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Evidence-Based Care in Urgent Care Centers

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Abstract

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Concussions are brain injuries--also called mild traumatic brain injuries--that affect the function of the brain temporarily or permanently. The purpose of this doctoral project was to develop an education module for staff at an urgent care center to address the lack of knowledge and low level of comfort regarding the care for patients with a head trauma. This project introduced and educated the clinical staff on an evidence-based protocol for the treatment and management of a patient with a concussion. The Rosswurm and Larrabee model for evidence-based change was used as a foundation for refining the practice question, gathering evidence, and translation of the protocol into the clinical setting. The Dreyfus model of the 5 stages of skill acquisition was used to measure the learners' level of achievement. A pretest and posttest were conducted to determine whether there was a gain in knowledge and confidence as a result of the project. There were 6 participants: 3 nonclinical staff and 3 nurses. Overall, there was a statistically significant improvement in confidence based on the Wilcoxon sign ranks test (z = -2.201; p = .028); however, a statistically significant increase in knowledge was not apparent, even though the scores did improve. All staff members were able to apply the practice guideline and make sound judgments using case studies. This project resulted in the translation of evidenced-based care into the urgent care setting, enhanced the confidence of the nursing staff, and has the potential to bring about positive social change by improving the quality of care that will be provided to patients with head injuries.

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Dedication

"Let your dreams be bigger than your fears, your actions louder than your words, and your faith stronger than your feelings." -Unknown

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First, I would like to thank my children Blake and Aydn for their patience and understanding throughout my entire educational journey. Next, I would like to acknowledge my family, friends, and coworkers, as they were my biggest cheerleaders and had faith in me even when I lost it. Third, I would like to acknowledge all those who set barriers in front of me and doubted me, as these became my motivation. Last, I would like to recognize the educators throughout my journey who assisted me embraced my weakness and build on my strengths. At each milestone I was blessed to have positive influences who lent their guidance, support and dedication, especially this last milestone. Thank you Dr. Niedz.

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Section 1: Nature of the Project

Introduction

It is estimated that 42 million people worldwide annually are injured and suffer a mild traumatic brain injury (MTBI) or concussion (Gardner, 2015). The terms *concussion* and *MTBI* are interchangeable and are used to identify a common condition or disorder affecting the brain in an acute or chronic state or permanently. This common condition can have a substantial impact on public health (Levin, 2015).

Recognition of this public health problem has led to the development of guidelines for treatment in emergency departments, organization-based education, prevention and surveillance programs, and public health policy changes (Levin, 2015). However, significant gaps remain in the uptake of the evidence-based care and treatment for individuals outside of these institutions and organizations. This doctoral project addressed the differences in the uptake and utilization of evidence-based concussion guidelines among nursing and clinical staff as well as the need for improved competency levels of the team working in an urgent care center (UCC) and their use of a newly implemented concussion protocol.

Problem Statement

The problem addressed by this project is the lack of standardized treatment for adults and children seeking care after a head injury in an UCC. This project also addressed the barriers of the incorporation and use of newer evidence-based care methodologies. Lastly, it addressed the lack of a continuing education method for the

nursing and clinical staff that meets the needs of the organization and the diversity of learners.

Mild Traumatic Brain Injuries

The number of those seeking care in the ER for traumatic head injuries has steadily increased. In an analysis of the nationwide emergency department sample for 2006 to 2011, there were 756,214,762 (weighted) emergency department visits, of which 0.5% diagnosed with a concussion with the incidence of concussion visits increasing by 28.1% from 2006 to 2011 overall (580,573 to 743,994; Zonfrillo, 2015). MTBIs can have adverse cognitive, behavioral or emotional, and physical symptoms, which can impact a person's daily activities (The Ontario Neurotrauma Foundation [ONF], 2018). Early diagnosis, treatment, and management will reduce persistent symptoms and improve a patient's outcome (ONF, 2018). Acute assessment, interpretation, and management of symptoms should include a standardized assessment tool, because often an overlap of symptoms with other clinical disorders can contribute to a patient's symptoms (ONF, 2018). Over the last several decades, injury prevention strategies, anticipatory guidelines, and best practice guidelines for diagnosis and management have been developed; however, there are barriers in implementing them into the clinical setting.

Urgent Care Centers

According to the Urgent Care Association in 2017, there were 7,639 UCC across the United States (Japsen, 2018), and of the 42 million people diagnosed or suffering from a MTBI annually (Gardner, 2015), it is likely many of those have sought care at a UCC. In the State of Georgia, UCC are unregulated health care centers, as with most

states across the nation. These centers are classified as a business, which means they are not required to meet or utilize clinical guidelines or standards of practice as traditional hospital and emergency rooms must do. This lack of oversight can create inconsistencies in care and care that is not considered standard of practice or evidence based. UCCs are also staffed with licensed and nonlicensed employees as well as varying degrees of level of licensures, which creates inconsistencies and gaps in the basic knowledge of disease or illness, resulting in substantial differences in documentation and assessment skills, impacting care and outcomes for patients.

Nursing and Clinical Staff

A licensed health care provider is qualified to make the diagnosis of a concussion (West, 2015). They may employ clinical experience, knowledge, and expertise, and utilize guidelines to aid them in the process. Additionally, they rely on nursing observations, assessments, and documentation to assist them in the care, treatment, and management of the patient. Nursing and clinical staff play an important role before, during, and after a diagnosis is made by a health care provider. Thus, it is important for each member of the team to understand and apply protocols and evidence-based standards of care. To ensure that all staff have knowledge and the ability to utilize organizational protocols, continuing education is necessary.

Purpose

The purpose of this project was to plan, design, prepare and implement a staff education module and an adjusted workflow that is supported by evidence on the treatment and management of patients with MTBI in an urgent care setting. Evidence-

based practice (EBP) and evidence-based care improves the delivery of health and patient outcomes as well as reduces costs and variations of care. However, it is not the standard of care that is delivered across all settings (Melnyk, 2014), which is especially true in small, privately-owned practices. There are some reasons evidence-based care is not successfully implemented into clinical settings. There is often a lack of awareness about EBP and lack of a mentor to guide in its adoption as well as competencies to develop EBP knowledge and skills (Melnyk, 2014). This lack of knowledge is demonstrated by discrepancies among the staff of the appropriateness of a patient receiving care at the center, assessment and documentation, and the information provided at discharge to the patient.

The initial problem identified was the need for standardized care and treatment in an UCC for patients presenting with an injury likely to result in a concussion. Prior to the project, when a patient would enter the center, they would be greeted by the front desk staff who are either medical assistants or general office staff. The patient would then be asked if they have ever been there before and if they have an appointment before being provided the appropriate paperwork. Once the paperwork is completed, they would be asked for their ID and insurance information. It is not until the documents are reviewed for “reason for visit” that the staff identify that the patient is presenting with a complaint of a head injury or symptoms commonly caused by a recent head injury. At that point, unless the person would be bleeding or lethargic, the chart would be placed in the rack to be seen with the rest of the patients waiting.

Once the chart would be pulled, the nurse or the medical assistants would call the patient from the waiting room to an open room. They would complete the vital signs, enter a brief chief complaint in the computer, and put the clipboard up in the "ready to be seen area." When the patient would be seen by a provider, assessments and tests or diagnostics using non standardized concussion tools and methodologies would be completed, which is when it would be determined whether the patient should stay and continue care at the center or transferred to a higher level of care at the emergency room. If care were continued at the center, the remaining visit is dictated by the tests and treatments ordered by the provider, additional assessments, observations, and discharge education are done by the provider. Lastly, the chart would be placed up for discharge, the nurse scans in any prescriptions, instructions (if given) are then handed to the patient, and the patient is directed to follow the exit signs out.

Direct observations of the workflow at the UCC led to the conclusion that the workflow needed to be adjusted to be consistent with evidence (ONF, 2018; Reisner, 2017; Tavender, 2015) and that there was a lack of staff knowledge to care for a patient with an injury resulting in trauma to the head. Thus, the practice-focused question for this doctoral project was "Will a staff education program on MTBI improve the staff's knowledge of concussions, leading to successful use of the evidence-based protocol for MTBI in an UCC where children, adolescents, and adults receive care?" This project provided education for the nursing and clinic staff, enabling them to develop the basic knowledge of MTBIs that will allow them to use the newly adopted concussion protocol effectively, using a new workflow that emerges from the ONF (2018) practice guideline,

which is based on evidence (ONF, 2018; Reisner, 2017; Tavender, 2015). Additionally, this project increased the level of confidence and competence in identifying and treating these patients.

This staff education project served as the basis for an adjusted workflow and use of standardized assessment tools that are consistent with ONF (2018) guidelines. The staff education improved the staff's knowledge and competency level caring for patients who have suffered an injury resulting in a concussion and ensured that evidence-based care is used even in smaller health care settings, thus closing the gap-in-practice. This project improved the quality and consistency of care, creating a positive social change for the community of patients receiving care at the UCC, supporting the translation of evidence into clinical practice, and enhancing the body of knowledge for those viewing the module.

Nature of the Project

Through observation and informal inquiries among the staff and administration of the clinic UCC, I identified a need within the UCC for education specific to head injuries. To meet the needs of the organization, I designed a web-based learning activity. Resulting from a strong desire to improve the consistency and quality of care that patients receive, I suggested the ONF (2018) concussion algorithms and guidelines to be adopted at the UCC. The Doctor of Nursing Practice (DNP) project followed the Walden educational manual and provided the UCC staff with adequate educational support to adjust the workflow in a way that is based on the ONF practice guideline and research (ONF, 2018; Reisner, 2017; Tavender, 2015).

An e-learning approach was used for the varied levels of learners, which enhanced the delivery and met the budget of the organization. This activity was an interactive, online learning experience that presented primary education on MTBI, synthesized material from leading authorities on MTBI, and demonstrated proper application of the concussion protocol. Pretest and posttest surveys were conducted anonymously and helped evaluate the outcome of the project and measure if the clinical staff gained the anticipated knowledge. I included a survey of satisfaction of this type of learning activity to identify if the online education met the learning styles of the employees and was acceptable for future continuing education activities.

Barriers within the practice relate mainly to the diversity of staff and generational differences in learning styles of those employed at the center. The design and content of the staff education module met the needs of those with limited or without formal health care education and training as well as those with more advanced training and education in health care, allowing all the staff to gain knowledge about MTBI. As I anticipated, the clinical staff and providers demonstrated improvement in the collaboration and care of patients with concussions. In addition, an increase confidence among the staff when encountering a patient with a head injury and enhancements in patient education were a result of the knowledge gained.

A workflow algorithm was developed and included the use of the recommended tools presented in the education and training. To evaluate the impact of the training on UCC practice, qualitative data were elicited from the UCC team at a staff meeting held after the interactive on-line educational program was completed by all staff. The purpose

of the informal, follow-up staff meeting was to determine if the tools were helpful, the extent to which the revised workflow was being followed, and the collection of narrative data on the effect of the training. Actual cases did not present themselves for discussion during the interim after the training; therefore, case studies were presented for discussion and analyses.

Significance

This project identified a lack of protocol use and standardized care for patients seeking treatment in an UCC after a head injury. This finding led to the decision to implement the ONF recommendations as an evidence-based protocol in the center. This process involved the owner, a provider, the director, and a lead clinical staff member. These individuals are also stakeholders of the staff education project and will be involved in the input and refinement phases of the clinical staff education project. All of these stakeholders became contributors of the doctoral project.

This project was designed and intended for nurses and other employees of an UCC. The presentation increased their knowledge and comfort when encountered with a patient suffering from a MTBI and improved the education a patient receives at discharge. The overall impact of the project is improving the quality of the care patients with MTBI receive in the community. The project should serve as a model of concussion care for other UCCs to adopt.

UCCs are one of the fastest growing practice-types in the United States, and the promotion and improvement of the utilization of evidence-based care into this venue is crucial. UCCs, especially single owner facilities often lack the resources and abilities to

provide continuous staff education. Other UCCs may implement the ONF concussion protocol into their centers and utilize this staff education project as an introduction to the protocol.

Summary

Cost, accessibility, and convenience of care have all resulted in drastic changes in health care. The increased utilization of the emergency room for nonurgent care has resulted in lengthy wait times (Van Donk, 2017). As a result, many patients are seeking care at alternate sources. UCCs are the fastest growing sector in health care for these reasons; however, they are the newest models of the delivery of care and, so there are substantial variations in care received at these centers. The lack of urgent care specific research, private or single owner business models, and staffing differences create large gaps-in-practice in the use and application of evidence-based guidelines.

Media outlets, researchers, and individuals in health care have begun to notice an increase in incidents and diagnosis of concussions, capturing the attention of health care providers, government officials, the public, and leading health care authorities including the World Health Organization, the ONF, and others. These organizations have published guidelines to assist clinicians to become more adept at recognizing, managing, and monitoring individuals they encounter with traumatic injuries to the head. However, translation into practice remains problematic, especially into the smaller facilities for health care delivery such as UCCs.

Section 2: Background and Context

Introduction

Concussions are a significant public health problem. Although certain people are more at risk for a MTBI, the poor outcomes associated with improper care and treatment of MTBI can have lasting effects on patients. Over the past 15 years, much information has emerged about concussions, especially sports-related concussions and concussion syndromes. However, this information has resulted in confusion even among individuals working in health care settings about the appropriate level of care and treatment necessary for patients. For example, media outlets often emphasize the risks and adverse outcomes of head injuries; therefore, when patients seek care with a complaint of a blow to the head, they are referred directly to the emergency room. Frequently these patients are prematurely turned away from an urgent care because of an initial complaint of a head injury or the subtle symptoms they report are overlooked, and a MTBI diagnosis is missed.

This project introduced a newly implemented concussion protocol at an UCC through a role-specific adjusted workflow and provided staff education on MTBIs. This project educated staff that most head injuries can receive care safely at a UCC, which can reduce delays and cost of care for these patients without compromising outcomes. The project answered the focused practice question “Will a staff education program on MTBI improve the staff knowledge of the newly implemented evidence-based protocol for MTBI in an UCC where children, adolescents, and adults receive care?” I designed an evidence-based education program to support the new protocol and provided it through

an e-learning activity, which included information on evidence supported care, treatment, and management of a patient with a head injury.

Concepts, Models, and Theories

Mid-range theories move theory-based research into nursing practice and allow for the transfer of knowledge and translation of evidence into practice. Two distinct mid-range theories were selected to support this doctoral project. The Rosswurm and Larrabee model (1999) guided the translation of evidence into practice changes and the Dreyfus model of skill acquisition guided the process of learning (see Dreyfus, 2004; Dreyfus & Dreyfus, 1980). The Dreyfus and Dreyfus (1980) model was applied to guide the learning and skill acquisition of the nursing staff, whereas Rosswurm and Larrabee's model enabled the workflow changes to incorporate EBP into routine care at the UCC.

Mild Traumatic Brain Injury

Injuries to the brain are classified as mild or minor to severe. Nonpenetrating head injuries in low-risk populations who present with an Abbreviated Injury Scale (AIS) score for the head and neck region of 1-2 (Baker, 1974; Brasure, 2012), Glassglow coma score greater than 13 or a score of 14-15, and who have not reported a loss of consciousness over 30 minutes are typically categorized as mild (ONF, 2018) and are the focus of this project. As these patients are more likely to not require neuroimaging or neurosurgical services and will most likely be discharge from the emergency department after a brief period of observation, they are appropriate for care at an UCC. Patients who are high risk, have a Glassglow coma score less than 14, a greater than 30-minute period of loss of consciousness, and an AIS score 3 or higher are identified as having a moderate

to severe injury and will be discussed later for the purposes of identifying appropriate care levels of a patient within the education module.

The classification of brain injury is determined based on the AIS, Glassglow coma score, loss of consciousness, and skull penetration; however, the delineation of evidence for the criteria of the AIS, Glassglow coma score, and loss of consciousness as predictors of discharge and outcome is what also drives the level and depth of care suggested in guidelines and standardized assessment tools. The Glassglow Coma Scale (GCS) was first introduced in the 1970s by Jennett and Teasdale as a prediction scale of a coma and outcome after a severe head injury (Teasdale, 1974). This scale is the most widely used today as an initial assessment of a patient's level of consciousness (Centers for Disease Control and Prevention [CDC], 2015). The intended use of the scale was not for measurement of all head injuries or a prediction of milder injuries (Jennett, 1989) but a confident prediction (> 0.97 probability) that demonstrated actual outcomes, which would show a 96-98% chance of death or survival of the patient (Teasdale, 1974); therefore, the higher the number on the GCS, the lower chance of death and highest probability of survival. The GCS alone is not an accurate tool for the detection of MTBIs, and TBI severity can be misclassified (CDC, 2015), but it is relied on for its ability to quickly assess for and detect severe injuries, which is why it is only one of the many tools recommended to use for classification, identification, and assessment of head injuries. Following the GCS assessment is usually the assessment for loss of consciousness or posttraumatic amnesia.

Similar to the GCS, the duration of loss of consciousness and posttraumatic amnesia has been identified as an indicator of the severity of injury (Anderson, 1996) as well as a predictor of post-concussion disorder. For example, the loss of consciousness of a patient as a predictor of post-concussion disorder, otherwise defined as negative outcome of a MTBI, was examined in a retrospective study of 53 patients who had experienced post-concussion disorder, showing no evidence that injuries associated with a loss of consciousness were more debilitating than those without a loss of consciousness (Leininger, 1990). Nevertheless, the length of time the patient is unconscious is used as a criterion for severity, and a mild brain injury is usually defined as less than 30 minutes of unconsciousness (von Holst, 2004) despite evidence suggesting that the cut-off time of 30 minutes or less for a loss of consciousness is unclear (Shukla, 2010). Lastly, the AIS ranks injuries assigning 1 to 6 points with 6 being the highest risk for mortality (Brasure, 2012). Like the GCS, the AIS is useful in identifying those with elevated risks of severe injury who are more likely to require neuroimaging or neurosurgical imaging and are not suitable for routine discharge.

A report from the CDC in 2010 found that 87% of the 2.5 million people who were diagnosed with a traumatic brain injury were treated and released from the ER (CDC, 2015), indicating that the patients did not exceed the measures of the GCS, AIS, and loss of consciousness/posttraumatic amnesia scales for MTBI and therefore did not need additional interventions beyond evaluations and observation. In 2014, a population-based descriptive epidemiological study using the Nationwide Emergency Department Sample of TBI visits to emergency departments 2006 through 2010 indicated similar

outcomes of patients discharged following an injury (Marin, 2014). Based on descriptive statistics with 95% confidence intervals, the study indicated that there were 559,325 patients meeting the ICD-9-CM diagnosis in 2010, 81.3% were discharged from the emergency department, and most patients (87.3%) were identified as having minor injuries (Marin, 2014).

Evaluating Mild Traumatic Brain Injury in an Urgent Care Center

Most patients with MTBI are evaluated, treated, and discharged within hours from the emergency room (Marin, 2014), because evidence-based guidelines are used to provide their care (Tavender, 2015). There are several evidence-based guidelines for the assessment and management of concussions, which include algorithms for rapid assessment, assessment tools and clinical guidance when dealing with specific populations, imaging criteria, and discharge plan and education. For instance, a couple of published assessments are the Acute Concussion Evaluation (ACE)—physician/clinician office version or emergency department version—are evidence-based guidelines for patients 18 years and older for evaluation of a MTBI (Gioia, 2008), and the Child-Sport Concussion Assessment Tool (SCAT)3 in athletes ages 5-13 (McCrory, 2012). Additionally, the Pediatric Emergency Care Applied Research Network (PECARN) pediatric head injury/trauma algorithm (Schonfeld, 2014) and Canadian CT head injury/trauma rules (Stiell, 2001, 2005) are tools to determine if computed tomography (CT) or conventional MRI are indicated for a patient.

An additional tool for assessment includes the ONF guidelines. The ONF 2018 guidelines for adults are based on the best available evidence at the time of publication

(ONF, 2018). Included in the guidelines are key recommendations, which are graded levels of evidence: Level A includes at least one randomized controlled trial, meta-analysis or systematic review; Level B involves at least one cohort comparison, case studies, or other types of experimental study; and Level C involves expert opinion, experience, or consensus panel (ONF 2018). For example, the recommendations identify the ACE as Level or Grade A for its strengths as a standardized tool for assessment for the targeted user population. The targeted users for the guidelines include primary care providers (family physicians, nurse practitioners), neurologists, physiatrists, chiropractors, occupational therapists, physiotherapists, psychiatrists, psychologists, social workers, counselors and speech-language pathologists (ONF, 2018).

ACEs, which are evidence-based guidelines for patients 18 years and older for evaluation of a MTBI (Gioia, 2008), and the Child-SCAT3 in athletes ages 5-13 (McCrory, 2012) have been both supported in their utilizations for specificity and sensitivity. The SCAT was first published 16 years ago and has undergone several revisions including SCAT2/SCAT3 and ChildSCAT3/5, which are age specific evaluation tools (Echemendia, 2017). The SCAT is still the most widely accepted acute concussion assessment tool currently available (Haydel, 2012). The ACE is part of a number of toolkits and guidelines or recommendations for the assessment, diagnosis, and management of concussions. The ACE is a part of the CDC's "Heads Up to Health Care Providers" toolkit (CDC, 2018) as well the third edition of the ONF Guidelines for Concussion/MTBI and Persistent Symptoms (ONF, 2018).

In addition to assessment tools, clinical supports for providers to assist in decision-making for the use neuroimaging are also available in primary care of office-based setting and emergency rooms. To date, consistent patterns within the brain or changes have not been found on MRI or CT scans that are necessary to diagnose concussion as a result on a MTBI (ONF, 2018). Therefore, an MRI or CT scan are not necessary or clinically indicated for all patients presenting with a head injury. The PECARN is also a clinical decision-making tool that allows providers to rule out the presence of clinically important trauma to the brain or the need for neurosurgical interventions without the need for CT imaging (Kuppermann, 2009). Similar to the PECARN, the Canadian Head CT Rule can be utilized with patients over the age of 16, who are not taking blood-thinning medication, or who have had a seizure associated with the event (Stiell, 2001).

PECARN was found to be 100% sensitive for identifying those patients under the age of 2 in need of higher levels of care or otherwise not suitable for discharge home, and 96.8% of children over the age of 2 in the original PECARN trial that included 42,412 children (Kuppermann, 2009). The Canadian Head CT Rule was found to be 100% sensitive for injuries that require neurosurgical intervention and detecting clinical important brain injuries requiring further evaluations such as a CT and MRI (Stiell, 2001, 2005). Subsequent studies have found that when compared to similar tool, the Canadian Head CT Rule was superior and that 100% of interventions requiring neurosurgical intervention were identified (Stiell, 2005). These tools like the ACE and SCAT are readily available for use by an office-based provider or in emergency and trauma

departments. The findings of the research that support the ONF practice guideline **(**Kupperman, 2009; ONF, 2018; Stiell, 2005) indicate that most patients injured requiring evaluation and treatment for concussions could safely receive care in an UCC if the staff are trained in the use of the evidence-based guidelines and there is a clinic protocol for identifying and managing concussions (Francke, 2008; Kupperman, 2009; Reisner, 2017; Marin, 2014).

Knowledge Acquisition

Advancing the field of nursing, improving the quality and delivery of care, and decreasing the costs of care require continuing education of health care professionals. Just as advancements in technology have drastically altered medicine, they have also changed methods of teaching. E-learning is now a mainstream method of providing continuing education because of its flexibility and cost. E-learning is typically self-paced and allows training or learning to occur at a location preferred by the learner (Clark, 2016). However, the effectiveness of the activity in achieving the acquisition of knowledge depends on the quality of content as well as the design and presentation (Clark, 2016).

Knowledge acquisition is the process of absorbing new information and storing it in memory for retrieval later. The application of the knowledge is essential for delivering high-quality of care, especially in the changing health care environment (Ajanaku, 2018). The successful storing and retrieval processes depends on the presentation and organization of the information (Kalyanaraman, 2018). For example, concussions or MTBIs have been researched, highlighted in the media, and written about in publications

across many disciplines and organizations, including local, state, and federal governments (CDC, 2015; Cook, 2014; ONF, 2018; Thurman, 1999). These information outlets have provided a wealth of content; however, when viewed separately, none support the acquisition of knowledge to direct improvements in care. Thus, the purpose of this DNP project was to support evidence in the form of research from the literature and an evaluation that determined knowledge acquisition has occurred and influenced practice.

E-Learning

E-learning, also referred to as web-based learning, is now becoming the preferred method for continuing education for organizations and educational institutions because of its cost-effectiveness and flexibility. The method refers to the delivery of instruction on a digital device to support learning (Clark, 2016). E-learning offers various levels of complexity and functionality, ranging from systems using simple text-based applications to adaptive systems with artificial intelligence to engage the learner (Fontaine, 2017). The choice or preference to use a simple versus complex design is often based on budget and the limitations of the designer's expertise.

Systematic reviews continue to demonstrate the effectiveness of web-based learning to increase the knowledge, competence, and positive impact on the behavior of health care professionals (Fontaine, 2017; Sinclair, 2016). This method has been found to be as effective as traditional classroom instruction or printed text in improving learning outcomes (Fontaine, 2017; Sinclair, 2016). However, superior learning outcomes have

been found with activities designed with interactivity, repetition, feedback, and practice exercises such as adaptive learning environments (Cook, 2010; Fontaine, 2017).

Rosswurm and Larrabee's Model for Change

The model chosen to facilitate change within the urgent care is the model for evidence-based change (Rosswurm, 1999). This model was selected as the foundation of the project because it enabled a shift from the clinic's traditional methods of change to a model that fosters integration of EBP into traditional settings (West, 2015). The model uses six steps or processes for change (Rosswurm,1999), which are easy to apply to this small practice setting, yet ensures critical points are met for successful change. However, this model does not expand on staff education around the practice change until the last step of the process. It has been my experience that a change in practice or introduction of a new process into a setting is met with resistance unless staff have an advance understanding of the concepts evoking change. For those reasons, I implemented the staff education program, between steps four and five, to ensure all staff had attained the knowledge to understand and use the new protocol.

One of the central barriers identified is the large gaps in health care literacy among the employees, primarily relating to accidents and injuries likely to cause a concussion and subtle symptoms of concussions and post-concussion syndromes. It was essential to address the lack of knowledge among the staff about head injuries and the appropriateness of treatment within the UCC before implementing the change in practice to the new protocol. To overcome those gaps, I chose Dreyfus's model of the Five-Stage

Model of Adult Skill Acquisition (Dreyfus, 2004), because it allows the flexibility of all levels of learners to progress and achieve the desired individual outcome.

Five-Stages of Adult Skill Acquisition

Dreyfus and Dreyfus (1980) published a model that emphasizes progressive changes in a performer's ways of viewing the task environment. Dreyfus and Dreyfus identified that learning was experimental and, therefore, learning through experience, instruction, and situation. In pursuit of learning a new skill, the student passes through five stages of development novice, competence, proficiency, expertise and mastery. The model holds that as the student moves towards skill acquisition, they depend less on abstract principles or trial-and-error approaches and more on concrete experience (Dreyfus & Dreyfus, 1980).

The novice, stage one, includes a learner with no experience and the beginning of instruction. The instruction process then begins with the instructor decoding the task, so the learner can recognize the desired skill and given basic rules, ensuring they the context of the facts so they make sense (Dreyfus, 2004). Stage two, the advanced beginner, is the novice who is gaining experience with real life situations and begins understanding the relevant context and application to the situation (Dreyfus, 2004). All learners before viewing the material will be at the novice stage.

The module introduced basic terminology, statical data, and the staff's roles and responsibilities within the UCC, as a means of decoding the task so the learner was provided a foundation for skill development. The new assessment tools and algorithms were then introduced, key features were highlighted, and rules for correct utilization were

reinforced with case studies. After the education module, the participants transitioned from novice to advanced beginner and as anticipated they will move into stage three of the Dreyfus and Dreyfus (1980) model, competence.

In the competence stage, the learner will be able to recognize more relevant elements and procedures, but it is also the point where they become overwhelmed (Dreyfus, 2004). It is at this stage they have gained a sense of importance of a situation; however, lack the experience can lead them to doubt their ability to gain mastery (Dreyfus, 2004). To assist the learners cope and transition through this stage, informal debriefing was done. This allowed the staff opportunities to discuss case studies as no recent patient encounters were available, and to discuss the workflow changes, process of care for the patient and reinforce the tools and algorithms introduced in the learning activity.

The last two stages of the Dreyfus's model are stage four proficiency and stage five expertises (Dreyfus & Dreyfus, 1980). Proficiency is where the learner is able to discriminate in a variety of situations and react automatically (Dreyfus, 2004). The learners recognized the important aspects of the situation, were more confident, and anticipate the needs and outcome of the patient. Stage five, expertise is achieved when a learner sees what needs to be done and develops a plan. The expert is also able to distinguish the subtle differences in situations requiring one reaction from others needed another (Dreyfus, 2004). The measurement of success of this education project was that all learners demonstrate proficiency when encountering and caring for a patient with a MTBI.

Definitions of Terms

Concussion: An injury to the brain that results in a temporary loss of normal function, caused by a blow to the head with or without external signs or loss of consciousness (American Association of Neurological Surgeons, 2019). Concussions are considered to be a MTBI (ONF, 2018). However, concussions are distinguished from MTBI when evidence of intracranial injury on conventional neuroimaging is found or a state of persistent neurologic deficit is found (ONF, 2018).

E-learning: Defined as learning or instruction through a digital device, with the goal to support the individual learning and organizational needs (Clark, 2016).

Mild traumatic brain injury: A traumatically induced physiological disruption of brains function, as evidenced by at least one of the following: (a) any period of loss of consciousness; (b) any loss of memory for events immediately before or after the accident; (c) any alteration in mental state at the time of the event, and (d) the severity of the event does not exceed the following: a loss of consciousness over 30 minutes, an initial Glassglow coma score of less 13-15; and posttraumatic amnesia is not greater than 24 hours (Head, 1993) and an AIS score greater than 2 (0-6 scale; Brasure, 2012).

Traumatic brain injury: An alteration in brain function or pathology, caused by an external force (Menon, 2010).

Relevance to Nursing Practice

MTBIs have gained attention over the past several decades. The vast majority of attention has been related to sports injuries and prevention, despite individuals over the age of 75 having the highest observed rates of MTBI (2,232.2 per 100,000 population)

(Taylor, 2017). In 2013, several new clinical practice guidelines and position statements were published by a number of organizations for the diagnosis, treatment, and management of MTBIs (West, 2015). There is still considerable debate on the diagnosis and management of head injuries, and the risk of more permanent effects like chronic neurological sequelae (West, 2015). This debate has led to confusion among providers and staff on the best way to identify and treat the injury (West, 2015), across all ages or populations of patients.

The project outcome increased the clinical staff's knowledge about MTBIs, improved the understanding of the evidence-based concussion protocol, and enhanced the level of reliability, quality of care, and treatment of patients with head injuries at the UCC. This project provided education, which expands beyond traditional youth or "sports-related concussions" and included adults; as well as other likely causes of concussions for consideration and awareness. The project assisted the staff at the UCC to transition from the novice to experienced and expert stages in the care of patients with MTBIs.

The lack of standardized, reliable tools for screening patients with head injuries at the UCC that serves as setting for the DNP project presented a challenge to implementing into practice a universal method of care or protocol. A review and synthesis of literature demonstrated that there are a variety of concussion screening tools available for nursing and health care providers, which have been developed to assist in the diagnosis, care, and treatment of an individual presenting with trauma to the head. Thus, the recommended tools, supported by research evidence will include the ACE (CDC, 2018; Gioia, 2008;

ONF, 2018; Zemek, 2014), PECARN (CDC, 2018; Kuppermann, 2009; Zemek, 2014), Canadian Head CT Rule (CDC, 2018; ONF, 2018; Stiell, 2001), and ChildSCAT3/5 (Echemendia, 2017; Zemek, 2014). In addition to assessment and clinical decision tools, population specific standardized plans of care and discharge education published by the CDC and ONF also incorporated to promote the best outcome and recovery for the patient (CDC, 2018; Gioia, 2008; ONF, 2018; Zemek, 2014). Thus, the recommended tools, supported evidence-based care.

Clinical environments can vary greatly and so can the tools and guidelines of care, often because they are developed specifically for a particular setting or discipline. To improve nursing practice and the health care process in areas lacking specific practice-based research, nursing often relies on research from other specialty settings and disciplines. Although there may be some uncertainty and variability in a patient population, it is crucial to choose guidelines evaluated for their relative performance and practical usefulness with the particular group being addressed (Gioia, 2008; ONF, 2018; Reisner, 2017; Tavender, 2015). The ONF began publishing guidelines for health care providers in 2008 to address the needs of clinicians from all practice settings. Since then, the ONF along with many collaborators, have revised their guidelines to include the most current research and evidence. Implementing these guidelines will improve the quality of care and ensure each patient has a positive experience. Thus, the tools selected are appropriate for use in a primary care setting, as the UCC serves as the setting for the DNP project.

The dissemination of evidence can be challenging, especially when a clinical environment employs individuals with wide variations in educational preparations and experience backgrounds, such as within UCCs. Nurses do not rely solely on clinical experience to advance nursing and provide quality care. A higher level of expertise is necessary to identify, plan, and implement changes to overcome obstacles and barriers in the health care setting. This level of expertise is the tipping point where an advanced practice nurse and nurse practitioner can offer support because of a higher level of education which can help to apply knowledge of practice change into the clinical setting (American Association of Colleges of Nursing, 2004). In addition, an individual practice setting is clearly influenced by the licensed and non-licensed team members working at the site and the associated workflows. The gap-in-practice that defines the need for the DNP project was complicated by the various of levels of practice associated with care at the UCC. Accordingly, a workflow and tools for practitioners at every level from receptionist through to the advanced practice nurse or nurse practitioner and the physician provider that represent the ONF (2018) practice guideline closed the gaps in practice at the DNP project site.

Local Background and Context

Of the 7,639 UCCs across the United States (Japsen, 2018), 553 centers are located across the state of Georgia, 30 in Savannah, which services an estimated population of 146,444 and over 13.4 million visitors annually (Savannah Area Chamber of Commerce, 2018). These centers provide urgent and non-urgent care to a variety of patient populations and treat a wide range of illness and injuries, including a fall

involving a strike to the head, a motor vehicle accident, a headache, or an injury on the sports field. Rapid and critical decision-making process then is required to determine if the UCC is the appropriate place for the patient. This initial decision can impact the process of care and outcome of the patient.

Unlike hospitals and emergency rooms, UCCs, despite being the fastest growing segment in health care, are poorly represented in the literature and understudied (Montalbano, 2016). This finding is due to the vast differences in organizational structures and staff or disciplines encountered within an UCC, resulting in significant variances in the level of competent, consistent care and services provided. The lack of UCC oversight complicates and impacts the implementation and utilization of evidence-based care, due to the lack of reliable urgent care specific research.

There are presently approximately 4,000 patients served by the DNP project setting. Although the site supports an appointment process for primary care, there are also available times offered as “walk-in” for evaluation and care. Of the patients whom use the UCC, there are approximately 350 patients who present annually with MTBI for evaluation. Many of these are appropriately served by the UCC but some are transported to local emergency departments. Working at the UCC there is three receptionists, two medical assistants, one licensed nurse practitioner, one radiology technician, three in records and finance areas, one advanced practice nurse/nurse practitioner and a physician providers all who come together to provide primary care to an diverse patient population of adults and children who live and work in the Savannah, Georgia area. Seven of the twelve employees at the site will be included in the education and training, as well as the

follow up evaluation processes. The mission of the organization is to provide quality patient care, and the goal is for the patient to have a positive outcome. However, the role and influence each employee has are different and without the use process and practices founded on current best research, ensuring a positive result each time can be difficult, even when an organization feels they have a superior nursing staff.

The purpose of this project was to improve the quality of care and outcome of those patients seeking care with a head injury. By developing and implanting a concussion education module based on the best high-quality research available, each employee will know how to support the mission by providing care that is of the best quality, thus ensuring a positive outcome. The education module was for clinic staff and providers and included the necessary information about MTBIs, as well as assessment and treatment guidelines, a revised workflow, and the use of ONF evidence-based protocol. The objective of the learning experience was that all levels of caregivers at the site from the receptionist to the primary care providers, have gained sufficient knowledge to make critical decisions from the first encounter with the patient through the patient education and discharge process.

Role of the DNP Student

For the past 17 years, I have worked in emergency departments and UCCs in some capacity. Over the past three years, my role has drastically changed from nurse to nurse practitioner. I began to observe interactions between patients and staff and listen more intently to the health information that was being exchanged. It was through this role

change and my return to higher education, I was able to recognize and develop a plan for change.

I am currently working as a Nurse Practitioner at an urgent care in Georgia. I have been working in this capacity for over four years, and before that time, the majority of my nursing career was spent in rural and urban emergency rooms. Working in this area of nursing practice, I have experienced patients prematurely turned away for an injury to the head because of age or general head injury disclosures, and I have also discovered patients with severe head injuries waiting in the waiting area for an extended time. All of cases could have a negative impact on the patient, their families, and the community.

I have chosen essential II: Organizational and Systems Leadership and essential VI: Interprofessional Collaboration of the eight DNP elements to demonstrate my role and relationship with this doctoral project. As an advanced practice nurse, I have learned the methodologies, processes, and critical elements necessary to improve the delivery of care, and developed the skills to continue to promote the advancement of nursing within my organization. Because of my foundation in nursing and the transition to a provider role, I am in an optimal position to take a leadership role in implementing EBP into the center and decreasing the barriers to Interprofessional collaboration between the nursing staff and providers.

My role in the project was to complete a review of the literature on MTBI, translate research and evidence-based findings into a staff education activity that will provide a foundation of knowledge about concussions, as well as introduce the new concussion protocol. I acted as a mentor for the new protocol, as well as a facilitator of

change within the center to promote and support the organization's mission to provide consistently high-quality care.

Quality, accountability, and cost of care are very important to me, which is why I chose this project. As the provider, I am responsible for ensuring the quality of care that is received, and I am accountable for the care that is provided by others. Often when the patient is turned away, they will not seek attention in the emergency room due to costs; the cost of care is more than double in the emergency room compared to the cost of care at an UCC. Quality is compromised when a patient is left in a waiting area and is not directed or expedited to care that is urgently needed. Accountability is impacted when a patient experiences an adverse outcome, whether care is provided or not. Despite my motivation for this project, I have identified no potential biases I may have related to this project.

Summary

There are a variety of reasons that dissemination and utilization of concussion guidelines and protocols into the UCC are lacking, and the lack of incorporation of evidence-based guidelines imposes severe risks to those receiving care for head injuries these settings. It was identified within the UCC that there are large variances among the nursing and clinical staff and their health literacy levels, which can act as additional barriers for improving the process and quality of care. Bridging gaps of uptake and utilization of evidence-based guidelines and evidence-based care and remediation of current methods of continuing education in smaller clinics required the mentorship of individuals with advanced education and training.

The doctoral prepared nurse has the advanced education and training to recognize and assess the need for change, as well as the ability to implement and guide others through the change process. An advanced practice nurse can use appropriate models and concepts; synthesize and critique research; and plan, design, and execute changes in clinical practice, by assisting others in the acquisition of knowledge.

Section 3: Collection and Analysis of Evidence

Introduction

Concussions or MTBIs are one of the most common reasons that individuals seek urgent treatment. Due to the accessibility and the trend in those seeking care, these patients will likely choose an UCC over an emergency room. However, a lack of standardized care for patients presenting with injuries involving the head was identified as a problem at the project site. A decision was made to adopt the evidence-based ONF concussion protocol to improve the quality of care, but there were some barriers preventing its use including lack of education and training. This doctoral project addressed the lack of education and demonstrated the importance of proper assessment, management, and follow-up care for nursing staff specific to head injuries. Additionally, this project and activity introduced and supported the new evidence-based concussion protocol implemented into the UCC where children, adults, and older adults living and visiting Georgia receive care.

Practice-Focused Question

The clinical practice question addressed in this project was "Will a staff education program on MTBI improve the staff's knowledge of concussions, leading to successful use of the evidence-based protocol for MTBI in an UCC where children, adolescents, and adults receive care?" Staff education and training programs for clinical teams can improve the quality of care by improving competencies and decreasing barriers (van de Geer, 2018). In this project, the staff education program increased competence, reduced obstacles, and improved the staff's knowledge of the newly implemented evidence-based

guidelines for MTBI in an UCC where children, adolescents, and adults receive care. Thus, the project supported a social change in the community and improved the use of EBP within the UCC, which ensures that the patients are receiving care at these emerging health care centers that is based on the most current research.

Sources of Evidence

Published Research and Outcomes

Over the last several decades, there has been extensive research on concussions, which has brought about clinical guidelines, legislative changes, and public awareness campaigns. There is a range of organizations and health care authorities involved in the continuation of research and improving the outcomes for patients with MTBI. This education project drew from a number of resources, including a literature review to translate findings into evidence-based guidelines from leading health care authorities such as the CDC, World Health Organization, National Institute of Health, and the ONF.

The primary sources pertaining to the content or material was used for the learning activity. The CDC, World Health Organization, National Institute of Health, and the ONF were the primary resources used to create the education module. Each organization has evaluated and appraised research from leading experts and published facts, recommendations, and guidelines for the treatment and management of concussions. The databases relied on for additional sources of evidence included Google Scholar, PubMed, CINAHL, the Cochrane Library, and MEDLINE.

The ONF protocol was selected as the main source of information to present to the leadership at the DNP project site and address the lack of an appropriate protocol for

head injuries. This selection was based on the extensive work, partnerships, continuous research, and use of evidence in the guideline development process (Branch, 2008; Marshall, 2015; Management of Concussion-mild Traumatic Brain Injury Working Group, 2009; Zemek, 2014). The ONF, which has published the third edition of the protocol, is internationally known for two distinct guidelines for concussions: one for patients 18 years and older and one for patients under the age of 18 (ONF, 2018). These guidelines were developed to allow the health care practitioner to provide evidence-based care of concussions from any cause (ONF, 2018). Additionally, the ONF has published many health care and patient documents to assist in the care and understanding of head injuries.

The evidence and publications from the CDC, World Health Organization, and National Institute of Health were also used for supporting information to demonstrate the importance of improving the quality of care and effects of quality care on the outcome of patients. Similar to the ONF, these health care authorities also have published up-to-date research, health care provider resources, and patient education documents. These sources enhanced the learning experience for the staff and were translated into improved patient education and care. Furthermore, including these additional resources allowed novice learners to understand facts and concepts.

Evidence Generated for the Doctoral Project

This DNP project included resources from leading health care authorities, which were organized for optimum learning. The project drew on a broad range of sources as primary and adjunct resources to identify and synthesize the best evidence leading to a

thorough education that is appropriate for the learners and the environment. Moreover, to evaluate the acquisition of knowledge, I used an evidence-based evaluation with a pretest, posttest, and activity evaluation. The process of teaching and activity design was an e-learning or web-based activity, which included an introduction, objectives, linked sources for definition or vocabulary, and learning tasks and visual supports that aided in increase of knowledge of the diversity of learners. Throughout the evaluation, I assessed the effectiveness of and satisfaction with the staff education project to increase knowledge of the newly implemented evidenced-based protocols for MTBI.

Participants. There were seven participants who participated in the e-learning program. It took about 60 to 90 minutes to complete a pretest of knowledge using case studies and four questions regarding level of confidence as well as the actual content of the module on MTBI. Participants eligible for the training included (a) two medical assistants, (b) three receptionists, (c) one radiology technician who assist at reception and direct patient care, and (d) one licensed nurse practitioner. Participants were asked to complete the e-learning module at home or while on duty at the UCC and were paid by the organization for the time spent completing the module, the case study knowledge check questions, and the confidence level questions. The e-learning was made available to the learners over a 2-week period.

Procedures. Continuing education programs are significant to improving the quality of care in the clinical environment. Larger organizations often have entire departments dedicated to nursing and staff education, which allow them unlimited time and resources to provide the employees the most up-to-date clinical practices, protocols,

and research. Much of this education is presented in clinical simulation labs, seminars or lectures, and web-based and hands-on competency learning sessions (Gillian, 2018). But smaller practice settings do not have these resources, creating a barrier to the incorporation of EBP into the clinical environment for the improvement of care. In a small practice, it is often difficult to gather every member of the team together for a 1-hour period to dedicate to training. Thus, an e-learning platform can be helpful in addressing this barrier. Additionally, small or private business owners tend to prefer informal learning (Sharafizad, 2018), which makes an e-learning activity an acceptable choice for this continuing education project. An e-learning design met the needs of the learners in the project setting and delivered the education to the nursing staff to guide them through the change in practice. E-learning also ensured the successful buy-in and understanding of the new concussion protocol and removed the barriers within the organization for providing evidence-based care to patients suffering a MTBI.

An outline of the curriculum that was presented to the staff at the DNP project site is in Appendix A. A PowerPoint was developed that included a pretest assessment of need using case study and confidence level questions and a posttest evaluate the knowledge acquisition and a change in confidence level (see Appendices B and C). Both the curriculum and the PowerPoint are supported with evidence from the literature. Assessment tools for use accompanied the training and these are included in Appendices D, E, F, G and H, along with the patient education tools in Appendices I and J. Current and revised workflows for the site can be seen in Figures 1 and 2.

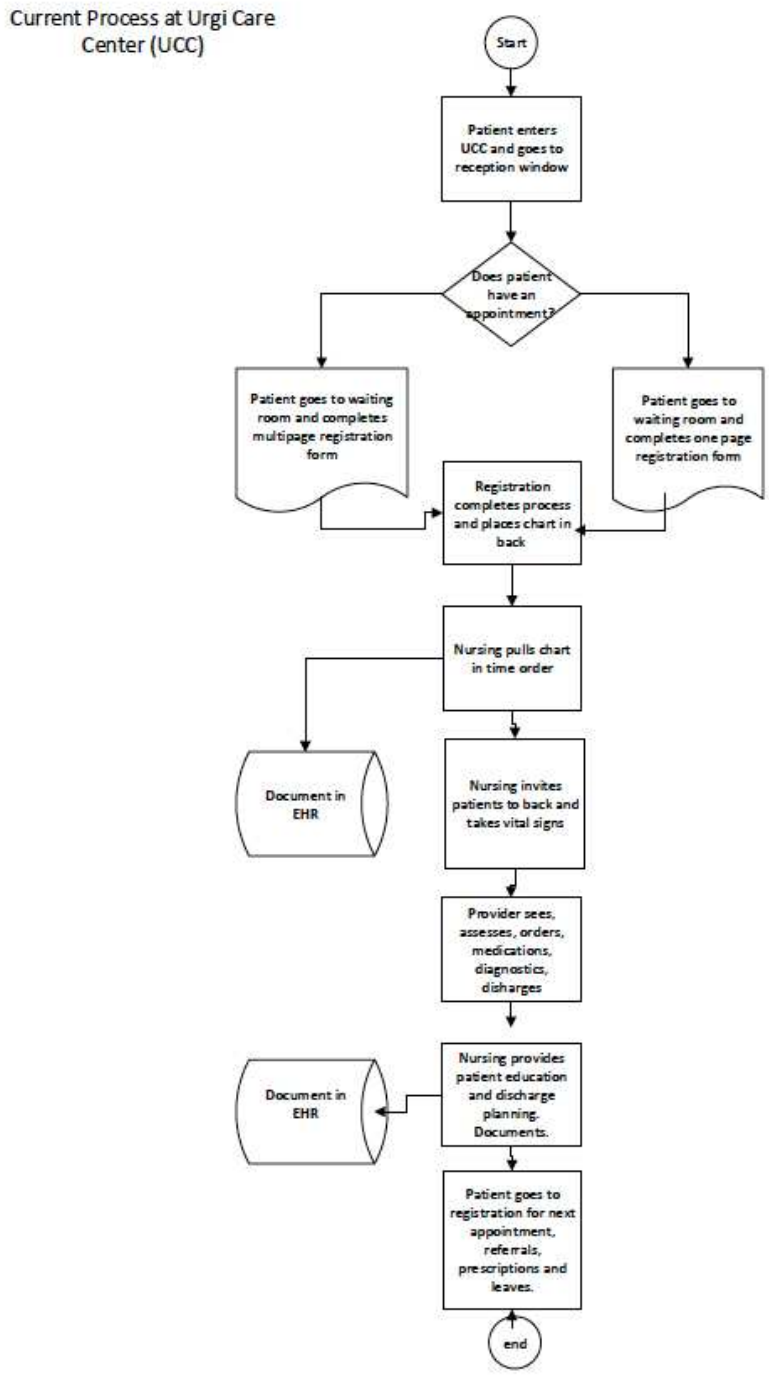

Figure 1. Current UCC workflow.

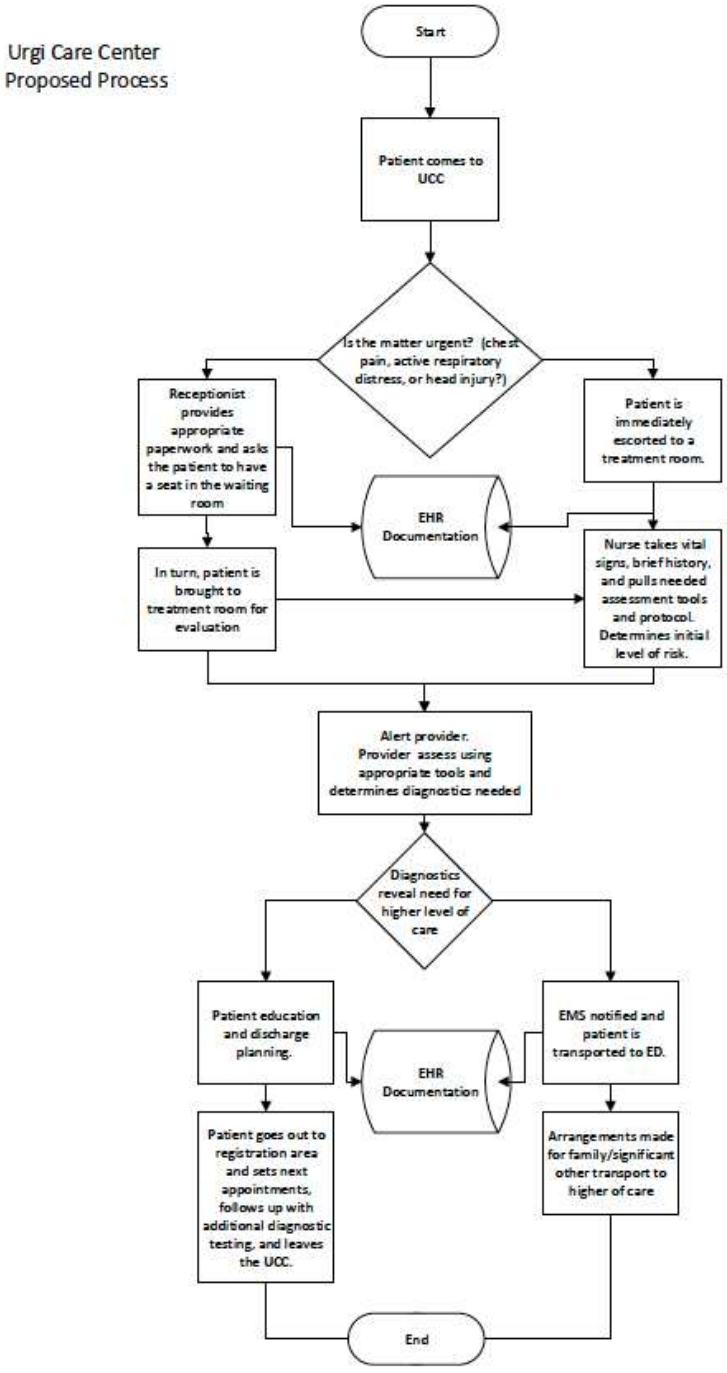

Figure 2. Revised UCC workflow.

The e-learning was offered over a 2-week period, with a commitment of the leadership at the site that all team members will complete the training. A survey with satisfaction or dissatisfaction with the training can be found in Appendix F. Finally, case studies were used in a one-hour debriefing discussion (see Appendix K) that was held at the completion of the training, to determine the impact of the training on practice at the DNP project site, from a qualitative perspective.

Protections. To ensure the ethical protection of the facility and the participants, the Walden University Manual for Staff Education Project DNP Scholarly Project (2017), was utilized as a guide in addition to obtaining approval from the Institutional Review Board (IRB). This doctoral project did not involve the solicitation or collection of information, data, interviews, or observations from patients or visitors; it was strictly for an education in-service for the staff currently employed at the center. A site agreement was obtained from the practice owner and emailed to the IRB along with the completion of the appropriate forms. The consent form for anonymous questionnaires was provided to all participants.

Analysis and Synthesis

Inferential statistics were nonparametric because of the small sample size, less than nine participants. I looked to see if there are statistically significant differences between the pre and posttests on confidence (4 questions on survey) and knowledge acquisition (15-20) case study questions. I used a special form of Chi Square that is designed specifically for small samples called a Fisher-Exact test. I did not use the demographic statistics to compare for differences between groups because the sample

size is so small, however did compare confidence and knowledge acquisition between registration and staff working in nursing roles.

Qualitative Debriefing

Case studies and/or actual patient encounters were discussed in the debriefing for qualitative data, to determine if knowledge acquisition had been achieved and workflow changes were successful. However, only case studies were used, because no actual patients with MTBI presented between the time of the activity and debriefing. The focus during the debriefing was on role responsibilities, identification of proper tools and utilization of concussion algorithms. Additionally, the debriefing allowed for exploration of the clinical environment and identified if the new clinical tools and algorithms are readily accessible and if they are placed throughout the clinic for ease of reference and workflow.

Thematic analysis was also conducted in this doctoral project, to identify themes or pattern in the data that are interesting or important (Maguire, 2017). I coded each of the participant's statements that were relevant and captured in a summative thematic way to answer the practice focus question of the project (Clarke, 2013). The analysis of these qualitative data was beneficial in determining if that staff is able to apply the knowledge gained from the module and demonstrated critical thinking skills, evidenced by the change in workflow and initiation of the concussion protocol.

Summary

At the UCC, care is often guided by habit and by the way that things were done in the past, and not necessarily by the best evidence. The review, evaluation, and appraisal

of guidelines published by leading experts led to the decision to use the ONF guidelines as the model for concussion care improvement at the UCC. To date, the ONF has published the most recent best practice research in their third edition of *Guidelines for Concussion/Mild Traumatic Brain Injury & Persistent Symptoms*, as well as correlating tools and patient education material.

Using the ONF guidelines bridges one practice gap identified in this doctoral project and was presented as the primary objective of the staff education project. The e-learning platform or design was chosen to introduce this new information to the staff. E learning had the feasibility and flexibility to allow small practice settings to provide consistent education across all types of learners and has been shown to have significant improvement in the knowledge and skills of nurses (Liaw, 2017).

There are many variables that can contribute to the improvement in the quality of care in health care settings including staff education, staffing ratios, the use of new products or procedures, and even the expectations of the consumer of care. Most of these variables change over time and can have a negative impact on an organization's ability to live up to its mission. Continuing education in nursing is imperative, and e-learning has been researched extensively in nursing academic settings (Rouleau, 2017), and has been shown to improve the knowledge and skills of nurses. The introduction and implementation of continuing education in the UCC improved the staff's attainment of knowledge, the quality of care delivered, and the health outcomes of the population it serves.

Section 4: Findings and Recommendations

Introduction

Concussions or MTBIs are a significant public health problem, as the CDC (2015) estimates that 2.5 million annually are diagnosed. These injuries can have short- and long-term effects on an individual and can result in significant loss of time at work and school and quality of life. Prompt recognition, evidence-based treatment, and patient education can improve an individual's outcome and lessen the impact of these injuries on individuals, families, and the community.

It is becoming more common that UCCs are the primary care source in communities, with 7,639 centers across the United States (Jaspen, 2018) and 30 located in Savannah, Georgia. These centers are unregulated and not required to utilize treatment guidelines, EBP, or standardized clinical tools resulting in care that is not always using the best practice. The lack of EBP care leaves gaps in knowledge, resulting in treatment delays, undertreatment, overtreatment, and negative outcomes for the patient.

To address gaps in knowledge, I designed this project based on evidence-based guidelines for care in emergency rooms and primary care offices from a literature review. This yielded clinical guidelines and recommendations from leading health experts including the CDC, National Institute of Health, ONF, and the World Health Organization. Additional publications were also identified related to the treatment and care of patients who have sustained a MTBI, which are summarized in Section 2. The purpose of this project was the promotion and adoption of EBP into an UCC in a Savannah through staff education activities, which improved clinical staff's confidence in

managing patients with concussions and head traumas, improved their knowledge, demonstrated revised workflows for optimal care, and introduced a new concussion protocol based on the 2018 ONF guidelines for best practice. The practice-focused question that guided this project was "Will a staff education program on MTBI improve the staff knowledge of the newly implemented evidence-based protocol for MTBI in an UCC where children, adolescents, and adults receive care?" The question was answered using inferential statistics and a qualitative debriefing.

Findings and Implications

Inferential statistics and a qualitative debriefing were the primary sources of analysis and synthesis for this project. There were six participants in the final project: one radiology technician, one licensed nurse practitioner, and one certified medical assistant; three were nonlicensed receptionists responsible for seeing the patients upon entry to the UCC. Overall mean scores and standard deviation are shown in Table 1. There were 27 questions on the knowledge pre- and post-test (see Appendix C), thus, a score of 22 represents 81% of the knowledge needed. The average score before the training was 16 of 27 (59%), and the mean score after the training improved to 19.67—a final average score of 73%. These results indicate that more must be done to ensure that both the licensed and nonlicensed staff members' MTBI knowledge improves.

Table 1

Knowledge and Confidence Scores Pre- and Post-tests

	N	Minimum	Maximum	Mean	*SD*
KnowPretest	6	13	19	16.00	2.966
KnowPosttest	6	17	24	19.67	2.582
ConfidencePre	6	0	7	2.17	2.787
ConfidencePost	6	4	12	9.17	3.125
Valid *N* (listwise)	6				

There were four questions on the confidence pre- and post-tests (see Appendix B), each measured on a forced-choice 4-point scale, categorized as *confident* (1) or *not confident* (0). The highest confidence score possible was 12, as each positive answer was worth 3 points, and the lowest score possible was 0. The confidence score across all four items on the pretest was 2.17, and after the education, the average confidence score improved to 9.17, a statistically significant increase based on the Wilcoxon Signed Ranks test (z = -2.201; p = .028).

After the education was provided, I held a debriefing with all six members of the UCC team and reviewed seven case studies (see Appendix K). The debriefing was informal, and case studies were reviewed to examine the gain of knowledge and the clinical staff's ability to incorporate the revised workflow, algorithms, evidence-based tool, and discharge instructions into each of the case study patient's care. This exercise demonstrated that the staff together understood the proper care and treatment of a patient

suffering a MTBI within the UCC. In addition to the review of the case studies, additional rationale and expansion on the use of the new workflow and tools were given to improve the uptake of the new protocol.

The responses during the debriefing revealed that the staff working in nursing roles expressed concerns most often for "extra work," being "too busy," anticipating review of discharge education, and extended wait and visit times for patients due to observation of these patients. Individuals working in front desk roles reported that they "like the idea" of having these patients moved to the back as soon as they arrive but noted concerns when the rooms are full that they will "get in trouble" for having a patient waiting in the waiting area. Overall, both nursing and front desk participants responded that they are now less likely to automatically refer a patient with a head injury to the ER and explained that they would be able to follow the revised workflow "if a room was open."

Utilizing the new work flow and several of the case study questions, I walked through the proper process of the reception, triage, assessment forms, and discharge process. The initial concern of the front desk staff was what to do if the rooms were all full. Together we were able to identify the x-ray room as a suitable solution. This room is closest to the waiting area door yet is accessible for the nursing and providers to triage and perform a rapid assessment if needed. The staff were also reassured that if the workflow process is followed and the nursing and or provider is notified that no one would "get in trouble." Next, to ensure that all staff understand the new workflow process during the review of case studies, they were asked to identify the next step for each of the

cases. Little remediation was needed, and expansion and explanation were given around areas of change from the previous workflow process. This made a positive impact to their use of the new workflow for the remaining case study questions. Lastly, in addressing the concerns of being "too busy" to provide discharge instructions, I referred to the patient education discharge instructions (see Appendices J and I) and demonstrated that a review of these does not take any longer than other discharge instructions.

There was one major unanticipated limitation to the project: two of the clinical staff members left the company during the project. One was a front desk staff member and the other was one of the clinic staff working in a nursing role. However, because all individuals working at the center are cross trained, one person from the administration area who on occasion is asked to fill in at the front desk, the new manager and one newly hired medical assistant were asked to take part in the activity.

All the individuals participated, the data for the comparison of confidence and knowledge gained based on job role was small ($n = 6$); this small sample size represents another limitation of the project. Additionally, it was decided that the knowledge and confidence comparisons from the new manager should be omitted, as it would skew the outcome of the staff education project. The new manager did take part in the debriefing, but only for observation and support of the activity and staff; that is, the new manager did not comment. Small samples are often the cause of a Type II error, the chance of not finding statistical significance when it is there (Anderson, 2011). However, this is a small UCC and $n = 6$ represents the entirety of the staff. Therefore, the loss of two staff

members did interrupt the flow of the DNP project but their replacements were hired and all of the staff still participated.

As a result of the doctoral staff education project, individuals seeking care with head injuries at the UCC will potentially receive care by clinic staff who now have more knowledge about these types of injuries, more confidence about rendering care to them, and will likely manage patients according to the CPG rather than referring them to the emergency department as a reflex reaction. Patients living in the community that is serviced by this UCC will encounter staff that can easily and promptly recognize a patient at risk for a concussion, expedite their care and provide discharge education. As a result of their experience the patient will be less likely to experience a negative outcome, incur unnecessary expenses, return to work or school safely, and quickly. Furthermore, as a result of this project EBP, guidelines, standardized assessment tools and improved patient education were introduced and will be implemented into the practice setting, as well as a method to provide continuing education through an e-learning activity; which met the budget and learning style of the staff who work at the UCC.

The UCC is one of the fastest growing practices in the health care sector today. UCCs are gaining popularity because of cost, accessibility and reduced waiting times which makes them appealing to all populations of patients seeking care for illness and various injuries, including head injuries. Improving methods of providing continuing education, promotion of EBPs and utilization of clinical guidelines is critical. There is potential for other UCCs to also utilize this education module for their staff to improve their practice and care for patients suffering from a MTBI.

Recommendations

There were several proposed solutions and recommendations for improving the quality of care at the UUC, for patients suffering with a head injury. The ONF practice guidelines are one of the major recommendations for the practice and the incorporation of these guidelines in the new concussion protocol. In addition to these practice guidelines recommendation for the modification to the current work flow to allow for more prompt and expedited care. Lastly, the recommendations of the use of standardized algorithms (Appendix D-H), triage tools (Appendix D, E), assessment and discharge tools (Appendix F-J) were also recommended and incorporated into practice, to improve the quality of care that patients in the community receive.

The outcome of the project resulted in the increase of confidence of staff, however did not demonstrate an acceptable gain of knowledge based on the overall pre and post test scores of the participants. When comparing the participants based on role, the front desk participants who have the lowest level of health care knowledge and are unlicensed did have the greatest improvement in score, over those licensed working in nursing roles. This outcome generated a need for further education, as well as the need for a quality improvement measure to be set in place to ensure that the staff are correctly utilizing the new workflow process and new concussion protocol.

The marginal improvement in knowledge indicates that additional learning and reinforcement of the concussion protocol will be essential to ensure that care meets evidence-based guidelines. The PECARN, Canadian Head CT Rule, GCS and pGCS triage tools and assessments recommended to improve and standardize care were the

most frequently missed answers on the pre and posttests. Reinforcement of these tools and documents will be done with the nursing staff, until mastery of identification of proper use is achieved.

In addition to reinforcement and continued education around the new concussion protocol, a quality improvement measure will be added for six months. Monthly reports will be generated to identify each patient that is registered at the UCC for a complaint of a head injury or a diagnosis of a concussion and their charts will be reviewed, to determine if the staff are utilizing the new work flow processes, triage and assessments tools and completing discharge education utilizing the appropriate discharge materials. The completion of the monthly review will allow for the identification of the need for further education or if mastery of the new knowledge has been achieved.

Strength and Limitations of the Project

The limitations of this doctoral project identified were the limited number of participants in which to complete a more robust analysis to determine a gain of knowledge and confidence as well as measure and comparisons between clerical staff and nursing staff. An additional limitation was that there were not actual patient encounters for observed changes in workflow. However, there were a number of strengths of this project and as a result, administration has inquired about other topics and areas where care can be improved with staff education and implementation of standardized tools.

The most prominent strength of the DNP project was the promotion and integration of EBP into the clinical setting for the care of patients suffering head injuries. The project provided staff of all areas and varied backgrounds with sufficient education

to improve their confidence levels when encountering this patient population as well as the acquisition of knowledge about concussions and proper treatment protocol adopted by the center. Lastly, the project introduced a method of teaching through e-learning that allowed all staff to improve and advance their knowledge and met the organizational needs, budget and structure for this as well as future topics. This altogether resulted in improvements in collaboration of care among the different staff roles and outcomes for the patients.

Section 5: Dissemination Plan

Introduction

The dissemination of work and the translation of research into the practice setting are imperative for advancing nursing practice as well as improving the quality of care and outcomes for individuals and the community. The "translation-gap" is often partially due to the ineffective dissemination of work (Brownson, 2018). The dissemination of findings, especially to nonscientists, can be improved by framing the message to evoke emotional interest and demonstrate usefulness (Minkler, 2012), considering the characteristics of the readers (Brownson, 2018), and using a time-efficient approach that is aligned with the skills of the staff and consistent with the institution's climate, resources, and culture (Jacobs, 2010). Particular attention in this project was provided to the diversity of learners and their experience, level of education, skill or role, and overall health care literacy. The demonstration of usefulness was also highlighted to the stakeholders when discussing the idea, plan, and importance of the project. Moreover, the delivery or translation was time-efficient with the use of e-learning.

The most frequent dissemination methods are academic conferences (81%) and academic journals (99%; Brownson, 2013; Tabaks, 2014), but future plans for dissemination of this project are beyond traditional the nursing profession and research professionals. Through social media platforms and making the presentation accessible on YouTube, dissemination and engagement of UCC centers with similar organizational structures is one method of dissemination. Identification of those organizations will be done using web-based searches and personal contact via e-mail providing a summary and

inviting them to view and consider the continuing education module for their staff. In addition to dissemination to UCC, a summary for submission to the Accreditation Council for Continuing Medical Education and the Urgent Care Association is also planned.

Analysis of Self

As a nurse practitioner working in urgent care, I identified a gap in practice and the potential to have a negative impact on the patient services at the center. Observation and informal inquiries led to discovery of the need to improve the knowledge among the staff working at the center as well as the need for evidence-based standardized care for those suffering a head trauma. Additionally, I identified the need to improve the workflow process to allow for more prompt attention and care of these patients and to incorporate the evidence-based tools to standardize practice and improve care.

As a scholar, I was able to develop a plan to improve the gaps and barriers within the UCC. I identified a framework and theory to aid in the process of change and transfer of knowledge across a range of individuals, and I determined the best platform for learning that met both the learners' and organizational needs that resulted in improved confidence among the team. I conducted a literature review to identify quality research to support the change in practice as well as tools and guidelines for use in patient care process. Lastly, as a scholar I was able to identify a proper evaluation method to determine whether the intervention or education project was successful.

Serving as the project manager was the most challenging for me. Although I consider myself as having strong leadership qualities, I found it difficult to engage

everyone on the same level and interest as myself to the subject matter. I have worked in nursing and in health care for almost 20 years, so my desire and drive to improving the efficiency and quality of care is different than the individuals working at the UCC, and they had a lack of professional evolution and educational experiences. Nevertheless, this project and experience has assisted me develop a deeper understanding of myself as a pioneer of change and improvement of care in these smaller sectors of the health care setting. With the completion of this project, I intend to not only disseminate the findings and share the continuing education piece but to identify other areas lacking within the setting and begin to address them in the same way.

Summary

The challenge to stay on top of best service and outcomes as the world of health care rapidly moves forward seems difficult to overcome (Schindler, 2016). The role of educators in health care is to anticipate changes and translate them in a meaningful manner to staff that influence outcomes (Schindler, 2016). Whatever skills, methods, or ideas are taught across whichever platform, the result must be optimal care receive by the patient (Schindler, 2016). This includes organizations that are regulated or not and even in the smallest of health care setting.

This doctoral project was successful in improving the knowledge and confidence of the staff. This project introduced and incorporated treatment guidelines for a patient experiencing a head injury from multiple leading experts in health into the practice setting. The project identified basic concepts and skills to increase understanding of the disease or injury process as well as health care staff's roles and effects on a patient's

outcome and provide the tools to deliver the highest quality of care that is evidence-based. Overall, this doctoral project led to a slight improvement in the staffs' knowledge as evidenced by the pretest/posttest comparison and by the qualitative discussion. Most notably, there was a statistically significant improvement in staff confidence when caring for a patient with a head injury; therefore, a positive change resulted in the care received at the UCC.

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Appendix A: Overview of MTBI Curriculum and Plan

MTBI Problem: Among the clinic staff there is a lack of knowledge, standardized care, and low level of comfort regarding the care for patients with head trauma at an urgent care center.

Purpose: Introduce and educate the clinical staff on a new evidence-based protocol for the treatment and management of a patient with a concussion, to improve the quality and safety of care for children and adults with mild traumatic brain injuries who receive care at the urgent care center.

Practice Focused Question: Will a staff education program on MTBI improve the staff's knowledge of concussions, thereby leading to successful utilization of the evidence-based protocol for MTBI in an UCC where children, adolescents, and adults receive care?

Learning Outcome(s): Apply the new MTBI protocol to our UCC practice.

Nursing Professional Development: Apply a revised workflow reflective of the evidence-based MTBI protocol
Organizational Outcome: Assure that MTBI patients are evaluated, referred and managed in concert with latest evidence.
Patient Outcomes: Patients will have a more satisfying experience, be assessed in a timely way, referred appropriately, and provided with educational materials to guide next steps.

Topical Content Outline	Approximate Time frame	References & Level of Evidence	Teaching method/learner engagement and Evaluation method
Introduction Concussions or MTBI are a significant public health problem Physical Cognitive Behavior Loss job/school Short- and long-term effects	5"	Centers for Disease Control and Prevention (2018).	E-Learning PowerPoint with interactive responses required Case Study Knowledge Acquisition Questions
Causes of MTBI MVC Fall Sruck Sports Assault Accident*	5"	Donovan (2014).	E-Learning PowerPoint with interactive responses required Case Study Knowledge Acquisition Questions

The importance of recognizing the signs Treatment delay Under treatment Over treatment Post-concussion disorders. Death	5”	The Ontario Neurotrauma Foundation (2018) Marin (2014) Kuppermann (2009) Stiell (2001)	E-Learning PowerPoint with interactive responses required Case Study Knowledge Acquisition Questions
High risk patients Population Injuries Medication-substances	5”	The Ontario Neurotrauma Foundation (2018) Marin (2014) Kuppermann (2009) Stiell (2001)	E-Learning PowerPoint with interactive responses required Case Study Knowledge Acquisition Questions
The ONF MTBI Protocol - Screening Tools Algorithm Discharge Education Follow-up visits	20”	The Ontario Neurotrauma Foundation (2018) Kuppermann, 2009 Stiell, 2001 Gioia, 2008	E-Learning PowerPoint with interactive responses required Case Study Knowledge Acquisition Questions
Validated concussion tools and how to use them: ACE PECARN Canadian Head CT Rule ChildSCAT3/5 MDCalc.	20”	CDC (2018) Gioia (2008) ONF (2018) Zemek (2014) Kuppermann (2009) Zemek (2014) Stiell (2001) Echemendia (2017) MDCalc. (2019)	E-Learning PowerPoint with interactive responses required Case Study Knowledge Acquisition Questions
MTBI: Revised Workflow Algorithm Role review: what do I do differently as medical assistant, receptionist, LPN or Radiology Tech? Barriers and Concerns What to do “if”? Case Studies	15”	ONF (2018) MTBI Protocol UCC	E-Learning PowerPoint with interactive responses required Case Study Knowledge Acquisition Questions
Summary and Evaluation	15”		Complete confidence survey and Posttest

Appendix B: Concussion/MTBI Confidence Survey

Current position:

[ ] Front Office [ ] Administrator [ ] Radiology[ ] Medical Assistant [ ] Nursing [ ] Other: _____

Number of years, if any, of Medical experience: _____

Number of years, (if any), of education beyond high school experience: _____

Have you ever cared for a patient with a concussion?

Yes [ ] No [ ] Unsure [ ]

Do you know any colleagues, friends, or family members that have had a concussion?
Yes [ ] No [ ] Unsure [ ]

Have you ever had a concussion?

Yes [ ] No [ ] Unsure [ ]

Check the box to indicate your level of confidence recognizing, caring for, or providing education to a patient with a concussion

Question	Very Confident	Confident	Somewhat Confident	Not at all Confident
Quickly recognize a patient with a concussion				
Use appropriate assessment tools, specific for concussions				
Refer patients to appropriate discharge education and resources upon discharge				
Use a concussion protocol				

What do you (did you) hope to learn in this education module?

Appendix C: Case Study Knowledge Check Questions

What are common complaints or symptoms of a concussion? (circle all that apply)

Bleeding
Crying
Confused
Loss of consciousness
Nausea
Ringing in the ears
Memory loss
Fever
Chest pain
Headache
Dizzy
Vomiting
Delayed response to questions

What is a Concussion/Mild Traumatic Brain Injury?

a. Any injury to the head that causes bleeding and confusion
b. Any injury that causes headache, vomiting, confusion
c. An injury to the brain that results in a temporary loss of normal function

Who or what age group is most likely to present with a concussion?

a. Children under 2
b. Children over 2
c. Adult
d. Adults over 65

Confusion is always the first sign of a concussion

a. True
b. False

Concussions are not a "big deal", as long as there is not bleeding or a loss of consciousness?

a. True
b. False

A Cat Scan (CT) is needed for anyone with a head injury

a. True
b. False

A head injury over 24 hours ago, can wait to be seen “in turn” or time of arrival?
a. True
b. False

Nothing can be done to prevent post-concussion syndrome
a. True
b. False

It is only the provider’s job to assess for a concussion
a. True
b. False

As long as a patient does not complain of a headache they can go to school/work the next day
a. True
b. False

A sports related concussion is never a “big deal”, in young children
a. True
b. False

Match the Correct Acronym

A. ACE
B. SCAT3\5
C. Child SCAT 3\5
D. PECARN
E. MedCalc

_____ The algorithm used to determine if a CT is needed for children

_____ The clinical assessment tool for patients over 18

_____ A clinical assessment tool for children 5-12 years old

_____ A clinical assessment tool for children 13 years and older

_____ A website to assist nursing and health care providers in clinical decision making

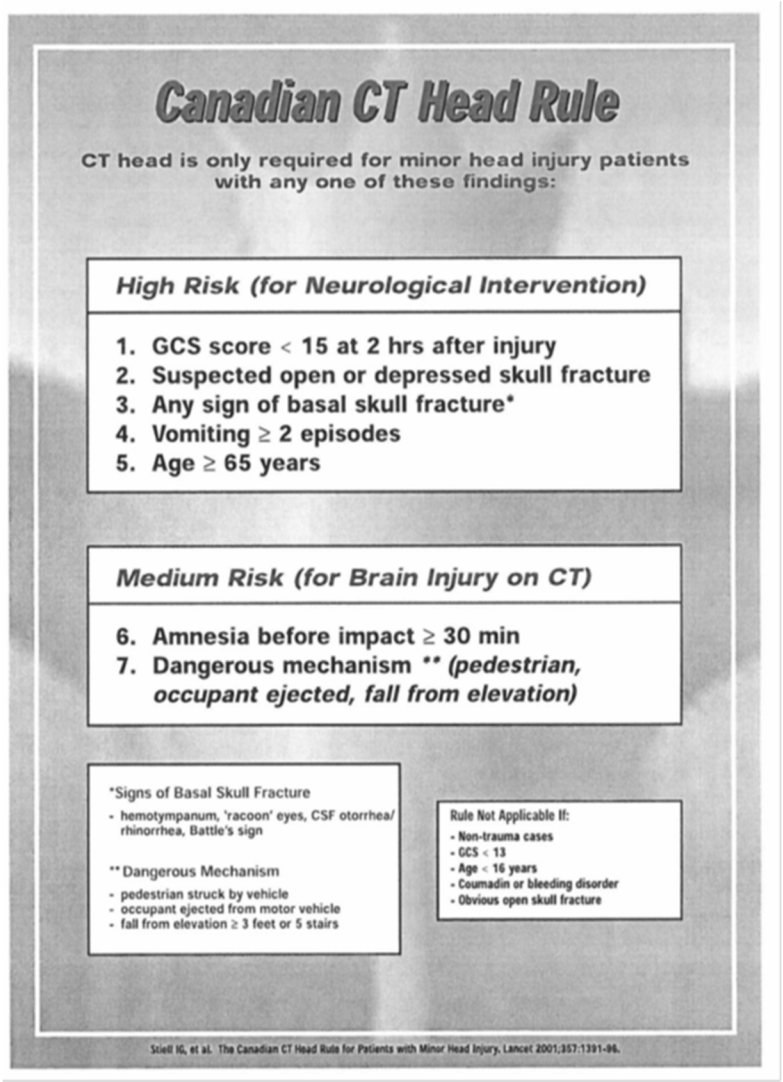
Who is responsible for screening for a possible mTBI?

a. The provider
b. The nurse and provider
c. The reception, nurse, and provider
d. No one we do not see patients who have had a mTBI?

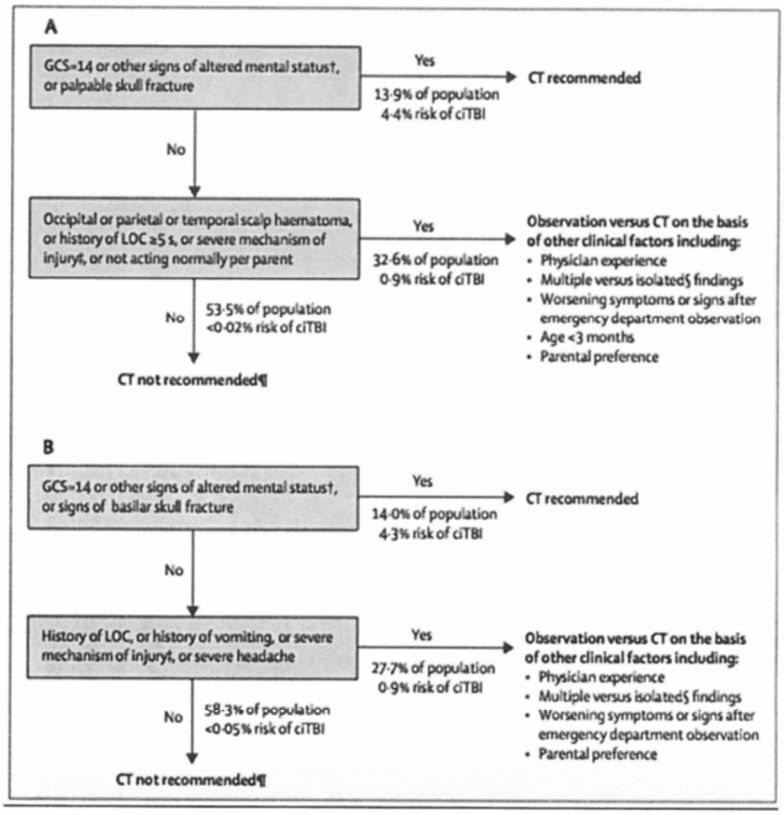
Discharge instructions (return to work/play) for a patient are only needed if the patient has reported a loss of consciousness or feeling confused?

a. True b. False

Appendix D: MTBI Assessment, CT Head Rule



Appendix E: MTBI Assessment Tool, PECARN



Online calculator tool available at:
http://www.mdcalc.com/pecarn-pediatric-head-injury-trauma-algorithm/

Kuppermann N, Holmes JF, Dayan PS, Hoyle JD Jr, Atabaki SM, Holubkov R, Nadel FM, Monroe D, Stanley RM, Borgialli DA, Badawy MK, Schunk JE, Quayle KS, Mahajan P, Lichenstein R, Lillis KA, Tunik MG, Jacobs ES, Callahan JM, Gorelick MH, Glass TF, Lee LK, Bachman MC, Cooper A, Powell EC, Gerardi MJ, Melville KA, Muizelaar JP, Wisner DH, Zuspan SJ, Dean JM, Wootton-Gorges SL; Pediatric Emergency Care Applied Research Network (PECARN). Identification of children at very low risk of clinically-important brain injuries after head trauma: a prospective cohort study. Lancet. 2009 Oct 3;374(9696):1160-70. Epub 2009 Sep 14. PubMed PMID: 19758692.

Appendix F: MTBI Assessment Tool, ACE

ACUTE CONCUSSION EVALUATION (ACE)

PHYSICIAN/CLINICIAN OFFICE VERSION

Gerard Gioia, PhD[1] & Micky Collins, PhD[2]
[1]Children's National Medical Center
[2]University of Pittsburgh Medical Center

Patient Name:_____
DOB: _____ Age:_____
Date:_____ ID/MR#_____

A. Injury Characteristics Date/Time of Injury_____ Reporter: __Patient __Parent __Spouse __Other_____

1. Injury Description _____

1a. Is there evidence of a forcible blow to the head (direct or indirect)? __Yes __No __Unknown
1b. Is there evidence of intracranial injury or skull fracture? __Yes __No __Unknown
1c. Location of Impact: __Frontal __Lft Temporal __Rt Temporal __Lft Parietal __Rt Parietal __Occipital __Neck __Indirect Force
2. Cause: __MVC __Pedestrian-MVC __Fall __Assault __Sports (*specify*)_____Other_____
3. Amnesia Before (Retrograde) Are there any events just BEFORE the injury that you/ person has no memory of (even brief)? __Yes __No Duration
4. Amnesia After (Anterograde) Are there any events just AFTER the injury that you/ person has no memory of (even brief)? __Yes __No Duration
5. Loss of Consciousness: Did you/ person lose consciousness? __Yes __No Duration
6. EARLY SIGNS: __Appears dazed or stunned __Is confused about events __Answers questions slowly __Repeats Questions __Forgetful (recent info)
7. Seizures: Were seizures observed? No__ Yes___ Detail_____

B. Symptom Check List* Since the injury, has the person experienced any of these symptoms any more than usual today or in the past day?
Indicate presence of each symptom (0=No, 1=Yes). ***Lovell & Collins, 1998 JHTR***

PHYSICAL (10)		COGNITIVE (4)		SLEEP (4)	
Headache	0 1	Feeling mentally foggy	0 1	Drowsiness	0 1
Nausea	0 1	Feeling slowed down	0 1	Sleeping less than usual	0 1 N/A
Vomiting	0 1	Difficulty concentrating	0 1	Sleeping more than usual	0 1 N/A
Balance problems	0 1	Difficulty remembering	0 1	Trouble falling asleep	0 1 N/A
Dizziness	0 1	COGNITIVE Total (0-4) _____		SLEEP Total (0-4) _____	
Visual problems	0 1	EMOTIONAL (4)			
Fatigue	0 1	Irritability	0 1		
Sensitivity to light	0 1	Sadness	0 1		
Sensitivity to noise	0 1	More emotional	0 1		
Numbness/Tingling	0 1	Nervousness	0 1		
PHYSICAL Total (0-10) _____		EMOTIONAL Total (0-4) _____			
(Add Physical, Cognitive, Emotion, Sleep totals) Total Symptom Score (0-22)	_____				

Exertion: Do these symptoms worsen with:
Physical Activity __Yes __No __N/A
Cognitive Activity __Yes __No __N/A

Overall Rating: How different is the person acting compared to his/her usual self? (circle)
Normal 0 1 2 3 4 5 6 Very Different

C. Risk Factors for Protracted Recovery *(check all that apply)*

Concussion History? Y___ N___	√	Headache History? Y___ N___	√	Developmental History	√	Psychiatric History
Previous # 1 2 3 4 5 6+		Prior treatment for headache		Learning disabilities		Anxiety
Longest symptom duration Days__ Weeks__ Months__ Years__		History of migraine headache __ Personal __ Family_____		Attention-Deficit/ Hyperactivity Disorder		Depression
						Sleep disorder
If multiple concussions, less force caused reinjury? Yes__ No__				Other developmental disorder_____		Other psychiatric disorder _____

List other comorbid medical disorders or medication usage (e.g., hypothyroid, seizures)_____

D. RED FLAGS for acute emergency management: Refer to the emergency department with sudden onset of any of the following:

* Headaches that worsen	* Looks very drowsy/ can't be awakened	* Can't recognize people or places	* Neck pain
* Seizures	* Repeated vomiting	* Increasing confusion or irritability	* Unusual behavioral change
* Focal neurologic signs	* Slurred speech	* Weakness or numbness in arms/legs	* Change in state of consciousness

E. Diagnosis (ICD): __Concussion w/o LOC 850.0 __Concussion w/ LOC 850.1 __Concussion (Unspecified) 850.9 __Other (854) _____
__No diagnosis

F. Follow-Up Action Plan **Complete *ACE Care Plan* and provide copy to patient/family.**
___ **No Follow-Up Needed**
___ **Physician/Clinician Office Monitoring**: Date of next follow-up _____
___ **Referral:**
___ Neuropsychological Testing
___ Physician: Neurosurgery____ Neurology____ Sports Medicine____ Physiatrist____ Psychiatrist____ Other_____
___ Emergency Department

ACE Completed by:_____

This form is part of the "Heads Up: Brain Injury in Your Practice" tool kit developed by the Centers for Disease Control and Prevention (CDC).

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Appendix G: MTBI Assessment Tool, SCAT 3 (13 years and older)

SCAT3™

Sport Concussion Assessment Tool – 3rd Edition

For use by medical professionals only

Name | Date/Time of Injury: Date of Assessment: | Examiner:

What is the SCAT3?[1]

The SCAT3 is a standardized tool for evaluating injured athletes for concussion and can be used in athletes aged from 13 years and older. It supersedes the original SCAT and the SCAT2 published in 2005 and 2009, respectively[2]. For younger persons, ages 12 and under, please use the Child SCAT3. The SCAT3 is designed for use by medical professionals. If you are not qualified, please use the Sport Concussion Recognition Tool[3]. Preseason baseline testing with the SCAT3 can be helpful for interpreting post-injury test scores.

Specific instructions for use of the SCAT3 are provided on page 3. If you are not familiar with the SCAT3, please read through these instructions carefully. This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. Any revision or any reproduction in a digital form requires approval by the Concussion in Sport Group.

NOTE: The diagnosis of a concussion is a clinical judgment, ideally made by a medical professional. The SCAT3 should not be used solely to make, or exclude, the diagnosis of concussion in the absence of clinical judgement. An athlete may have a concussion even if their SCAT3 is "normal".

What is a concussion?

A concussion is a disturbance in brain function caused by a direct or indirect force to the head. It results in a variety of non-specific signs and/or symptoms (some examples listed below) and most often does not involve loss of consciousness. Concussion should be suspected in the presence of **any one or more** of the following:

- Symptoms (e.g., headache), or
- Physical signs (e.g., unsteadiness), or
- Impaired brain function (e.g. confusion) or
- Abnormal behaviour (e.g., change in personality).

SIDELINE ASSESSMENT

Indications for Emergency Management

NOTE: A hit to the head can sometimes be associated with a more serious brain injury. Any of the following warrants consideration of activating emergency procedures and urgent transportation to the nearest hospital:

- Glasgow Coma score less than 15
- Deteriorating mental status
- Potential spinal injury
- Progressive, worsening symptoms or new neurologic signs

Potential signs of concussion?

If any of the following signs are observed after a direct or indirect blow to the head, the athlete should stop participation, be evaluated by a medical professional and **should not be permitted to return to sport the same day** if a concussion is suspected.

Any loss of consciousness?	Y N
"If so, how long?"	
Balance or motor incoordination (stumbles, slow/laboured movements, etc.)?	Y N
Disorientation or confusion (inability to respond appropriately to questions)?	Y N
Loss of memory:	Y N
"If so, how long?"	
"Before or after the injury?"	
Blank or vacant look:	Y N
Visible facial injury in combination with any of the above:	Y N

1 Glasgow coma scale (GCS)

Best eye response (E)	
No eye opening	1
Eye opening in response to pain	2
Eye opening to speech	3
Eyes opening spontaneously	4
Best verbal response (V)	
No verbal response	1
Incomprehensible sounds	2
Inappropriate words	3
Confused	4
Oriented	5
Best motor response (M)	
No motor response	1
Extension to pain	2
Abnormal flexion to pain	3
Flexion/Withdrawal to pain	4
Localizes to pain	5
Obeys commands	6
Glasgow Coma score (E + V + M)	of 15

GCS should be recorded for all athletes in case of subsequent deterioration.

2 Maddocks Score[3]

"I am going to ask you a few questions, please listen carefully and give your best effort."

Modified Maddocks questions (1 point for each correct answer)

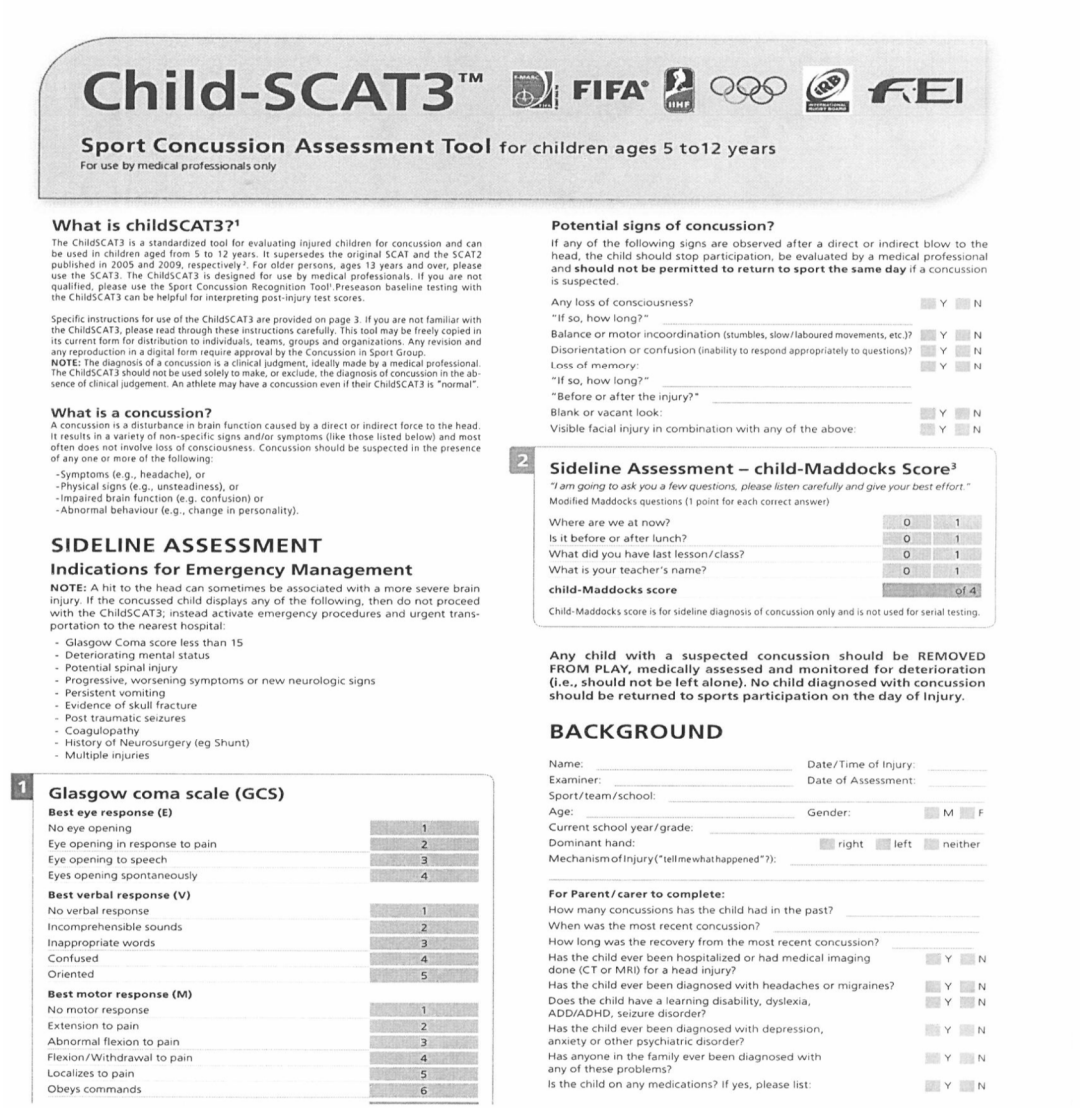
What venue are we at today?	0	1
Which half is it now?	0	1
Who scored last in this match?	0	1
What team did you play last week/game?	0	1
Did your team win the last game?	0	1
Maddocks score		of 5

Maddocks score is validated for sideline diagnosis of concussion only and is not used for serial testing.

Notes: Mechanism of Injury ("tell me what happened"?):

Any athlete with a suspected concussion should be REMOVED FROM PLAY, medically assessed, monitored for deterioration (i.e., should not be left alone) and should not drive a motor vehicle until cleared to do so by a medical professional. No athlete diag-

Appendix H: MTBI Assessment Tool SCAT Child (5-12 years old)



Child-SCAT3™

Sport Concussion Assessment Tool for children ages 5 to12 years

For use by medical professionals only

What is childSCAT3?[1]

The ChildSCAT3 is a standardized tool for evaluating injured children for concussion and can be used in children aged from 5 to 12 years. It supersedes the original SCAT and the SCAT2 published in 2005 and 2009, respectively[2]. For older persons, ages 13 years and over, please use the SCAT3. The ChildSCAT3 is designed for use by medical professionals. If you are not qualified, please use the Sport Concussion Recognition Tool[1].Preseason baseline testing with the ChildSCAT3 can be helpful for interpreting post-injury test scores.

Specific instructions for use of the ChildSCAT3 are provided on page 3. If you are not familiar with the ChildSCAT3, please read through these instructions carefully. This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. Any revision and any reproduction in a digital form require approval by the Concussion in Sport Group.
NOTE: The diagnosis of a concussion is a clinical judgment, ideally made by a medical professional. The ChildSCAT3 should not be used solely to make, or exclude, the diagnosis of concussion in the absence of clinical judgement. An athlete may have a concussion even if their ChildSCAT3 is "normal".

What is a concussion?

A concussion is a disturbance in brain function caused by a direct or indirect force to the head. It results in a variety of non-specific signs and/or symptoms (like those listed below) and most often does not involve loss of consciousness. Concussion should be suspected in the presence of any one or more of the following:

- Symptoms (e.g., headache), or
- Physical signs (e.g., unsteadiness), or
- Impaired brain function (e.g. confusion) or
- Abnormal behaviour (e.g., change in personality).

SIDELINE ASSESSMENT

Indications for Emergency Management

NOTE: A hit to the head can sometimes be associated with a more severe brain injury. If the concussed child displays any of the following, then do not proceed with the ChildSCAT3; instead activate emergency procedures and urgent transportation to the nearest hospital:

- Glasgow Coma score less than 15
- Deteriorating mental status
- Potential spinal injury
- Progressive, worsening symptoms or new neurologic signs
- Persistent vomiting
- Evidence of skull fracture
- Post traumatic seizures
- Coagulopathy
- History of Neurosurgery (eg Shunt)
- Multiple injuries

1 Glasgow coma scale (GCS)

Best eye response (E)	
No eye opening	1
Eye opening in response to pain	2
Eye opening to speech	3
Eyes opening spontaneously	4
Best verbal response (V)	
No verbal response	1
Incomprehensible sounds	2
Inappropriate words	3
Confused	4
Oriented	5
Best motor response (M)	
No motor response	1
Extension to pain	2
Abnormal flexion to pain	3
Flexion/Withdrawal to pain	4
Localizes to pain	5
Obeys commands	6

Potential signs of concussion?

If any of the following signs are observed after a direct or indirect blow to the head, the child should stop participation, be evaluated by a medical professional and **should not be permitted to return to sport the same day** if a concussion is suspected.

Any loss of consciousness?	Y N
"If so, how long?"	
Balance or motor incoordination (stumbles, slow/laboured movements, etc.)?	Y N
Disorientation or confusion (inability to respond appropriately to questions)?	Y N
Loss of memory:	Y N
"If so, how long?"	
"Before or after the injury?"	
Blank or vacant look:	Y N
Visible facial injury in combination with any of the above:	Y N

2 Sideline Assessment – child-Maddocks Score[3]

"I am going to ask you a few questions, please listen carefully and give your best effort."

Modified Maddocks questions (1 point for each correct answer)

Where are we at now?	0	1
Is it before or after lunch?	0	1
What did you have last lesson/class?	0	1
What is your teacher's name?	0	1
child-Maddocks score		of 4

Child-Maddocks score is for sideline diagnosis of concussion only and is not used for serial testing.

Any child with a suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration (i.e., should not be left alone). No child diagnosed with concussion should be returned to sports participation on the day of Injury.

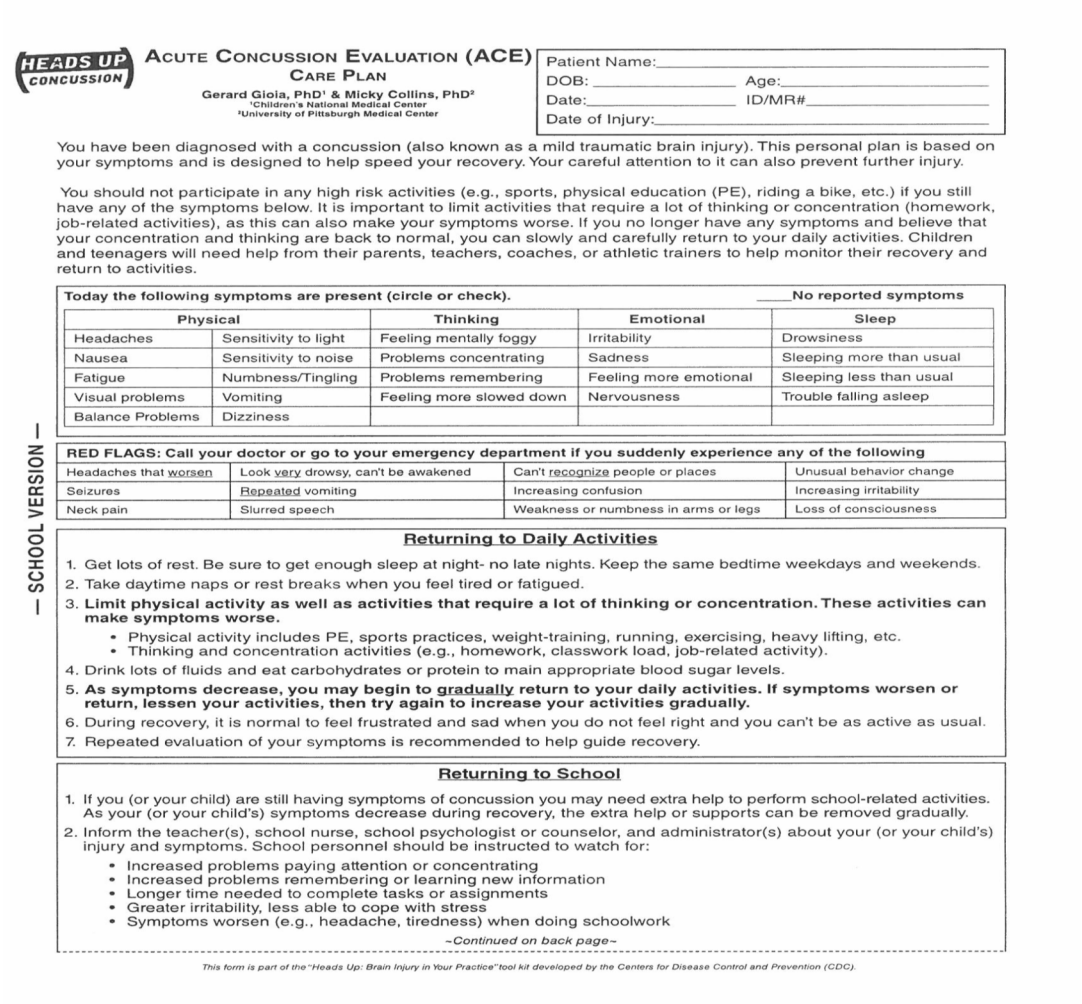
BACKGROUND

Name:	Date/Time of Injury:
Examiner:	Date of Assessment:
Sport/team/school:	
Age:	Gender: M F
Current school year/grade:	
Dominant hand:	right left neither
Mechanism of Injury ("tell me what happened"?):	

For Parent/carer to complete:

How many concussions has the child had in the past?	
When was the most recent concussion?	
How long was the recovery from the most recent concussion?	
Has the child ever been hospitalized or had medical imaging done (CT or MRI) for a head injury?	Y N
Has the child ever been diagnosed with headaches or migraines?	Y N
Does the child have a learning disability, dyslexia, ADD/ADHD, seizure disorder?	Y N
Has the child ever been diagnosed with depression, anxiety or other psychiatric disorder?	Y N
Has anyone in the family ever been diagnosed with any of these problems?	Y N
Is the child on any medications? If yes, please list:	Y N

Appendix I: MTBI Patient Education Tool, Child



HEADS UP CONCUSSION

Acute Concussion Evaluation (ACE) Care Plan

Gerard Gioia, PhD[1] & Micky Collins, PhD[2]
[1]Children's National Medical Center
[2]University of Pittsburgh Medical Center

Patient Name:_____
DOB: _____ Age:_____
Date:_____ ID/MR#_____
Date of Injury:_____

You have been diagnosed with a concussion (also known as a mild traumatic brain injury). This personal plan is based on your symptoms and is designed to help speed your recovery. Your careful attention to it can also prevent further injury.

You should not participate in any high risk activities (e.g., sports, physical education (PE), riding a bike, etc.) if you still have any of the symptoms below. It is important to limit activities that require a lot of thinking or concentration (homework, job-related activities), as this can also make your symptoms worse. If you no longer have any symptoms and believe that your concentration and thinking are back to normal, you can slowly and carefully return to your daily activities. Children and teenagers will need help from their parents, teachers, coaches, or athletic trainers to help monitor their recovery and return to activities.

Today the following symptoms are present (circle or check). ____No reported symptoms

Physical		Thinking	Emotional	Sleep
Headaches	Sensitivity to light	Feeling mentally foggy	Irritability	Drowsiness
Nausea	Sensitivity to noise	Problems concentrating	Sadness	Sleeping more than usual
Fatigue	Numbness/Tingling	Problems remembering	Feeling more emotional	Sleeping less than usual
Visual problems	Vomiting	Feeling more slowed down	Nervousness	Trouble falling asleep
Balance Problems	Dizziness			

RED FLAGS: Call your doctor or go to your emergency department if you suddenly experience any of the following

Headaches that worsen	Look very drowsy, can't be awakened	Can't recognize people or places	Unusual behavior change
Seizures	Repeated vomiting	Increasing confusion	Increasing irritability
Neck pain	Slurred speech	Weakness or numbness in arms or legs	Loss of consciousness

Returning to Daily Activities

1. Get lots of rest. Be sure to get enough sleep at night- no late nights. Keep the same bedtime weekdays and weekends.
2. Take daytime naps or rest breaks when you feel tired or fatigued.
3. **Limit physical activity as well as activities that require a lot of thinking or concentration. These activities can make symptoms worse.**
   - Physical activity includes PE, sports practices, weight-training, running, exercising, heavy lifting, etc.
   - Thinking and concentration activities (e.g., homework, classwork load, job-related activity).
4. Drink lots of fluids and eat carbohydrates or protein to main appropriate blood sugar levels.
5. **As symptoms decrease, you may begin to gradually return to your daily activities. If symptoms worsen or return, lessen your activities, then try again to increase your activities gradually.**
6. During recovery, it is normal to feel frustrated and sad when you do not feel right and you can't be as active as usual.
7. Repeated evaluation of your symptoms is recommended to help guide recovery.

Returning to School

1. If you (or your child) are still having symptoms of concussion you may need extra help to perform school-related activities. As your (or your child's) symptoms decrease during recovery, the extra help or supports can be removed gradually.
2. Inform the teacher(s), school nurse, school psychologist or counselor, and administrator(s) about your (or your child's) injury and symptoms. School personnel should be instructed to watch for:
   - Increased problems paying attention or concentrating
   - Increased problems remembering or learning new information
   - Longer time needed to complete tasks or assignments
   - Greater irritability, less able to cope with stress
   - Symptoms worsen (e.g., headache, tiredness) when doing schoolwork

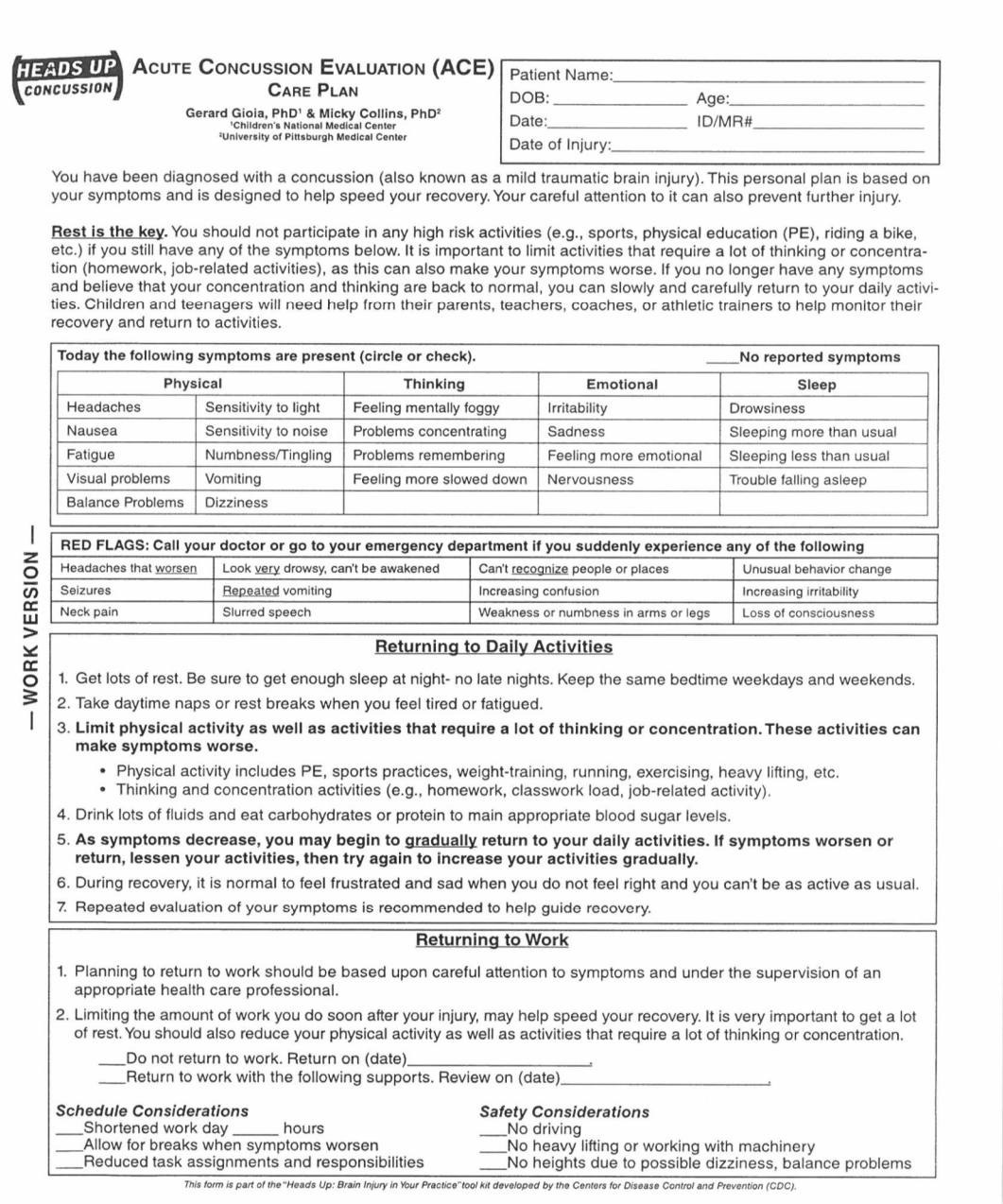
~Continued on back page~

This form is part of the "Heads Up: Brain Injury in Your Practice" tool kit developed by the Centers for Disease Control and Prevention (CDC).

— SCHOOL VERSION —

This form is part of the "Heads Up: Brain Injury in Your Practice" tool kit developed by the Centers for Disease Control and Prevention. https://www.cdc.gov/headsup/providers/tools.html

Appendix J: MTBI Patient Education Tool, Adult



HEADS UP CONCUSSION

ACUTE CONCUSSION EVALUATION (ACE) CARE PLAN

Gerard Gioia, PhD[1] & Micky Collins, PhD[2]
[1]Children's National Medical Center
[2]University of Pittsburgh Medical Center

Patient Name:_____
DOB: _____ Age:_____
Date:_____ ID/MR#_____
Date of Injury:_____

You have been diagnosed with a concussion (also known as a mild traumatic brain injury). This personal plan is based on your symptoms and is designed to help speed your recovery. Your careful attention to it can also prevent further injury.

Rest is the key. You should not participate in any high risk activities (e.g., sports, physical education (PE), riding a bike, etc.) if you still have any of the symptoms below. It is important to limit activities that require a lot of thinking or concentration (homework, job-related activities), as this can also make your symptoms worse. If you no longer have any symptoms and believe that your concentration and thinking are back to normal, you can slowly and carefully return to your daily activities. Children and teenagers will need help from their parents, teachers, coaches, or athletic trainers to help monitor their recovery and return to activities.

Today the following symptoms are present (circle or check). ____No reported symptoms

Physical		Thinking	Emotional	Sleep
Headaches	Sensitivity to light	Feeling mentally foggy	Irritability	Drowsiness
Nausea	Sensitivity to noise	Problems concentrating	Sadness	Sleeping more than usual
Fatigue	Numbness/Tingling	Problems remembering	Feeling more emotional	Sleeping less than usual
Visual problems	Vomiting	Feeling more slowed down	Nervousness	Trouble falling asleep
Balance Problems	Dizziness			

RED FLAGS: Call your doctor or go to your emergency department if you suddenly experience any of the following

Headaches that worsen	Look very drowsy, can't be awakened	Can't recognize people or places	Unusual behavior change
Seizures	Repeated vomiting	Increasing confusion	Increasing irritability
Neck pain	Slurred speech	Weakness or numbness in arms or legs	Loss of consciousness

— WORK VERSION —

Returning to Daily Activities

1. Get lots of rest. Be sure to get enough sleep at night- no late nights. Keep the same bedtime weekdays and weekends.
2. Take daytime naps or rest breaks when you feel tired or fatigued.
3. **Limit physical activity as well as activities that require a lot of thinking or concentration. These activities can make symptoms worse.**
   - Physical activity includes PE, sports practices, weight-training, running, exercising, heavy lifting, etc.
   - Thinking and concentration activities (e.g., homework, classwork load, job-related activity).
4. Drink lots of fluids and eat carbohydrates or protein to main appropriate blood sugar levels.
5. **As symptoms decrease, you may begin to gradually return to your daily activities. If symptoms worsen or return, lessen your activities, then try again to increase your activities gradually.**
6. During recovery, it is normal to feel frustrated and sad when you do not feel right and you can't be as active as usual.
7. Repeated evaluation of your symptoms is recommended to help guide recovery.

Returning to Work

1. Planning to return to work should be based upon careful attention to symptoms and under the supervision of an appropriate health care professional.
2. Limiting the amount of work you do soon after your injury, may help speed your recovery. It is very important to get a lot of rest. You should also reduce your physical activity as well as activities that require a lot of thinking or concentration.

___Do not return to work. Return on (date)_____.
___Return to work with the following supports. Review on (date)_____.

Schedule Considerations
___Shortened work day _____ hours
___Allow for breaks when symptoms worsen
___Reduced task assignments and responsibilities

Safety Considerations
___No driving
___No heavy lifting or working with machinery
___No heights due to possible dizziness, balance problems

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Appendix K: MTBI Case Studies and Debrief Guide

Now that you have all completed the education on MTBI, let's have a brief discussion on how this is working at our UCC site.

Have you had the opportunity to put the new workflow into place since the training? If yes, proceed to ask open-ended questions to generate discussion:

If you were not able to implement the workflow, let's discuss what barriers got in the way.

If you were able to implement the new workflow, how did it go? Were there any glitches and how did you handle them?

Did you use any of the tools for assessment? If so, did you have any difficulty in using them, were there any areas that were not clear or that you need additional help with? If not, why not? What got in the way?

Here is a case study, given your role, how would you handle this scenario:

A young mother comes into the UCC with a child about 18 months old in her arms. She is clearly distressed and says that her child fell off the changing table and hit her head on the floor. The child is awake and smiling. You are the receptionist: what do you do?

Young adult Hispanic male walks in with two other people. He does not speak English, one person with him tells you at the desk he fell off a ladder cutting trees, and his head is bleeding because the tree hit him. Let's work through this starting with the reception role:

19y old female is brought in by her parents. Mom tells you at the front desk they want her checked for drugs and alcohol, because she just came (30 minutes ago) home says she does not remember what happened to her car, but the front of the car is smashed in. Let's work through this starting with the reception role:

12y male walks limping in with his grandfather, the child is in his football uniform. Grandfathers reports the coach said he should bring him in to be checked out. He was at practice and got hurt. Let's work through this starting with the reception role:

68y female walks, tells you she is so glad she could get an appointment today; she has a terrible headache and ringing in her ears that will not go away for 2 days now. Let's work through this starting with the reception role:

30y female is leaving after being seen. She stops at the reception desk. She reports she is glad she didn't have to go to the ER and have a CT, the doctor said I only have a concussion. She asks if she really needs to make an appointment to be seen again? What is the correct answer? Why? What might you ask her about her discharge information?

20y female tells you when she walked in she passed out. Let's work through this starting with the reception role:

While doing the triage for patient came in for their regular appointment, tells you that he is feeling sore all over because of an auto accident yesterday. What is next? What questions? What tools?