EVALUATING THE EFFECTIVENESS OF AN EDUCATIONAL PROGRAM FOR SCHOOL PERSONNEL WITH STUDENTS RETURNING TO THE CLASSROOM FOLLOWING A TRAUMATIC BRAIN INJURY: AN EVIDENCE BASED PROJECT

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Abstract

This project provided an in-depth analysis of the effectiveness of an educational program for school personnel with students returning to the classroom following a traumatic brain injury (TBI). Through this investigation, lack of requisite TBI knowledge and strengths and weaknesses of familiarity and knowledge of TBI management were recognized. Unintentional feedback gathered during the educational intervention demonstrated students who had suffered more severe TBIs had a profound effect on educators. They recalled how the TBI not only affected the student who experienced the TBI physically, mentally and emotionally, but also how it affected their friends and their social experiences.

This study supported the importance that a live interdisciplinary TBI workshop will increase school personnel's TBI knowledge. The findings of this project contributed to the evidence related to uniformity in recognizing and managing a student's cognitive, behavioral, and social functioning following a TBI when returning to the classroom setting. It also contributed to filling the paucity in literature related to uniformity in recognizing and managing a student's cognitive, behavioral, and social functioning following a TBI when returning to the classroom setting.

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Chapter One

Introduction

Chapter One presents an introduction and overview of this study, exploring the overall health and well-being of adolescents who have suffered a traumatic brain injury (TBI) during reintegration into a school environment. The significance of the study includes a paucity of literature regarding uniformed guidelines for reintegration into a school environment after a student suffers a TBI. The method of the study is introduced with a detailed explanation of methodology given in Chapter Three.

Background of the Problem

Traumatic brain injury (TBI) is one of the leading causes of death and disability in the United States (Centers for Disease Control and Prevention [CDC], 2017a). Bryan, Rowhani-Rahbar, Comstock, and Rivara (2016) estimated that within the United States, over one million sport and or recreation-related TBIs occur annually for those 18 years of age and younger. The CDC (2017a) estimated that approximately 330,000 children under the age of 19 were treated in an emergency department for sports or recreation-related injuries. Those injuries lead to a diagnosis of a TBI or concussion with 30,000 or more that resulted in long-term disabilities.

The Brain Injury Association of America (BIAA, 2018) defined a TBI as an "alteration in brain function, or other evidence of brain pathology, caused by an external force." TBIs result from an acquired injury to the brain from an external force, like a bump, blow, or jolt to the head, that interrupts the ordinary functioning of the brain (CDC, 2017a). Leading causes of TBI in children and adolescents ages 0-19 years can include falls, assaults, motor vehicle accidents, sports/recreation injuries, or child abuse. Of those, TBIs can be either closed (non-penetrating) or open (penetrating) (BIAA,

2018). Falls, assaults, and physical abuse are the most common mechanisms of TBI in infants and children ages 0-4 years. TBI secondary to velocity injuries, such as motor vehicle or bicycle accidents and sports injuries, occurs more often in school-aged children and adolescents ages 5-19 years (American Speech, Language, Hearing Association, 2019).

TBI can be a chronic disease process that often leads to both short and long-term changes to cognitive, behavioral, and social functioning (Prasad, Swank, & Ewing-Cobbs, 2017). Changes can also occur in sleep patterns, such as trouble falling or staying asleep, drowsiness, and fatigue or low energy. These changes are often misunderstood by general school personnel for a variety of reasons but must be better understood by the staff and educators to meet the needs for this population (Davies, 2016).

TBIs can affect one or more areas of the brain and its cognitive functions such as memory, concentration, attention span, processing speed, and response precision (Dreer, Crowley, Cash, O'Neill, & Cox, 2017). Acquiring new tasks or remembering previously learned material may present challenges in the school setting. Concussive symptoms are frequently exacerbated with noisy classrooms or hallways, use of computer screens, and exposure to bright lights (Halstead, McAvoy, Carl, Devore, Logan, & Lee, 2013).

The National Institute of Neurological Disorders and Stroke (NINDS) (2018) described behavioral effects resulting from a TBI, which include an increase in hyperactivity, mood swings, poor control of anger, difficulty following rules, and behavioral impulsivity. Conversely, students may display a lack of self-initiative because they are experiencing greater behavioral inhibition. This can cause the student to feel

isolated from class activities, greater apathy towards school, and an increase in stress levels as they reintegrate back into the classroom environment.

Social effects of TBI following an injury can have very profound effects on students because they may experience periods of absences which may in turn increase their risk for feeling socially isolated from their peers (CDC, 2017b). There are restrictions placed on the concussed student, such as limited physical activity, screen time, and work assignments, which may lead to the perception that these students are "different," creating a further lack of acceptance by students' peers (Lantagne, Peterson, Kirkwood, Taylor, Stancin, Yeates, & Wade, 2018). These restrictions can lead children to avoid others and become socially isolated, which can result in further disruptive behaviors, anger, and confusion (Davies, 2016).

There is little evidence that demonstrates uniformity in strategies to successfully manage students' reentry into the school environment following a TBI (DeMatteo et al., 2015). According to the National Center for Injury Prevention and Control (n.d.), additional importance should be placed on school environment reentry. The foundation for this growing emphasis comes from an increased recognition that children may be predominantly susceptive to academic difficulty. Symptom exacerbation could increase in school because it involves continuous mental stimulation and effort for new learning to occur. Blackwell, Robinson, Proctor, and Taylor (2017) concluded that there is no standard for school environment reentry because every TBI case is different and complex with a wide range of outcomes. Therefore, it is important to address the challenges and difficulties that are associated with consequences a TBI has on the cognitive, behavioral, and social effects on adolescents when they reenter the school environment.

Purpose Statement

The purpose of this project was to improve the overall health and well-being of adolescents who have suffered a TBI during reintegration into a school environment. The intent was to provide a live interdisciplinary TBI workshop that would increase school personnel's TBI knowledge which may lead to improved use of accommodation strategies that promote the health and wellbeing of students.

Population/population, Intervention, Comparison, Outcome (PICO)

What is the effect of a Traumatic Brain Injury (TBI) Education Program on school personnel knowledge?

Operational Definitions

TBI or concussion: A type of brain injury that "disrupts the normal function of the brain." This can be caused by a "bump, blow, or jolt to the head" or from a "fall or blow to the body that causes the head to move rapidly back and forth" (CDC, 2017a).

Disability: A physical, mental, cognitive, or developmental condition that causes a temporary or permanent impairment (Robert Wood Johnson Foundation, 2015).

Cognitive: Of, relating to, being, or involving conscious intellectual activity such as thinking, reasoning, or remembering, as well as attention, concentration, memory, executive function, and emotional regulation (Koole, Nelson & Curtis, 2015).

Behavioral: Relating to or concerned with the social, psychological, and emotional factors that affect decisions and behavior as well as the ability to self-monitor and self-regulate their daily activities (Ettel, Glang, Todis, & Davies, 2016).

Social: Of or relating to human society, the interaction of the individual and the group, or the welfare of human beings as members of society that provide encouragement and understanding (Latagne, et. al., 2018).

Personnel: When used in the context of this project, of a school, or "school personnel." Refers to those who are faced with the responsibility of providing educational services to children and adolescents of school age (Koole, Nelson, & Curtis, 2015).

Academic accommodations: Described by Blackwell, Robinson, Proctor, & Taylor (2017) as "providing extended time to complete assignments, delayed in-class testing, reduced workload, reduced screen time, and rest breaks" along with excused absences from physical education class.

Rationale for Project

This project was needed because many school personnel lack the requisite knowledge and skills to recognize the symptoms of TBIs. Often, they do not recognize how to effectively meet the needs of children and adolescents in the classroom who are recovering from the condition (Davies, 2016). Previous efforts of concussion recovery have largely targeted athletes returning to playing their respective sport. More emphasis is needed in returning children to the classroom setting while promoting overall health and wellbeing DeMatteo et al., 2015).

School personnel interact daily with their students and oversee their school-related responsibilities that require cognitive exertion. They monitor and communicate academic progress with parents and the administration. School personnel are aware of a students' learning history, social, and behavioral development and other preexisting

problems that might affect academic progress (Dreer, Crowley, Cash, O'Neill & Cox, 2017). Thus, employing a live interdisciplinary TBI workshop may lead to improved use of accommodation strategies that promote the health and wellbeing of students.

Significance of the Project

There is a paucity of standardized guidelines for reintegration into a school environment after a student suffers a TBI, and little evidence demonstrates uniformity in managing a student's cognitive, behavioral, and social functioning following this type of injury (DeMatteo et al., 2015). Halstead, McAvoy, Carl, Devore, Logan, and Lee (2013) explained that the school environment itself is often overlooked and may increase TBI symptoms with noisy classrooms or hallways, working on computer screens, and exposure to bright lights.

Recognizing the strengths and weaknesses of familiarity and knowledge of TBI management, an educational intervention with school personnel may be beneficial by introducing a more specific live interdisciplinary training on individualized roles in reintegration to the school environment and implementation of a school based TBI-management approach to promote health and wellbeing of students (Kasamatsu, Cleary, Bennett, Howard, & Valovich McLeod, 2016). There is a need for teachers to have a holistic approach for guidance in managing adolescents following a TBI because the adverse effects of cognitive, behavioral, and social symptoms can cause a negative academic performance outcome (Dreer, Crowley, Cash, O'Neill & Cox, 2017). With this integrated approach, school personnel can help ease the transition of the concussed student back into the school environment while facilitating their recovery (Halstead, McAvoy, Carl, Devore, Logan, & Lee, 2013). The first step in developing an integrated

approach is to provide basic knowledge of traumatic brain injury in children and adolescents.

Conceptual Framework

Icek Ajzen's Theory of Planned Behavior (TPB) (2006) is a behavioral theory commonly used to understand human behavior. The model posits that the behaviors of humans are directed by three kinds of considerations: a person's attitudes, subjective norms, and perceived behavioral control over the action. The concepts of the TPB will provide the contextual framework as a foundation in the use of a written assessment used to measure school personnel's intent to change their level of knowledge of TBIs following a specific interdisciplinary training on individualized roles of reintegrating an adolescent who suffered a TBI to the school environment and implementation of a holistic school based TBI-management program.

The John Hopkins Nursing Evidence-Based Practice Model (JHNEBP) (Melnyk & Fineout-Overholt, 2019) will guide the best practices and strategies with methods meaningful to learners will display how evidence based practice related to TBI management in schools can be beneficial. The TPB will drive the development of more effective educational programming as a result of change in knowledge levels. Evidence generated from this study will be utilized to improve holistic care and outcomes.

Conclusion

Overall health and well-being of adolescents who have suffered a TBI can be improved during reintegration into a school environment. Providing a live interdisciplinary TBI workshop that will increase school personnel's TBI knowledge will promote the overall health and wellbeing of students. The findings of the study

contributed to filling the paucity in literature related to uniformity in recognizing and managing a student's cognitive, behavioral, and social functioning following a TBI when returning to the classroom setting.

Chapter Two

Literature Review

Chapter Two presents the extant literature on adolescents with traumatic brain injuries (TBIs) and returning to the school setting as well as gaps in the research. Symptoms and effects of TBI in adolescents are reviewed, specifically identifying factors and differences of post-concussion syndrome (PCS), convulsive concussions and post-traumatic seizures. Cognitive, behavioral, and psychosocial changes that may occur following a TBI are reviewed along with patterns of recovery. Following a TBI, students may experience adverse effects and need support from school personnel in the classroom. General TBI knowledge and patterns of TBI recovery are examined in this chapter.

Symptomology Following a TBI

Concussions, or traumatic brain injuries (TBIs), are common childhood injuries (Blume, 2015). A literature review conducted by Blume, specified that headache is one of the most common and disabling symptoms following a concussion in the acute, post-acute, and chronic phases of injury. Approximately 61% of pediatric concussions enrolled in Traumatic Brain Injury (TBI) clinics reported daily headaches, within pediatric concussions that were evaluated in an ER, 58% reported headaches, and an astonishing 93% of high school athletes complained of daily headaches as reported to their high school medical personnel.

Kerr, Zuckerman, Vander Begt, Yengo-Kahn, Solomon, Sills, and Dompier (2018) studied 1,334 concussed high school student-athletes from the 2011-12 through 2013-14 academic years. The purpose of the study was identifying factors associated with post-concussion syndrome (PCS) and symptoms occurring from initial injury until at

least four weeks post-injury or longer. PCS symptoms in this study fell into three categories: cognitive (retrograde amnesia, difficulty concentrating, and disorientation), somatic (loss of balance, visual disturbance, and sensitivity to noise), and sleep (insomnia). This comparative study found that the type of symptoms, not the quantity, may be more indicative of those at a higher risk of developing long-term PCS and headache was the top reported single symptom followed by retrograde amnesia.

A case presentation by Ellis and Wennberg (2016) described a 17-year-old male ice hockey player who fell backwards and struck the back of his head on ice resulting in a loss of consciousness (LOC) and immediate convulsions involving his arms and legs that lasted about 90 seconds. Concussive convulsions are uncommon and typically occur within seconds of head impact, where there is LOC and a brief tonic phase, followed by bilateral myoclonic jerking of the extremities lasting no longer than 150 seconds. Following the event, the patient shows clinical symptoms consistent with that of a concussion and neuroimaging studies are normal. Concussive convulsions can present a diagnostic and management challenge for those medical personnel who are unfamiliar with the nature of these events.

Conversely, a posttraumatic seizure defined by Ellis and Wennberg (2016), is a "single epileptic event where patients have recurrent unprovoked seizures after a traumatic brain injury." The timing differs from a concussive convulsion in that the seizures do not happen immediately following head impact, rather they occur as early as 24 hours to weeks following the injury. With posttraumatic seizures, Ellis and Wennberg explained that neuroimaging and electroencephalograms (EEGs) help identify the location and electrical behavior of the structural brain injury. Concussive convulsions are

not considered an epileptic event, have a benign history, and do not require any antiepileptic medications. Rather, treatment focuses on management of the associated TBI and optimization of preventive education strategies.

A TBI model systems study was completed to determine the incidence of posttraumatic seizure (PTS) following TBI among individuals with moderate-to-severe TBI requiring rehabilitation and surviving at least 5 years (Ritter, et. al., 2016). The median age of the population at the time of injury was 35.4 years and the distribution of causes of TBI included motor vehicle accidents (MVAs) (51.6%), any violence (20.6), fall (13.7) other (12.9), and any sport (1.1%). PTS incidence immediately post-TBI was 8.9% (<24 hours post-injury) during acute hospitalization, increasing to 9.8% by year 1, and by year 5, 20.5% of individuals in the study suffered PTSs. Although this study was completed on adults and was not related to adolescent TBIs, it demonstrates the paucity in literature of general adolescent concussions that are not related to sports.

Adverse Academic Effects Following a TBI

A qualitative descriptive study was done by Ransom, Vaughn, Pratson, Sady, McGill, & Gioia (2015) with the purpose to learning the nature and extent of the effects a TBI can cause on students in the area of academics. By utilizing PCSI self-reporting questionnaires: CLASS questionnaire and open-ended questions with Guttman scales, data was acquired from 349 youths between the ages of 5 and 18 years. Of that sample, 69% included parent-child pairs (n=239) and parents alone comprised the remaining 21% (n-110). The researcher then divided the subjects into two groups based on their recovery status at the time of the study: 1) actively symptomatic/not fully recovered as defined by present symptoms and/or impaired performance on neurocognitive testing, and 2)

completely recovered defined by being asymptomatic and having no impairments on neurocognitive tests.

The outcomes revealed that students who were actively symptomatic as well as their parents had more concerns that the TBI had significant impacts on academic performance ($P<.05$) as well as more school-related problems ($P<.001$) than recovered peers and parents. Students who had not fully recovered from a TBI reported more adverse effects such as difficulty concentrating, light and noise sensitivity, and increased headaches in school, than those who were relatively symptom-free upon return to school.

One recommendation for improving the situations for these students includes having a medical-school partnership focusing on school-based management for students with active TBI symptoms. By having specific but individualized return-to-learn guidelines, this will help to minimize the potential adverse academic effects, help reduce parent and student concerns following injury, and help expedite the TBI recovery process.

Support in the Classroom Following a TBI

Student-athletes may require cognitive rest and academic support following a TBI, but little is known regarding students returning to the classroom appropriately. Kasamatsu, Cleary, Bennett, Howard & Valovich McLead (2016) focused on athletic trainers (ATs) and academic support that student-athletes may require after a TBI. ATs in secondary schools are in a position where they provide medical care and collaborate with school professionals while managing TBIs.

The three purposes of research were recognized to be examining ATs perspectives on return to learn, cognitive rest, and communications between school professionals

following a TBI. A cross-sectional, qualitative, descriptive study using a web-based survey was emailed to secondary school ATs was part of a larger exploratory, sequential, mixed-method of research on TBI-management practices. A list of 4000 certified ATs was obtained from the National Athletic Trainers' Association (NATA). Those 4000 ATs were sent emails with a link to the survey if they chose to participate and the responses totaled 1124 participants.

Overall, this study found that ATs follow best practices for cognitive rest. They did report changes, and adjustments were made to the students' attendance expectations, assigned schoolwork, and testing. Conclusions and recommendations for this study included that schools would benefit from interdisciplinary training on individualized roles in the return-to-learn process and implementation of a school-based TBI-management approach.

Williams, Welch, Parsons, & Valovich McLeod (2015) assessed secondary school ATs perceived familiarity with, attitudes and beliefs about, and incorporation of academic accommodations (AAs) for student-athletes after sport-related TBI. A web-based survey using beliefs, attitudes and knowledge following pediatric athlete concussion among athletic trainers (BAKPAC-AT) was created to complete the cross-sectional, qualitative, and descriptive study. The survey utilized binary, multiple choice, and open-ended questions with Likert scales and multistep formats. This was distributed to secondary school athletic trainers via email after requesting a survey list from the National Athletic Trainers' Association. While 3,286 possible participants were solicited, it resulted in 851 viable participants for the study. This study showed that ATs

believed that approximately 41% of the student-athletes who received a TBI received AAs.

Williams, Welch, Parsons, & Valovich McLeod (2015) concluded that understanding AAs is important for all ATs. Along with physical rest, cognitive rest and returning to the classroom are being more widely accepted and recommended as part of TBI management plans. They also expressed that it is important for ATs and school officials to understand evidence-based protocols for TBI management to provide clinicians with proper return-to-play guidelines as well to promote return-to-learning in the classroom.

Cognitive Rest Following a TBI

Brown, Mannix, O'Brien, Gostine, Collins & Meehan (2014) studied the effect of cognitive activity level on the duration of post-TBI symptoms because there was limited data to support the recommendation of cognitive rest in the management of sport-related TBI. This study added empirical data to support the recommendation for cognitive rest after a sport-related TBI.

A single-center, prospective cohort study of patients who presented to the Sports Concussion Clinic of Boston Children's Hospital between October 1, 2009 and July 31, 2011 was used. A satisfactory sample size of 335 were included in the study after inclusion criteria were met and a Post-Concussion Symptom Scale (PCSS) consisting of 22 symptoms that athletes rate using a 0 to 6 Likert scale was distributed and completed by participants.

The results received showed that there is a direct correlation between those who continued to engage in cognitive activities and individuals who had longer recovery times

to symptom resolution. The study also supported the current consensus that the use of cognitive rest and limiting extensive cognitive activity reduces the duration of TBI symptoms.

A prospective randomized controlled study was completed by Thomas, Apps, Hoffmann, McCrea & Hammeke (2015) consisting of patients presenting to the Children's Hospital of Wisconsin Emergency Department and Trauma Center with mild TBI/Concussion (mTBI) between May 2010 and December 2012. The purpose of the research was to determine if recommending strict rest improved TBI recovery and outcome after discharge from the pediatric emergency department (ED) or not. There is limited data to support the recommendation of cognitive rest in the management of sport-related TBIs.

This research group used an Acute Concussion Evaluation (ACE) for, ImPACT computerized neurocognitive testing, Balance Error Scoring System (BESS) standardized balance assessment, and individually kept Seven-Day Activity Diaries. The small sample size of 99 participants were randomized. The strict rest group average age was 14.7 years while the usual rest group was 13.1 years, and two-thirds of all participants were males. Inclusion criteria identified that the participants must be between the ages of 11-22 years, and present to the ED within 24 hours of injury and be diagnosed with a TBI.

An intervention was used, and participants were randomly assigned to one of two groups: 1) Rest for 1 or 2 days and return to school, or 2) Strict rest at home (specifically, no school, work, or physical activity) followed by return to activity. Analysis of results suggested that there was no benefit in recommending strict rest as an intervention to improve outcomes following an acute concussion in pediatric patients. Unlike any other

studies, this one recommended strict rest as an intervention to improve acute TBI outcomes in pediatric patients. As a result, the researchers recommended that further research studies are needed to determine optimal ED discharge recommendations for adolescents following a TBI. Further research is needed to test the safety and efficacy of active rehabilitation in the acute TBI post-injury period with a large randomized controlled trial.

Patterns of Recovery and Psychosocial Problems Following a TBI

The purpose of a 2015 study by Purcell, Harvey and Seabrook was to evaluate patterns of recovery following a sport-related TBI. They had identified that children were taking longer to recover from sport-related TBI due to their brains continuing to develop. Unknown recovery times in children following TBI and poorly managed TBIs were also identified while there was little research on returning to the classroom following a TBI.

The researchers used a retrospective chart review in an Ontario, Canada sports medicine clinic over a 3 year period where both electronic medical records and paper charts were reviewed. The standardized TBI form that was used was the SCAT2, which is a symptom evaluator including a maximum of 22 symptoms and a 7 point Likert-type scale. Self-reported symptoms and symptoms reported by family members were also considered. Of the 324 charts that were initially reviewed, 198 were included in the study.

Outcomes of this study included students who were actively symptomatic, had more concerns that the concussion had significant impacts on academic performance ($P<.05$) as well as more school-related problems ($P<.001$) than recovered peers. Overall,

this research provided evidence that children and adolescents generally take 2 to 4 weeks to fully recover from a sport-related TBI.

Valovich McLeod, Wagner, and Welch Bacon (2017) explored the psychosocial aspects resulting from concussions among adolescent athletes utilizing a health-related quality of life interview. Their findings concluded that adolescents felt the SRCs affected numerus aspects of their life. As a result of their TBIs, adolescents noted a significant influence of their emotional, school, and social health status.

Often, participants found themselves minimizing or masking their symptoms in an attempt to regain a sense of normalcy in their lives, which would negatively affect their recovery. More than half of the participants expressed that they did this because they did not want to feel different from their peers, they didn't want to be made fun of or thought of as a faker, and they didn't want to be withheld from participating in their sport, school, or social activities.

Factors Contributing to Difficulties in the School Setting Following a TBI

Halstead, McAvoy, Devore, Carl, Lee & Logan, (2013) along with the Council on Sports Medicine and Fitness together developed a report to provide guidance and recommendations to help school officials recognize the need for academic or environmental adjustments for students following a TBI. The problem this cohort wanted to address was that school officials often fail to recognize the need for academic and environmental adjustments even though students look physically normal after suffering a TBI.

Many recommendations resulted from this report including further research needs conducted regarding the effects and role of cognitive rest after TBI. It is also

recommended that future research should be done to clarify what the best practices are for returning students to the classroom and the best methods to assist them in individualizing their plans for cognitive rest and recovery.

To expand on current knowledge, future studies should quantify outcomes of school settings that have TBI management teams compared to those that do not to determine if those teams would be of adequate value. Continued education, in the form of an appropriate TBI management program, is suggested for all those who are involved with the rest and recovery in the academic setting as well as to help facilitate better overall outcomes.

Recommendations also include having a medical-school partnership focusing on school-based management for students with active TBI symptoms. By having specific but individualized return to the classroom guidelines, this will help to minimize the potential adverse academic effects, help reduce parent and student concerns following injury, and help expedite the concussion recovery process. TBI management needs to include a holistic approach rather than just monitoring the impairments, and address the whole person being sensitive to emotional, social, and psychological stressors (Valovich McLeod, Wagner, & Welch Bacon, 2017).

Assessing Knowledge About TBIs

School psychologists lead the assessment and evaluation process in school settings. They need the knowledge, skills, and training to accurately assess and evaluate student needs following a TBI. Glang, McCart, Moore & Davies, (2017) conducted a national survey of TBI knowledge and self-efficacy of school psychologists in working with students who have suffered a TBI. A total of 232 school psychologists participated

in the survey and the average score was 62.7%. Less than 60% rated themselves as qualified to provide appropriate school-based interventions for students with TBI. School psychologists' lack of knowledge of concussions and perceived ability to provide appropriate interventions for students who suffered a TBI from this study suggested that more training is needed on identifying, evaluating, and supporting students with TBI in the classroom.

DeMatteo, et.al., (2015) recognized that there are few protocols that exist for adolescents who return to school following a TBI. He explained that while returning to school is characteristically based on the presence or absence of symptoms, little guidance is provided to indicate how much rest is needed, how much time off from school is recommended, and how to effectively accommodate students returning to school routines. As a result, DeMatteo, et. al. (2015) developed a return to school protocol using evidence based materials to guide school personnel in balancing students' cognitive rest, timely return to school, as well as curriculum, environmental and activity modifications.

Studies assessing school personnel's knowledge related to TBIs are limited. Dreer, Crowley, Cash, O'Neill and Cox (2017) assessed teacher's TBI knowledge in the state of Alabama. Approximately 25% of the teachers perceived that they were "very confident" or "extremely confident" in their ability to recognize signs or symptoms related to a TBI. Under half of those teachers (41.9%) reported that they had received specialized training or information on concussions as part of their jobs, while only 14.1% reported that someone came into their school presenting information on TBIs. About half of the teachers indicated that a TBI could cause a student difficulty when returning to school. The teachers reported any TBI information they received was from the school

nurse (55.6%) and over 82% reported that they needed more information on concussions and how to manage students with concussions in the classroom.

Conclusion

The review of the literature demonstrated that there is a paucity in uniformity in recognizing and managing a student's cognitive, behavioral, and social functioning following a TBI when returning to the classroom setting. Students may be predominantly susceptive to academic struggles and symptom exacerbation in school because it involves continuous mental stimulation and exertion for new learning to occur. Every TBI case is different and complex with a wide range of outcomes; therefore, it is important for school personnel to recognize the challenges and difficulties that are associated with TBIs to aid in the promotion of health and wellbeing of students.

Chapter 3

Methodology

This project examined current concussion knowledge and management practices in addition to academic support measures for school personnel when students return to the classroom following a Traumatic Brain Injury (TBI). The implications of this study add significance and support to the evidence related to uniformity in recognizing and managing a student's cognitive, behavioral, and social functioning following a TBI when returning to the classroom. This chapter focuses on the design, setting, sample, ethical considerations, instrumentation, data collection, and data analysis of the project.

Design

Evidence-based practice (EBP) is a problem-solving approach to deliver healthcare that is centered on safety, quality, patient outcomes and healthcare costs (Melnyk & Fineout-Overholt, 2019). EBP integrates the best evidence scientific and experiential evidence from research and translates it into clinical practice settings. The overall goal of EBP is to empower health care professionals to make informed and individualized treatment-based decisions and to deliver the highest quality of health care to their patients.

The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP) (Melnyk & Fineout-Overholt, 2019), uses a three-step process to ensure that the latest research and best practices are quickly and appropriately integrated into patient care. The three phases include a practice question, evidence, and translation (PET). Within these three phases

are 19 prescriptive steps. Although the process appears linear, it may be repetitious in order to generate a sequence of outcomes as the process evolves (Appendix A).

Utilizing the JHNEBP to develop a PICO question, this project focused on the effectiveness of an educational intervention using a pre- and post-test design to examine the effects of a live interdisciplinary TBI workshop on school personnel knowledge in the middle and high school setting (Melnyk & Fineout-Overholt, 2019). Educational intervention strategies targeted TBI knowledge and the importance of recognizing the causes, signs and symptoms, and side effects of TBIs. This was based on evidence collected during internal and external searches and evidence appraised through systematically examining the quality, validity, and size of the research.

Information in the educational intervention placed a high importance on recognizing the challenges and difficulties that are associated with TBIs. An examination of the influence of subjective norms was discussed as a reason students may struggle in the classroom after a TBI. Strategies to successfully manage students' reintegration into the school environment following a TBI were also discussed. The aim of this topic was to improve teacher's perceived behavioral control of managing student reintegration.

Once the educational intervention was completed and data collected from the pre- and post-test surveys, the resulting evidence was analyzed for implementation of appropriate and feasible recommendations. The recommendations were then communicated with high school administrators in the region with the hope that they will engage their school personnel by having the presentation at their schools and adopt the recommendations that increase TBI knowledge and strategies to successfully manage students' reintegration into the school environment following a TBI.

Bridging Theory to Practice

Icek Ajzen's Theory of Planned Behavior (TPB) (1991) posits that attitude toward behavior, subjective norm, and perceived behavioral control influence behavioral intention (Appendix B). The first construct of the theory is the motivational factor that influences behaviors, behavioral intention. The stronger the intention to engage in an activity or behavior, the more likely it is to perform that behavior. Attitude, the second construct, consists of behavioral beliefs and outcome evaluations. The attitude toward the behavior is the extent to which a person has a positive or negative appraisal of a given behavior. Lastly, the social pressure to complete or not complete a given behavior is the subjective norm. Normative beliefs and motivation comply to constitute subjective norm.

The Utility of the Theory of Planned Behavior

Understanding and utilizing the TPB (1991) provided the framework in the development of effective educational programming and knowledge transfer at the school educators' level. Ajzen (1991) reported that knowledge may influence behavior; thus, if knowledge about TBI is increased by an educational intervention, educators may develop stronger intentions towards students' who have suffered TBIs and change their behavior when students return to the classroom. If this is true, then following an educational intervention, teachers may utilize specific accommodation techniques acquired through the workshop which will increase the health and well-being of adolescents who have suffered a TBI.

Goal, Objectives, and Expected Outcomes

Goal. The goal of this intervention was to provide a live interdisciplinary TBI workshop to increase school personnel's knowledge of TBIs.

Objectives. The purpose of this project was to improve the overall health and well-being of adolescents who have suffered a TBI during reintegration into a school environment. The intent was to provide a live interdisciplinary TBI workshop that would increase school personnel's knowledge of TBIs from pre- to post-test, before and after the TBI workshop. The goal was to empower educators to successfully integrate students into the classroom following a TBI. The learning outcomes included upon completion were for participants to be able to:

- Describe causes, signs and symptoms, and side effects of a TBI;
- Recognize the challenges and difficulties that are associated with TBIs to aid in the promotion of health and wellbeing of students; and
- Discuss strategies to successfully manage students' reintegration into the school environment following a TBI.

The 90-minute workshop facilitated by the principal investigator, was comprised of a PowerPoint presentation, twelve minute video, and demonstrations involving an egg challenge and Jell-O challenge to simulate movement of the brain inside the cranial cavity. Other activities included use of a spotlight, strobe light, air horn, and visual impairment goggles to mimic possible ongoing symptoms that adolescents with a TBI may be experiencing. Helping school personnel better understand what students may be experiencing after a TBI can assist them in recognizing the challenges the students face when returning to the classroom following a TBI. This recognition, along with proper management in the classroom, can empower school personnel to successfully integrate students into the classroom following a TBI (Appendix C).

Expected Outcomes. For this project, the primary expected outcome was an increase in TBI knowledge reflected by change in the pre- and post-test surveys developed by Ettel, Glang, Todis, & Davies (2016). Additional outcomes included school personnel being able to (a) describe the causes, signs and symptoms, and side effects of a TBI, (b) recognize the challenges and difficulties that are associated with TBIs to aid in the promotion of health and wellbeing of students, and (c) discuss strategies to successfully manage students' reintegration into the school environment following a TBI.

Accessing the Population

The school superintendent of the high school was contacted via email and an in-person meeting was scheduled at the respective schools. An overview of the project along with the purpose, goals and learning outcomes were explained in-person. The superintendent was highly interested and expressed a need for this education within their respective school system. Thus, the superintendent agreed to include this DNP project on their school's workshop agenda to be presented during a professional development day.

School personnel participating in this workshop included school superintendents, school principals and assistant principals, teachers, school nurses, school psychologists, social workers and school counselors at the middle and high school levels. Other school personnel willing to participate were also invited to attend by invitation of the school superintendent. The workshop was presented in the high school library in morning and afternoon sessions. This location offered adequate space for the presentation and

activities. The surveys from the two different sessions were combined from and used as one sample size of 69 participants.

Setting

This live interdisciplinary TBI workshop was completed at a high school located in rural northwestern Pennsylvania. According to data from the 2019 National Center for Education Statistics (NCES), this school district is home to approximately 2,044 students and employs 135 teachers for a 15:1 teacher to student ratio. There is a male and female distribution of 51% and 49% respectively. There are three elementary schools comprising of 885 students, 438 students in the middle school, and 683 students at the high school, with only 5% of students being minority students (NCES, 2019). Data provided by the school superintendent includes 36 middle school personnel and 47 high school personnel.

The AI-Therapy sample size calculator (2020) was used in advance to determine the minimum number of participants that are necessary to achieve sufficient statistical power. Parameters in the calculator included the t-test (test family), same subject sample groups, two tail directionality, 0.5 effect size, 0.05 significance level, and a power of 0.8. These parameters yielded that 34 participants are the minimum number needed for statistical power.

Ethical considerations

The mandatory Collaborative Institutional Training Initiative (CITI) curriculum on human subject research and responsibility conduct was completed by the researcher of this study (Appendix D). This study was presented to the DNP project committee, and then was submitted to the Institutional Review Board (IRB) of Clarion University of

Pennsylvania for review. Clarion's IRB determined the DNP project to be exempt and approval for the workshop was granted (Appendix E).

Survey participant information remained confidential to reduce social pressure, likewise, reducing social desirability bias. Any potential identifying information had been considered and had not been considered issue. An informed consent statement explaining the purpose of the study and the confidentiality of the participants was included at the beginning of the presentation.

A demographic survey and paper surveys were distributed, completed by participants, and collected prior to the educational intervention as the pre-test. Following the TBI workshop, the same test was distributed, completed by participants, and collected as the post-test survey. Individual identifiers included participants' surveys being numbered to pair the pre-and post-tests.

Instrumentation

The tool that was used is a 30-question, self-administered survey entitled "TBI Knowledge Survey" developed in 2016 by Ettel, Glang, Todis, & Davies. Through electronic communication, Glang (2019) verified that the items on this survey were adapted from a validated instrument (Hux, Bush, Evans, & Simanek, 2013; Hux, Walker, & Sanger, 1996), with additional items derived from TBI training materials (Dise-Lewis, Lewis, & Reichardt, 2009; Glang, Tyler, Pearson, Todis, & Morvant, 2004).

The final 30-item adapted version for the current study (Appendix G) included a two-point response option (true and false). The number of correct items was summed and a percentage correct computed. Reliability could not be determined by the developer due to not completing any test-retest reliability procedures.

The survey included 30 true or false questions about general TBI knowledge. Questions investigated knowledge about TBI signs, symptoms, and side effects, characteristics of TBIs, and behaviors following a TBI. General demographic questions were also included as a separate questionnaire and distributed with the pre-test.

Data Collection

Paper surveys were distributed, completed by hand by the participants, and collected prior to the educational intervention as the pre-test. A separate demographic questionnaire was included and distributed with the pre-test survey. Following the TBI workshop, the same survey was distributed as the post-test, completed by participants.

Data Analysis

Participants completed the pre- and post-test surveys that were provided to them. After participants completed the pre-test, TBI workshop, and post-test survey, data was manually transferred for analysis using AI-Therapy Statistics Paired *t*-test online calculator.

Demographics: Demographic information was gathered to describe the participants in the aggregate. Demographic variables collected included age, gender identification, job position, and highest level of education. Other demographic data gathered included if the participant had ever received any formal concussion training and if the participant ever suffered a concussion themselves.

PICO Question: What is the effect of a Traumatic Brain Injury (TBI) Education Program on school personnel knowledge? Responses were “true” or “false” answers. The correct responses were coded 1 and summed to determine a score between 0-30. Higher scores determined there are standardized practices in place

utilized by school personnel to maximize TBI recovery efforts in the academic setting. To compare differences between the pre- and post-mean knowledge scores, a paired t-test was conducted. Additionally, each item was analyzed for frequencies and percentages reporting the correct and incorrect answers.

Summary

This chapter focused on the effectiveness of an educational intervention by utilizing the Johns Hopkins Nursing Evidence-Based Practice Model and understanding how an intervention may affect a person's behavior and intent to change. The setting of the project was completed at a school in rural northwestern Pennsylvania. The instrument that was used is a 30-question, self- administered paper survey designed from the TBI Knowledge Survey developed by Ettel, Glang, Todis, & Davies (2016). Finally, the project bridged the theory-practice gap using an evidence based educational intervention.

Chapter 4

Introduction

Chapter Four presents the data analysis from surveys used before and after a traumatic brain injury (TBI) educational program. A review of the descriptive statistics from the pre- and post-test groups using frequencies and percentages along with a paired *t*-test to compare differences between the pre- and post-mean knowledge scores is provided. Outcomes of the project are discussed and compared to previously published evidence. Finally, theory is linked to practice and future directions for the role of the Advance Practice Nurse are identified.

Implementation of the Project

The program participant demographics are presented in the aggregate with an overall description of the participants. Pre- and post-intervention surveys are discussed. Finally, an analysis of the data is presented.

Program Participant Characteristics

Participant demographic data are detailed in Table 1. The demographic data demonstrates a convenience sample of educators who were present during the teachers' professional development day and decided to attend this workshop. Means, medians, frequencies and ranges were used to describe key characteristics of the sample. The table shows the sample of 69 participants which was comprised of a higher proportion of females than males (62% vs. 38%) with the mean age group between 40-49 years old. The average number of years teaching was 17.36 with the majority of participants teaching at the high school level (n=38). Surprisingly, a high proportion of participants had known someone who had suffered a TBI (92.8%) than those who had not known

someone who had suffered a TBI. Lastly, prior to this educational intervention, slightly less than half the participants have taken some type of TBI training.

Table 1.
Demographic Variables of Participants (N = 69)

Variable		n	%
Gender			
Male		*26*	*37.7*
Female		*43*	*62.3*
Age (years)			
1 (22-29)		*7*	*10.15*
2 (30-39)		*14*	*20.3*
3 (40-49)		*29*	*42.0*
4 (50-59)		*12*	*17.4*
5 (60 or above)		*7*	*10.15*
Level of Education (degree)			
1 *(up to Bachelor)*		*24*	*34.8*
2 (Master and beyond)		*45*	*65.2*
Number of Years Teaching			
Mean	*17.4*		
Range	*45*		
Max	*46*		
School/Level Taught			
Middle School		*26*	*37.7*
High School		*38*	*55.1*
Both		*5*	*7.2*
Have You Ever Had a TBI?			
Yes		*15*	*21.7*
No		*54*	*78.3*
Do You Know Anyone Who Has Had a TBI?			
Yes		*64*	*92.8*
No		*5*	*7.2*
Have You Ever Take Online TBI Courses?			
Yes		*31*	*44.9*
No		*38*	*55.1*
Have You Ever Taken Formal TBI Training?			
Yes		*10*	*14.5*
No		*59*	*85.5*
Do You Coach Sports?			
Yes		*26*	*37.7*
No		*43*	*62.3*

Program Results

The primary focus of this educational intervention was to compare TBI knowledge reflected by a change in pre- and post-test survey outcomes. The data was entered by the DNP student into an Excel spreadsheet. A paired *t*-test of the responses of

the 69 program participants was used to determine whether there was a statistically mean difference between pre- and post-test survey knowledge scores when participants completed a TBI educational program. Table 2 illustrates that participants scored higher on the post-test surveys (M=18.681, SD=2.206) compared to the pre-test surveys (M=17.2, SD=2.5), a statistically significant increase of 1.4 survey points, ($t(68) = -4.638$, $p < .001$). These results suggest that when educators participate in a TBI educational program, their TBI knowledge increases.

Table 2.
Means and Standard Deviations (N = 69)

Variable	M	SD
Pre-test survey	17.246	2.482
Post-test survey	18.681	2.206

Knowledge Scores by Topic

Table 3 shows all the participants' mean scores and standard deviations of the TBI Knowledge Items for each pre- and post-test question. This is the average score the participants had on each question, and the amount of variability amount the numbers in that data set.

Table 3.

Distribution of the TBI Knowledge Items (N = 69)

TBI Knowledge Items	Pre-test		Post-test	
	M	SD	M	SD
1. TBI is equally common in males and females.	0.391	0.491	0.928	0.261
2. A child/adolescent in a coma is usually not aware of what is happening around them.	0.217	0.415	0.449	0.501
3. After a brain injury, children/adolescents can forget who they are and not recognize others but be 'normal' in every other way.	0.087	.0284	0.029	0.170

4.	A brain injury affects girls' and boys' brains differently.	0.304	0.163	0.174	0.382
5.	Even after several weeks in a coma, when children/adolescents wake up, most recognize and speak to others right away.	0.652	0.479	0.696	0.464
6.	After a brain injury, it is usually harder to learn new things than it is to remember things from before the injury.	0.841	0.369	0.884	0.323
7.	A child/adolescent's pre-injury status (i.e., intellectual and emotional functioning) is likely to impact recovery from the brain injury.	0.797	0.405	0.826	0.382
8.	Children/adolescents who have had one brain injury are more likely to have a second one.	0.783	0.415	0.971	0.169
9.	Complete recovery from severe brain injury is not possible no matter how badly the child/adolescent wants to recover.	0.348	0.479	0.159	0.369
10.	Children/adolescents are likely to recover more completely from a brain injury than adults due to the greater plasticity of the young brain.	0.145	0.355	0.333	0.475
11.	A child who acquires a brain injury between 12 and 16 will typically present an even pattern of academic strengths and weaknesses.	0.676	0.471	0.783	0.415
12.	A child's brain, unlike an adult's, is able to bounce back after a brain injury.	0.536	0.502	0.507	0.504
13.	It is common for children/adolescents with brain injuries to be easily angered.	0.942	0.235	0.986	0.120
14.	Fluctuation among cognitive abilities is a finding typical of children/ adolescents who have a brain injury and is not typical of the general population of children/adolescents.	0.696	0.464	0.652	0.479
15.	When children/adolescents are knocked unconscious, most wake up quickly with no lasting effects.	0.579	0.497	0.739	0.442
16.	It is important to provide many details when delivering instructions to a student with brain injury.	0.420	0.497	0.449	0.501
17.	Greater variability exists in the population of students with TBI than exists in populations of others students with disabilities.	0.797	0.405	0.768	0.425
18.	The only sure way to tell if someone has suffered brain impairment from a brain injury is by an X-ray of the brain.	0.768	0.425	0.739	0.442
19.	Knowing the location of a TBI helps in the development of programming to meet a student's needs.	0.101	0.304	0.246	0.434
20.	Many students with TBI display characteristics similar to those of students with a learning disability.	0.869	0.339	0.884	0.323
21.	Knowledge of a student's background prior to TBI is necessary when developing an educational plan.	0.159	0.369	0.087	0.283
22.	Medical labels that specify TBI as mild, moderate, or severe are useful for programming communication and academic services.	0.116	0.323	0.087	0.284
23.	The primary goal of brain injury rehabilitation is to increase physical abilities such as walking.	0.739	0.442	0.826	0.382
24.	Many students with TBI perform better in structured testing situations				

	than they do in classroom settings.	0.406	0.495	0.377	0.488
25.	The challenges of students with TBI are typically more difficult to assess than the challenges of students with other disabilities.	0.768	0.425	0.783	0.415
26.	Most special and regular educators are knowledgeable about the speech, language, and cognitive communication problems associated with TBI.	0.826	0.382	0.841	0.369
27.	Students with TBI often have trouble forming and maintaining friendships.	0.754	0.434	0.855	0.355
28.	Recovery following TBI can continue for several years.	0.928	0.261	0.971	0.169
29.	Students with TBI often display behavior problems.	0.797	0.405	0.912	0.286
30.	Standardized tests are more beneficial than descriptive measures (e.g., language samples, interviews, checklists, observational techniques) in assessing cognitive deficits secondary to TBI.	0.812	0.394	0.754	0.434

The questions related to general knowledge of TBIs including identifying causes, signs and symptoms, and side effects of TBIs, recognizing challenges and difficulties that are associated with TBIs, and strategies to successfully manage students' reintegration into the school environment.

Recognizing Causes, Signs & Symptoms and Side Effects of a TBI

In the pre-test, 39.1% of participants answered correctly that TBI are not equally common in males and females, and in the post-test, 92.8% of participants answered it correctly. In the pre-test, 21.7% of the participants understood that children/adolescents in a coma are not aware of what is happening around them which increased to 44.9% in the post-test. In the pre-test, 8.7% of participants correctly identified "false" for the statement, "After a brain injury, children/adolescents can forget who they are and not recognize others, but be 'normal' in every other way, and in the post-test, only 2.9% correctly answered "false." In the pre-test, 30.4% of participants correctly identified that a brain injury does not affect girls' and boys' brains differently and in the post-test, 17.4% correctly answered. In the pre-test, 65.2% of participants understood that after a

coma, most children/adolescents do not recognize and speak to others right away, while this slightly increased to 69.9% of participants correctly answering.

In the pre-test, 94.2% of participants identified that it is common for children/adolescents with brain injuries to be easily angered, and in the post-test, 98.6% identified this correctly. In the pre-test, 57.9% of participants correctly answered that when knocked unconscious, children/adolescents do not wake up quickly with no lasting effects, while 73.9% correctly answered this in the post-test. About three-quarters of the participants answered correctly in both the pre- and post-tests that an x-ray of the brain is not the sure way to tell if someone has suffered a brain injury. In the pre-test, only 10.1% of the participants answered correctly that it doesn't matter what the location of the TBI is for developing the programming to meet a student's needs, where 24.6% answered correctly in the post-test. In the pre-test, 79.7% of participants distinguished that students with TBI often display behavior problems, and on the post-test, 91.2% answered this correctly.

Challenges and Difficulties Associated with TBIs

In the pre-test, 79.7% of participants correctly answered that preinjury status is likely to impact recovery from a brain injury, and 82.6% answered correctly post-test. In the pre-test, 78.3% of participants understood that children/adolescents who had one brain injury are more likely to have a second one compared to a post-test increase to 97.1%. In the pre-test, 34.8% of participants answered correctly that complete recovery from severe brain injury is not possible no matter how badly the child/adolescent wants to recover. That number declined in the post-test with only 15.9% of participants answering it correctly. In the pre-test, only 14.5% of participants knew that children/adolescents

don't recover more completely from a brain injury than adults as opposed to 33.3% correctly answering in the post-test. In the pre-test, 53.6% of participants agreed that a child's brain is not able to bounce back after a brain injury and in the post-test, that number decreased slightly, and 50.7% agreed.

In the pre-test, 69.6% of participants recognized that there is fluctuation among cognitive abilities of children/adolescents who have suffered a brain injury which is not typical of the general population of this age group and in the post-test, 65.2% were able to recognize this. In the pre-test, 79.7% of participants agreed that greater variability exists in the population of students with TBI than exists in populations of other students with disabilities, where in the post-test, 76.8% agreed with this. In the pre-test, 86.9% of participants agreed that many students with TBI display characteristics similar to those of students with a learning disability and in the post-test, 88.4% agreed with this statement. In the pre-test, 76.8% of participants correctly identified that the challenges of students with TBI are typically more difficult to assess than the challenges of students with other disabilities and on the post-test, 78.3% correctly identified this.

In the pre-test, 82.6% of the participants recognized that most special and regular educators are not knowledgeable about the speech, language, and cognitive communication problems associated with TBI and on the post-test, 84.1% recognized this as well. In the pre-test, 75.4% of participants correctly acknowledged that students with TBI often have trouble forming and maintaining friendships, and on the post-test, 85.5% correctly acknowledged this. Over 92% of participants in the pre-test (92.8%) and post-test (97.1%) correctly answered that recovery following TBI can continue for several years.

Strategies to Successfully Manage Students' Reintegration into School

In the pre-test, 67.6% of participants understood that children between the ages of 12 and 16 do not present an even pattern of academic strengths and weaknesses whereas on the post-test, 78.3% indicated understanding of this. In the pre-test, 42.0% of participants understood that they should not provide detailed instructions to a student with a brain injury and post-test, 73.9% understood this concept. In the pre-test, 84.1% of participants agreed that after a brain injury, it's usually harder to learn new things than it is to remember things from before the injury, which slightly increased to 88.4% in the post-test. In the pre-test, only 15.9% of participants knew that knowledge of a student's background prior to a TBI was not necessary when developing an educational plan which dropped to 8.7% in the post-test.

In the pre-test, 11.6% of participants correctly answered that medical labels that specify TBI as mild, moderate, or severe do not make a difference for programming, communication, and academic services where only 8.7% answered this correctly on the post-test. A total of 73.9% of participants in the pre-test correctly answered that the primary goal of brain injury rehabilitation is not related to increasing physical abilities such as walking. This total increased to 82.6% on the post-test. In the pre-test, 40.6% of participants correctly disagreed with the statement, "Many students with TBI perform better in structured testing situations than they do in classroom settings" as opposed to 37.7% answering this statement correctly as false on the post-test. In the final question on the pre-test, 81.2% of participants agreed that standardized tests are not more beneficial than descriptive measures in assessing cognitive deficits secondary to TBI and in the post-test 75.4 agreed with this as well.

Knowledge Scores by Educator Characteristics

Overall, 49.3% of participants had some sort of TBI training. The mean score of those who identified as having TBI training was 18.68 which was the same as the overall post-test mean score of 18.68. Educators with less than 10 years of teaching had a mean score of 18.10, which was slightly less than the overall post-test mean score of 18.68. On the other hand, educators with more than 21 years of teaching had a mean score of 19.00 which was more than the overall post-test mean score of 18.68. This suggests that the more years an educator teaches, the more general knowledge they have about TBIs. This may be because they have experience educating more students with TBIs since they have been teaching for a longer period of time.

Observations of Participants

There was also feedback that was gathered unintentionally during this educational intervention which is significant to mention. Many educators discussed former students who had experienced severe TBIs. They discussed how it not only affected the student who experienced the TBI, but also how it affected their friends and even the educators themselves. As a result, they did acknowledge how important it is to have regular TBI training during professional development days as well as how the different activities helped them understand a little bit better what students with TBIs may be going through.

Discussion

As identified in the review of literature, headaches were the most commonly reported TBI symptom by high school athletes (Blume, 2015). In another study, post-concussion syndrome (PCS) symptoms were categorized into three groups: cognitive (retrograde amnesia, difficulty concentrating, and disorientation), somatic (loss of

balance, visual disturbance, and noise sensitivity), and sleep (insomnia) (Kerr, Zuckerman, Vander Begt, Yengo-Kahn, Solomon, Sells, and Dompier, 2018). Overall, participants in the current educational intervention showed strength with over 85% correctly identifying the different symptoms of TBI's. The highest correct answers were 98.5% of participants identifying that "It is common for children/adolescents with brain injuries to be easily angered."

Participants had the greatest difficulty understanding planning and delivery and academic support following a TBI. While 45% of the participants thought providing many details when delivering instructions to a students with a brain injury was appropriate, Kasamatu, Cleary, Bennett, Howard & Valovich McLead (2016) acknowledged in their study that cognitive rest should be included during recovery of a TBI. Also, a study by Dreer, Cash, O'Neill and Cox (2017) recognized that because new learning involves continuous mental stimulation and exertion, students may be susceptive to academic struggles and symptom exacerbation as a result. They concluded that over 82% of teachers in their study in Alabama felt they needed more information on TBIs and how to manage students with TBI's in the classroom, which aligns with the results of the current educational intervention results.

Limitations

This educational intervention project had several limitations. Although the results proved to be statistically significant, the sample was limited to a small size, including participants from only one school district. Future educational interventions in other school districts is encouraged to evaluate the amount of change in TBI knowledge from Glang's TBI Knowledge Survey.

Another limitation to this project is there is not a schedule post-test to evaluate long term knowledge retention. The time from pre-test to post-test was approximately an hour. Periodic follow-up studies could assess retention of knowledge. Additionally, the school system did not identify future educational interventions to maintain knowledge. Future projects could include periodic assessment to evaluate knowledge retention.

An observation made by the presenter was that participants seemed to hurry through both the pre-test surveys, appearing so that they could converse with their coworkers, and the post-test surveys, so they could leave the session quickly. This could indeed have a negative effect on the performances of both the pre- and post-test surveys; however, it would likely underestimate the results because the participants would likely have performed poorly. Improved attention to the survey could be alleviated by having more activities after the post-test survey is completed, which may decrease the participants' eagerness of leaving in a hurry.

Barriers

Primary barriers were time constraints and competing priorities for educators. The TBI workshop allowed for an abundant amount of information to be shared in a short period of time, which limited some discussions. To address time constraints, future workshops could include more time for questions, answers, and discussions.

Educators have large caseloads of students with limited time in the classroom, and balancing time between educational instructions to the classroom as a whole versus identifying and addressing the needs of an individual who has suffered a TBI can be challenging. Understanding the importance of having TBI knowledge is important for educators so they can incorporate reasonable accommodations when needed.

Conclusion

The overall goal of this intervention was to provide a live interdisciplinary TBI workshop to increase school personnel's knowledge of TBIs. This study supports the importance that a live interdisciplinary TBI workshop will increase school personnel's TBI knowledge as shown by the increase in mean scores from the pre-test (17.2) to the post-test (18.7), a statistically significant increase of 1.4 points.

The learning outcomes that were expected upon completion of the workshop included participants' ability to describe the signs, symptoms, and side effects of a TBI; recognize the challenges and difficulties that are associated with TBIs, and to discuss strategies to successfully manage students' reintegration into the school environment following a TBI. Participants' greatest strengths were recognizing the signs, symptoms, and side effects following a TBI. Participants' greatest knowledge deficits came with difficulty understanding planning and delivery of materials following a TBI.

Translation of Theory to Practice

Icek Ajzen's Theory of Planned Behavior (TPB) (2006) asserted that behaviors of humans are directed by three kinds of considerations: a person's attitudes, subjective norms, and perceived behavioral control over the action. Utilizing the Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP) (Melnyk & Fineout-Overholt, 2019) to guide the best practices and strategies with meaningful methods to learners and applying the TBP to drive the educational programming, the live interdisciplinary Traumatic Brain Injury (TBI) workshop that was presented to the group of participants proved effective in increasing school personnel's TBI knowledge. The findings of this project contributes to the evidence related to uniformity in recognizing and managing a

student's cognitive, behavioral, and social functioning following a TBI when returning to the classroom setting.

Recommendations for Further Research and Practice

This project demonstrates the importance that a brief, live interdisciplinary TBI workshop increases school personnel's TBI knowledge. As identified in the literature review, there are no standardized methods of recognizing and managing a student's cognitive, behavioral, and social functioning following a TBI when returning to the classroom. Further research and evidence is needed to develop best practices for providing educators with the knowledge necessary to promote the well-being of students who experienced a TBI.

By introducing and employing TBI workshops to school districts, Advance Practice Nurses (APNs) can improve educators' knowledge of working with students who experience TBIs while helping them recognize the strengths and weaknesses of familiarity of TBI management in the school environment. Advance Practice Nurses can provide educators with the tools necessary to help ease the transition of the student with a TBI back into the school environment while facilitating their recovery.

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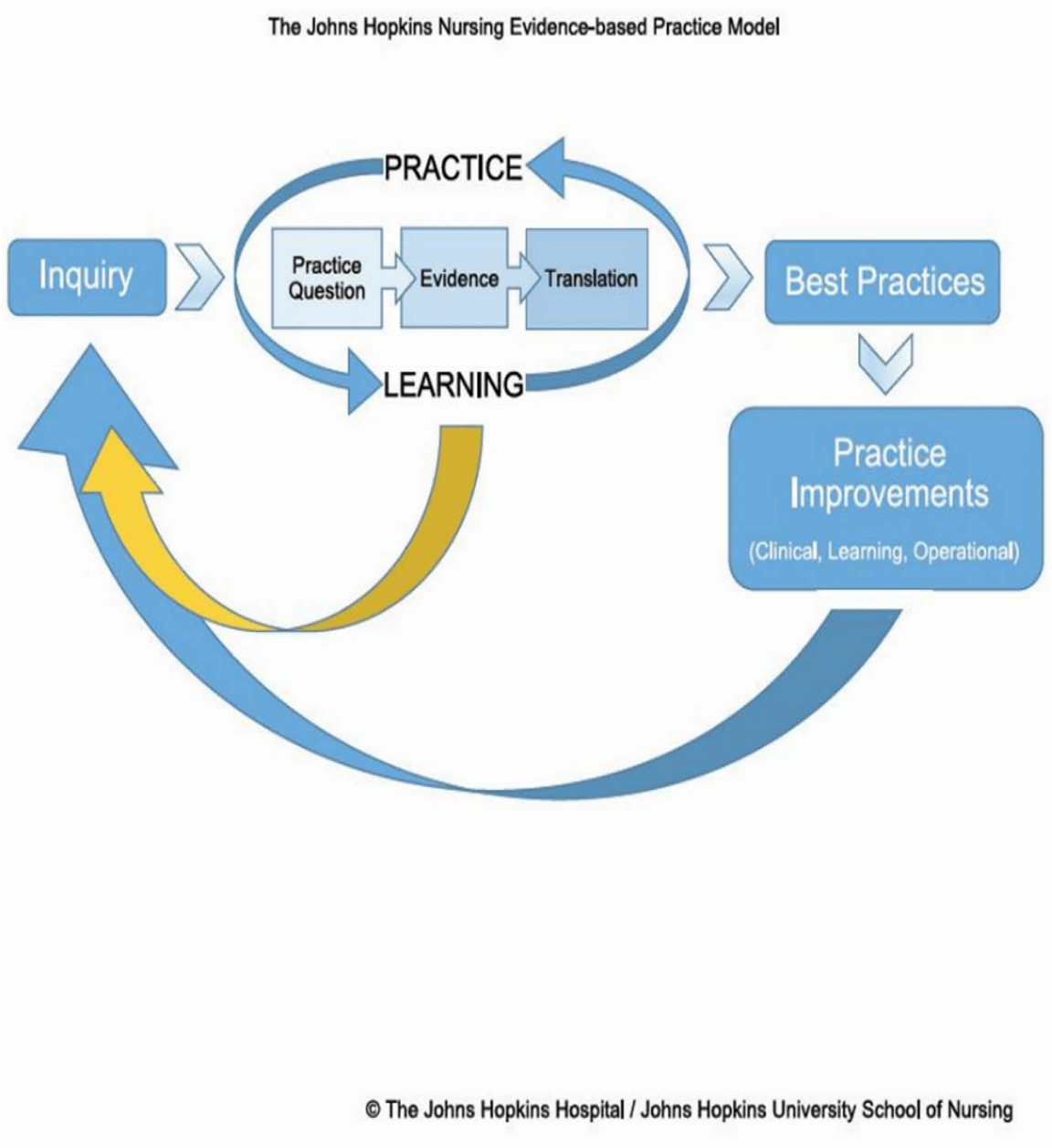
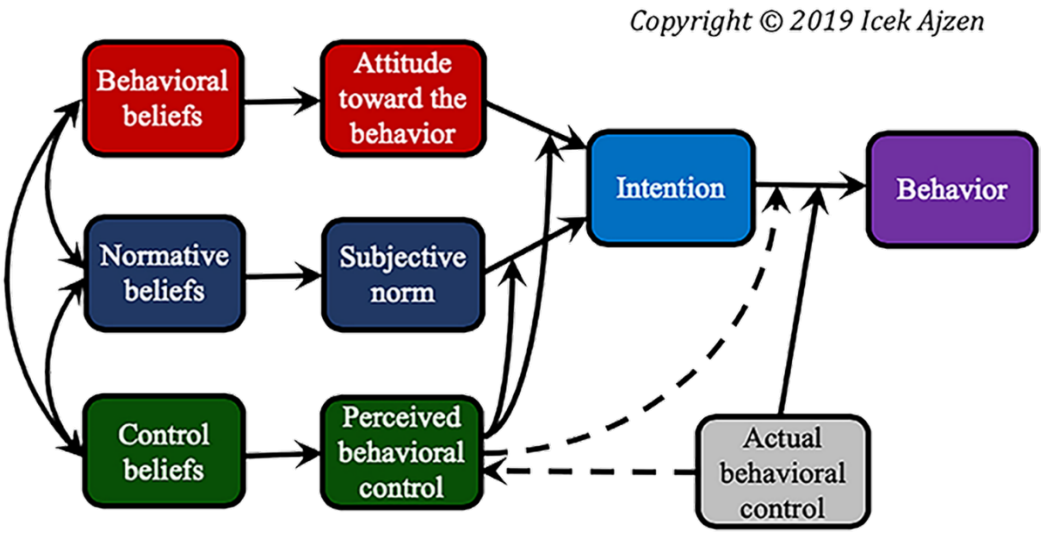
Appendix A

The Johns Hopkins Nursing Evidence-based Practice Model



Appendix B

Icek Ajzen's Theory of Planned Behavior



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Appendix C

TBI Workshop Lesson Plann

TBI Workshop Lesson Plan

Title

Trisha L. Wright, MSN, CRNP, FNP-BC, ATC

Time duration

90 minutes

Overview

If you received a note from a physician stating a student in your class had a Traumatic Brain Injury (TBI – or concussion) would you know how to help the student continue participating and class and recover?

TBIs are serious brain injuries that have a significant influence on the brain's ability to function at its normal capacity. The key to recovery from a TBI is both physical and mental rest, followed by a gradual progression back to activity, both in athletics and in the classroom. Most TBIs resolve within a few days or weeks, so the management of a student who has suffered a TBI may be no different than that of one who missed a few days due to minor illness. However, some TBI symptoms linger and have the potential to cause long-term academic and social difficulties for the student. If unmanaged, these problems have the potential to significantly impact the student's academic career. Seizures should be recognized as a post-TBI side effect that can occur that needs appropriate immediate care and management until qualified health care professionals arrive. Proper management of a student who has suffered a TBI in the classroom by his or her educators can allow the student to continue making academic progress through accommodations designed to help prevent permanent damage to the student's academic record. An educator's involvement is vital.

Objective

Purpose: The purpose of this project is to improve the overall health and well-being of adolescents who have suffered a TBI during reintegration into a school environment. The intent is to provide a live interdisciplinary TBI workshop that will increase school personnel's knowledge of TBIs.

Goal: To empower educators to successfully integrate students into the classroom following a TBI.

Learning Outcomes: Upon completion of the TBI workshop, participants will be able to:

- Describe causes, signs and symptoms, and side effects of a TBI.
- Recognize the challenges and difficulties that are associated with TBIs to aid in the promotion of health and wellbeing of student.
- Discuss strategies to successfully manage students' reintegration into the school environment following a TBI.

Materials

Presentation

Outline

Eggs

Jell-O

Containers

Spotlight

Strobe Light

Air horn

Visual Impairment Goggles

Activities and procedures

Egg Challenge

Jell-O Challenge

Spotlight, Strobe light, and Air horn Activities

Visual Impairment Activities w/ Goggles

TBI Video

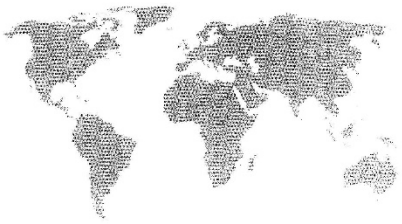
Conclusions

A successful return to the classroom following a TBI requires a collaborative approach from school personnel and health care providers. Every young person experiencing a TBI is different and may exhibit varied symptoms. Educators should have the knowledge base of TBs to assist with the transition to the classroom.

Appendix D

CITI Training Certificates

CITI PROGRAM



Completion Date 13-Feb-2018
Expiration Date 12-Feb-2021
Record ID 26189523

This is to certify that:

Trisha Wright

Has completed the following CITI Program course:

Conflict of Interest course (Curriculum Group)
Conflict of Interest (Course Learner Group)
1 - Stage 1 (Stage)

CITI
Collaborative Institutional Training Initiative

Under requirements set by:

Edinboro University of Pennsylvania

Verify at www.citiprogram.org/verify/?wb0b5e854-d246-46b2-b0fc-fb40941e767c-26189523

Appendix E

Clarion University Institutional Review Board Approval Letter

CLARION UNIVERSITY OF PENNSYLVANIA
Institutional Review Board

DATE: February 13, 2020

FROM: Karl Sprenger, Chairperson
Institutional Review Board

TO: Trisha Wright

RE: ARA Approved

Your application for Research Approval, Evaluating the Efficacy of an Educational Program for School Personnel with Students Returning to the Classroom Following a Traumatic Brain Injury: An Evidence-Based Project, Project 51-19-20, has been reviewed and approved as exempt. **Be sure that you include your IRB project number in your project cover letter and in any correspondence with the Administrative Office. Also, please include your approval number from the initial application, if submitting an addendum. Your IRB project number should appear on your informed consent and/or your survey instrument.**

Please review the following IRB policy guidelines, which cover your responsibilities as primary investigator:

You must file written permission, which serves as consent, from the institution or facility with the Administrative Office (included in your IRB application). You must also retain all signed consent forms, if required for participation, for a period of three years after the end of the research approval period.

If your research extends beyond one year, you must submit a request for extension and an annual progress report.
Principal investigators are responsible for reporting the progress of the research to the Administrative Office no less than once per year. Problems involving risks or changes in the research must be reported immediately.

You must promptly report injury and/or unanticipated problems involving risks. Principal investigators are responsible for promptly reporting (in writing) to the Administrative Office, through their department heads, any injuries to human subjects and any unanticipated problems, which involve risks to the human research subjects or others.

You must report changes in the research.
Research investigators are responsible for promptly reporting (in writing) to the

Administrative Office, through their department heads, any proposed changes in a research activity.

Changes in research during the period for which IRB approval has already been given **shall not be initiated** by the research investigators **without IRB review and approval**, except where necessary to eliminate apparent immediate hazards to the subject. In such occurrence the IRB is to be notified as soon as possible.

You must report noncompliance with this assurance.
Research investigators and department heads are responsible for reporting promptly to the Administrative Office and the IRB any serious or continuing noncompliance with the requirements of this assurance or the determinations of the IRB.

If your project is under continuing review (Expedited and Full-Board Applications), you may be requested to produce evidence that your research is following the guidelines provided in your application. If your project is chosen for an audit, you will be notified.

You must submit a research conclusion form, available on the IRB site, once your research project is completed. Please submit the research conclusion form to irb@clarion.edu.

Clarion University of Pennsylvania
840 Wood Street, Clarion, PA 16214
814-393-2774 (Phone)
814-393-2825(Fax)

Appendix F

TBI Knowledge Survey

Dr. Ann E. Glang
Center on Brain Injury Research & Training
University of Oregon

Please answer the following:

	False	True
1) TBI is equally common in males and females	o	o
2) A child/adolescent in a coma is usually not aware of what is happening around them.	o	o
3) After a brain injury, children/adolescents can forget who they are and not recognize others but be 'normal' in every other way.	o	o
4) A brain injury affects girls' and boys' brains differently.	o	o
5) Even after several weeks in a coma, when children/adolescents wake up, most recognize and speak to others right away.	o	o
6) After a brain injury, it is usually harder to learn new things than it is to remember things from before the injury.	o	o
7) A child/adolescent's pre-injury status (i.e., intellectual and emotional functioning) is likely to impact recovery from the brain injury.	o	o
8) Children/adolescents who have had one brain injury are more likely to have a second one.	o	o
9) Complete recovery from severe brain injury is not possible no matter how badly the child/adolescent wants to recover.	o	o
10) Children/adolescents are likely to recover more completely from a brain injury than adults due to the greater plasticity of the young brain.	o	o
11) A child who acquires a brain injury between 12 and 16 will typically present an even pattern of academic strengths and weaknesses.	o	o
12) A child's brain, unlike an adult's, is able to bounce back after a brain injury.	o	o
13) It is common for children/adolescents with brain injuries to be easily angered.	o	o
14) Fluctuation among cognitive abilities is a finding typical of children/adolescents who have a brain injury and is not typical of the general population of children/adolescents.	o	o
15) When children/adolescents are knocked unconscious, most wake up quickly with no lasting effects.	o	o
16) It is important to provide many details when delivering instructions to a student with brain injury.	o	o
17) Greater variability exists in the population of students with TBI than exists in populations of others students with disabilities.	o	o
18) The only sure way to tell if someone has suffered brain impairment from a brain injury is by an X-ray of the brain.	o	o
19) Knowing the location of a TBI helps in the development of programming to meet a student's needs.	o	o
20) Many students with TBI display characteristics similar to those of students with a learning disability.	o	o

21) Knowledge of a student's background prior to TBI is necessary when developing an educational plan.	o	o
22) Medical labels that specify TBI as mild, moderate, or severe are useful for programming communication and academic services.	o	o
23) The primary goal of brain injury rehabilitation is to increase physical abilities such as walking.	o	o
24) Many students with TBI perform better in structured testing situations than they do in classroom settings.	o	o
25) The challenges of students with TBI are typically more difficult to assess than the challenges of students with other disabilities.	o	o
26) Most special and regular educators are knowledgeable about the speech, language, and cognitive communication problems associated with TBI.	o	o
27) Students with TBI often have trouble forming and maintaining friendships.	o	o
28) Recovery following TBI can continue for several years.	o	o
29) Students with TBI often display behavior problems.	o	o
30) Standardized tests are more beneficial than descriptive measures (e.g., language samples, interviews, checklists, observational techniques) in assessing cognitive deficits secondary to TBI.	o	o