IMPROVING THE INTERPROFESSIONAL TEAMS' KNOWLEDGE, CONFIDENCE, AND SELF-EFFICACY IN THE CARE OF ADULT BRAIN TUMOR PATIENTS

by

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ABSTRACT

MARGARET A. MCDONNELL. Improving the Interprofessional Teams' Knowledge, Confidence, and Self-Efficacy in the Care of Adult Brain Tumor Patients. (Under the direction of DR. KATHLEEN S. JORDAN, DNP)

Purpose:

The purpose of this educational project was to determine whether interprofessional team members who participate in a structured educational session demonstrate an increase in knowledge, confidence and self-efficacy in the care of adult brain tumor (ABT) patients. The aim was to evaluate baseline ABT knowledge of neuroscience registered nurses (RNs) and advanced practice providers (APPs) and to identify barriers associated with specialized educational programs.

Methods:

An evidence-based education program on ABT's was developed and delivered to neuroscience interprofessional team members in a single institution in Charlotte, North Carolina. Three measurement tools were used for data collection. One tool was used to collect demographic information, one was used for a knowledge pre/post-intervention and one for the participants to rate their confidence level. RNs and APPs functioning in a neurosurgical, neurointensivist or neurohospitalist role were eligible to participate. Travel RNs were excluded.

Results:

Seventeen care providers participated in this project. Descriptive statistics were used to analyze the demographic characteristics of the participants, belief in supplemental education, and pre/post-intervention knowledge assessment items. McNemar's test for paired binary data and StataCorp v.16 statistical software (2019) were used. Six participants recalled prior education specific to ABTs and 94% (n=16) believed additional education would be beneficial. A statistically significant increase in correct responses from the pre-posttest was seen in one question pertaining to histological grading classification system (p=.031). The lowest response recorded on the confidence survey was regarding the APP's level of comfort in discussing treatment plans with patients and caregivers.

Implications:

The results of the project created a basis for understanding neuroscience team members level of knowledge and confidence. Further study is needed to determine effective educational strategies for the neuroscience team.

***Keywords*:** brain neoplasm, clinical guidelines, specialized training

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List of Abbreviations

AANN	American Association of Neuroscience Nursing
ABTA	American Brain Tumor Association
APP	advanced practice providers
CBTRUS	Central Brain Tumor Registry of the United States
CDSR	Cochrane Database of Systematic Reviews
CENTRAL	Cochrane Central Register of Controlled Trials
CNS	central nervous system
PICO (T)	population, intervention, comparison, outcome, time
RN	registered nurse
SWOT	strengths, weaknesses, opportunities and threats

Chapter 1: Introduction

A brain tumor is a collection or mass of abnormal cells that develops in the brain and may occur in individuals at any time during the lifespan. These tumors originate from different kinds of cells, such as astrocytic tumors which arise from astrocytes or meningiomas which develop from meningothelial cells. They may occur as primary (originating from the brain) or secondary (metastatic) lesions and can be benign or malignant. Due to the degree of variability and extensive nature of a brain tumor diagnosis, these patients require specialized care; however, many interprofessional team members have no additional or specific training in the unique neurological and oncological aspects of these patients' care (De'Magalhaes et al., n.d.).

The incidence of primary brain tumors, both malignant and non-malignant, in American adults is 23.03 per 100,000 people, as referenced by the Central Brain Tumor Registry of the United States (CBTRUS, 2019). In data published by the American Brain Tumor Association (2019), the number of new primary brain tumors diagnosed in 2019 was approximately 86,970. Approximately 32% of these primary brain lesions are malignant, while the remaining 68% are benign (ABTA, 2019). Additionally, the incidence of metastatic brain tumors which originate outside of the central nervous system is unknown however, it is known that 80% of cancers are associated with their ability to metastasize to the brain (National Brain Tumor Society, 2019). More specifically lung, breast, renal, colorectal and melanoma are all known to metastasize to

the brain which results in somewhere between 56,000 and 500,000 metastatic cases a year (National Brain Tumor Society, 2019).

Background

Globally, primary brain and central nervous system (CNS) cancer has been increasing over the past several decades, with a 17.3% increase in the incidence of CNS cancer between 1990 and 2016 ("Global, Regional, and National," 2019). Considering this significant increase in incidence, it is understandable how the burden of CNS cancer on the healthcare system would be very high. The cost of healthcare for these patients is often exceedingly high, not only because of treatment and mortality rates but also due to the disabling functional effects that brain tumors have on their victims ("Global, Regional, and National," 2019, p. 376).

The diagnosis, management and treatment of brain tumors consists of multiple therapeutic modalities requiring access to neurosurgical and critical care, oncological and radiation-oncology care. As a result, following initial presentation through primary care or emergency services, the patients are frequently thrust into a whirlwind of specialist evaluations and inpatient treatment. While hospitalized, these patients are often cared for on medical-surgical and neuro intensive care units, rather than oncology. The care teams on these floors may be well versed in neurological disorders, but have no oncological training, while others may be medical-surgical or critical care certified but have no specialized neuro-oncology knowledge. The complex management of these patients

necessitates a highly specialized interprofessional approach to provide excellent evidence-based care to patients.

Problem Statement

At the forefront of inpatient adult brain tumor patients' care are registered nurses and advanced practice providers (APPs). In order to achieve the delivery of evidence-based care to this patient population, it is imperative that these interprofessional team members have a foundational understanding of the pathophysiology of symptoms, supported interventions and treatment plans. This knowledge empowers team members to provide comprehensive care to brain tumor patients and their caregivers (Siegel & Armstrong, 2018). The clinical management and guidance that brain tumor patients require while inpatient is not well defined at the project lead's clinical institution, despite the complexity of this population. Additionally, in the neuroscience intensive care unit, there is no requirement for registered nurses to become neuro certified. Without the application of evidence-based practice research to improve patient care and outcomes, the quality of care is lacking (Zaccagnini & White, 2017). In a search for current evidence-based research on nursing or inpatient protocols for brain tumor management, there has been a notable lack of literature. Rather, research studies are significantly more prominent in other cancer areas, such as lung or breast cancer.

Purpose and Significance of Project

The purpose of this clinical project was to determine whether time allotted for specialized education to interprofessional team members improves their knowledge and

confidence in the care of brain tumor patients. Because of the hands-on, 24/7 bedside care that registered nurses provide, the ability for nurses to thoroughly assess and evaluate their patients and then translate that information to the provider is crucial to positive outcomes for these patients. Similarly, the APPs, whether nurse practitioners or physician assistants, often provide a substantial amount of care and direction for the management of these patients, albeit with the supervision of a physician. Through an increase in the interprofessional team's knowledge, it is postulated that brain tumor patients will be affected by an improvement in the quality of healthcare they receive.

The project is also significant in its potential to provide information on the use of additional education for interprofessional team members, in areas other than neuro-oncology. While the educational nature of the project focused solely on adult brain tumor content, the principles relating to participants self-assessed need for further education as well as increased knowledge on a specific topic, is translatable.

Clinical Question

The clinical PICO(T) question guiding this scholarly project is: do members of the interprofessional team who participate in a structured educational session, compared to experiential-knowledge alone, demonstrate an increase in knowledge, confidence and self-efficacy in the care of brain tumor patients?

The population addressed in this question are interprofessional team members, comprised of registered nurses and advanced care providers, specifically in the neuroscience intensive care unit, neuroscience intermediate care unit and post-operative

unit(s). The project lead utilized current evidence-based research and clinical practice guidelines for care of the adult patient with a brain tumor to develop an educational lecture as the intervention. The comparison of experiential-knowledge alone was gauged based on a pretest and posttest model evaluation. Subsequently, the outcome was measurable based on changes in knowledge level, confidence, and self-efficacy appreciated in the pretest/posttest results.

Project Objectives and Outcomes

The primary objective of this clinical project was to determine whether interprofessional team members who participate in a structured educational session, compared to experiential knowledge alone, demonstrate an increase in knowledge, confidence and self-efficacy in the care of brain tumor patients. At the culmination of the clinical project, the project lead aimed to have evaluated registered nurses and advanced practice providers working in neuroscience for baseline knowledge of brain tumor pathology, care and national standards of treatment. The identification of barriers associated with the utilization of specialized educational programs for neuroscience staff members in our institution as well as evaluation of the effectiveness of an educational program through comparison of pretest and posttest results, were also main objectives. Lastly, the formulation of a permanent evidence-based educational program for new neuroscience registered nurses and advanced practice providers was a goal established by the project lead.

Similarly, the main expected outcome from the clinical project was to have increased neuroscience registered nurses and advanced practice providers' knowledge and awareness of brain tumor pathology, care, and national standards of treatment, measured by pretest/posttest evaluation. Seeing an improvement in the participants' subjective report of confidence and self-efficacy following the intervention was a second anticipated outcome. Lastly, the long-term utilization of the evidence-based educational protocol for all new neuroscience registered nurses and advanced providers was a desired outcome.

Chapter 2: Literature Review

A review of literature published between 1998 and 2019 was conducted using PubMed/MEDLINE, CINAHL Plus, Cochrane Database of Systematic Reviews (CDSR) and Cochrane Central Register of Controlled Trials (CENTRAL) with the following search words: brain tumor, brain neoplasm, glioblastoma, meningioma, glioma, brain metastases, nursing interventions, nursing care, advanced practice guidelines, medical interventions, management of, care guidelines, education protocols, clinical guidelines and specialized training. Articles ranged in level of evidence from I to VI but were included if there was clinical significance. Database search inclusion criteria included articles that focused on nursing specialty education on brain tumors, standards of care, and nursing protocols. Articles were excluded if they did not offer clinical significance to the project, therefore, while 28 articles were thoroughly reviewed, only 14 were incorporated into the final literature review.

There was a notable gap in the literature in regard to specific protocols, interventions, and knowledge related specifically to the interprofessional team caring for brain tumor patients. Consequentially, much of the literature search identified studies related to the role of the interprofessional team, primarily nursing, in education and implementation of interventions in cancer and neuroscience patients. The themes found in the literature centered around specialization within nursing, the extensive involvement that nursing has in the care of patients and protocols surrounding the specific care of adult brain tumor patients.

Specialization

The need for specialization within nursing and advanced practice care remains somewhat controversial, with no clear consensus on whether it is essential or not. Turris et al. (2007) provide a historic description of specialized nursing and explored the current issues associated with specialization. Although their article specifically focused on emergency medicine specialization in Canada, they discussed the varying philosophies on the value of specialized certificate programs. The authors wrote that the Canadian Nurses Association currently has 17 certification exams available, including in Neuroscience, but a relative absence of advanced education and professional development opportunities exists, presenting challenges to building a body of professional knowledge (Turris et al., 2007).

Slusarz (2019) analyzed the professional development of neuroscience and neurosurgical nurses in Poland, noting that the career path for neuro-nurses is unregulated and varies among countries. He conducted a study with the use of a survey questionnaire on a group of 93 nurses in 6 neurosurgical centers. The survey revealed that no specific training for neurosurgical nurses was demonstrated and lack of time for training and interesting training topics were cited as the most common problems associated with lack of professional development (Slusarz, 2019).

The value of specialized neurosurgical nurses was explored in a case study vignette utilized by Westcott & Dunn (1998). The case study vignette was administered to two groups of 75 participants, consisting of nurses from neurosurgery, general surgery, and general medicine. The vignette tested their knowledge of clinical care in

neurosurgical scenarios and data analysis was completed with Mann-Whitney tests in categories of neurosurgery vs. general surgical, neurosurgery vs. general medical and general surgical vs. general medical (Westcott & Dunn, 1998). The results of the study showed that the scores of even the least experienced neurosurgical nurses was higher than that of general nurses at all levels, including expert level (Westcott & Dunn, 1998).

Perhaps most applicable to this specific scholarly project was an article published in *American Association of Critical Care Nurses News* on a neuroscience intensive care unit at Tampa General Hospital (Eggleston, 2009). The article discussed the development of a culture of specialty certification in the neuro ICU and the purposeful commitment to cultivating specialized care. The descriptive study acknowledged difficulties associated with successfully creating this culture and how this was helped by direct reimbursement by the hospital for exam fees and study material. After completion of certification, registered nurses were acknowledged and congratulated on their accomplishments (Eggleston, 2009).

McKenzie et al. (2017) wrote that "interprofessional education offers an opportunity to engage multiple professions in interactive learning and clinically relevant problem solving to achieve high-quality patient-centered care" (p. 232). In their qualitative study, McKenzie et al. (2017) involved 95 participants who were trained on a variety of strategies to decrease the fall risk in a geriatric population. The practice and teaching teams consisted of medicine, nursing, pharmacy, social work and gerontology members to create a collaborative approach, and the researchers compared knowledge

increase from pre- and postworkshop (McKenzie et al., 2017). The results after the workshop revealed that participants' knowledge improved significantly, as did the learners' confidence in fall risk assessment and reduction of risk.

Involvement in Patient Care

Oncology nurses are actively involved in delivering complex and diverse interventions across the entire cancer spectrum. In the systematic review completed by Charalambous et al. (2018), 214 studies were used to demonstrate that the majority of cancer nurse-led interventions are delivered by specialized cancer nurses. Despite this, the study revealed gaps for future research, as cancer nurse-led trial evidence focuses primarily on mixed cancer groups, breast or prostate cancer (Charalambous et al., 2018). There were no studies conducted on brain cancer for the authors to review, demonstrating that further studies need to be completed on the effect of nurse-led care in brain cancer (Charalambous et al., 2018).

The nursing role in patient education regarding outpatient neurosurgical procedures was studied by Zanchetta & Bernstein (2004). Using an exploratory design, they interviewed a small number of patients who had recently undergone craniotomy for tumor biopsy or resection to gain feedback on patient perspectives (Zanchetta & Bernstein, 2004). Data from the patient interviews were evaluated using content analysis and demonstrated a need for further studies to validate the role and impact of nursing education on patient outcomes (Zanchetta & Bernstein, 2004).

In a similar study, Thakur et al. (2019) utilized a randomized control trial to assess the effectiveness of nurse-led interventions on symptoms of post-operative patients with intracranial tumors. The patients in the experimental group who received nurse-led interventions had significantly fewer behavioral symptoms. Additionally, caregivers in the experimental group also had less severe distress compared to the control group, contributing to the value found in nurse-led interventions with patients and their families (Thakur et al., 2019). The role of nurses and advanced practice providers in quality improvement and patient safety cannot be underestimated. Because of the many hours of patient contact that nurses have with patients, nurses are perfectly positioned to assume a major role in quality improvement initiatives to implement best scientific evidence and evidence-based practice (Hickey & Giardino, 2019).

Care of Brain Tumor Patients

J. Mohammed (2019) wrote that the National Cancer Patient Experience Survey recently reported that the care of brain tumor patients is less positive compared to other cancer sites, likely due to unmet care needs of this patient subset. Mohammed (2019) completed a qualitative project to explore registered nurses' experiences of primary brain tumor patients care and to identify knowledge and skills that may be lacking or would limit them. Only three registered nurses participated in the study however, it highlighted that senior nurses were significantly more knowledgeable and aware of the needs of their patients (Mohammed, 2019). The project findings emphasized that novice or even competent level nurses felt that they had very limited experience, confidence or

knowledge to care for adult patients with primary brain tumors. They recognized that additional education and training was necessary in order to provide staff with confidence and knowledge to holistically care for the needs of primary brain tumor patients (Mohammed, 2019).

The American Association of Neuroscience Nursing (AANN) published nursing recommendations from "evidence obtained from the scientific and clinical work of multiple disciplines" (Blissitt, 2014, p.3). The purpose of the *AANN Clinical Practice Guideline* was to summarize what is known about adult brain tumors and provide recommendations. The clinical practice guideline was the culmination of extensive literature review and includes content of epidemiology, brain tumor classification, pathophysiology, clinical features, diagnostic tests, surgical management, radiation therapy, chemotherapy, symptom management, psychosocial and educational needs of patients and families, as well as end of life care (Lovely et al., 2016). The intervention and measurement tools developed for this scholarly project will be largely based on the evidence-based research and recommendations presented in the *AANN Clinical Practice Guideline*.

There are many areas surrounding adults with brain tumors in which nursing and advanced practice providers play a significant role. In an article that specifically described needs of the glioblastoma patient, the author discussed the instrumental role that nurses play on the care team (Davis & Mulligan-Stoiber, 2011). Through effectively managing symptoms and treating side effects, oncological nurses and advanced practice

providers are present to help foster patients' hope, optimum level of function and quality of life (Davis & Mulligan-Stoiber, 2011). The use of an educational intervention will help neuroscience nurses and advanced practice providers in caring for the adult brain tumor patient by imparting knowledge to them. In a quantitative study evaluating the knowledge of palliative radiotherapy treatment in oncology and palliative care nurses, over half reported insufficient knowledge of radiotherapy and 94% felt that they could benefit from more education on radiotherapy and its use in oncology (Hayden & Connolly, 2019). Palliative radiotherapy is an effective modality for improving the quality of life for patients who have advanced cancer, with associated painful symptoms (Hayden & Connolly, 2019). This is just one example of a treatment modality used for cancer patients and oncology nurses felt that they could use more education on the topic.

Conceptual Framework

For this scholarly project, Lewin's Theory of Planned Change was utilized as the theorical framework. This theory was chosen because it most closely represents the stages that would be needed to successfully complete the project. Lewin's Theory involves three elements including *unfreezing*, *moving* and *refreezing*. Stage I or *unfreezing* involves getting ready for change through the use of a change agent, such as the project lead, recognizing a problem and mobilizing others to see the need for change (Shirey, 2013). The second stage is *moving,* which regards change as a process rather than a single event. The third stage of the theory, described as *refreezing*, refers to the stabilization of the change "so that it becomes embedded into existing systems such as

culture, policies and practices" (Shirey, 2013, p. 69). This clinical doctoral project evaluated the impact of a structured educational session for nursing and advanced practice providers, on knowledge, confidence and self-efficacy, in the care of brain tumor patients.

Through the application of Lewin's Theory of Planned Change, the project employed the three stages of *unfreezing*, *moving/change* and *refreezing*. The first stage of unfreezing involved the change agent using force-field analysis to determine which forces or issues contribute to the status quo (Sare & Ogilvie, 2010). This stage relates to the project lead completing the needs assessment, in which not only was the need for further education determined but also, stakeholders were assessed and determined. Although the project implementation focused on nursing staff and advanced practice providers, they are not the only individuals affected by the project. Hence, during this first stage of unfreezing, it was imperative to identify and introduce the project to all individuals who had or would have an investment in the outcome of the project. Administrative and department heads, nurse managers for the neuroscience intensive care unit and neuro post-operative floors, and the neuroscience intensive care medical director were among the internal stakeholders contacted. Their ability to understand the problem, as well as their willingness to allow their staff to participate in the project and implement the results into clinical practice change, were crucial to the project being efficacious, making it necessary to gain their approval.

The second phase of *moving/change* encompasses implementation. This stage necessitated creating a detailed plan of action and engaging stakeholders to try the proposed change (Shirey, 2013). During this phase, the project lead developed the detailed implementation plan which included a pre-test, the education presentation, and a post-test and post-intervention survey. These were two separate post-intervention evaluations; one evaluated for an increase in knowledge and the latter evaluated for an increase in confidence and self-analyses of their ability to care for this specific patient population.

In the last stage of Lewin's Theory of Planned Change, *refreezing* occurs, and the change is stabilized so that it becomes embedded into existing systems. Policies and practices become the subjects of long-term change in the refreezing period (Shirey, 2013). At the conclusion of the education implementation stage, after surveys and post-intervention evaluations were obtained and analyzed, the *refreezing* step began to work towards creating a protocol for the neuroscience department to have in place for all new hires, allowing for specialized brain tumor education. This is still in process, but the long-term goal is that this will be developed to implement through all neuroscience departments within the institute. This creates a new, higher level of performance when caring for this patient population; as a result, the institution will offer improved, competent care for brain tumor patients.

In summary, the literature search was sparse and lacking in specific articles related to specialization and continuing education for nursing. While nursing as a

profession encourages further general education such as nurses advancing from an associate degree to a bachelor or master's degree, there is an overall gap when it comes to nurses receiving certification or specialty education in their specific area of daily practice. Providing the best evidence-based care to patients, requires the continuous education of nurses and providers, expanding their knowledge and comprehension on the new and best practice research.

Chapter 3: Project Design

Effective implementation of an advanced clinical project requires strategic planning and preparation. Through this scholarly project, the project lead determined whether participation in a structured educational session, compared to experiential-knowledge alone, demonstrated an increase in knowledge, confidence and self-efficacy in the care of brain tumor patients. Through the use of an educational intervention to a specific population, the goal was that there would be a notable increase in knowledge, confidence and self-efficacy following the intervention.

Subjects

In order to create a study with enhanced intervention fidelity, the project lead determined that delivery of the intervention to two specific groups would yield the best outcomes for evaluation purposes. The intervention was implemented with registered nurses in the previously mentioned settings. Given a recent influx of nurses to these units, travel nurses with a contract >6 weeks were included. Registered nurses with travel contracts of <6 weeks or who were working as float staff were not included in the intervention. Additionally, implementation also included advanced practice providers who function in the following roles at Novant Health Presbyterian Medical Center: Neuroscience Intensive Care APP, Neurosurgical APP, or Neuro-Hospitalist APP.

Setting

The implementation setting for this scholarly project was in Charlotte, North Carolina at Novant Health Presbyterian Medical Center where there is a relatively new

and rapidly expanding neuroscience department. The plan involved participation from those employed by or who staff the neuroscience intensive care unit, neurology floor and neurosurgical postoperative floor. All three of these units play an integral role in the inpatient care and management of adult brain tumor patients and were included during implementation.

Intervention

The intervention for this scholarly project was educational in nature and took the form of a pretest, followed by an educational presentation and a posttest. The first step for implementation was to obtain the demographic data of each registered nurse or APP. Their identities remained anonymous; however, data was obtained as to years in practice, level of education, prior education related to adult brain tumors, recent care for brain tumor patients (how many in a given timeframe), and the participants belief about supplemental education regarding this topic. Next, the evaluation of participants' baseline levels of knowledge on the topic was assessed with a pre-test of 15 questions. Questions were multiple choice and matching and focused on clinical signs and symptoms, risk factors, pathology, imaging findings, initial medical and nursing interventions, postoperative care, patient discharge education and outpatient treatment plans based on pathology.

Following this, the project lead directed participants to a web-based link which led to an educational PowerPoint presentation with an interactive video. Lastly, a posttest was administered to all participants. The first portion of the posttest included the same

clinical questions that were administered before the educational presentation. Then, the second part assessed their confidence and attitudes towards caring for adult brain tumor patients, following the education. The intervention was then ready for the next step, data analysis and evaluation. Due to the COVID-19 pandemic, the educational presentation was limited to solely a virtual option.

Data Collection

Measurement Tools

An essential component to an organized and effective proposal is a well-defined plan for data collection (Bonnel & Smith, 2018). For this scholarly project, which focused on an educational intervention, there were three measurement tools utilized. The first tool was a simple demographic form which included the participants' years in practice, years in neuroscience, profession (i.e. registered nurse or advance practice provider), prior education related to adult brain tumors, recent care for brain tumor patients (how many in a given timeframe), and the participants' belief about whether they felt supplemental education is needed regarding this topic. The second portion was composed of 15 objective multiple choice and matching questions that focused on the clinical signs and symptoms of brain tumors, risk factors, pathology, imaging findings, initial medical and nursing interventions, postoperative care, patient discharge education and outpatient treatment plans based on pathology. The third measurement tool was directed towards the attitude, confidence and self-efficacy regarding care of the adult

brain tumor patient. This tool utilized a Likert scale, allowing participants to rate their level of confidence, knowledge, and skill in caring for the patient population.

Inclusion/Exclusion Criteria

Included in the study were registered nurses working at Novant Health Presbyterian Medical Center in the neuroscience intensive care unit, neurology unit and neurosurgery post-operative unit. Travel nurses with a contract >6 weeks were included. The second group included were APPs who function in the following roles at Novant Health Presbyterian Medical Center: Neuroscience Intensive Care APP, Neurosurgical APP, or Neuro-Hospitalist APP. Registered nurses (RNs) with travel contracts of <6 weeks or registered nurses working as float staff, were excluded. The goal was to have a minimum of 30 RNs and APPs included in the study.

Method and Timeline for Data Collection

The design was limited to a virtual format only, due to the COVID-19 pandemic. A PowerPoint presentation was offered virtually in combination with Qualtrics surveys to allow convenience for participants. In an effort to encourage participation, data collection was extended to occur over six weeks, rather than closing after two weeks. This allowed more time for participants to complete the surveys and education.

Data Analysis

Data analysis was conducted to determine a change in knowledge level before and after the education intervention and examine for change in confidence and self-efficacy following the education. Qualtrics was utilized due to the virtual nature of the project and

the project lead was able to personally export the data results, following survey closure. Upon completion of the intervention, the project lead was assisted with statistical analysis by a clinical data analyst. McNemar's test for paired binary data was utilized for this project, as McNemar's test is effective when the sample is dependent, with pretreatment and posttreatment scores for the same people.

Method to Maintain Confidentiality of Data

Confidentiality is an important aspect of any scholarly project, to ensure that participants privacy will be protected at all times (Polit & Beck, 2017). The demographics sheet required that the participants answer certain questions identifying things such as how long they have been licensed, practicing and in a neuroscience specialty, but they were not asked for their name or any other identifying information. In order to accurately compare the tests, participants were asked to include a unique identifier on both the pre- and post- test. The Qualtrics data was stored on a password protected computer, through the entire implementation and data analysis stages. Lastly, IRB exempt status was obtained through Novant Health and the University of North Carolina at Charlotte to ensure that the project was institutionally compliant and approved.

Project Analysis

Utilization of SWOT Analysis

As the project lead planned and prepared for program implementation, there were several strengths and resources considered. First, because the neuroscience program is

new and rapidly developing, there is great opportunity for education. There are many new nurses and new APP's who have been hired into these positions within the past 1-2 years who are in need of further education. There has been a request from administration for further education for the new hires, from experienced providers or those with specialty certifications. For this reason, the biggest strength of this project was buy-in from administration and lead physicians. Other strengths included Novant Health's designated neuroscience units at Presbyterian Medical Center and having engaged nursing leadership. A weakness considered with this project was limited time for the participants to complete the pretest/posttest and education session. While they may be willing to complete the tests and presentation, having time in their busy schedules to do so is difficult, and limited participation. Additionally, the current pandemic created additional stress on potential participants and was a limiting factor to method and study design options.

The ultimate opportunity for this project was for an ongoing educational program to be implemented throughout Novant Health institutions to better prepare new hires to care for adult brain tumor patients. As a result, patient care will improve because their care providers will have increased knowledge and confidence in caring for them. No matter the project, there will most likely always be some risk or threat to success of the project and in this project specifically, the risks were low from a financial standpoint. However, there was significant stakeholder risk, primarily when it comes to competing priorities within the organization. One valuable aspect of the project involved the project

lead identifying the barriers that are associated with registered nurses and advanced practice providers obtaining specialized training and certification in their area of practice. Multiple barriers to specialization or continuing education exist including time availability, perception of need for education, and related cost. There was also a risk that after the project was completed, there would not be support from management to establish a long-standing protocol.

Marketing Plan

The development of a marketing plan to 'sell' stakeholders on the need for the project implementation is one of the most crucial aspects of implementation planning. In the setting that the project lead implemented this project, it was important to gain not only the buy-in but also to consider the opinions, concerns, and goals of the stakeholders. The participants needed to be aware that their voices were being heard and that this project was being completed to help them, not to belittle them or add another item to their to-do list. Other stakeholders included the nursing leadership team, medical directors of the units, and the team leads, who were also involved.

In order to obtain the most participants possible, the project lead spoke individually with and emailed the nursing manager and clinical leaders for the APP groups prior to implementation. The email gave a brief outline of the project purpose, structure and goals. The project lead requested that the managers and leadership team forward the email to all of their nursing staff and APP teams, respectively.

The email was detailed with information as to the structure of the intervention: pretest, education and posttest. It also contained disclaimers, including anonymity, that the use of their responses is purely educational in nature, and that there were no financial disclosures. Lastly, the link to the Qualtrics survey was included for participants to launch the survey and presentation. This served as the initial notice to raise awareness that their participation was requested for the scholarly project.

Following this email, a reminder email was sent two weeks later, with a second request to complete the project, time requirement of 30 minutes, and the date that the survey would close. Unfortunately, recruitment was difficult and so the decision was made to extend the closure date by an additional three weeks. A paper notice was hung in the neuro-intensive care unit regarding the extension of the date and donuts were supplied to the unit as a token of appreciation and to increase incentive. At that time, a promise of further food delivery to the unit served as additional incentive, with a request that a minimum of 25 nurses participate. As a final reminder, an email was sent again four days prior to the survey closing, with the Qualtrics survey link attached.

Economic Principles

The inclusion of the economic principles of bounded rationality and cost-benefit analyses as a basis for the project was imperative to thoroughly understanding the intricacies of education in healthcare. These two economic principles were closely associated to the underlying theme(s) of the scholarly project: the need for further education and also the realization that many care providers do not recognize or are not

willing to obtain further specialized education. The project exemplified the principle of bounded rationality by evaluating registered nurses, nurse practitioners and physician assistants and noting the difference in their knowledge base, bounding the rationality of some individuals over others.

The second economic principle that was evaluated for its relationship to the educational project was that of cost-benefit analysis. Through the use of cost-benefit analysis, the project was able to evaluate the approach that individuals take in measuring the benefits of additional specialty education. The pre/posttest survey analyzed the personal economics of the participants through questioning participants as to their underlying concerns or hesitancies with obtaining further education such as cost and time.

It is the responsibility of educators to move towards overcoming bounded rationality in their staff. Rationality is bounded because of limits to knowledge, available information and time; consequentially, an increase in knowledge and information will increase the limits of individuals over time. Additionally, the cost-benefit analysis that individuals use for a specific process is most certainly affected by their level of knowledge and understanding on a particular topic. In applying this to the scholarly project, it is understandable how a nurse or advanced practice providers' perspective on need for further education would be affected and how they might, over time, change the amount of value they place on time versus benefit of education.

Chapter 4: Results

The purpose of the study was to determine if an educational intervention provided to the neuroscience interprofessional team members would improve their knowledge and confidence in the care of brain tumor patients. The implementation occurred at a single institution in Charlotte, North Carolina and was completed December 2020. The results will be discussed below and an overview of the limitations, strengths and both clinical and research implications will also follow.

Methods

Descriptive statistics were performed (counts and percentages) on participant demographic characteristics, belief in supplemental education, and pre- and post-intervention knowledge assessment items. Pre and post intervention questions were converted to binary to denote if the participant answered correctly or incorrectly (1 = correct; 0 = incorrect).

Because the data was paired, McNemar's test for paired binary data was performed, and exact significance probabilities were reported if the frequency of conflicting cells (correct/incorrect or incorrect/correct) was less than five. Statistical significance was set at $p \leq .05$ and all analysis was performed using StataCorp v.16 statistical software (2019).

Demographics

As illustrated in Table 1, there were twenty-one participants in this study and participants were split about evenly with 7 registered nurses, 7 physician assistants and 7

nurse practitioners; however, only seventeen participants completed the entire project. Given the higher number of APP participants, masters' degree (64.7%) was the leading response for highest level of education completed, although one participant was a doctoral prepared nurse practitioner (4%). Thirty-five percent of participants were in the early stages of their career and have been working for <5 years, 35.3% have been in practice for >16 years, and the remaining 29.5% fell somewhere in between. Most reported having worked at Novant for less than one year (35.3%).

Of significance, only 28% (n=6) recalled receiving education in their academic programs specific to the topic of adult brain tumors. However, 64.8% reported having cared for more than 10 adult brain tumor patients in the past 6 months. When participants were asked if they believed supplemental education regarding brain tumor pathology, patient care and treatment plans would be beneficial 94.1% responded definitely yes. Eighty-eight percent felt that supplemental education on this topic should be a requirement specifically for registered nurses who work in the neuroscience department.

Lastly, the demographic survey inquired about what participants saw as the greatest barrier(s) to supplemental education at their current place of employment. Eighty-two percent of participants responded that time constraints or scheduling conflicts are the greatest barrier to supplemental education. Meanwhile, 14% noted lack of educators and opportunity, and the remaining 9% (n=2) reported multiple factors including lack of interest in supplemental education by RNs and the COVID-19 pandemic.

Table 1. Participant Characteristics

Baseline Characteristics N = 17	Count (n) N=17	%
Provider Type		
Nurse Practitioner	5	29.4
Physician Assistant	6	35.3
Registered Nurse	6	35.3
Education level		
Bachelor's degree	5	29.4
Master's degree	11	64.7
Doctorate	1	5.9
Years worked		
0-5	6	35.3
6-10	2	11.8
11-15	3	17.7
16+	6	35.3
Years worked at Novant		
<1	6	35.3
1-3	3	17.7
3-5	4	23.5
5-8	1	5.9
8+	3	17.7

Evaluation of Knowledge

The knowledge-specific section was administered as a 15-question pretest and posttest immediately before and after the participants viewed the educational PowerPoint presentation. The mean score on the pretest was 69% with a range in score from 21% to 95% correct. Following the educational presentation, the mean score on the posttest was 77% with an increase in score range of 40% to 100%.

The question that was most incorrectly answered on the pretest and posttest was a select-all-that-apply regarding risk for brain tumors. Participants were asked to select all

the answers that were known risk factors from a list of options. The correct answer was exposure to radiation; however, only 11.1% answered this correctly on the pretest and only 29.4% answered correctly on the posttest. Although this was an increase, it was not significant. Numerical increases in post-intervention percent correct responses were also seen in the following questions: overall incidence (Pre: 52.9% Post: 76.5%), pituitary adenoma classification (Pre: 88.2% Post: 94.1%), case study tumor location (Pre: 58.8% Post: 64.7%), hydrocephalus concern (Pre: 88.2% Post: 94.1%), steroid administration by cancer type (Pre: 58.8% Post: 82.4%), and treatment of elevated blood pressure (Pre: 41.2% Post: 70.6%). However, these increases were not statistically significant. A statistically significant increase in percent correct responses was seen only in the question pertaining to histological grading classification system (Pre: 47.1% Post: 82.4%; p=.031), as noted in Table 2.

Table 2. Pre and Post Assessment of Knowledge

	Pre-Intervention N=17 **% Correct**	**Post-Intervention** N=17 **% Correct**	**p-value**
A known risk factor for brain tumors includes (select all that apply)	2 (11.8)	5 (29.4)	.375
Factors contributing to overall prognosis include which of the following (select all that apply)	13 (76.5)	13 (76.5)	1.0
The overall incidence of brain tumors is higher in men.	9 (52.9)	13 (76.5)	.125
Brain tumors are classified on the basis of histopathology and can be malignant or benign. Match... - Select one – Meningioma	15 (88.2)	17 (100)	.500

Brain tumors are classified on the basis of histopathology and can be malignant or benign. Match... - Select one - Pituitary Adenoma	15 (88.2)	16 (94.1)	1.0
Brain tumors are classified on the basis of histopathology and can be malignant or benign. Match... - Select one – Glioblastoma	17 (100)	17 (100)	1.0
Brain tumors are classified on the basis of histopathology and can be malignant or benign. Match... - Select one - Acoustic Neuroma	17 (100)	16 (94.1)	1.0
Brain tumors are classified on the basis of histopathology and can be malignant or benign. Match... - Select one - Anaplastic Astrocytoma	15 (88.2)	15 (88.2)	1.0
Brain tumors are classified on the basis of histopathology and can be malignant or benign. Match... - Select one - Grade III, Oligodendroglioma	16 (94.1)	16 (94.1)	1.0
Histological grading is a way of predicting the behavior of the tumor. Which classification system is utilized to grade central nervous system tumors?	8 (47.1)	14 (82.4)	.031*
The majority (>60%) of adult brain tumors are:	15 (88.2)	12 (70.6)	.375
A patient presents to the emergency department via EMS following a seizure. The family reports recent progressive memory loss, speech changes and headaches. You have been told that the CT and MRI revealed a tumor. Based on the patient's symptoms described, you expect that the tumor may be located in the:	10 (58.8)	11 (64.7)	1.0
What is the prognosis for glioblastoma multiforme?	17 (100)	17 (100)	1.0
Why would you be MOST concerned about the development of hydrocephalus in a patient with an infratentorial tumor?	15 (88.2)	16 (94.1)	1.0
Seizures are associated with up to 60% of primary brain tumors and up to 35% of metastatic brain lesions. Many brain tumor patients will be placed on an anti-	16 (94.1)	16 (94.1)	1.0

epileptic drug. The first line drug of choice for seizure management or prophylaxis is:			
In which of the following cancer types, would you avoid giving steroids initially, if suspected on MRI?	10 (58.8)	14 (82.4)	.125
Contrast enhancement is frequently seen in high-grade tumors.	15 (88.2)	15 (88.2)	1.0
Post-operative complications may occur following brain tumor resection or biopsy. Your patient returns from PACU following resection of a left frontal lobe tumor. Upon arrival you note that the patient's VS are as follows: T 37.6, RR 16, HR 98, and BP 194/104. You know that the MD/APC ordered a SBP range of 100-140. What are you MOST concerned about occurring, secondary to the patient's vital signs.	12 (70.6)	12 (70.6)	1.0
You know the previous patient needs blood pressure medication. What is the next step to treat the elevated blood pressure.	7 (41.2)	12 (70.6)	.125
You are assessing a patient with a large pituitary tumor and are aware that vision changes can be associated with pituitary tumors. What is your primary visual concern?	13 (76.5)	13 (76.5)	1.0

* indicates statistical significance at a $p<.05$ level

Evaluation of Confidence and Self-Efficacy

The third and final area of data collection was the participants self-assessment of confidence and regarding their level of knowledge in patient care. A Likert scale was used for this participant self-assessment. Participants reported the highest levels by selecting Agree or Strongly Agree regarding their level of confidence in their ability to identify appropriate care for adult brain tumor patients (64.7%) and confidence in their ability to understand what a patient's symptoms may be as they relate to brain tumor

location (64.7%). As demonstrated in Table 3, the lowest levels of either Agree or Strongly Agree responses were reported for comfort in ability to answer patient and caregiver questions (53.0%) and comfort in ability to discuss brain tumor treatment plans with patients and caregivers (50.0%).

Table 3. Belief in Supplemental Education

Do you recall having education in your academic program(s) on the subject of adult brain tumors?		
Yes	6	35.3
No	8	47.1
Do not recall	3	17.7
In the past 6 months, how many patients have you cared for with a confirmed brain tumor in your role as a RN/PA/NP?		
1-5	6	35.3
6-10	3	17.7
10+	8	47.1
Do you believe that supplemental education regarding brain tumor pathology, patient care and treatment plans would be beneficial to you?		
Definitely yes	16	94.1
Probably yes	1	5.9
Do you believe that supplemental education regarding adult brain tumors should be a requirement for Registered Nurses who work in a Neuroscience department?		
Definitely yes	15	88.2
Probably yes	2	11.8
What do you see as the greatest barrier to supplemental education at your place of employment?		
COVID	1	5.9
Lack of educators	1	5.9
Multiple factors	1	5.9
Time/scheduling concerns	14	82.4

I believe that I have adequate knowledge and skills regarding all aspects of adult brain tumor patient management		
Agree	7	41.2
Disagree	4	23.5
Neither	2	11.8
Strongly agree	3	17.7
Strongly disagree	1	5.9
I am confident in my ability to identify appropriate care for adult brain tumor patients		
Agree	9	52.9
Disagree	1	5.9
Neither	4	23.5
Strongly agree	2	11.8
Strongly disagree	1	5.9
I am confident in my ability to complete competent discharge education with adult brain tumor patients, regarding their follow up care/needs		
Agree	7	41.2
Disagree	2	11.8
Neither	4	23.5
Strongly agree	3	17.7
Strongly disagree	1	5.9
I am comfortable in my ability to answer patient and caregivers' questions that pertain to their brain tumor diagnosis		
Agree	8	47.1
Disagree	2	11.8
Neither	5	29.4
Strongly agree	1	5.9
Strongly disagree	1	5.9
I am confident in my ability to understand what a patient's symptoms may be, related to the location of a brain tumor		
Agree	9	52.9
Disagree	2	11.8
Neither	3	17.7
Strongly agree	2	11.8
Strongly disagree	1	5.9
PA/NP only: I am comfortable in my ability to discuss brain tumor treatment		

plans with patients and their caregivers, specific to their pathology (n=12)		
Agree	5	41.7
Disagree	2	16.7
Neither	3	25.0
Strongly agree	1	8.3
Strongly disagree	1	8.3

Discussion

Neuroscience care providers are uniquely positioned to care for adult brain tumor patients, throughout all inpatient phases of their care. The scholarly project demonstrated two specific themes, one found in the pretest survey and the second in the knowledge pretest/posttest. The demographic survey resulted in an acknowledgement by 94.1% of participants (n=16) that specialty education regarding brain tumors would definitely be beneficial. Additionally, 82.4% (n=14) of participants felt that time and scheduling conflicts are the greatest barrier to receiving supplemental education at the institution. The knowledge pretest/posttest also revealed the diversity of responses among participant subsets and revealed that a significant knowledge deficit exists. Unfortunately, there was only statistical significance seen in one of the pre-post knowledge questions.

A concern with the validity of the results, however, is that participants may not have actually viewed the entire educational presentation prior to taking the posttest. This was able to be assessed based on the duration of time from each survey, with response times ranging from 4 minutes to sixty-six minutes. This is a limiting factor which should be addressed in future research study design, as face-to-face education sessions would have reduced this issue significantly. Clinically, the results of the implementation were

significant in that the majority of participants did not recall receiving supplemental education on the topic of brain tumors and believed they would benefit from it. Future studies in this area would certainly be advisable, with recommended adjustments.

Chapter 5: Discussion

While the results of the surveys revealed both expected and unexpected findings, there were some notable weaknesses, strengths and implications associated with this scholarly project. In retrospect, certain adjustments could have been made to the study to increase the strength and validity of the project, as well as to increase participation.

Limitations

One limitation to this scholarly project was that it was completed at a single institution and the sample size was small, involving only 21 participants. Project implementation and data collection needed to be completed virtually, rather than in-person, secondary to the COVID-19 pandemic restrictions. This made recruitment particularly difficult, and the registered nurses specifically expressed concern that they did not have enough time to dedicate to participating in the project. Their availability, or lack thereof, was likely secondary, at least in part, to the additional stress and workload created by the current COVID-19 pandemic. Unfortunately, the timeline of implementation was such that the impact of the COVID-19 pandemic could not be avoided. Therefore, competing priorities for participants' time was most certainly a limitation, and the inability to complete a face-to-face session due to the pandemic also limited the outcome.

The project was potentially longer than ideal, making it more difficult for busy nurses and providers to set aside time to complete it. Another limitation was that data collection was completed immediately following the educational presentation. Long-term

follow up would better evaluate participants' level of retention and confidence level over time.

Strengths

The scholarly project also had strengths. One strength was that it aligned with leadership goals for education amongst both registered nurses and providers. While many did not take advantage of the educational opportunity afforded by the project, the neuroscience department supported the effort. Another strength was that the project served a need in our program as education is always needed on specific neuroscience topics. As was learned from the survey, most of the participants did not recall ever receiving formal education on the topic of adult brain tumors; in this way, it was a project that addressed a needed knowledge topic. Lastly, the format of the project was easily distributable. Through the use of email and Qualtrics surveys, the project was distributed in a straight-forward, virtual format.

Implications

The scholarly project also resulted in several implications for future research. Future research with improved recruitment and the utilization of a larger sample size would be essential. Because the project did not produce a statistically significant increase in education, further research is also needed to determine what type of education intervention(s) will be more effective in a busy inpatient, neuroscience setting. Additionally, the possibility that participants did not actually view the entire educational presentation prior to taking the posttest is certainly a limiting factor which should be

addressed in future research study design. Clinically, the scholarly project revealed that the majority of participants do not recall receiving supplemental education on this topic and believe that they could benefit from it. Providers and nurses alike should be educated on making evidence-based decisions for their patients.

Summary

The demographic survey resulted in an acknowledgement by 94.1% of participants (n=16) that specialty education regarding brain tumors would definitely be beneficial for them. The results of the pre-post knowledge assessment survey, while demonstrating overall improvement in scores, was not statistically significant, except for a statistically significant increase in one question response. The project also identified that 82.4% (n=14) of participants recognized time constraints or scheduling conflicts as the greatest barrier to supplemental education. Finally, the confidence survey results showed the lowest level of comfort lies in participants' ability to discuss brain tumor treatment plans with patients and caregivers, with only 50% agreeing that they were comfortable with this.

Recommendations

In the future, it would be beneficial to assess and determine what type of education intervention(s) are going to be the most effective for the inpatient neuroscience setting. As the knowledge increase was not found to be statistically significant, this educational project in its current format will not be utilized to create a permanent educational protocol in the project leads institution. However, revision of the project

implementation to an in-person educational session, when possible from a COVID-19 perspective, may make it more valuable and could be considered. The project revealed that participants believe there is a gap in their knowledge and education on the topic of adult brain tumors, but further analysis should be completed on how educators can combat this knowledge deficit and provide beneficial education in a format that will encourage participation.

Conclusion

The foundation of this scholarly project was based around the concept that the complex management of adult brain tumor patients requires the knowledge and skill of a highly specialized team in order to provide quality evidence-based care. This education-based scholarly project was therefore designed to evaluate the team members who are at the forefront of these patient's care, namely, the neuroscience registered nurses, nurse practitioners and physicians' assistants. Through the implementation of an educational session and subsequent evaluation, the goal was ultimately to increase the interprofessional teams' knowledge, confidence and self-efficacy. It was postulated that through an increase in the interprofessional team's knowledge, brain tumor patients would be affected by an improvement in the quality of healthcare they receive while inpatient.

Implementation of the scholarly project occurred with the utilization of evidence-based research and clinical practice guidelines and the outcomes were measurable based on changes in knowledge level, confidence, and self-efficacy. The results of the study

were not statistically significant from a knowledge-increase perspective, but the results provided several clinical and research implications for future studies. Finally, the scholarly project created a basis for understanding the current neuroscience team members' level of knowledge and confidence, while setting the stage for further studies on effective educational strategies for neuroscience team members.

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APPENDIX A: CONSENT ACCEPTANCE

Improving the Interprofessional Teams' Knowledge, Confidence, and Self-Efficacy in the Care of Adult Brain Tumor Patients: A Quality Improvement Educational Project

Purpose: The purpose of this project is to increase the knowledge, confidence, and self-efficacy among neuroscience care providers in the inpatient care and management of adult brain tumor patients. The objectives of this research study are: a) to examine the effectiveness of a comprehensive educational intervention program in increasing the knowledge, confidence, and self-efficacy of neuroscience care providers in the care of adult brain tumor patients and b) to identify barriers associated with the utilization of specialized educational programs for neuroscience nursing and advanced practice providers.

Eligible Participants: Registered nurses- full time, part time or per diem. Please do NOT participate if you are a float nurse. If you are a travel nurse, please participate if you have been working more than 6 weeks in your current position. If you have been working in your current position for less than 6 weeks and are a travel nurse, please do NOT participate. All Physicians' Assistants and Nurse Practitioners who receive this email link are eligible and asked to participate.

Design: The design of this educational program will involve three steps: pretest, presentation and post-test.

1.) Pretest: You will first be directed to complete a demographic survey as well as a knowledge pretest. PLEASE do not utilize google or other resources for the knowledge

testing component and answer solely off of what you know, as otherwise the results will be skewed.

2.) After the first section is completed, you will be directed to a link for the presentation.

3.) Immediately following the presentation, you will complete the post-test.

Please note that all results will be anonymous, and you will not be required to disclose your identity. This educational program will be approximately 1 hour in length.

Investigator: This study is being conducted by Margaret A. McDonnell, MSN, FNP-C, RNFA who is a Doctor of Nursing Practice Student at UNC Charlotte School of Nursing and a Nurse Practitioner for Novant Health Brain and Spine, Charlotte, North Carolina. This study is being completed under the supervision of Dr. Kathleen S. Jordan, DNP who is a Clinical Associate Professor at UNC Charlotte School of Nursing.

Risks and Benefits: This educational program is conducted in the hope of increasing the knowledge, confidence, and self-efficacy in the inpatient care and management of adult brain tumor patients. There is no risk to patients.

Voluntary Participation: Your participation in this project in completely voluntary. You may withdraw at any time without any negative consequences.

Conflict of Interest: The investigator has no conflict of interest to report.

Confidentiality: To protect your privacy, numerical coding will be used to match the pre- and post-tests, and the data obtained will be non-identifiable. Results from this project will be recorded as aggregate data.

Informed Consent: I have read the information in this consent. If I have questions about this study, I will email mmcdonn5@uncc.edu. By proceeding to complete this survey, I give my consent and freely agree to participate in this project.

APPENDIX B: DEMOGRAPHIC INFORMATION SURVEY

1. Please circle the response that applies to you and how many years you have worked in this role: RN PA NP

_____ 0-5 years
_____ 6-10 years
_____ 11-15 years
_____ 16-20 years
_____ >20 years
_____ Not applicable

2. Highest level of nursing/healthcare education completed

_____ Diploma
_____ Associates Degree
_____ Baccalaureate Degree
_____ Master's degree
_____ Other

3. Do you recall having education in your academic program(s) on the subject of adult brain tumors?

_____ Yes
_____ No
_____ Do not recall

4. In the past 6 months how many adults have you cared for with a confirmed brain tumor in your role as a RN/NP/PA?

_____ None
_____ 0 - 5
_____ 6-10
_____ >10

5. Do you believe that supplemental education regarding brain tumor pathology, patient care and treatment plans would be of benefit to you?

_____ Yes
_____ No
_____ Undecided

6. Do you believe that supplemental education regarding adult brain tumors should be a requirement for **Registered Nurses** who work in a Neuroscience department?

_____ Yes
_____ No
_____ Undecided

7. What do you see as the greatest barrier to supplemental education at your place of employment?

_____ Time/Scheduling conflicts
_____ Allotment of money
_____ Lack of educators/opportunities
_____ Lack of interesting topics
_____ Other (please describe)

APPENDIX C: PRETEST/POSTEST LEVEL OF KNOWLEDGE

Select one answer for each question below and circle your response. **(Answer key bolded.)**

1. A known risk factor for brain tumors includes (select all that apply):

    A. Behavioral risk factors

    B. Smoking

    C. Exposure to ionized radiation

    D. All of the above

2. Factors contributing to overall prognosis include which of the following (select all that apply):

    A. Age

    B. Extent of resection

    C. Karnofsky Performance Status

    D. Enhancement

    E. All of the above

3. The overall incidence of brain tumors is higher in men.

    A. True

    B. False

4. Brain tumors are classified on the basis of histopathology and can be malignant or benign. Match the following tumors on the left to the associated classification on the right.

Meningioma	**B**	A. Malignant
Pituitary Adenoma	**B**	B. Benign
Glioblastoma.	**A**	
Acoustic Neuroma	**B**	
Anaplastic Astrocytoma	**A**	
Grade III oligodendroglioma	**A**	

5. Histological grading is a way of predicting the behavior of the tumor. Which classification system is utilized to grade central nervous system tumors?

A. Nottingham Grading Scale

B. World Health Organization Grade

C. Gleason Score

D. National Cancer Institute Grade

6. The majority (>60%) of adult brain tumors are _____.

A. Infratentorial

B. Supratentorial

C. Cerebellar

D. Sellar

7. A patient presents to the Emergency Room via EMS following a seizure. The family reports recent progressive memory loss, headaches, and speech changes. You have been told that the CT and MRI of the brain revealed a tumor. Based on the patient's symptoms described, you suspect the lesion to be located in the

A. The brain stem

B. Parietal lobe

C. Frontal Lobe

D. Occipital lobe

E. Cerebellum

8. What is the prognosis for glioblastoma multiforme?

A. Excellent. As long as the tumor was able to be fully surgically removed, full recovery is expected, and no further treatment is needed.

B. Good. The patient will need further chemotherapy and radiation but, is likely to live >10 years.

C. Fair. The patient will likely need significant rehabilitation and follow up treatment before returning to the previous state of health.

D. Poor. It is a rapidly growing, aggressive tumor that there is not a known cure for.

9. Why would you be concerned about the development of hydrocephalus in a patient with an infratentorial tumor?

A. Infratentorial tumors are more likely to hemorrhage and obstruct the normal CSF pathway.

B. The lateral ventricles may be compressed because of adjacent edema.

C. It is close in proximity to the fourth ventricle and may obstruct the flow of CSF.

D. Leptomeningeal infiltration by tumor cells which prevents reabsorption of CSF by the arachnoid villi.

10. Seizures are associated with up to 60% of primary brain tumors and up to 35% of metastatic brain lesions. Many brain tumor patients will be placed on an anti-epileptic. The first-line drug of choice for seizure management or prophylaxis is

A. phenobarbital

B. carbamazepine

C. lacosamide

D. levetiracetam

11. In which of the following cancer-types would you avoid giving steroids initially, if suspected on MRI?

A. ependymoma

B. lymphoma

C. metastatic lung lesion

D. meningioma

12. Contrast enhancement is frequently seen in high-grade gliomas.

A. True

B. False

13. Post-operative complications may occur following brain tumor biopsy or resection. Your patient returns from PACU following resection of a left frontal lobe tumor. Upon arrival to ICU, you note that the patient's VS are as follows: temp = 37.6, RR = 16, HR =

98 and BP = 192/104. You know that the MD ordered an SBP range of 100-140. What are you MOST concerned about occurring, secondary to the patient's vital signs?

A. Seizure

B. Infection

C. Hemorrhage

D. Cerebral Edema

14. You know the previous patient needs blood pressure medication. What is the next step to treat the elevated blood pressure?

A. Start a nicaripine (Cardene) gtt to get the blood pressure down quickly.

B. Give IVP labetalol (Trandate) or hydralazine (Apresoline) x 1 dose.

C. Administer patient's home BP medication amlodipine (Norvasc) and reassess in 30 minutes.

D. Administer diazepam (Valium) one-time PRN to help with the patient's anxiety, which is likely the cause of their high BP.

15. You are assessing a patient with a large pituitary tumor and are aware that vision changes can be associated with pituitary tumors. What is your primary visual concern?

A. Diplopia

B. Blurred vision

C. Central vision loss

D. Visual field loss or loss of peripheral vision

APPENDIX D POSTTEST: CONFIDENCE AND ATTITUDES

Please circle your response to the following statements using a 5-point Likert Scale

1 – Strongly Disagree
2 - Disagree
3 - Uncertain
4 – Agree
5 - Strongly Agree

1. I believe that I have adequate knowledge and skills regarding all aspects of adult brain tumor patient management

1 2 3 4 5

2. I am confident in my ability to identify appropriate care of adult brain tumor patients.

1 2 3 4 5

3. I am confident in my ability to complete competent discharge education with adult brain tumor patients regarding their follow up care/needs.

1 2 3 4 5

4. I am comfortable in my ability to answer patient and caregivers' questions that pertain to brain tumors.

1 2 3 4 5

5. I am confident in my ability to understand what a patient's symptoms may be, related to location of the brain tumor.

1 2 3 4 5

6. Advanced Practice Providers only: I am comfortable in my ability to discuss brain tumor treatment plans with the patient and caregiver, specific to their pathology.

1 2 3 4 5

APPENDIX E: NURSING RESEARCH COUNCIL

Name: Margaret McDonnell, MSN, FNP-C, RNFA

June 19, 2020

Dear Margaret,

Thank you for submitting your evidence-based practice proposal, "Improving the Interprofessional Teams' Knowledge, Confidence, and Self-efficacy in the Care of the Adult Brain Tumor Patients: A Quality Improvement Educational Project" to the Nursing Research Council for approval.

Your project was approved as a sound project with the potential to improve care at Novant Health. The Nursing Research Council recommended the following changes to strengthen your study:

- Consider adding question about length of service in current role to demographics, if this sounds feasible to you and your advisor.

Your completed project will be eligible for inclusion in career ladder portfolios for eligible nurses. The final report must be submitted back to the Nursing Research Council prior to Career Ladder submission.

We look forward to hearing back from you within the year.

Best wishes!

Gloria A Walters

Gloria Walters PhD, RN, RN-BC, CCRN-K
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