table 1. Distribution of the demographic characteristics of the nurses (n=35)		
	n	%
Age (Years)		
< 30	20	57.1
31 – 40	9	25.7
41 – 50	6	17.1
Mean ±SD	29.6 ±10.2	
Gender		
Male	6	17.1
Female	29	82.9
Educational level		
Secondary	22	62.9
Nursing institute	9	25.7
University	4	11.4
Marital status		
Single	9	25.7
Married	26	74.3
Residence		
Urban	7	20.0
Rural	28	80.0
Income		
Sufficient	15	42.9
Insufficient	20	57.1

Table 2. Comparison of the nurses' knowledge regarding meningioma pre and post intervention

	Pre – intervention						Post – intervention						Chi – square test	
	Poor knowledge		Fair knowledge		Good knowledge		Poor knowledge		Fair knowledge		Good knowledge		X ²	P
	n	%	n	%	n	%	n	%	n	%	n	%		
Nurses' knowledge domains														
Nurses' knowledge about Meningioma	25	71.4	5	14.3	5	14.3	8	22.9	6	17.1	21	60.0	18.695	<0.001**
Nurses' knowledge about Complications after Meningioma Resection	23	65.7	7	20.0	5	14.3	5	14.3	6	17.1	24	68.6	24.097	<0.001**
Nurses' Strategy for Managing Complications after Meningioma Resection	24	68.6	6	17.1	5	14.3	6	17.1	8	22.9	21	60.0	20.932	<0.001**
Nurse's total knowledge	23	65.7	8	22.9	4	11.4	6	17.1	7	20.0	22	62.9	22.494	<0.001**

**Figure 1. Comparison of the nurses' knowledge regarding the meningioma at pre and post-nursing strategies intervention.****Table 3. Comparison of the Nursing Practice nursing strategies for complications post meningioma resection**

	Pre – intervention				Post – intervention				Chi – square test	
	Unsatisfactory practice		Satisfactory practice		Unsatisfactory practice		Satisfactory practice		X ²	P
	n	%	n	%	n	%	n	%		
Nurses' checklist domains										
General Assessment	21	60.0	14	40.0	7	20.0	28	80.0	11.667	<0.001**
Neurological Assessment	22	62.9	13	37.1	10	28.6	25	71.4	8.289	0.004*
Vision Changes	25	71.4	10	28.6	8	22.9	27	77.1	16.568	<0.001**
Total checklist level	24	68.6	11	31.4	9	25.7	26	74.3	12.899	<0.001**

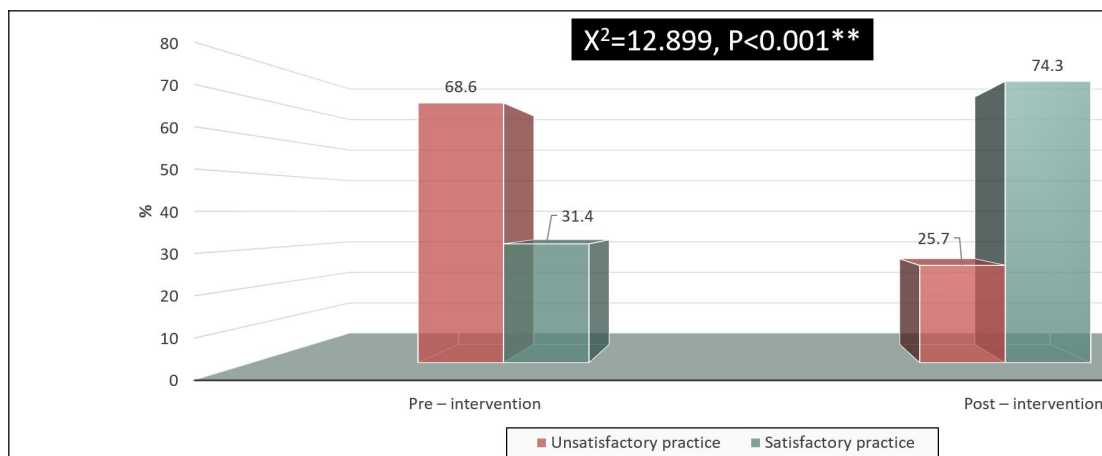


Figure2. Comparison of the nurses' practice nursing strategies regarding the complications after meningioma resection.

Table 4. Correlation between nurses' knowledge and nurse practice regarding nursing Strategies for Managing Complications post meningioma

	Unsatisfactory practice (n=9)		Satisfactory practice (n=26)		Chi – square / fisher's exact test	
	n	%	n	%	X ²	P
Nurses' knowledge						
Poor knowledge	6	66.7	0	0.0		
Fair knowledge	3	33.3	4	15.4		
Good knowledge	0	0.0	22	84.6	26.026	<0.001**

Discussion

Meningiomas are neoplasms originating from meningotheial cells which comprise the innermost layer of the arachnoidal layer of the meninges that envelop the brain and spinal cord. They comprise about 20– 30% of all primary brain tumors and considered as the most frequent kind (Hussein & Abbas., 2021). The objective of the present investigation was to evaluate the effectiveness of nursing strategies concerning complications post meningioma.

According to the nurses age groups, the present investigation showed that over half of the investigation's samples were < 30 year, this result was supported with (Aljabari., 2014) who found that over half of the investigation's samples (56%) were female, while the rest were male, with ages ranging from 26 to 30 years.

The outcomes of the current research showed that most of the surveyed nurses obtained secondary school level about meningioma. This finding was inconsistent with that of (McDonnell et al., 2021) who stated that about two-thirds of the surveyed sample (64.7%) had master's degree.

In the present research, findings showed that before the nursing program, less than a quarter of the studied nurses had good total knowledge, whereas the majority exhibited insufficient total knowledge concerning meningioma. However, after the nursing strategies implementation, good total knowledge score increased to about two thirds, while poor total knowledge decreased to less than one quarter. These outcomes aligned with (Mohamed et al., 2019) who noted that the majority of the investigated nurses had unsatisfactory level of preoperative nurses caring knowledge (i.e. 91.7%), however it improved to be "satisfactory" by 100% following the implementation of the nursing educational program.

Concerning nurses' practice, about the nursing strategies before, less than one-third of nurses in the study had satisfactory practice, whereas over two-thirds of them had unsatisfactory practice, regarding nursing strategies for managing complications after meningioma resection. However, after the nursing strategies implementation, satisfactory practice score increased to about three-quarters, while

unsatisfactory practice decreased to one-quarter. This was in agreement with that of **(Badir & Jaddoue., 2018)** who revealed that the nurses in the research sample profited from the execution of the health education program, resulting in significant improvement and development of their knowledge and practices.

The current investigation indicated a positive correlation between nurses' knowledge and practices regarding post meningioma complications, both prior to and post-implementing nursing strategies. Our research outcome agreed with **(Ahmed et al. 2021)**, who reported a statistically significant relationship between nurses' knowledge and practices. Over fifty percent of nurses demonstrated a satisfactory level of knowledge and practices.

Conclusion

The investigation findings disclosed that the nursing program positively affected and improved nurses' knowledge, and practice related to the nursing strategies for managing complications after meningioma surgery. The nurses who received the nursing strategies had a better level of knowledge and practices than before implementing the nursing strategies.

Recommendations

The following recommendations are proposed based on the outcomes of the present research:

- Replication of this investigation on a larger scale across several hospitals.
- Providing continuous professional training for working nurses about nursing strategies for patients having meningioma.

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