

CONCUSSION EDUCATION AND MANAGEMENT FOR SCHOOL NURSES

by

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As members of the DNP Project Committee, we certify that we have read the DNP Project prepared by Brooke Wright Mgonja entitled Concussion Education and Management for School Nurses and recommend that it be accepted as fulfilling the DNP Project requirement for the Degree of Doctor of Nursing Practice.

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Final approval and acceptance of this DNP Project is contingent upon the candidate's submission of the final copies of the DNP Project to the Graduate College.

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STATEMENT BY AUTHOR

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ABSTRACT

Background: Despite the increased awareness and education to the public, concussions in children continue to ensue without proper concussion education and management in school systems.

Whether the child suffers a concussion in school or at home, it is essential for school nurses to have proper concussion education and evidence based management strategies to further monitor post-concussive symptoms in the school setting. Concussion symptoms can affect the student up to 7-10 days following the injury. Concussions can range from mild to severe, with symptoms lasting hours, days, months or longer. Children who experience a concussion can experience academic challenges that will affect them in the classroom. Without proper concussion education for school nurses, concussed youth may experience post-concussive symptoms. School nurses have a significant role, collaborating with the parents, providers, and the student in providing accommodations and support while transitioning back into the classroom.

Purpose: To assess the knowledge of Utah school nurses regarding concussion education and management of the concussed student. In addition evaluating the educational intervention, which changed the knowledge base of the participants.

Methods: A one group pre-test and post-test design was used. Study materials were emailed via the Utah School Nurse Association listserv to all Utah school nurses. A concussion educational power point was provided to these nurses before having them complete the post-test.

Results: The results of the paired sample t-test revealed that there was a significant difference ($p=.000$) in comparison of the pre-test and post-test results after viewing the concussion educational power point.

Conclusion: The results of this study showed that there was a significant difference between pre-test and post-test results after viewing the concussion educational power point. Therefore it can be concluded that providing education and awareness regarding concussion and its management will increase the knowledge and ultimately may change practice which in turn may improve patient outcomes.

INTRODUCTION

Background and Significance

Nearly 1.6 million sports related concussions in adults and children are reported annually in the United States (Rains & Robinson, 2010). Concussion awareness has been emphasized to the public with the use of public service announcements, documentaries, sports, media, news coverage, and concussion campaigns (Sady, Vaughan, & Gioia, 2011; Williamson et al., 2014). Concussions have been deemed a public health issue due to the negative neurological deficits they can have on the young developing brain. It is estimated that 100,000-140,000 children and adolescents, ages 1 to 18 years are seen yearly in emergency departments for non sports related concussions in the United States (Wing, Amanullah, Jacobs, Clark, & Merritt, 2015a). Despite this increased awareness and education to the public, concussions continue to ensue without proper concussion education and management in school systems.

Concussions can happen at any moment whether the child is at school, or with family at home. There are many ways children and adolescents can suffer a concussion such as playing sports, gym class, recess, car accidents, and falls. Whether the child or adolescent suffers a concussion in school or at home, it is essential for school nurses to have proper concussion education, and evidence based management strategies to further monitor post-concussive symptoms in the school setting. Concussion symptoms can affect the student up to 7-10 days following the injury, hence the importance for school nurses to have an evidence based education and management plan in place to ensure that the student remains safe (Piebes, Gourley, & McLeod, 2009; Scorza, Raleigh, & O'Connor, 2012). Ensuring that there is an increased

appreciation and knowledge of concussions in schools will provide a significant health benefit that promotes a concussion awareness culture (Bagley et al., 2012).

A concussion is characterized by a bump or blow to the head, which may or may not result in a loss of consciousness. Concussions can range from mild to severe, with symptoms lasting hours, days, months or longer. A mild traumatic brain injury, or concussion, is considered a serious health concern, and failure to adhere to the standard care recommendations can result in grave consequences such as lifelong cognitive, motor, and behavioral impairments (Williamson et al., 2014). Symptoms of concussion generally fall into four categories: physical, emotional, cognitive, and sensory (Jamault & Duff, 2013; Scorza et al., 2012). Physical symptoms consist of headache, nausea, vomiting, blurred vision, loss of consciousness, light sensitivity, amnesia, and poor balance (Jamault & Duff, 2013; Scorza et al., 2012). Emotional symptoms consist of irritability, lability, and sadness. Cognitive symptoms consist of poor concentration, poor short-term memory, feeling “foggy”, slowed reaction time, forgetting recently learned information, and repeating questions (Jamault & Duff, 2013). Sensory symptoms consist of poor sleep, excessive sleep, fatigue, and drowsiness.

The concussed youth will require cognitive rest, academic modifications, and tailored management for returning back to school and play based on individual concussive symptoms (Borich et al., 2013). Concussion management involves cognitive rest, pain medication to alleviate symptoms of headache, and close observation of neurological status, especially in the first 24 hours (Sady et al., 2011). Cognitive and physical rest are both essential in the management of concussions. Cognitive rest is meant by eliminating activities that stimulate the brain such as video games, texting, television, refraining from physical activities, modifying

school activities and or duration of activities, and most importantly ensuring frequent periods of rest (McAbee, 2014a; Sady et al., 2011; Wing et al., 2015a). Those who do not follow the prescribed regimen of cognitive and physical rest may experience an increased or longer duration of post concussion symptoms. Ensuring that children are receiving appropriate cognitive and physical rest will allow for the brain to heal and further lessen the risk of exacerbating symptoms and delayed recovery (Scorza et al., 2012). An exacerbation of symptoms is termed post concussive syndrome and can persist for several months following the concussion.

Post concussive syndrome is characterized by non-specific symptoms that are reported following a concussion that generally persist beyond the expected recovery period (Broshek, De Marco, & Freeman, 2015). These symptoms are: headaches, irritability, fatigue, difficulty concentrating, sleep disturbance, emotional lability, depression, and anxiety (Broshek et al., 2015; Jamault & Duff, 2013). Individuals who experience post-concussive symptoms may struggle with daily activities and long-term neurological challenges that may result in cognitive, physical, and emotional issues (Gibson, Nigrovic, O'Brien, & Meehan, 2013). Post-concussive syndrome may also affect children who have already suffered a previous concussion, thus making their recovery symptoms last longer. Children are more likely to experience post concussive syndrome over adults, due to their developing brain (Jamault & Duff, 2013). The developing brain is vulnerable due to its immature central nervous system, thinner cranial bones, smaller brain that results in a large area of subarachnoid space that allows the brain to move freely and a larger head to body ratio (Karlin, 2011). A traumatic injury to the developing brain results in a prolonged period of pathogenesis in both cortical and subcortical structures, thus

leading to progressive neurodegeneration causing sustained cognitive, behavioral, and developmental impairments (Daneshvar et. al., 2011).

According to the Centers for Disease Control and Prevention (CDC) (2016), falls are the primary mechanisms of injury in 0-4 year olds accounting for 73% of emergency room visits. Injuries caused by falls and or being struck in the head by an object equaled 35% for 5-14 years of age (Centers for Disease Control and Prevention, 2016). Emergency rooms see nearly half a million children ages 0-14 years for concussions annually (National Association of School Nurses, 2016). However according to the CDC (2016) rates for concussion related hospitalizations in children 5-14 years have remarkably decreased by almost 50% in 2010. Concussions in children are associated with approximately one billion in total hospital charges annual (Brain Injury Alliance Utah, n.d.).

Concussion management plays a crucial role as the student returns to school following a concussion. The school nurse has a significant role, collaborating with the parents, school staff, special service providers, health care professionals, and the student in providing accommodations and support with transitioning back to school (National Association of School Nurses, 2016). By providing education to school nurses, allows the nurse to educate children and their parents on the basic awareness of recognizing, seeking medical attention, and reporting concussions to school faculty for those concussions that happen outside of school (Bagley et al., 2012). This will allow the school nurses to be aware and closely monitor the concussed child. A lack of concussion knowledge and management guidelines amongst school nurses can lead to adverse deficits that can impair the child's developing brain function, leading to temporary or permanent learning disabilities (Sady et al., 2011).

It is imperative for school nurses to have the knowledge and skills to provide concussion prevention education to parents, students, and staff; and provide continuous monitoring and evidence based management guidelines to the concussed student (National Association of School Nurses, 2016; Sady et al., 2011). These guidelines allow for proper identification of a concussion when it occurs at school or when a child is returning back to school following a concussion that will assist in minimizing post concussive syndrome. Due to the vast array of elusive symptoms, it can be difficult to properly recognize a concussion, especially if one hasn't been trained on proper identification. Every concussion is unique and symptoms can appear immediately, whereas others may become more apparent several days following the injury (Sady et al., 2011).

Local Problem

In Utah there are currently 899 public schools that consist of elementary, middle, junior high, and high school; with a total of 491, 206 students enrolled (Education Bug, 2015). In Utah elementary school consists of K-5th grade, middle school grades 6th-7th, junior high 8th-9th, and high school 10th-12th. In 2011 6,228 Utahns were treated in emergency departments for concussions, of that number nearly 41.7% were related to sports and recreational activities (Violence & Injury Prevention Program, 2014). Furthermore 48.3% of these concussion related injuries were among children ages 10-19, with 25.7% ages 15-19, and 22.6% ages 10-14 (Violence and Injury Prevention Program, 2014) . In 2013, 35.9% of children ages 9-12 had symptoms of concussion but never reported, 16% were diagnosed with a concussion, and 15.3% were removed from a game due to concussion like symptoms (Violence & Injury Prevention Program, 2014).

Given these statistics, it is vital for Utah's school nurses to understand concussions and be able to provide evidence-based management to Utah's concussed children. Children who experience a concussion can experience academic challenges that will affect them in the classroom. Without proper concussion education for school nurses, concussed youth may experience post-concussive symptoms. The concussed youth may show signs of difficulty maintaining the normal classroom pace, inability to do academic work, and difficulty participating in the classroom setting (McGrath, 2010). Providing supportive cognitive and physical rest will help to lessen long-term symptoms following a concussion. Ensuring that school nurses are knowledgeable in managing concussions will provide them with the tool set to foresee cognitive deficits that may happen in school. By doing so they will be able to support and provide temporary accommodations to the recovering student (McGrath, 2010). These challenges can be with classroom participation, behavior, extracurricular activities, relationships amongst teachers and students, overall difficulty focusing and or concentrating in the classroom (McGrath, 2010).

Purpose

The purpose of this project is to assess the knowledge of Utah school nurses regarding concussion education and management of the concussed student, following the implementation of the concussion and education power point. This was done by providing evidence based, online education on post-concussion management to public school nurses in elementary, middle, junior high, and high schools in Utah. I am aware that sports related concussions generally happen mostly in high schools, however; due to the inability to segregate public school nurses by educational setting, I have chosen to focus the area of educational content in this project on the

topic of post-concussion management. The goal of this project is to ensure that school nurses are knowledgeable in managing children who have recently suffered a concussion. By doing so, I will provide school nurses with a tool set to anticipate cognitive deficits and provide temporary accommodations to the recovering student. Concussion education that is provided to school nurses is expected to help decrease or eliminate the short-term and long-term risks associated with concussions that may lead to deficits in youth.

School nurses and the concussed child are the main stakeholders in this project. Stakeholders have the greatest influence and serve to have the majority of responsibility for making this project successful. Thus making stakeholders the ones who are the most impacted by this project. School nurses need to have an understanding of concussion injuries and be able to assess the progress throughout the recovery period based upon evidence based management guidelines. By doing so school nurses will help to decrease the long-term symptoms associated with a concussion. The concussed child will benefit greatly from this project. Unrecognized concussions symptoms and lack of evidence based management leads to concentration problems, short-term memory, problems with new learning, and memory consolidation if left unrecognized (Sady et al., 2011).

Study Question

This project seeks to answer the following questions:

1. Are Utah public school nurses knowledgeable about concussions?
2. Do Utah school nurses have an understanding of evidence based management guidelines to assist in providing care to the concussed student?
3. Do school nurses feel they have appropriate training in caring for the concussed student?

FRAMEWORK & SYNTHESIS OF EVIDENCE

Theoretical Framework

Description

The theoretical framework that will be utilized in guiding the project of “Concussion Education and Management for School Nurses” will be the Health Belief Model (HBM) (See Figure 1). The HBM was developed in the 1950s as a systematic method used to explain and predict preventative health behaviors (Jones Bartlett Learning, n.d.). This model is used for research that focuses on patient compliance and preventative healthcare practices (Polit & Beck, 2012). The model states that health-seeking behavior often times is influenced by a person’s perception or their perceived susceptibility and the perceived severity associated with the healthcare problem (Polit & Beck, 2012; Quaranta & Spencer, 2015). This model is important in guiding this research project because for successful concussion outcomes, school nurses must be knowledgeable about concussions and understands the likelihood of treating a concussed student in their care is a certain. It is imperative for school nurses to feel confident in their ability to provide care and education that is needed to assist the concussed student. HBM will help to identify factors that influence school nurses perceptions and attitudes regarding concussions knowledge and its management in caring for the concussed student. Understanding these factors will provide an enhanced school concussion education plan, that will improve health behaviors of school nurses in treating concussions, thus leading to positive concussion management and outcomes in children.

The HBM is composed of four constructs: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers (Jones Bartlett Learning, n.d.). Perceived seriousness speaks to the individual’s belief about the seriousness of the severity of the disease (Jones

Bartlett Learning, n.d.). Perceived susceptibility is the individual's perception that a health problem is personally relevant or that a given diagnosis is accurate (Jones Bartlett Learning, n.d.; Polit & Beck, 2012). This concept promotes individuals to adopt a healthier behavior. Perceived benefits is the individual's opinion of the value or usefulness of a new behavior in decreasing the risk of developing a disease (Jones Bartlett Learning, n.d.). Lastly, perceived barriers is the individual's evaluation of the complexity, duration, and accessibility of adopting a new behavior (Jones Bartlett Learning, n.d.; Polit & Beck, 2012).

The Health Belief Model

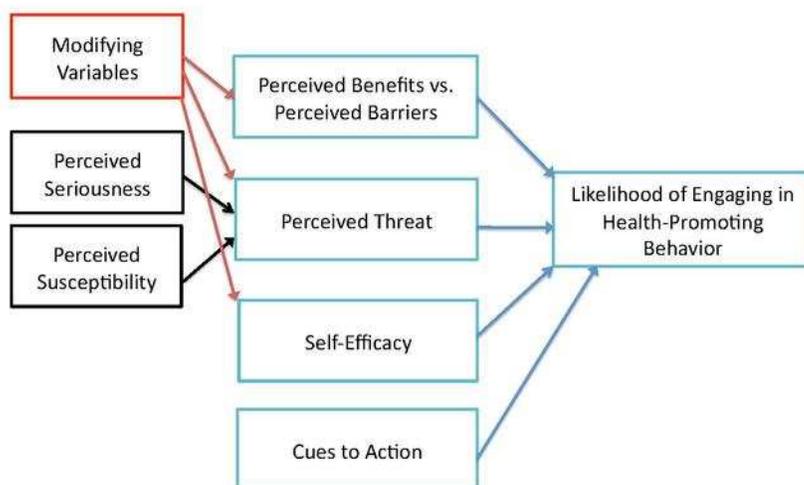


Figure 1. HEALTH BELIEF MODEL

Concepts

The key concepts within the project that relate to the HBM include: public school nurses in Utah, school nurses knowledge and education regarding concussions, and school nurses knowledge of evidence based management of concussions. Given the concepts outlined in the HBM, the perceived barriers for school nurses are likely to change when they perceive that concussions are serious and can lead to negative neurological deficits in children. By providing school nurses with the knowledge base and education to understand the negative outcomes associated with concussions and post concussive symptoms allows for an adoption of healthier behaviors. Thus the perceived benefits will greatly influence and lead school nurses to strive for the need of concussion education and evidence based management in their schools.

Synthesis of Evidence

The rate of concussions continues to rise and is increasing amongst children and adolescent age groups despite the countless public service announcements regarding concussion prevention (Jamault & Duff, 2013; Sady et al., 2011). There are approximately 1.6 million to 3.8 million sports and recreational concussions yearly in the United States with approximately 7.5 million students enrolled in interscholastic activities yearly (Borich et al., 2013; Jamault & Duff, 2013; Rains & Robinson, 2010; Williamson et al., 2014). Research has shown that concussions can threaten the developing child's future ability to learn, and is shown to have both short-term and long-term negative effects (McLeod, 2014; Olympia, Ritter, Brady, & Bramley, 2015; Sady et al., 2011). Schools across the country are needing standardized concussion awareness, education, and management programs (Sady et al., 2011). These astounding numbers demonstrate the need for providing concussion education to school nurses. School nurses should be knowledgeable on

the recognition and appropriate management of the concussed student, as well as educating school personnel, coaches, parents, and students on concussion prevention and management (McLeod, 2014).

To gain a better understanding of concussion education and management programs for school nurses, several literature searches were conducted using CINAHL, PubMed, Embase and PsychINFO. The following key words were used: concussion, post-concussion syndrome, head injury, rehabilitation, brain injury, and concussion management. The following filters were applied: English language, humans, published within the last 5 years, school age 7-12, adolescent 13-18. These searches yielded a total of 144 articles that met the listed criteria. Articles were then narrowed down that didn't closely relate to concussions in school, returning to school following concussion, post concussive symptoms, and return to play. 15 articles were retained that applied to the project's purpose. See Appendix A for appraisal table.

Wing et al. (2015) states that school nurses play a dynamic role in the care of the concussed child and adolescent. There are many benefits for primary care providers and school nurses to develop uniform recommendations that assists the student, parents and school nurses in managing the concussed child when returning back to school (Olympia, Ritter, Brady, & Bramley, 2015; Wing et al., 2015). It is imperative for school nurses, students, and parents to understand the fundamental concepts associated with concussions, to help decrease the residual effects that they can leave on school-aged children (Bagley et al., 2012).

Williamson et al. (2014) points out the valuable concussion education programs that effectively communicate medical facts, diagnosis, and prompt treatment for concussions that are available for school nurses and parents. These web based educational programs consist of: CDC

Heads Up, ThinkFirst, Sports Legacy Institute, SLICE, Brain 101, and Barrow Brainbook; all of which can assist school nurses in providing concussion education to students and parents, as well as assisting with managing concussion symptoms (Caron, Bloom, Falcao, & Sweet, 2015; Glang, Todis, Sublette, Brown, & Vaccaro, 2010; McGrath, 2010; Rains & Robinson, 2010; Williamson et al., 2014).

Understanding concussion management is critical for the school nurse, post concussive symptoms such as: headaches, dizziness, nausea, noise sensitivity, sleep disturbance, fatigue, irritability, frustration and poor concentration are all symptoms associated with a concussion and vary with each individual (Borich et al., 2013; Glang et al., 2010; Jamault & Duff, 2013; Olympia et al., 2015). Post-concussion symptoms often interfere with the students ability to do academic work, classroom participation, and interpersonal relations with peers and fellow students (McGrath, 2010; Sady et al., 2011). Studies have shown that individuals with concussions who engage in high levels of cognitive activity experience the longest time for symptom resolution (Brown et al., 2014).

Strengths

Sady et al. (2011) supported school systems to have a widespread concussion education and management plan in place for school personnel that included: understanding of concussions, establishing policies and procedures, early identification and proper management. McLeod, (2014) states that school nurses act as the primary on-site health care provider and play an integral piece in managing the collaboration between athletic trainers, teachers, and parents in facilitating the management of the concussed student.

Weaknesses

There has been a limited focus on providing necessary education to school nurses, other school personnel, students, and parents. In one study nearly 19% of school nurses felt that they did not have the necessary training, nor the time to care appropriately for the concussed student (Wing et al., 2015). Research indicates that school nurses often have a lack of knowledge and resources in responding to concussions and its management (Jamault & Duff, 2013). There are limited articles that support school nurses by providing an educational tool kit to assist students who either have a concussion during school hours or those returning back to school following a concussion.

Gaps

The gaps in literature highlighted areas where additional support and research is needed. There is little information given to parents and children on cognitive and physical rest and the importance it plays in recovery for the concussed child. This dissemination of knowledge is lacking and the vast majority of people in the community are unable to properly recognize a concussion and often times are unsure of when to be seen or that they should report it to school faculty (Sady et al., 2011). Proper concussion education will assist in an increased awareness of concussion management in school systems, thus leading to improved outcomes for students (Williamson et al., 2014).

METHODS

Ethical Issues

There are three main principles that have been identified on which standards of ethical conduct in research is based, they are respect for persons, beneficence, and justice (U.S.

Department of Health & Human Services, 1979). When humans are used in a study, ethics must be exercised to ensure that their rights are protected in a manner that they feel is ethical, safe, and fair (Polit & Beck, 2012).

Respect for persons ensures that humans are to be treated autonomously, capable of controlling their own actions, have the right to ask questions, right to refuse to give information, and right to withdraw from a study (Polit & Beck, 2012). The participants for this project are school nurses in Utah. Their participation in the project was completely voluntary and informed consent was obtained via Qualtrics. A detailed explanation of the project was sent via email and outlined the use of a pretest, followed by an online concussion education power point that was then followed up with a posttest. (See Appendix B). Confidentiality was maintained, as all test results remained anonymous.

Beneficence ensures that researchers minimize harm and maximize benefits, thus ensuring that there is a benefit involved in using humans as research (Polit & Beck, 2012). The data gathered from the pretest and posttest did directly affect the school nurses in this project, however it did have the potential to impact other concussed students, as concussion education was tailored and or provided to school nurses.

Justice ensures that participants are selected based on study requirements and not based on a group's vulnerability. Justice requires that participants have the right to fair treatment and their right to privacy (Polit & Beck, 2012). When conducting research for the project, it is important to treat all participants equally and fairly. This was demonstrated by providing everyone with the same amount of time to complete the pretest and posttest.

The project proposal was submitted to the Institutional Review Board (IRB) at the

University of Arizona for a formal review prior to implementation and data collection. Doing so ensured that biased opinions of the practitioner did not conflict with ethical principles within the study and or participants. Informed consent was obtained at the start of each survey. The surveys were hosted by Qualtrics, thus ensuring that all participants remained anonymous and could not be tracked back to the individual participant. Qualtrics is a web-based software that enables users to conduct online data collection and analysis for research purposes. Appendix C includes the IRB approval form, which states this project was reviewed and considered exempt.

Setting

The setting of the project was online utilizing an electronic educational module, which was rendered to all public school nurses in the state of Utah. Public schools consist of elementary, middle, junior high, and high schools in Utah. School nurses were provided an educational module via Google drive documents and also provided pre and posttests through an online site called Qualtrics. Providing this information in an online approach, allowed school nurses to complete the educational project on their own time and in a manner they feel most comfortable in, thus increasing the odds of participation.

Purposive sampling was used to select the participants for this project. Purposive sampling allows the practitioner to select participants that are knowledgeable about the issues of the study (Polit & Beck, 2012). The inclusion criteria for the sample were public school nurses in the State of Utah. Utilizing the Utah School Nurses Association listserv, I was able to reach out to 100 school nurses who provide care to 899 public schools in the state of Utah. With a purposive sample you are able to reach a targeted sample quickly (Research Methods Knowledge Base, 2006a). Optimally 25% of participants will respond. Results are reported based on the number of

actual participants who completed pre and posttests.

Planning the Intervention

Utah public school nurses were sent, via email, a complete description of the project, approved by UA IRB. The email also included a link to the project's pretest that was housed on the Qualtrics' platform. Participants who completed the pretest were then sent the Concussion Education and Management for Utah School Nurses education power point (See Appendix I) that was followed up with the posttest, also housed on the Qualtrics' platform (See Appendix E).

The pretest and posttest questions, and educational power point were developed by the primary investigator and reviewed by two experts in the area of pediatric concussion rehabilitation (See Appendix F). The educational power point was derived from an extensive review of relevant literature, based in the current evidence, and was geared toward school nurses pertaining to concussion education and management. Informative online sites that provided education for school nurses such as Heads Up to Schools; School Nurses, Brain Line, and Brain 101 the Concussion Playbook were used to prepare the educational materials. The Heads Up to Schools; School Nurses site is developed by the Centers for Disease Control and Prevention. Brain Line is an informative organization that focuses on concussions signs and symptoms, management, and provides support for the concussed individual, families, and professionals. Brain 101 The Concussion Playbook site offers resources for school coaches, educators, parents, and teen athletes.

At the end of the educational power point nurses were given a printable handout that contained an educational tool kit that provided them with these links for quick reference (See Appendix H). The following links provide school nurses with helpful tools that contain fact

sheets for students and parents, concussion signs and symptoms checklists, and educational references. The Heads Up to Schools; School Nurses sites also contain a link that provides school nurses with options to print customizable signs and symptoms cards or posters that can either be displayed in the schools or sent home with the concussed student.

The questions from both the pretest and posttest specifically pertained to information in the Concussion Education and Management for Utah School Nurses educational power point. The pretest contained 11 multiple-choice questions. The questions focused on signs and symptoms of concussion, assessment of concussion, management of concussion, and post concussive symptoms related to children who sustained a concussion either at school or returning back to school following the event (See Appendix D). The posttest incorporated the same questions as the pretest but had one additional multiple-choice question to evaluate the effectiveness of the online education power point (See Appendix E).

Participants were sent two emails; the first email contained a link to Qualtrics that provided them with the pre-test, which the participants had two weeks to complete. One week after completion of the pretest, participants received another email that contained a link for the educational module. Following completion of the power-point they were directed back to Qualtrics and provided the posttest; two weeks were allotted to complete the post-test. The total process took five weeks, thus allowing the participants to complete the pre-test, educational power point and post-test on their own time and at their convenience. Limited resources were needed from the participants, however the participants had to have access to a computer with internet access to complete the intervention. There was no cost to this practitioner or the participants for this project.

Summary of Expert Evaluations of Pre-Test and Post-Test Questions

A pediatric rehabilitation physician and a rehabilitation school nurse were asked to evaluate the pre and post test to assist with identifying any issues or potential errors with the type of questions being asked, wording, or answers. The expert evaluations are presented below in Table 1 and Table 2. Based on these expert reviews this practitioner felt comfortable and confident in providing the pretest and posttest questions to Utah school nurses.

TABLE 1. *Expert Evaluation by Pediatric Rehabilitation Physician with Expertise and Management of the Utah Concussion Clinic.*

Evaluation Statement	Response
The pre-test and post-test are easy to follow?	Strongly Agree
The concussion education and management educational materials presented are easy to follow?	Strongly Agree
The pre-test and post-test address the concussion education and management education?	Strongly Agree
The pre-test and post-test assess the school nurses understanding of concussion?	Strongly Agree
The pre-test and post-test questions assess the school nurses critical thinking as to what should be done next as presented in the educational module?	Strongly Agree
Please provide any additional concerns/comments that you have regarding the educational module, pretest, and posttest (i.e. any additional test questions that should be added, changing wording of certain questions or answers).	This looks great! 8B – correct he to she and his to her 8D – change his to her. Post Test 16 – what is the point of having this question on the post test but not the pre-test? Excellent questions geared toward school nurses.

TABLE 2. *Expert Evaluation by School Nurse in Rehabilitation Clinic*

Evaluation Statement	Response
The pre-test and post-test are easy to follow?	Strongly Agree
The concussion education and management educational materials presented are easy to follow?	Strongly Agree
The pre-test and post-test address the concussion education and management education?	Strongly Agree
The pre-test and post-test assess the school nurses understanding of concussion?	Agree
The pre-test and post-test questions assess the school nurses critical thinking as to what should be done next as presented in the educational module?	Strongly Agree
Please provide any additional concerns/comments that you have regarding the educational module, pretest, and posttest (i.e. any additional test questions that should be added, changing wording of certain questions or answers).	Brooke you did an excellent job with this and I feel that these are all very important ideas and concepts that every school nurse in Utah should understand, especially when taking care of the concussed child. Great work!

Methods of Evaluation

This project used a quasi-experimental approach, utilizing a one group design with a pre-test and post-test. This was done to assess school nurses baseline knowledge regarding concussions and knowledge retention following an education intervention and the intention to apply knowledge gained following the intervention. Quasi-experimental designs consist of controlled trials without randomization that involves an intervention with or without a control group (Polit & Beck, 2012). The use of a pretest-posttest design method incorporates an experimental design in which data is collected from subjects both before and after introducing an intervention (Polit & Beck, 2012).

The primary goal of this project was to ensure that Utah school nurses are knowledgeable in managing concussions. The secondary goal was to provide Utah school nurses with a tool set to foresee cognitive deficits that may happen in school and provide temporary accommodations to the recovering student (See Appendix H).

Analysis

Data analysis was completed using descriptive statistics and paired sample t-test. Descriptive statistics were used to describe or synthesize the data results from the pretest and posttest. Incorporating the paired t-test is appropriate for this project due to the use of a pre posttest design. Paired t-test is used when results are obtained from two measures from the same participants (Polit & Beck, 2012). Data analysis was completed using Qualtrics software to export into SPSS. Qualtrics assisted by providing real-time data reports and graphs for data interpretation.

RESULTS

Nature of Setting

The sample included all public school nurses in the state of Utah. All participants were members of the Utah School Nurses Association and had email access via their listserv. The pretest, educational power point, and posttest were sent out to 100 school nurses. Of those 100 potential participants, 25 had pretests and posttests that matched and only 1 participant completed just the pretest, making a 25% completion rate for this project. Table 3 describes the professional background of the participants with the average school nurse holding a bachelor's degree. It also demonstrates that most school nurses work in multiple educational levels such as elementary school, middle school, junior high, and high school. Elementary school consists of K-

5th grade, middle school grades 6th-7th, junior high 8th-9th, and high school 10th-12th. Years of experience as a school nurse ranged from less than 1 year to greater than 10 years, with 1 participant with less than 1 year experience, 14 with 1-5 years, 8 with 5-10 years, and 2 with greater than 10 years of experience.

TABLE 3. *Descriptive Information of Sample*

	Number of Participants (N=25) (%)
Professional background	Diploma: 0 Associates Degree: 10 (40%) Bachelor's Degree: 14 (56%) Master's Degree: 1 (4%) Other: 0
Educational level of where you work	Elementary School: 3 (12%) Middle School: 2 (8%) Junior High: 3 (12%) High School: 3 (12%) Elementary, Middle School: 4 (16%) Elementary, Middle, Jr high: 6 (24%) Elementary, Middle, Jr, High: 1 (4%) Middle, Jr, High School: 2 (8%) Jr, High School: 1 (4%)
Experience as a school nurse	Less than 1 year: 1 (4%) 1-5 years: 14 (56%) 5-10 years: 8 (32%) Greater than 10 years: 2 (8%)

Pre-Test and Post-Test Scores

There were a total of 10 questions asked on the pre-test and 11 questions asked on the post-test. Table 4 represents the improvement of number of questions answered correctly after viewing the concussion education and management power point. The additional question on the post-test related to students returning back to school following a concussion and offered the following multiple choice options: students may need to: take frequent rest breaks, spend fewer hours at school, be given extra time to complete assignments or tests, all of the above, and none

of the above. All 25 participants answered this question correctly, which further demonstrates the knowledge retained from the power point.

Table 5 lists the pre-test and post-test question comparison. The first column reflects the pre-test scores with number/percent of questions answered correctly and the second column is the post-test results with the number/percent of questions answered correctly following the educational power point.

TABLE 4. *Pre-Test and Post-Test Average Scores*

	Pre-Test Totals	Post-Test Totals
Number of Participants	26	25
Mean (# of correct answers)	7.60	8.88
Median (# of correct answers)	8.00	9.00
Standard Deviation	1.258	.526
Minimum number of questions answered correctly	4	7
Maximum number of questions answered correctly	10	10

TABLE 5. *Pre-Test and Post-Test Question Comparison*

Concussion Questions	Pre-test N (%)	Post-test N(%)
A concussion only occurs when a student has a loss of consciousness? a. True b. False * c. Don't know	1 (4%) 23 (96%)	25 (100%)
What things are likely to make concussion symptoms worse? (Check all that apply) a. Sleeping more than usual b. Playing with friends* c. Playing on the internet/video games*	6 (24%) 22 (88%) 25 (100%)	1 (4%) 24 (96%) 25 (100%)

d. Schoolwork*	24 (96%)	25 (100%)
Two students in your class experience a concussion from the same car accident where they were rear-ended at a stop sign. Both students are likely to complain of the same initial symptoms and recover at the same time. a. True b. False* c. Don't know	1 (4%) 20 (80%) 4 (16%)	25 (100%)
A student brings you a note that diagnoses her with a concussion. At times she complains of a headache, dizziness, and trouble remembering things. Regarding school attendance, which of the following are appropriate courses of action? (Check one answer) a. She should be absent from school for 2 week until her headaches resolve. b. She may attend school regardless of symptoms so she doesn't fall behind in her work. c. She may come to school long enough to take any scheduled tests. d. She may attempt to attend school and go home if symptoms continue to worsen during the day. *	11 (44%) 14 (56%)	3 (12%) 22 (88%)
A student comes to your office after the weekend saying he fell riding his bike this weekend. What are some common signs that class work is becoming more difficult for the student? (Check all that apply) a. Increased forgetfulness b. Decreased focus c. Impulsive behavior during class d. All of the above *	1 (4%) 1 (4%) 1 (4%) 25 (100%)	25 (100%)
A concussed student complains of being sensitive to light while in class. What accommodations would you use to help her overcome this problem? (Check all that apply) a. Move her seat to the front of the classroom b. Allow her to wear sunglasses for short	16 (64%) 12 (48%)	21 (84%) 24 (96%)

period of time *		
c. Allow her to take a brief break from class *	20 (80%)	24 (96%)
d. Move student away from or dim lights in room *	13 (52%)	24 (96%)
Do you feel confident in your ability to provide treatment to concussed students?		
a. Yes	7 (28%)	24 (96%)
b. No	1 (4%)	
c. Unsure	17 (68%)	1 (4%)
The cornerstone of treatment for concussions is?		
a. Narcotic pain medications		
b. NSAID's (Ibuprofen, Motrin, Aleve, etc.)	6 (24%)	
c. Physical and cognitive rest *	19 (74%)	25 (100%)
d. Increase fluids	1 (4%)	

Note: * indicates correct answers.

Paired Sample T-test Analysis

All data were input into SPSS and a paired sample t-test was then used to examine the difference between pre and post-test responses. There was a significant difference in comparison of the pre and post-test results. Results support that school nurses do not feel confident in their ability to provide treatment to the concussed student ($m= 1.64$, $s= 0.56862$) compared to those school nurses who feel confident after reviewing the concussion education power point ($m= 1.04$, $s= .2000$, $t(24)= 5.196$, $p < 0.05$). Having a p-value of .000, which is less than 0.05, is commonly used to determine statistical significance between groups. Given that the results of the paired t-test demonstrated statistical significance, it is appropriate for the practitioner to conclude that the school nurses participation in this project demonstrated an improvement in knowledge related to management of post-concussion syndrome in the school setting. From these results, the

practitioner may conclude that there was a significant change in school nurse's knowledge regarding concussion education and management.

DISCUSSION

Summary

The purpose of this DNP project was to assess the knowledge of Utah school nurses regarding concussion education and management of the concussed student, both before and following the intervention of providing a concussion and education power point. The nurses demonstrated an increase in knowledge regarding concussion education and management in schools as reflected by the increased number of correct responses on the post-test results. These results demonstrated that providing school nurses with an evidence based education intervention, school nurses will have an increased awareness and knowledge of concussions, will promote a concussion awareness culture in their school and ultimately decrease post concussive symptoms in school age children (Bagley et al., 2012). The statistically significant findings of this project support the integration of concussion education into Utah school nurse's annual skills day workshop and education. It is anticipated that the strong outcomes of this project may also inform school nurse policy in the state of Utah to improve post-concussion management of school age children. Given these results, Utah school nurses could benefit from participation in this educational intervention as a precursor to a change in their practice

The lack of knowledge and/or comfort level with caring for the concussed student is demonstrated in the pre-test results. The pre-test showed 68% of school nurses did not feel confident in their ability to provide care to the concussed student. Following the concussion educational power point, that number increased to 96% of school nurses feeling confident in

their ability to properly manage the concussed student in the school setting. This drastic increase suggests that educational training is beneficial and should be implemented in all school systems. Furthermore the pre-test responses from nurses showed a lack of confidence regarding school attendance, if the concussed student experiencing concussive symptoms should avoid school for two weeks (44%) or if they attend and go home if symptoms worsen (56%). The post-test results of this question showed that school nurses selected the correct answer of attending and go home if symptoms worsen at 88%. Table 5 demonstrates that there was an increase in knowledge in post-test results regarding concussions after the educational power point was provided.

It is anticipated that based on these outcomes, the Utah School Nurses Association will require future training to all school nurses regarding concussion education and management. The school nurses were also provided three links; HEADS Up to Schools: School Nurses, Brain Line, and Brain 101 The Concussion Playbook at the end of the power point to incorporate in their daily practice and when faced with a concussed student. These sites provide educational resources that focus on concussions in the school setting.

Limitations

The limitations to this project were the participation and response rates. Ideally it would be best to have every school nurse in Utah take the pre and post-test, however this training was not mandated by the school. There was 25% participation amongst the school nurses. For future studies the primary investigator should look into incentives to increase optimal participation.

Interpretation

A review of relevant literature demonstrates the need for all school personnel, particularly school nurses to have an understanding of concussion management. Despite the increased

number of concussions happening there continues to be a gap, or loss in information that is given to either students, parents, or school personnel (Guskiewicz & Register-Mihalik, 2011). The information gained from this project will assist The Utah School Nurse Association with future projects that are geared toward enhancing school nurse education not only focusing on concussion education but the general welfare of students and the injuries they may be faced with at school. Implementation of a quarterly or yearly school based education program or workshop that addresses concussion education and management and the negative consequences that post concussive symptoms can have on the school aged student can potentially aid in the recovery process and lessen duration of symptoms and complications.

Conclusion

In conclusion, this DNP project assessed Utah school nurses' knowledge regarding concussion education and management using a pre-test and post-test design. School nurses were also introduced to the concussion educational power point via electronic mail and utilized Qualtrics software for testing. The results of this project showed a statistically significant difference between pre-test and post-test results after viewing the concussion educational power point; therefore demonstrating that providing education and awareness regarding concussions and its management was proven beneficial for Utah school nurses. For the concussed student, this increase in knowledge on the part of the school nurses as well as the integration of this knowledge into practice may lead to a decrease in recovery time as well as prevention of further injury (CDC, 2015).

The information gained from this project will not only better equip Utah school nurses with the knowledge they need to understand and manage the concussed child in Utah, but will

open communication to concussion awareness among school nurses, teachers, other school faculty, children, and their parents. This project demonstrated that 25% of Utah school nurses who participated, demonstrated an increase in knowledge and retention following the educational power point. Given these results, Utah school nurses could benefit from participation in this educational intervention as a precursor to a change in their practice. It is the hopes of this practitioner that the results of this project will support evidence based education and practice change in the area of concussion management for Utah school nurses.

APPENDIX A
APPRAISAL TABLE

APPRAISAL TABLE

Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Eisenberg, Meehan, & Mannix, 2014) Duration and Course of Post-Concussive Symptoms	Secondary analysis to delineate the course of specific post-concussive symptoms in children.	*Prospective cohort study *Patients 11-22 years of age who presented to Children's Emergency Department with acute concussion. * <72 hours from injury N=302 patients	Questionnaire on: describing mechanism of injury, associated symptoms, past medical history, and Riverhead Post-Concussion Symptoms Questionnaire (RPSQ), the repeat of RPSQ in 3 months.	*Initial symptoms were: headache, fatigue, dizziness, and longer time to process things. *Further symptoms that develop later: sleep disturbance, frustration, fatigue, and forgetfulness *57% of patients reported moderate limiting cognitive activity during school after one week. *15% experienced limited cognitive ability in school after one week. *27% had no cognitive function in school at one week. *18% reported worse school performance than before	Strengths= Large sample size, prospective methodology. Enrollment of eligible patients and majority of patients continued participation. Limitations= No control group and only studied self reported symptoms with patient reports may be influenced by other circumstances.
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Wing, Amanullah, Jacobs, Clark, & Merritt, 2015b) Heads up: communication is key in school nurses' preparedness for facilitating "return to learn" following	To assess the current understanding and practices of a sample of school nurses regarding the concept of "return to learn" in concussed students.	Quantitative; cross sectional study Sample: New England school nurses surveyed, N=151	*Confidential survey sent out to school nurses. *Targeted population was nurses in elementary, middle, and high schools in public and private sectors. *Two sections of	*19% nurses felt they did not have the training necessary for role *38% reported "inadequate concussion training". *30% report "inadequate time necessary to care for a student with concussion". *Education	*The study identified the need for specific education of school nurses regarding concussion management in the academic setting. Limitation:

concussion			<p>questions asked.</p> <p>*#1 :grade level, size of school, availability of health care providers at school.</p> <p>#2: participant knowledge of understanding and experiences with pediatric concussions, frequency of school nurse visits for concussion.</p>	<p>and facilitation of academic plans regarding concussions and return to play guidelines are needed for school nurses. *92% of nurses were able to recognize symptoms of concussions.*Identifying specific gaps in knowledge and challenges at the school level.*School nurses play a dynamic role in the care of concussed students.*Concussion experts and program need to partner with PCP and school nurses to develop uniform recommendations and forms to aid school nurses directing return to classroom guidelines.</p> <p>*A comprehensive team approach to concussion management should facilitate better outcomes for students with concussions, that includes a quicker and more successful return to academics.</p>	<p>*Biased sample of nurses who are motivated and able to receive continuing education in a conference setting.</p> <p>*Resulting in the results may be over estimating the general school nurse knowledge of concussions.</p>
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Bagley et al., 2012)	To evaluate the efficacy of a novel concussion education program called Sports	Quantitative Study; Prospective cohort study	*Education program called Sports Legacy Institute Community Educators (SLICE)	*Assessing knowledge of concussion recognition via pre/post. *Pretest 43% and	*Identifying the need for concussion educational programs to student athletes.
Effectiveness of the					

SLICE program for youth concussion education	Legacy Institute Community Educators (SLICE) my measuring learning trends of participating students.	Sample: students ranging from 9-18yrs. N=636	that measuring learning trends of student athletes. *Pre/post test following presentation *SLICE education pertains to CDC concussion guidelines, relevant concussion case studies, previous SLICE films, and mock presentation.	Posttest 65% *Improved understanding of concussions after SLICE presentation those aged 9-12 was 23%, 13-15yrs 23%, 16-18yrs 21%. *SLICE model provides a highly effective model for educating about concussions.	Limitations: *Although short-term improvements in knowledge are gained, it is unsure if SLICE programs translated into long term behavioral changes among student athletes.
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Sady et al., 2011) School and the concussed youth: recommendations for concussion education and management	*Outline of recommended concussion education	Quantitative Study Sample: N=49 concussed students, parents surveyed about return to school after injury guidelines. *24% reported aware of a school plan for management *43% parents	*Develop school based concussion education and management, ensuring policies and procedures are put in place to help concussed students succeed in their recovery. *Develop education programs for staff *Implement the plan for concussed students.	*Education geared toward school personnel about: concussions and their effects, and professional's role in management when injury occurs *Develop school wide education plan implemented with review and updating each year and before school starts. *Successful implementation of return to cognitive activities *Practical considerations: timing and return to school carefully monitored, symptom management, and effective communication amongst all staff.	

				*Symptom specific considerations for students are put into place and monitored by staff.	
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Glang et al., 2010) Professional Development in TBI for Educators: The importance of context	Describes the current professional development efforts that incorporate features of evidence-based training to improve academic outcomes for students with TBI.	Quantitative	*Review of two professional development systems for concussion education. *TBI consulting team model and Brain STARS.	*TBI model= recruitment of educators who are interested in improving services to students with concussions. Ongoing EBP. Mentorship and ongoing coaching to ensure fidelity of trained skills. Development of concussion specific plan. *Brain STARS= manual based intervention to educate parents and school personnel about neurodevelopment weaknesses from concussions. *Additional need for education to educators regarding concussions is needed. *Recent survey reported 92% of educators having no training for educating those with TBI's.	*Effective staff development for educators must include training in EBP interventions.
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(McLeod, 2014) Managing concussion	Summary of the key areas of importance for the school nurse based	Review	Evaluation of 4 key areas: Education and prevention,	Education and Prevention: *School nurse to assist	*Continues to not be enough information regarding concussion

in the school setting	on National Athletic Trainer's Association (NATA) recommendations for clinical practice.		documentation and legal aspects, evaluation and return-to-play, and other considerations.	<p>in providing education to personnel on the recognition and appropriate treatment of concussed student.</p> <ul style="list-style-type: none"> *Education on concussion prevention, cause, recognition, and referral. *Education to parents and students that a concussion can happen without losing consciousness. <p>Documentation and Legal Aspects:</p> <ul style="list-style-type: none"> *All schools need to develop and implement an emergency action plan. *Plan should include: appropriate reference to concussion state laws, policies from the state interscholastic association, and school district. <p>Evaluation and Return-to-play guidelines:</p> <ul style="list-style-type: none"> *Understanding the self-reported symptoms associated with concussion. *Initial evaluation includes: clinical exam, injury history, observation, oculomotor exam, palpation for associated injuries, 	management in schools
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				<p>testing mental status, and motor control.</p> <p>Home Care: *Provide written instructions that identify red flags that warrant immediate referral, substances to avoid, appropriate nutrition, and f/u evaluations.</p> <p>Role of School Nurse: *Integral in managing collaboration between healthcare and school personnel. *Provide education for school personnel, students, and parents. *Stay current on concussions literature.</p>	
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Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
<p>(Caron et al., 2015)</p> <p>An examination of concussion education programs: a scoping review methodology</p>	<p>Review the literature on concussion education programs. Secondly to inform knowledge translation strategies for concussion researchers and practitioners.</p>	<p>Quantitative; Methodology review</p> <p>Literature review of 5938 records, N=9 adequate concussion education programs.</p>	<p>Literature search based on concussion education programs.</p>	<p>*Despite an ever-increasing body of research and public awareness, there is relatively little that is known about the most effective ways to disseminate the information to knowledge users. *Imperative that concussion education strategies are adapted to</p>	<p>Strengths: *Integrate several different strategies such as video, case studies, social media, handouts, oral presentations, and discussions over of number of education sessions and regularly-were shown to be the most effective.</p>

				<p>specific audience/local context, ensuring that barriers and facilitators of knowledge use are assessed and proper intervention strategy is chosen, implemented, and evaluated.</p> <p>*Concussion education is focused on concussion symptoms, management strategies, long-term sequelae, and return-to-play protocol.</p> <p>*Main outcomes showed that education programs did not improve the participants' knowledge, attitudes, or behaviors related to concussions.</p> <p>*Improved concussion knowledge. Programs were done by comparing pre/post tests, and control groups.</p>	<p>Limitations:</p> <p>*Education programs included limited use of active tools, delivery of education at one time point only, and lack of long term assessment.</p>
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Rains & Robinson, 2010) School nurses and athletic trainers team	*Understanding and identifying concussion management for school nurses and athletic trainers	Review	*School nurses and athletic trainers need to work together to provide proper education, accurate	*Approx. 1.6 -3.8 million sports related concussions yearly. *Estimated one in every 10 high school football	*Education program should include: *Concussion education programs for athletes, parents, coaches,

up on concussion management			detection, and improved management and treatment in an attempt to prevent long-term implications	student will suffer a concussion. *41% who suffered a concussion, return to play earlier than suggested and not symptom free. *Ensuring that education in concussion management is geared toward recognizing: physical symptoms (headache, nausea, dizziness, light and or noise sensitivity), behavioral and emotional changes, sleep disturbances, and neurocognitive implications (changes to attention span, memory, processing, reaction time, focus, and impulse control). *Communication is key to assessment process. *Implementation of a screening tool.	focusing on recognition, the recovery process, and return-to-play guidelines. *Guidelines for faculty, administrators, parents, and student students to ensure cognitive rest. *Concussion prevention strategies including proper fit and maintenance of protective equipment, correct sport tech. *Baseline and post-concussion neurocognitive testing for student athletes. *Strict accident reporting protocol for coaching staff.
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Olympia et al., 2015) Return to learning after a concussion and compliance with recommendations for cognitive rest	To determine the compliance of schools and school nurses in the United States with national recommendations for cognitive rest in students who sustain a	Cross Sectional Questionnaire Members of National Association of School Nurses working at high school level. N=	*A questionnaire, developed by the authors and based on recommendations for cognitive rest, was electronically distributed 3 times during the 2012 to	*Fifty-three percent of schools have guidelines to assist students when returning to school after a concussion. *These guidelines include extension of assignment deadlines	*Wide variability in compliance of schools and school nurses with national recommendations for cognitive rest. Limitations=

	concussion.	1033 completed	2013 academic year. *Self-reported responses were collected regarding demographics and compliance of schools and school nurses with recommendations for the management of the post concussion student, including the presence of specific guidelines for individualized care and the responsibility of the nurse for the prevention, detection, and management of concussions.	*(87%), rest periods during the school day (84%), post-ponement or staggering of tests (75%), reduced workload (73%), and accommodation for light or noise sensitivity (64%). *Sixty-six percent of nurses in our sample have had special training in the recognition and management of concussions. *Nurses reported involvement in the following roles: identifying suspected concussions (80%), providing emotional support for recovering students dealing with concussion- related depression (59%), and guiding the student's post concussion graduated academic and activity re-entry process (58%).	*Our low response rate may not reflect the true state of compliance of schools in the United States with national recommendations for cognitive rest.
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(McAbee, 2014b) #11 Pediatric concussion, cognitive rest and position statements,	Further review of research for guidelines on concussion management Current published evidence evaluating	Meta-Analysis	*Review of current guidelines on concussion management.	*A prospective study showed nearly 20% of children complained of cognitive symptoms one month following.	*Various recommendations either given to parents or no information given at all regarding cognitive rest.

practice parameters, and clinical practice guidelines	the effect of rest following a concussion is sparse.			<p>*Another prospective study demonstrated that increased cognitive activity was associated with longer recovery from post concussive symptoms.</p> <p>*Cognitive rest is prescribed but no clear guidelines on exactly what that means.</p> <p>*There is no universally agreed on opinion relating to the effectiveness, type, degree, and duration of cognitive rest for treatment of concussions.</p>	
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Borich et al., 2013) Concussion: Current concepts in diagnosis and management	<p>Despite increasing attention in popular media and within the context of sports. Considerable gaps exist in our knowledge of the diagnosis underlying brain pathology, recovery of function, and optimal interventions for concussions.</p> <p>*Discuss the definition and risk factors associated with</p>	Meta Analysis	<p>*Understanding the risk factors of injury and recovery to aide future research aiming to minimize the impact of injury and develop therapeutic approaches.</p> <p>*No set tool, current recommendations for returning to normal activity and those that are in place are not strong</p>	<p>*Greater occurrence in males. Children and adolescents take longer to recover.</p> <p>*Children and adolescents suffer greater number of consequences.</p> <p>*Continues to not be a single tool for guiding concussion management.</p> <p>*Multiple or</p>	*An understanding of the overall risk factors for concussions is crucial for appropriate and timely diagnosis and management.

	<p>concussion, summarize, and highlight some of the most widely used assessment tools, and critique the evidence for current principles of concussion management.</p>			<p>reoccurring concussions increases the risk of long-term consequences such as significant cog impairment and increases the likelihood of suffering a subsequent concussion. *Current guidelines of concussion management emphasize physical and cognitive rest until symptoms improve.</p> <p>* Incidence of concussion continues to increase, a comprehensive understanding of the recovery is necessary to improve preventative strategies, develop evidence guidelines and optimize management strategies.</p>	
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
<p>(McGrath, 2010)</p> <p>Supporting the student-athlete’s return to classroom after a sport-related concussion</p>	<p>To provide a framework for school athletic trainers to use in advising colleagues about the health and academic needs to concussed students.</p>	<p>Review</p>	<p>*5-step model for concussion management within school setting. *Review of reasonable academic accommodations for student athletes in recovery. *Suggestions for the implementation of</p>	<p>*Days following concussion students present with combination of physical, cognitive, sleep dysregulation, and emotional symptoms. *Premature returning to activities can prolong symptoms. *Educators should</p>	<p>*Further testing should be done on concussed students in the school in the form of core evaluation or a more in depth neuropsychological assessment.</p>

			accommodation plan with emphasis of educational team.	<p>understand that recovering students might not be able to meet the usual expectations for class participation and homework.</p> <p>*School personnel should receive education during the school year so they can be prepared to care for concussed students.</p> <p>*Once a concussion is recognized all school personnel should be notified to ensure appropriate monitoring of student.</p> <p>*Concussed students need to be reminded that achieving full recovery is crucial before returning to activity.</p>	
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations

<p>(Williamson et al., 2014)</p> <p>Concussion 101: the current state of concussion education programs.</p>	<p>This article highlights a few nationally recognized educational programs that aim to accurately and effectively inform all members of the athletic, academic, and medical communities about the importance and urgency of concussion.</p>	<p>Review</p>	<p>*Lystedt Law in May 2009= Educate coaches, parents, and athletes: Inform and educate □ coaches, athletes, and their parents and guardians about □ concussion through training or a concussion information sheet. Remove the athlete from play: An athlete who is believed to □ have a concussion is to be removed from play immediately. □ Obtain permission to return to play: An athlete can return to play or practice only after at least 24 hours and with □ permission from a healthcare professional. □ □</p> <p>*Heads Up includes information on preventing, recognizing, and responding to concussions, as well as action plans for schools, instructor training, posters, and more. After viewing the material, primary care physicians were much less likely to</p>	<p>*The Sports Legacy Institute (SLI). The SLI is dedicated to advancing the study, treatment, and prevention of concussion in young athletes. Presentation aims to answer 3 main questions for the audience: what is a concussion, why individuals should care about concussions, and what can be done about concussions. *Brain 101: The Concussion Playbook, a Web-based comprehensive school-wide concussion management program. Goal is to minimize the risk that concussion poses to young student athletes by educating each group and proposing a unified community response when a young athlete suffers a concussion. Provides information on the signs and symptoms of concussion and details how to safely reincorporate brain-injured student athletes back into both athletics and academics. *Barrow Brainbook =most comprehensive</p>	<p>*Concussion is a complex and important issue in today's public healthcare world</p> <p>*Essential to find an effective way to disseminate knowledge about concussion to the community to aid in preventing concussion and recognizing when concussions occur.</p> <p>*Concussion education programs highlighted in this article aim to effectively communicate both the medical facts of concussion and the importance of accurate diagnosis and prompt treatment.</p> <p>*The increased penetration of these types of educational programs into the public sphere will ideally correlate with a decreased rate of sports-related TBI.</p>
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			<p>allow student athletes to return to play within 24 hours of a concussion compared with those who did not use the toolkit.</p> <p>*ThinkFirst program aims to help achieve this goal by providing classroom presentation.</p>	<p>educational effort in the state of Arizona. Consists of 2 phases, the first of which is concussion education. This program is designed to help student athletes understand how to prevent, recognize, and respond to concussions. Brainbook is an Internet-based tool that uses a social network interface, videos of professional athletes and doctors, footage of sports concussions, and computer-generated animation to deliver educational content.</p>	
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations

<p>(Piebes et al., 2009)</p> <p>Caring for student-athletes following a concussion</p>	<p>Symptom review following a concussion for the school nurse</p>	<p>Review</p>	<p>*Assessment</p> <p>*Management</p> <p>*Precautions</p> <p>*Special Accommodations</p>	<p>*Assessment= Baseline data allow the clinician to know what is “normal” for each individual athlete and provide a means of comparison for subsequent testing. The current recommendations for concussion assessments suggest that the baseline and post-injury tests be comprised of neurocognitive, mental status, and postural stability (balance) tests, as well as the use of a symptom scale or checklist. *</p> <p>Management= complexity of a concussion requires the assistance of a variety of health care and school personnel to create an environment that encourages physical and cognitive rest to promote recovery. The school nurse plays a vital role, acting as a liaison among all aspects of care. Proper management following a concussion includes proper preparation for home care, which involves athlete and</p>	<p>*School nurse also plays a vital role in the utilization of school resources that will aid in the student-athlete’s recovery.</p>
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				<p>parent education.</p> <p>*Precautions= concussed student-athlete recovers and may deal with post-concussion syndrome. The school nurse also needs to have a strong knowledge base of what medications a student-athlete should be taking or not taking to aid in relief from the short-term, and possibly long-term, effects of concussion such as headache, LOC, blurred vision, dizziness, amnesia, continuous irritability, reaction time impairments, delayed memory, and delayed processing speed. *Special Accommodations =The school nurse also plays a vital role in the utilization of school resources that will aid in the student-athlete's recovery. As previously discussed, concussive injury has the potential to affect a student-athlete's ability to function in the classroom. Like parents, teachers need to be educated on the signs</p>	
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				and symptoms of a concussion.	
Author	Purpose, Aims, Hypothesis	Methods/ Sample	Interventions	Outcomes/Results	Strengths and/or Limitations
(Glang et al., 2014) The Effectiveness of a web-based resource in improving post concussion management in high schools	Implementation of a web-based concussion resource tool for schools.	Participating school included those with: registered athletic trainers, access to high-speed internet, and agreement to expose all students participating. Total 25 schools, (*13 intervention and 12 controlled). N=4,804 athletes + 1,004 parents.	*Athlete survey *Parent survey *Concussion logs *Exit interview with school administrators	*Posttest results showed that student athletes and parent from intervention schools outperformed their counterparts regarding sports concussion knowledge, application and behavioral intention. *Providing extra time for tests, reducing workload and structured mental rest breaks help to aid in the recovery after concussion.	Limitations: No assessment given to teachers, school administrators, or athletic staff. *No info on the long-term maintenance of knowledge and behavioral intention or school practices.

APPENDIX B
LETTER OF INTENT

Dear valued school nurse,

My name is Brooke Wright and I am a Family Nurse Practitioner and DNP student at the University of Arizona. You are being invited to participate in a study for my doctor of nursing project. I am conducting a brief electronic education module for all public school nurses in Utah, regarding concussion education and management guidelines for the concussed student.

The purpose of this study is to provide school-based education training on concussion education and evidence based management to public school nurses in elementary, middle, junior high, and high schools in Utah. The goal of this project is to ensure that school nurses are knowledgeable in managing concussions.

You are being asked to participate in this study and inclusion criteria are as follows: **licensed practical nurse or registered nurse; currently working as a school nurse in a Utah public school.** You are being asked to take a 10 question pretest, followed by an electronic educational module taking approximately 10 minutes, then followed with a post test. Testing will be completed via Qualtrics. All personal information regarding demographics will be kept confidential as will all answers.

By beginning the survey, you acknowledge that you have read this information and thus providing your consent to participate in this study. Your participation in this study is absolutely voluntary and you are free to stop the survey at any time. There are no risks associated with this study.

Please click on the survey link listed below where you will be redirected to the Qualtrics site.

Thank you in advance for your interest and for your participation.

Sincerely,

Brooke Wright
DNP Student
The University of Arizona
brookewright@email.arizona.edu

APPENDIX C
IRB APPROVAL LETTER



Research
Office for Research & Discovery

Human Subjects
Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
<http://rgw.arizona.edu/compliance/home>

Date: August 02, 2016
Principal Investigator: Brooke Wright

Protocol Number: 1608752811
Protocol Title: CONCUSSION EDUCATION AND MANAGEMENT FOR SCHOOL NURSES

Level of Review: Exempt
Determination: Approved

Documents Reviewed Concurrently:

Data Collection Tools: *Pretest Posttest.docx*
Data Collection Tools: *Test answers.docx*
HSPP Forms/Correspondence: *appendix_f.docx*
HSPP Forms/Correspondence: *F107 Updated form EDIT.doc*
HSPP Forms/Correspondence: *IRB Final Form 7 20 EDIT.docx*
HSPP Forms/Correspondence: *Signature page.pdf*
Other: *Concussion ppt Final.pptx*
Other Approvals and Authorizations: *Listserv authorization email.pdf*
Recruitment Material: *intent letter_Disclosure EDIT.docx*

This submission meets the criteria for exemption under 45 CFR 46.101(b). This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- Exempt projects do not have a continuing review requirement.
- Amendments to exempt projects that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination. See the Guidance on Exempt Research information on changes that affect the determination of exemption. Please contact the HSPP to consult on whether the proposed changes need further review.
- You should report any unanticipated problems involving risks to the participants or others to the IRB.
- All documents referenced in this submission have been reviewed and approved. Documents are filed with the HSPP Office. If subjects will be consented, the approved consent(s) are attached to the approval notification from the HSPP Office.

APPENDIX D

PRETEST

Pretest

1. Please take a moment and create an individualized user name. We will use this name to link together your pretest and posttest. **PLEASE ENTER THE FOLLOWING:** first two letters of first name, first two numbers of street address, and first two letter of mother's maiden name. Examples: br25br
2. What is your professional background/preparation?
 - a. Diploma
 - b. Associates Degree
 - c. Bachelor's Degree
 - d. Master's Degree
3. What educational level do you work in?
 - a. Elementary School
 - b. Middle School
 - c. Junior High
 - d. High School
4. How many years have you been a school nurse?
 - a. Less than 1 year
 - b. 1-5 years
 - c. 5-10 years
 - d. Greater than 10 years
5. A concussion only occurs when a student has a loss of consciousness?
 - a. True
 - b. False
 - c. I don't know
6. What things are likely to make concussion symptoms worse? Check all that apply.
 - a. Sleeping more than usual
 - b. Playing with friends
 - c. Playing on the internet/video games
 - d. Schoolwork
7. Two students in your class experience a concussion from the same car accident where they were rear-ended at a stop sign. Both students are likely to complain of the same initial symptoms and recover at same rate.
 - a. True
 - b. False
 - c. I don't know
8. A student brings you a note that diagnoses her with a concussion. At times she complains of a headache, dizziness, and trouble remembering things. Regarding school attendance, which of the following are appropriate courses of action? Check one answer.
 - a. She should be absent from school for 2 weeks until her headaches resolves
 - b. She may attend school regardless of symptoms so she doesn't fall behind in her work
 - c. She may come to school long enough to take any scheduled tests
 - d. She may attempt to attend school and go home if his symptoms continue to worsen during the day

9. A student comes to your office after the weekend, saying he fell riding his bike this weekend. What are some common signs that class work is becoming more difficult for the student? Check all that apply.
 - a. Increased forgetfulness
 - b. Decreased focus
 - c. Impulsive behavior during class
 - d. All of the above
10. A concussed student complains of being sensitive to light while in class. What accommodations would you use to help her overcome this problem? Check all that apply.
 - a. Move her seat to the front of the classroom
 - b. Allow her to wear sunglasses for short period of time
 - c. Allow her to take a brief break from class
 - d. Move student away from or dim lights in room
11. A 8 year old with history of diabetes is sent to your office for hypoglycemic symptoms the child is alert, as the school nurse what is your immediate response?
 - a. Give non-caloric clear liquids
 - b. Administer rapid acting insulin
 - c. Give 4 ounces of orange juice
 - d. Call their parents
12. Do you feel confident in your ability to provide treatment to concussed students?
 - a. Yes
 - b. No
 - c. Unsure
13. The cornerstone of treatment for concussions is?
 - a. Narcotic pain medications.
 - b. NSAID's (Ibuprofen, Motrin, Aleve etc..)
 - c. Physical and cognitive rest.
 - d. Increase fluids.
14. Danger signs are?
 - a. One pupil larger than the other
 - b. Headache that won't go away
 - c. Weakness
 - d. All of the above
15. A 6 year old is sent to your office with what looks like pink eye, as the school nurse what is your next step?
 - a. Send back to class
 - b. Put eye drops in eye
 - c. Call parents for pick up
 - d. Instruct child not to touch eye and send back to class

Note: The pre-test has nine questions related to Concussion Education online learning module and two distractor questions.

APPENDIX E

POSTTEST

Posttest

1. Please take a moment and create an individualized user name. We will use this name to link together your pretest and posttest. **PLEASE ENTER THE FOLLOWING:** first two letters of first name, first two numbers of street address, and first two letter of mother's maiden name. Examples: br25br
2. What is your professional background/preparation?
 - e. Diploma
 - f. Associates Degree
 - g. Bachelor's Degree
 - h. Master's Degree
3. What educational level do you work in?
 - a. Elementary School
 - b. Middle School
 - c. Junior High
 - d. High School
4. How many years have you been a school nurse?
 - a. Less than 1 year
 - b. 1-5 years
 - c. 5-10 years
 - d. Greater than 10 years
5. A concussion only occurs when a student has a loss of consciousness?
 - a. True
 - b. False
 - c. I don't know
6. What things are likely to make concussion symptoms worse? Check all that apply.
 - a. Sleeping more than usual
 - b. Playing with friends
 - c. Playing on the internet/video games
 - d. Schoolwork
7. Two students in your class experience a concussion from the same car accident where they were rear-ended at a stop sign. Both students are likely to complain of the same initial symptoms and recover at same rate.
 - a. True
 - b. False
 - c. I don't know
8. A student brings you a note that diagnoses her with a concussion. At times she complains of a headache, dizziness, and trouble remembering things. Regarding school attendance, which of the following are appropriate courses of action? Check one answer.
 - a. She should be absent from school for 2 weeks until her headaches resolves
 - b. She may attend school regardless of symptoms so she doesn't fall behind in her work
 - c. She may come to school long enough to take any scheduled tests
 - d. She may attempt to attend school and go home if his symptoms continue to worsen during the day

9. A student comes to your office after the weekend, saying he fell riding his bike this weekend. What are some common signs that class work is becoming more difficult for the student? Check all that apply.
 - a. Increased forgetfulness
 - b. Decreased focus
 - c. Impulsive behavior during class
 - d. All of the above
10. A concussed student complains of being sensitive to light while in class. What accommodations would you use to help her overcome this problem? Check all that apply.
 - a. Move her seat to the front of the classroom
 - b. Allow her to wear sunglasses for short period of time
 - c. Allow her to take a brief break from class
 - d. Move student away from or dim lights in room
11. A 8 year old with history of diabetes is sent to your office for hypoglycemic symptoms the child is alert, as the school nurse what is your immediate response?
 - a. Give non-caloric clear liquids
 - b. Administer rapid acting insulin
 - c. Give 4 ounces of orange juice
 - d. Call their parents
12. Do you feel confident in your ability to provide treatment to concussed students?
 - a. Yes
 - b. No
 - c. Unsure
13. The cornerstone of treatment for concussions is?
 - a. Narcotic pain medications.
 - b. NSAID's (Ibuprofen, Motrin, Aleve etc..)
 - c. Physical and cognitive rest.
 - d. Increase fluids.
14. Danger signs are?
 - a. One pupil larger than the other
 - b. Headache that won't go away
 - c. Weakness
 - d. All of the above
15. A 6 year old is sent to your office with what looks like pink eye, as the school nurse what is your next step?
 - a. Send back to class
 - b. Put eye drops in eye
 - c. Call parents for pick up
 - d. Instruct child not to touch eye and send back to class
16. Students who return to school after a concussion may need to?
 - a. Take frequent rest breaks as needed
 - b. Spend fewer hours at school
 - c. Be given extra time to complete assignments or exams

- d. All of above
- e. None of above

Note: Post-test is identical to pre-test, except for one additional question at the end.

APPENDIX F
EXPERT EVALUATION FORM

Expert Evaluation Form

1. The pre-test and post-test are easy to follow?
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
2. The Concussion Education and Management educational materials presented are easy to follow?
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
3. The pre-test and post-test address the concussion education and management education?
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
4. The pre-test and post-test assess the school nurses understanding of concussion education and management as presented in the educational module?
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
5. The pre-test and post-test questions assess the school nurses critical thinking as to what should be done next as presented in the educational module?
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
6. Please provide any additional concerns/comments that you have regarding the educational module, pretest, and posttest (i.e. any additional test questions that should be added, changing wording of certain questions or answers).

APPENDIX G
PRE-TEST AND POST-TEST ANSWERS

Pre-Test and Post-Test Answers

5. A concussion only occurs when a student has a loss of consciousness?
Answer: B (False)
6. What things are likely to make concussion symptoms worse? Check all that apply.
Answer: B, C, D, (Playing with friends, playing on the internet/video games, schoolwork)
7. Two students in your class experience a concussion from the same car accident where they were rear-ended at a stop sign. Both students are likely to complain of the same initial symptoms and recover at same rate.
Answer: B (False)
8. A student brings you a note that diagnoses her with a concussion. At times she complains of a headache, dizziness, and trouble remembering things. Regarding school attendance, which of the following are appropriate courses of action? Check one answer.
Answer: D (She may attempt to attend school and go home if his symptoms continue to worsen during the day)
9. A student comes to your office after the weekend, saying he fell riding his bike this weekend. What are some common signs that class work is becoming more difficult for the student? Check all that apply.
Answer: D (All of the above)
10. A concussed student complains of being sensitive to light while in class. What accommodations would you use to help her overcome this problem? Check all that apply.
Answers: B, C, D, (allow her to wear sunglasses for a short period, allow her to take a brief break from the class, move student away from or dim lights in room)
11. A 8 year old with history of diabetes is sent to your office for hypoglycemic symptoms the child is alert, as the school nurse what is your immediate response?
Answer: C (Give 4 ounces of orange juice)
13. The cornerstone of treatment for concussions is?
Answer: C (Physical and cognitive rest)
14. Danger signs are?
Answer: D (All of the above)
15. A 6 year old is sent to your office with what looks like pink eye, as the school nurse what is your next step?
Answer: C (Call parents for pick up)
16. Students who return to school after a concussion may need to?
Answer: D (All of above)

APPENDIX H
TOOL KIT FOR SCHOOL NURSES

Tool Kit for School Nurses

- HEADS UP to Schools; School Nurses
- Brain Line
 - http://www.brainline.org/landing_pages/categories/concussion.html?gclid=C1zjx8i6oswCFZCIaQodENkIjg
- Brain 101 The Concussion Playbook
 - <http://brain101.orcasinc.com/3000/>

APPENDIX I
EDUCATIONAL POWER POINT

Concussion Education and Management for Utah School Nurses

Brooke Mgonja BSN, RN
University of Arizona
DNP Project



Objectives

- Define concussion
- Identify the prevalence
- Identify the signs & symptoms
- Describe signs and symptoms student may exhibit
- Discusses the impact on students
- Discuss post concussive syndrome
- Discuss management
- Discuss accommodations
- Discuss worsening signs
- Tool kit for nurses



What is a Concussion?

- A concussion is characterized by a bump or blow to the head
- May or may not result in a loss of consciousness
- Range from mild to severe, with symptoms lasting hours, days, months or longer
- Can occur: playing in the halls at schools, sports, recess, recreational activities, falls, or car accidents

(Broshek, De Marco, & Freeman, 2015)

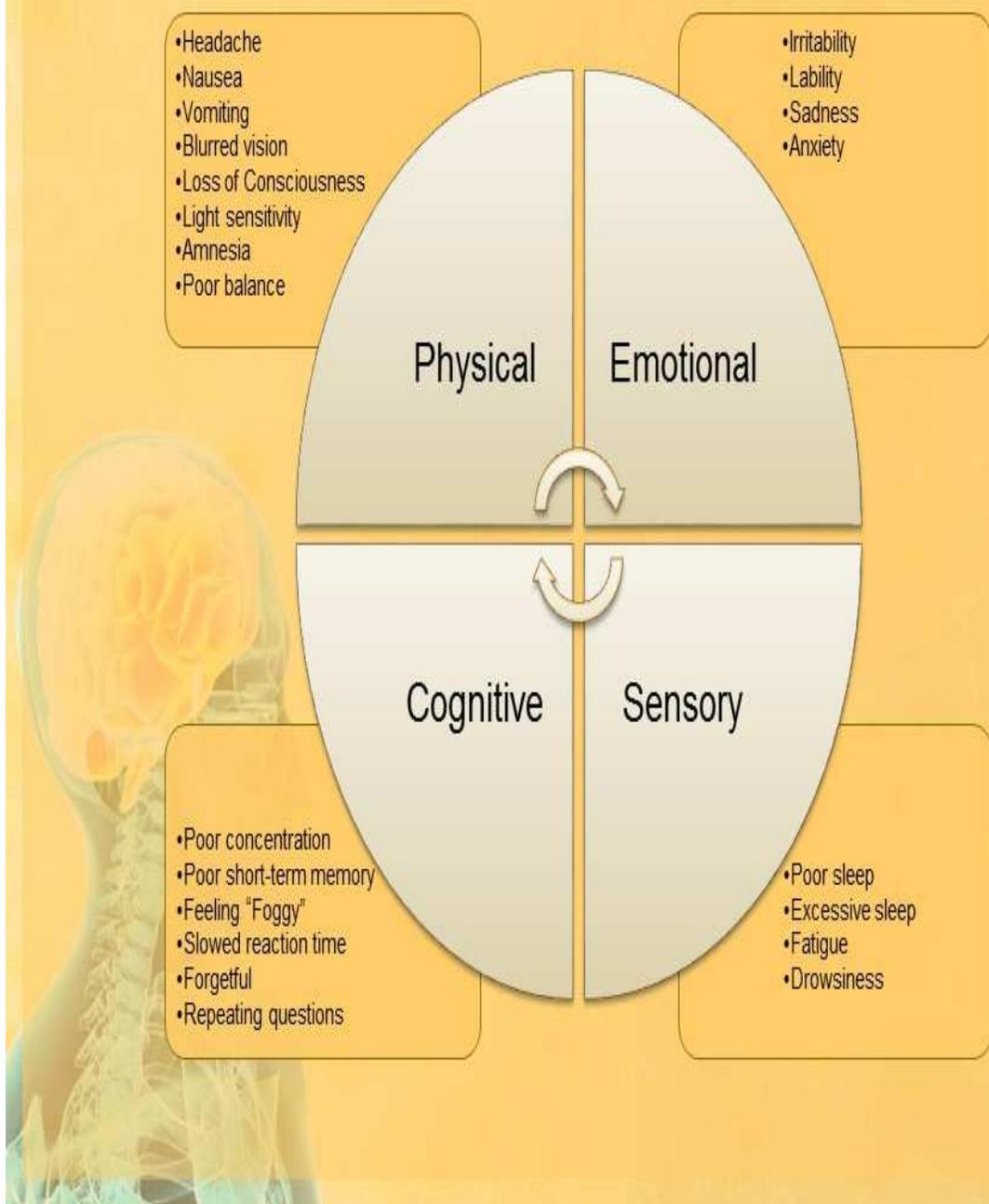


Prevalence

- 100,000-140,000 children and adolescents are seen yearly in emergency department for non sports related concussion in the United States (Wing, Amanullah, Jacobs, Clark, & Merritt, 2015)
- In 2013 (Violence & Injury Prevention Program, 2014)
 - 36% of children ages 9-12 had concussion symptoms but never reported
 - 16% of children ages 9-12 were diagnosed with a concussion
- In 2015 there were 491,206 students enrolled in Utah public schools (Education Bug, 2015)



Signs & Symptoms (CDC, 2015)



Student May Exhibit

- Increased problems paying attention or concentrating
- Fatigue with physical or mental difficulty with organizing tasks
- Increased irritability
- Increased problems remembering or learning new information
- Decreased ability to cope with stress
- Labile emotions
- Longer time is needed to complete tasks or assignments
- Behavior or personality changes



Impact on Students

- 50% of kids will have symptoms resolve within 7-10 days
 - Recovery may in some cases take much longer and having support at school through the whole process is critical, especially for those who are slower to recover (Broshek, De Marco, & Freeman, 2015)
- Concussions in children are common, and frequently have significant impact on their neurological development, leading to long-term deficits (Karlin, 2011)



Post Concussive Syndrome

- May occur when the prescribed cognitive and physical rest are not followed
- Symptoms persist beyond the expected recovery period
- Symptoms include: headache, fatigue, irritability, fatigue, difficulty concentrating, sleep disturbances, depression, and anxiety



Management

- Ensuring that the child has complete rest for 2-3 days:
 - Limit physical exertion
 - Limit cognitive exertion activities
 - Reading, computers, game systems, phones
 - No sports
 - **OBSERVE CLOSELY!**
- A gradual return to academic activities should be attempted after a period of initial rest



Management

- Implementing an effective treatment plan that includes cognitive and physical rest is crucial
- Studies show that concussive symptoms can be reduced and long-term consequences of post concussive symptoms minimized with cognitive and physical rest (Karlin, 2011)
- Normal for student to feel frustrated, sad, or angry due to not being able to return to sports, and or keep up on current school work (CDC, 2016)



Accommodations

- Students returning to school following a concussion may need to:
 - Spend fewer hours at school
 - Take rest breaks as needed
 - Receive help with school work
 - Reduced time spent on computer, writing, or reading
 - Given more time to take tests or complete assignments

(CDC, 2015)



Accommodations

- Noise sensitivity
 - Encourage students to avoid loud areas
 - Provide class notes
 - Allow student to take frequent breaks
 - Move student to the front of the class
- Light sensitivity
 - Move student away from window
 - Allow student to wear sunglasses
 - Encourage students to avoid bright lights

(CDC, 2015)



Worsening Signs

- Refer to Emergency Department if:
 - Focal neurological deficits
 - Worsening mental status
 - Seizure activity
 - Worsening headache
 - Increased vomiting
 - Increased drowsiness
 - One pupil larger than the other
 - Unusual behavior, confusion
 - Weakness

(CDC, 2015)



Tool Kit for School Nurses

- HEADS UP to Schools; School Nurses
 - <http://www.cdc.gov/headsup/schools/nurses.html>
- Brain Line
 - http://www.brainline.org/landing_pages/categories/concussion.html?gclid=C1zjx8i6oswCFZClaQodENkljg
- Brain 101 The Concussion Playbook
 - <http://brain101.orcasinc.com/3000/>



CDC Concussion Checklist

- Very helpful checklist for school nurses regarding concussion education and management.
 - http://www.cdc.gov/headsup/pdfs/custom/headsupconcussion_fact_sheet_for_schools.pdf



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