Effect of Nurse-Led Intervention on Headache Pain, Anxiety, and Fatigue Levels among Patients with Brain Tumors

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Abstract

Headache pain, anxiety, and Fatigue are recognized as one of the most common and distressing adverse effects among patients with brain tumors. **The aim was to** investigate the effect of the nurse-led intervention on headache pain, anxiety, and fatigue levels among patients with brain tumors. **Subjects and method: Design:** A quasi-experimental research design was used to fulfill the aim of this study. **Setting:** The research was conducted in the neurosurgery department at Mansoura University Hospital. **Subjects**: A purposive sample of 50 adult patients was included. **Four tools were used:** Tool (I) a structured interview questionnaire (II) a numerical pain rating scale, (III) a State-Trait Anxiety Inventory, and Tool (IV) a Fatigue assessment scale. **Results**: The current study revealed reductions in the mean headache pain scores with a highly statistically significant difference post-nurse-led intervention at (P= <0.05). Also, the study demonstrated that there was a highly statistically significant difference in anxiety scores post-nurse-led intervention with (P= <0.001). Highly statistically significant differences and reductions were detected between fatigue mean scores pre and post-nurse-led intervention with (P= <0.001)**. Conclusion:** The nurse-led intervention had a positive effect on headache pain, anxiety, and fatigue levels among patients with brain tumors. **Recommendations:** The nurse-led intervention regarding brain tumors should be conducted, discussed, and integrated into the rehabilitation programs.

Keywords: Anxiety, Fatigue level, Nurse-led intervention, Pain level, Patients with brain tumors.

Introduction:

Malignant brain tumors (BT) are terrible diseases that can have a significant impact on a person's ability to function and quality of life in addition to having a grim prognosis. In the USA, it is anticipated that 23,180 new cases of primary malignant BT will be identified. All brain, CNS, pituitary, and nasal olfactory tumors fall under the category of primary malignant BT. A surgical resection, either partial or total, chemotherapy, and/or radiation therapy are frequently used to treat BT. Overall, the USA has a 34.2% 5-year survival rate after BT diagnosis (**Valko**. **et al., 2018).**

Glial cells are the source of central nervous system (CNS) tumors, which make up between 40% and Adults are most likely to develop 60% of all CNS primary tumors. Glioblastomas can result in neurological abnormalities such as ataxia, altered behavior, dizziness, motor deficits, visual impairment (blurred vision, diplopia), epilepsy, recurrent syncope, and, in more severe cases, extreme drowsiness and coma. Patients with glioblastoma multiforme have a 10- to 24-month survival rate, according to the literature. Surgery is the traditional first line of treatment, followed by radiotherapy and chemotherapy (**Lakhan & Harle, 2019**).

Intervention for any brain tumor can be invasive, even though benign tumors are more common and are thought to be more durable than malignant tumors. Treatment options for brain tumors include observation, surgery, chemotherapy, and radiotherapy. The characteristics and location of the tumour as well as the state and preferences of the patients should all be taken into account when choosing the treatment strategy **(McCarty et al., 2017**).

However, there are hazards associated with treatments. The side effects of radiotherapy and chemotherapy treatments can include exhaustion and encephalopathy. It is generally known that patients with brain tumors can develop a variety of medical issues, such as seizures, dysphagia, venous thromboembolic disease, and the syndrome of inappropriate antidiuretic hormone (SIADH). Headaches, altered sleep patterns, and cognitive difficulties have been observed together with psychiatric symptoms such as sadness, exhaustion, mood swings, and personality abnormalities (**Berger et al., 2018)**.

Patients with brain tumors experience headaches; nonetheless, it's crucial to recognize the headaches that are typically present with tumors. Headaches are more likely to occur in certain places (e.g., a posterior fossa tumor causes headaches more often than a supratentorial tumor). Headaches are more frequently linked to rapidly expanding tumors. Cluster headaches and paroxysmal cough are two uncommon headache manifestations that can accompany malignancies (**McCarty et al., 2017**). The classic brain tumor headache is not as common as a tension-type presentation or migraine. In addition to their primary headache issue, patients who have experienced primary headaches in the past may experience greater headache symptoms if they have a tumor. Along with a headache, mass lesions progress and inevitably generate new symptoms and indicators; it is important to look for and identify these new symptoms and signs. Headache and neck- and back-related spinal discomfort are possible symptoms of metastatic leptomeningeal involvement (**Piil et al., 2020**).

In general, imaging headache patients for tumors is not cost-effective if they have primary headache diseases like migraines and typical cluster headaches, but it is required if there are any abnormal symptoms. Patients with metastatic brain tumors should receive aggressive pain and symptom management for their headaches. The type of neoplasm and location determine how primary CNS malignancies are treated, although headache management should not be ignored **(Allan & Sarah, 2017**).

Even though patients with headaches are less likely to have brain tumors, 33% to 71% of patients with brain tumors also experience headaches. In 2-year prospective research, 58.78% of patients with brain neoplasms also had headaches, with headaches being their first complaint for half of them (**McCarty et al., 2017**). As headaches are the most common complaint and are frequently reported as the initial symptom among patients with malignant brain tumors, it was speculated that headaches or migraines should be treated as risk factors for the development of brain tumors or merely be considered as the "first sign" of brain neoplasms (**Kurth et al., 2019**).

Anxiety levels were higher in those with brain tumors. The data may, however, indicate an acute stress reaction rather than the anxiety itself because the anxiety evaluations were only done one week before and after the operation. Patients with right posterior lesions on their brain tumors reported considerably higher degrees of anxiety compared to those with right anterior and left posterior lesions. Since mood assessments were done as soon as 2–10 days after the tumor was removed, the authors hypothesized that the patients' mood alterations may have more to do with their current state than with specific changes in the focused brain lesions (**Louis et al., 2020).**

Patients with brain tumors have reported experiencing anxiety, which has been linked to the unfavorable course of the disease, a worsening of life quality, and even higher rates of mortality (**Pranckeviciene & Bunevicius, 2019**). Anxiety among brain tumor patients has been reported by various diagnostic clinical interviews with various criteria and thresholds. Estimates of the prevalence of depression or depressed symptoms, however, were widely **(Palese et al., 2019**), from 2.8% to 95%. To assess the prevalence of depression in patients with brain tumors of various ages or sexes, educational levels, nations, brain tumor types, and grades, several screening and diagnostic scales were used. As a result, diverse conclusions about the estimated depression prevalence were produced (**Rooney et al., 2020**).

It is widely acknowledged that fatigue is one of the most prevalent and upsetting side effects of cancer and its treatment. The worldwide quality of life of cancer patients is significantly impacted by the clinical symptoms of fatigue, which can also include generalized weakness, poor mental focus, insomnia or hypersomnia, and emotional change both during and after treatment. Although the etiology of the link between cancer and fatigue is not fully understood, it appears that physiological, biochemical, and psychological abnormalities are at play. Numerous management strategies for cancer-related fatigue have been researched due to the complex nature of the condition **(Armstrong & Gilbert, 2018).**

A few physiopathological causes of weariness are abnormalities in the serotonergic system in the central nervous system (CNS), dysregulation of inflammatory cytokines, and hypothalamic regulator circuit modifications (**Horneber et al., 2017**). Furthermore,

Circadian and sleep-wake rhythm irregularities, gene polymorphisms of regulatory proteins involved in oxidative phosphorylation, B-cell signaling, pro-inflammatory cytokine production, and catecholamine metabolism (**Raaf et al., 2018**).

Due to fatigue's heterogeneous etiology and the lack of understanding of underlying mechanisms, there is no proven gold standard for treating it. Nevertheless, it has been discovered that various pharmacological and non-pharmacological methods can help to lessen weariness brought on by cancer. Exercise, counseling, managing work and rest hours, and practicing relaxation and concentration skills are all examples of psychological therapies are the non-pharmacological methods that are most frequently utilized (**Bower, 2014**).

According to the definition of cancer-related fatigue (CRF), it is "an unpleasant, persistent, subjective sensation of physical, emotional, and/or cognitive tiredness or exhaustion connected to cancer or cancer treatment that is not proportional to recent activity and interferes with ordinary functioning." The so-called "healthy" or "normal" fatigue differs significantly from the CRF because it is typically more severe, more upsetting, and less likely to be alleviated by rest. According to studies, more than 80% of BT patients report feeling exhausted throughout treatment **(Armstrong & Gilbert, 2018)**.

In individuals with recurrent malignant gliomas, the incidence of CRF may be as high as 89–94% when determined with validated and trustworthy tests designed for this population. 39% of patients with low-grade gliomas complained of fatigue up to 8 years after the end of their treatment. It has also been said that other symptoms, including discomfort or gastrointestinal issues, such as nausea and vomiting, which are typically treated with medication, are less bothersome than fatigue. The CRF may have significant psychological, economic, and societal effects (**NCCN Clinical Practice Guidelines inOncology, 2019**).

According to an expert neurological assessment, nurses play a crucial role in the care of adults undergoing various stages of treatment for brain tumors and are essential to the patient's overall result. They also play a key role in the health education of these patients. For thebest nursing intervention and education to benefit the patient's health, the nurse must be fully informed of their needs (**White et al., 2017**).

Significance of the study:

Anxiety, weariness, and headaches were reported by 55% of patients with brain tumors ina prospective cohort study (McCarty et al., 2017). Any educational endeavors intended to enhance patients' hygienic practices and Patient education is the term used to describe health status. The main objective of this treatment is to maintain or improve the patient's health, or in some situations, to prevent further decline. Patients who are well-informed and educated can take an active role in their care, enhance results, spot mistakes early, and shorten their hospital stays. Medical information and preventative strategies about health and well-being are a part of health education's medical component. According to studies, identifying patients' many critical requirements is the first step in effective health education (**Pachman et al., 2018**).

Cognitive-behavioral therapy and educational therapy are two of the psychosocial interventions that have been demonstrated to have a major positive impact on patients, along with counseling and support groups. In addition to introducing new ideas about energy saving, self-care, and confrontation skills, educational guidelines also include general information about weariness. Energy conservation is described as tailored planning intended to improve a patient's capacity to manage fatigue throughout the entire day and prevent a decline in the patient's energy level needed to perform a task **(Pachman et al., 2018)**. So, this study was conducted to investigate the effect of the nurse-led intervention on headache pain, anxiety, and fatigue levels amongpatients with brain tumors.

Aim of the study

Investigate the effect of the nurse-led intervention on headache pain, anxiety, and fatigue levels among patients with brain tumors through:

- Assessing patients' headache pain level regarding brain tumors.
- Assessing patients' anxiety level regarding brain tumors.
- Assessing patients' fatigue level regarding brain tumors.
- Designing and implementing nurse-led interventions according to the patient's needs.

- Measuring patients' levels of headache pain, anxiety, and fatigue following the introduction of nurse-led intervention in patients with brain tumors.

Research hypothesis:

H_1-The patients with brain tumors who received nurse-led intervention expected to experience an improvement in headache pain levels less than those who did not.

H_2-The patients with brain tumors who received nurse-led intervention expected to experience an improvement in anxiety levels less than those who did not.

H_3-The patients with brain tumors who received nurse-led intervention expected to experience an improvement in fatigue levels less than those who did not.

Subjects and Method:

Research design:

A quasi-experimental research design was used to fulfill the aim of this study.

Setting:

The study was done in the neurosurgery department at Mansoura University Hospital, Egypt, This setting was chosen because it serves the largest portion of the population and because patients are highly prevalent there.

Subjects:

Sample size calculation:

The sample size was determined using the power analysis level of significance of 0.95(=1-0.95=0.5) at alpha. The significance was set at 0.05 (one-sided) with a big effect size (0.5), and the high significance was set at 0.001.

Within six months, 50 patients who met the inclusion criteria and got care from the aforementioned setting were included in a purposive sample from a population. Adult patients with ages ranging from 18 to 60 years old who attended the aforementioned location, were completely oriented, were between the ages of 20 and 60, and accepted to participate in the study met the inclusion criteria. Before being released from the neurosurgery department, the patients were followed up with for a month. Patients who failed to cooperate, were disoriented, or were using mechanical ventilation were all excluded.

Data collection tools:

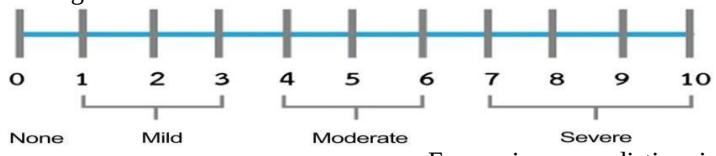
The following four instruments were used to gather the study's data:

Tool I: A structured interview questionnaire The researchers created it after analyzing the pertinent research studies and literature (**Pachman et al., 2018; Zeng, et al., 2018; and Yennurajalingam & Bruera, 2019**); it had two parts:

Part 1: It contained the patients' personal information, such as their age, education level, employment, and place of residence.

Part 2: It included information about the past and medical history, including previous neurological issues (more than one), the existence of chronic illnesses, previous neurosurgical treatments undergone, the type of tumor, and family history.

Tool (II):- Numeric Pain Rating Scale (NRS) adopted from **John et al, (2008**), used for assessment of the pain intensity, the child is asked to indicate the numeric value on the segmented scale that best describes their pain intensity, consists of (11 points) numeric rating scale, with 0 representing "no pain" and 10 "unbearable pain. It was used twice in an individual interview with researchers pre and post-manipulation.



Tool (III):- State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory developed by **Spielberger** (1972) to detect the State-Trait Anxiety level, is a self-assessment questionnaire consisting of short statements. 20 items asked participants to describe how they felt about themselves in a specific context and under certain circumstances, taking into account how they felt about the situation in which they were present.

Expressions are distinguished in this section by their direct and reverse relationships. Using the SPSS program in a computer setting, the scoring was completed. For both the direct and inverted expressions, initially, two distinct scales were created. The weighted total score for negative expressions was deducted from the weighted total score for direct expressions after being positive for direct expressions and negative for negative questions.

Scoring system:
The scale items are scored as "none" (1), "some" (2), "many" (3), and "entirely" (4) and measure the degree of State-Trait Anxiety. The average score is 80, with 20 being the lowest.

Tool (IV): Fatigue assessment scale:

This measure, a 10-item rating scale that was independently constructed, was adapted from **Kleijn et al., (2011**) which evaluates people's level of fatigue throughout a week of activity in terms of their physical, social, psychological, and spiritual well-being, as well as how it relates to the time of day. Total scores can range from 0 to 100. scores might be anywhere from 0 (no weariness) to 10 (worst possible). No weariness, hardly any, light, moderate, severe, and worst are denoted by 0, 1, 9, 10, 31, 60, 61, 80, and 81, respectively. With a Cronbach's alpha of 0.81 for the overall score, the scale's reliability is regarded as good.

Validity of the tools:

The content validity of the tools, their clarity, comprehensiveness, appropriateness, and relevance were reviewed by five experts; three professors in Medical- the medical-surgical nursing field and two professors; in the Psychiatric nursing field. Modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

Reliability of the tools:

State-Trait Anxiety Inventory reliability is considered good with Cronbach's alpha of 0.87 for the total score. The Numeric Pain Rating Scale reliability was (r = 0.94). A structured interview questionnaire reliability was (r = 0.93).

Methods of data collection:

Ethical considerations:
The Mansoura Faculty of Nursing's Ethical Research Committee's approval was required before the study could be conducted. To explain the study's objectives and obtain their consent, the researchers visited with the medical and nursing directors of the chosen settings. Patients' written agreement was acquired to secure their cooperation. In this letter, authorization was requested for data collection, and the purpose of the study was described along with the anticipated results from its implementation. Adult patients heard an explanation of the study's goal. The Patients were told by researchers that participation in the study was completely voluntary and that they had the right to decline. Patients were free to leave the trial at any time.

A pilot study
10% (5 patients) of the entire sample were used in a pilot study to assess the feasibility and clarity of the research methodology. The tools' ultimate form was developed without any alterations. The research study includes the patients who participated in the pilot.

Fieldwork:
Three stages make up the actual study:

A- Assessment phase:

50 patients were included in the study's assessment phase. The patients who attended the previously chosen settings three days a week from 9 a.m. to 1 p.m. on the morning shift (Sunday and Monday) provided the researchers with the data. From June 2021 through the end of November 2021, data were gathered throughout 6 months. Each interview questionnaire was finished in about 40 to 50 minutes.

B- Implementing Phase:

In the waiting room present in the previously chosen settings, the researchers met patients one-on-one and introduced themselves before outlining the purpose of the study. To assist the patients in filling out their responses with the tools, the researchers conducted face-to-face interviews and read the questions and potential answers to them. After choosing the patients who met the criteria for inclusion, the purpose and significance of the research project were discussed.

After analyzing the pertinent literature based on the evaluation of the actual needs of the examined patients, the streamlined booklet was used as a supportive material and delivered to adult patients in the Arabic language to cover every aspect surrounding brain tumors. Various instructional techniques, including lectures, dialogues, images, and posters were used.

The nurse-led brain tumor intervention was created and put into action by researchers. It was put into practice via lectures, posters, instructional movies, play scenarios, and role-plays. An educational pamphlet with illustrations and rudimentary Arabic writing

Patients were given information about brain tumors that had been prepared by the researchers.

The subject material was divided into 4 sessions, each lasting between 20 and 30 minutes. For each one, the total time was two hours. The nurse-led intervention for brain tumors was introduced at the start of the first session, and each one thereafter began with a summary of the session's input.

The nurse-led intervention included brain tumors as follows:

Brief descriptions of the brain's anatomy and how to prepare for various diagnostic procedures

- The advantages of surgical management, as well as systemic and neurosurgical postoperative problems following brain tumor surgery
- Information on postoperative medical care that can be used to lessen or prevent difficulties after surgery.
- Seizure management techniques
- Nutrition
- Weight management
- Rest
- Exercises and physical activity
- Quitting smoking
- Taking good care of the wound site;
- Reducing stress;
- Effective communication
- Radiotherapy and chemotherapy
- Regular follow-up

C-Evaluation Phase: Each patient underwent a second interview one month later to evaluate their level of pain, anxiety, and weariness. The same instruments (II, III, and IV) were used to reassess the adult patient.

D-Administrative design:

The Directors of the Neurosurgery Department received administrative approval to carry out this study through a letter provided by the Dean of the Faculty of Nursing at Mansoura University.

Statistical analysis:

SPSS for Windows, version 20, was used for both data entry and statistical analysis. Descriptive statistics were used to represent frequencies and percentages for qualitative variables and means and SDs for quantitative variables. The t-test for differences between the two means was applied. Test of Chi-square (x2) compared qualitative parameters with this. The Pearson's correlation coefficient test () was employed. P-value was used to determine statistical significance at <0.05.

Results:

60% of the patients in the study were between the ages of 40 and 60, according to **Table 1.** 70% of the sample's participants were male, 44% had a secondary education, 68% were employed, and 62% lived in metropolitan areas.

Table 2: Displayed that (90%) of the patients under study had neurological issues in the past, (52%) of the patients under study had a chronic illness, (54%) of the cancer patients under study had chemotherapy administered to them, and (100%) of the patients under study had received anticonvulsant medication, analgesics, and antibiotics. 90 percent of them received steroids. Finally, benign brain tumors were seen in 70% of the patients investigated.

Less than two-thirds (64%) of the patients in the study had no history of the disease in their families, according to **Figure 1.**

Figure (2) showed that 70% of the patients who participated in the study said that their primary source of knowledge concerning brain tumors came from their doctors.

Following a month of nurse-led care, patients in **Table 3** show a highly statistically significant reduction in pain score (P 0.001) and a statistically significant difference.

Table (4) demonstrates that the anxiety mean ratings were lower before the nurse-led intervention than they were following it, with a statistically significant difference between the two (p 0.001).

Table (5) shows the frequency and percentage distribution of patients' fatigue levels before and after a nurse-led intervention. It was found that patients with lower fatigue level scores experienced a significant reduction in their degree of weariness.

According to **Table 6,** after a month of nurse-led intervention, the study participants' fatigue scores decreased in a very statistically significant (P0.000) way with a statistically significant difference.

Table (1): Personal data of the studied patients (n=50)

Items	No.	%
Adult patients ' age in years		
21< 30 years	4	8
30< 40 years	16	32
40 - 60 years	30	60
Gender		
Male	35	70
Female	15	30
Education level		
Illiterate	5	10
Read and write	3	6
Secondary education	22	44
Higher education	20	40
Occupation		
Working	40	68
Not working	20	32
Residence		
- Rural	19	38
- Urban	31	62

Table (2): Frequency and percentage distribution of the studied patients regarding their past and medical data (n=50)

Item	No.	%
Previous neurological problems:		
- Yes	45	90
- No	5	10
Presence of chronic illness		
- Yes	27	52
- No	24	48
Previous neurosurgery		
- Yes	0	0
- No	50	100
Treatment received		
Radiotherapy	23	46
Chemotherapy	27	54
Anticonvulsants medication	50	100
Analgesics medication	50	100
Antibiotics	50	100
Steroids	45	90
Type of tumor		
- Benign	35	70
- Malignant	15	30

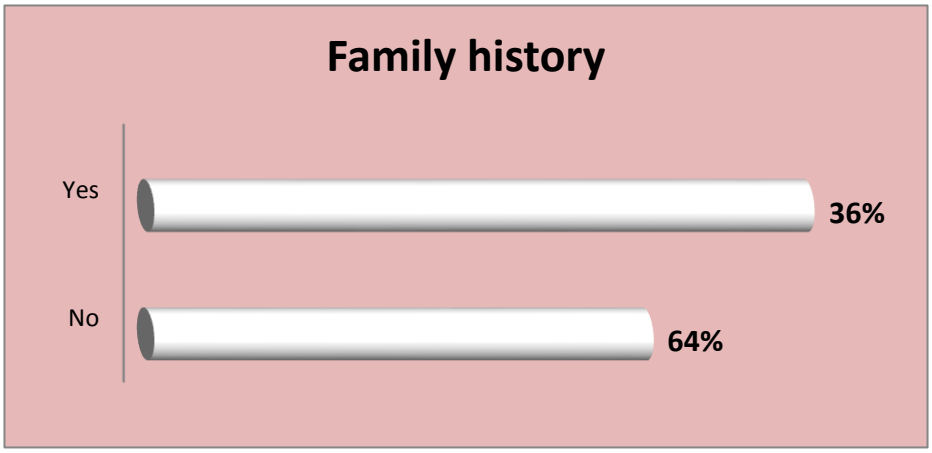


Figure (1): Percentage distribution of the studied patients regarding their family history (n=50)

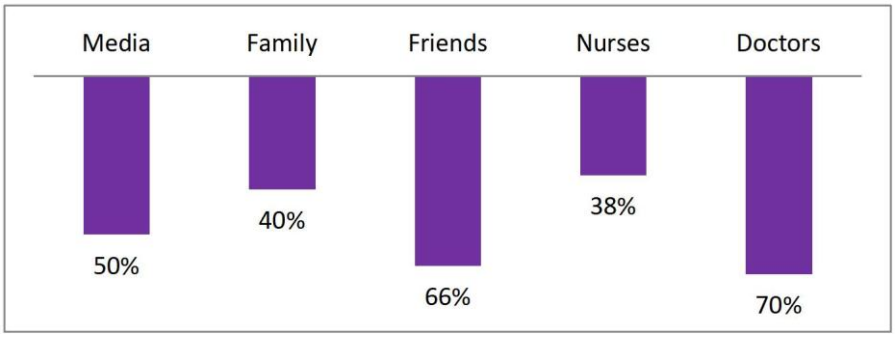


Figure (2): Source of knowledge regarding brain tumors among the studied adult patients (n=50)

Table (3): Comparison between patients' pain mean scores pre and post-one month of nurse-led intervention regarding brain tumors (n=50)

Items	Pre nurse-led intervention	Post-nurse-led intervention	P- value
Pain score	6.69 ± 2.47	2.73 ± 2.17	0.138 (<0.000*)

*Highly Significant at 0.0001 levels

Table (4): Comparison between patients' anxiety mean scores pre and post-one month of nurse-led intervention regarding brain tumors (n=50)

Items	Pre nurse-led intervention	Post-nurse-led intervention	P- value
Anxiety score	39.49 ± 4.43	24.13 ± 2.36	0.142 (<0.000*)

*Highly Significant at 0.0001 levels

Table (5): Fatigue level of the studied patients' pre and post-nurse-led intervention (n=50)

Fatigue level	Pre nurse-led intervention		Post-nurse-led intervention		T	P-value
	No	%	No	%		
No fatigue (0)	0	0.0	4	8.0	17.025	<0.001*
Very little (1-9)	0	0.0	11	22		
Mild (10-30)	0	0.0	20	40.0		
Moderate (3- 60)	22	44	15	30		
Severe (61-80)	15	30	0	0.0		
Worst (81-100)	13	26	0	0.0		

Table (6): Comparison between patients' fatigue mean scores pre and post-one month of nurse-led intervention regarding brain tumors (n=50)

Items	Pre nurse-led intervention	Post-nurse-led intervention	P- value
Fatigue score	27.76+ 4.03	14.03+ 1.43	0.123 (0.0001*)

*Highly Significant at 0.0001 levels

Discussion:

From the time of diagnosis until death, patients with brain tumors are thought to experience pain, anxiety, and fatigue as their most frequent symptoms. These symptoms are described as a distressing, enduring, and irrational feeling linked to physical, cognitive, and emotional fatigue that impairs daily functioning **(Bower, 2014)**

According to the results of the current study, less than three-quarters of the overall sample were men, and three-fifths of the patients were between the ages of 40 and 60. These results are comparable to those of a study by **Bin-Madhi**, published in **2017**, titled " According to a study titled "Brain tumors excision guided by neuronavigation: Practical application and outcomes," men had a higher risk of developing brain tumors than women did, with a mean age of 47 years old.

The majority of the patients in the current study had prior neurological problems, according to the study's findings. The more frequent clinical signs of brain tumors, according to **Urden et al. (2016) and Krucik (2018**), are headache, drowsiness, visual abnormalities, consciousness change level, seizures, and impairment in motor function.

The findings of this study showed that adults who were evaluated had chronic diseases in greater than 50% of cases. This finding is comparable to that of **Edlinger et al. (2016),** who investigated "Blood Pressure and Other Metabolic Syndrome Factors and Risk of Brain Tumour," discovering that 30% of the study group had hypertension. Therefore, individuals with high blood pressure may be at increased risk for brain tumors. Additionally, **Tong et al. (2018**) revealed similar findings in their study on "Diabetes

mellitus and risk of brain tumors," which found that women with diabetes had a 24% increased chance of developing brain tumors.

According to the study's findings, all of the patients evaluated received anticonvulsant medicine, analgesics, and antibiotics, and more than half of them had chemotherapy. Steroids were given to the majority of them. Patients with brain tumors need a range of medical therapies, according to **White et al. (2017**). Anticonvulsant drugs are routinely administered to prevent the potential of seizures. Usually, antibiotics are taken to treat infections. After intracranial surgery, analgesics are frequently administered to lessen pain, and steroids are typically given to lessen cerebral edema.

Less than two-thirds of the patients in the study had no family history of cancer, according to the family history of the patients. From the researchers' perspective, it demonstrated the possibility that the patients under study also had cancer.

Less than 75 percent of the survey subjects indicated that their primary source of information on brain tumors came from doctors, according to the study's findings. This shows, in the opinion of the researchers, that patients are guided appropriately when seeking treatments and assistance for such chronic disorders.

Regarding the study subjects' pain scores, it was noted that after receiving nurse-led intervention for one month, there was a very statistically significant decline in pain scores with a statistically significant difference (P 0.001). According to the researchers, this outcome demonstrates the beneficial impact of nurse-led interventions that match patients' needs and give them the information they need to preserve their health and lessen their discomfort.

The results of the present study demonstrated that anxiety mean scores were lower pre-nurse-led intervention than their anxiety mean scores post-nurse-led intervention, with a statistically significant difference between pre and post-nurse-led intervention.

The nurse-led intervention had a positive effect on lowering anxiety levels, according to the researchers, and this study supported that conclusion. These demonstrated the considerable changes in the patient's anxiety that represented the primary objectives of the implementation of the nurse-led intervention. This development highlights the fact that the majority of patients have a great desire to learn more about their problems and to demonstrate the impact of the nurse-led intervention. This finding is consistent with that of **Youssef and Hassan (2019**), who discovered that following the application, the anxiety level in the study group was decreased.

According to the study's findings, after receiving nurse-led brain tumor management for one month, the average fatigue score among the patients was statistically significantly lower. The purpose and hypothesis of the current investigation supported these findings. These findings are consistent with **Parth et al., (2020)**'s research on "Patients with Primary Brain Tumors Rehabilitation," which found a reduction in fatigue following the rehabilitation program. According to the researchers, the implementation of the teaching recommendations for brain tumors was successful.

Piper and Stewart (2009) found that an effective health education program will result in long-lasting improvements that demonstrate increased awareness of specific medical and health-related topics, which results in changes that support these findings. Effective health education will result in both temporary and permanent behavioral changes that lessen risky behavior and lessen or prevent numerous postoperative problems. Evaluator observations and learner comments can be used to document these behavioral changes.

Conclusions:

Based on the findings and research hypotheses of the current investigation, the study results concluded that the implementation of the nurse-led intervention had a good impact on lowering headache pain, anxiety, and fatigue levels among brain tumor patients.

Recommendations:

The following suggestions are made in light of the findings of the current study:

- Nurse-led interventions involving brain tumors should be undertaken, covered, and incorporated into rehabilitation programs.
- To improve patients' knowledge and lower their levels of pain, anxiety, and fatigue,

Nurses should teach them about brain tumors using the booklet and illustrated pamphlets foreach patient.

- To generalize the results of the current study, it needs to be repeated with a larger sample of patients who have brain tumors in various settings.

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