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Educational Needs Regarding Concussion in Youth Athletes

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EDUCATIONAL NEEDS REGARDING CONCUSSION IN YOUTH ATHLETES

A Scholarly Project Submitted to the Graduate School
In Partial Fulfillment of the Requirements
for the Degree of
Doctor of Nursing Practice

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Pittsburg, Kansas

May, 2021

EDUCATIONAL NEEDS REGARDING CONCUSSION IN YOUTH ATHLETES

An Abstract of the Scholarly Project by
Trevor Harvey

BACKGROUND: Concussions are a major health concern for youth athletes. Parents and coaches of youth athletes are often tasked with monitoring, treating, and managing youth athletes who are suffering from a concussion. The purpose of this study was to increase education provided to parents and coaches of youth athletes regarding concussions, concussion symptoms, and concussion management.

METHODS: Parents and coaches ($n=64$) of youth athletes in grades seven through twelve participated in a pretest, educational opportunity, and posttest study design to determine if knowledge of concussions, concussion symptoms, and concussion management increased following an educational presentation. Participants were recruited via convenience sampling from local school districts and social media platforms.

Participant knowledge was measured prior-to and following an educational presentation.

RESULTS: The findings of the study indicated that parents and coaches had increased knowledge of concussions, concussion symptoms, and concussion management following the educational presentation. Specifically, misidentification of symptoms and identification of proper management strategies improved significantly following the educational presentation.

CONCLUSIONS: Increasing education for parents and coaches of youth athletes will increase knowledge regarding concussions, concussion symptoms, and concussion management. Future studies should focus on symptom identification and proper management strategies of concussions.

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Chapter I

Introduction

The United States of America (USA) prides itself on being a country that accepts diversity. Its youth come from different backgrounds and situations. Race, gender, family dynamics, education level, and economic status are all different ways in which youth can be divided and defined. While these divisions and definitions do create a true diversity in the country, it is important for a society to be able to come together and find commonality. Oftentimes, one of the best things to bring people from all facets of the country together is athletics. In 2018-19, a total of 7,937,491 athletes participated in high school sports across the country (NFHS, 2019). The National Federation of State High School Associations reports that total participation, which is calculated by surveys conducted by 51-member state high school associations, including the District of Columbia, is the third-highest participation ever recorded (NFHS, 2019).

Physical activity in children and adolescents can improve physical fitness, cardiometabolic health, bone health, cognitive outcomes, mental health, and reduced adiposity (World Health Organization, 2020). Additionally, students who participate in athletics often have enhanced leadership skills in comparison to students who are not athletes (Dobosz & Beaty, 1999). However, athletics participation does not come without risk. Athletic injuries are often discussed by the media when a key athletic figure is

injured and unable to participate. However, injuries to children and adolescents are also common, and the highest risk factor for hospitalization of adolescents due to injury is directly related to participation in organized sports (Mattila, Parkkari, Koivusilta, & Rimpela, 2009). One of the more common sports-related injuries that can cause prolonged neurological health concerns in athletes is concussions (Moser, Schatz, & Jordan, 2005).

A concussion is a “complex pathophysiological process affecting the brain, induced by traumatic biochemical forces secondary to direct or indirect forces to the head” (Gioia, Collins, & Isquith, 2008, p.230). Symptoms of a concussion – such as irritability, nausea, vomiting, fatigue, dizziness, ringing in the ears, photophobia, double vision, weakness, sleeplessness, headache, anxiety, and loss of memory – can be present for up to six months following the initial head trauma (Concussion, 2019). A single concussion for a young athlete is certainly debilitating itself, but a major concern for members of the medical society are recurrent concussive and sub-concussive hits to the head (McKee, Cantu, Nowinski, Hedley-Whyte, Gavett, Budson, Santini, Lee, Kubilus, & Stern, 2009). Chronic Traumatic Encephalopathy (CTE), which is the result of repetitive impacts to the head, can be defined as ongoing severe neurological destruction that presents itself with memory disruptions, personality deviations, Parkinson-like movement disorders, and difficulty verbalizing and walking (McKee, et al., 2009).

Concussions and other sports-related injuries will likely never be eliminated from athletics. Healthcare workers have the opportunity to utilize their training and experience to educate their patients about sports-related injuries, including concussions. While

prevention of injury is unlikely, increased education regarding concussions will allow for a better understanding of the injury.

Significance to Nursing

The goal of every nurse should be to provide care to the ill and to help prevent illness in the healthy population. With education paired with training and experience, nurses can play a vital role in the dissemination of healthcare information to the general public. Nurses are educated and trained to assess for signs and symptoms of many different acute and chronic health conditions, including mild traumatic brain injuries such as concussions. Management strategies for health conditions are also key aspects to a nurses' education and training. As a result, nurses are often granted the duty of providing education to their patients regarding their health condition.

Concussions and CTE are different from many other healthcare concerns. For management of a health condition such as diabetes, the utilization of medications during treatment will often benefit the patient (Morgan, 2017). In concussions, prolonged medication management is usually not indicated (Meehan & O'Brien, 2020b). Therefore, the role of the nursing profession related to concussions is to educate individuals about the signs, symptoms, and management strategies involved with concussions to most benefit the patient. While the strategy of the nursing role is different for this healthcare concern, the significance of the role is in no way lessened or decreased.

Specific Purpose

The goal of this DNP project was to increase the education provided to parents and coaches of youth athletes regarding concussions, concussion symptoms, and concussion management. Parents and coaches are often the individuals who have the

most contact with youth athletes, therefore they need to be educated on the signs and symptoms of concussion to assess for, as well as strategies of properly managing athletes following a concussion. Elimination of concussions from sports is likely unachievable but increasing the knowledge of concussions can be attained. Concussions are sometimes considered the invisible injury due to concussion patients not having any visible signs of injury or confirmatory diagnostic testing (Tong & Almquist, 2017). Parents and coaches, therefore, need to understand the symptoms to monitor to properly manage these athletes when concussions occur.

Coaches have a particular role in properly managing concussed athletes. Everyone has a competitive edge and wants to see their athletes compete and be successful in athletic competition, but not recognizing the symptoms of a concussion or not taking the proper steps in treatment – which is often brain rest – could significantly impact the athlete both in the present as well as in the future. From 2009 to 2014, all 50 states in the USA had passed legislation regarding return-to-play requirements (NCSL, 2018). Nevertheless, understanding and knowledge of the signs and symptoms of concussion is vital. The improper management of a concussion athlete can have significant consequences later in life and needs to be avoided at all costs (McKee, et al., 2009).

Theoretical Framework

The theoretical framework chosen for this project was Pender's health promotion model (Srof & Velsor-Friedrich, 2006, pg. 366). The health promotion model is a guide that leads evaluation of the multidimensional nature of individuals as they choose to partake in healthy behaviors to improve quality of life (Srof & Velsor-Friedrich, 2006, pg. 366). The model is compiled of three major areas: individual characteristics and

experiences, behavior-specific cognitions and affect, and behavior outcomes (Petiprin, 2016). Petiprin (2016) lists the model's four major assumptions which will be used during this project. This list includes:

1. Individuals seek to actively regulate their own behavior.
2. Individuals, in all their biopsychosocial complexity, interact with the environment, progressively transforming the environment as well as being transformed over time.
3. Health professionals, such as nurses, constitute a part of the interpersonal environment, which exerts influence on people through their life span.
4. Self-initiated reconfiguration of the person-environment interactive patterns is essential to changing behavior.

The major statements associated to the project are greater perceived self-efficacy results in fewer perceived barriers to a specific health behavior and the greater the commitments to a specific plan of action, the more likely health-promoting behaviors are to be maintained over time.

Project Questions

The following are the project questions that this DNP scholarly project addressed.

- Will educating parents of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?
- Will educating coaches of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?

Definition of Key Terms

The following is a list of the key terms used throughout this DNP scholarly project and their definitions:

Chronic Traumatic Encephalopathy (CTE) – ongoing severe neurological destruction that presents itself with memory disruptions, personality deviations, Parkinson-like movement disorders, and difficulty verbalizing and walking (McKee, et al., 2009).

Coaches – Those individuals directly involved with making decisions on who can participate in competition.

Concussion – A complex pathophysiological process affecting the brain, induced by traumatic biochemical forces secondary to direct or indirect forces to the head (Gioia et al., 2008, p.230).

Youth Athlete – Students in grades 7-12 who are involved in organized athletic competitions which are sanctioned by state activity associations.

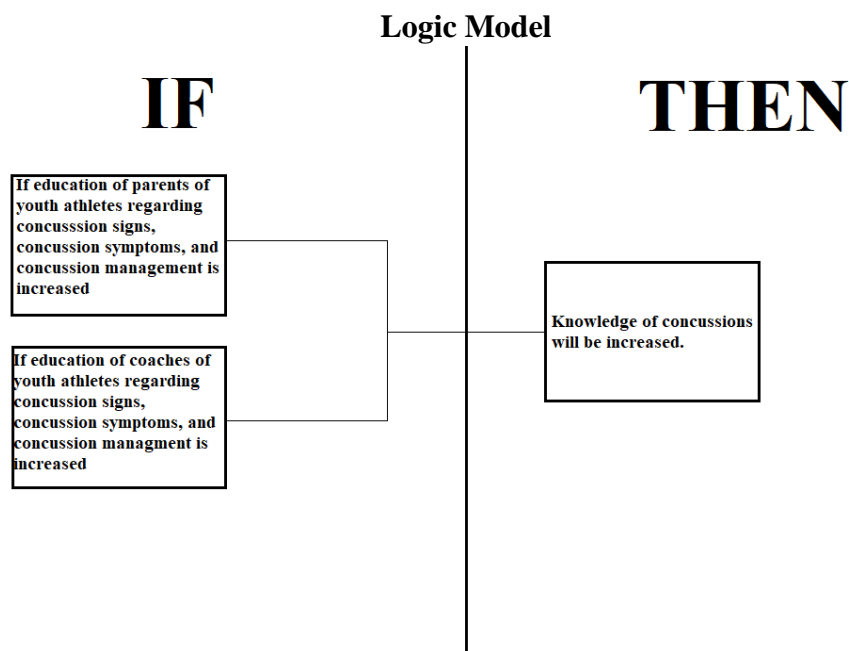


Figure 1. Logic Model for DNP Scholarly Project
Summary

Organized athletics provides an opportunity for youth from many backgrounds and walks of life to come together and have a common interest. The beneficial aspects to athletics by far outweigh the potential negatives however, injuries are one of the potential negative events that must be considered. Specifically, injuries to the head such as concussion are a major concern.

Concussions, unfortunately, affect athletes both in the present time and potentially in the future. Symptoms of a concussion can persist for up to six months, and recurrent concussions can result in life-long problems (Concussion, 2019). It is vital for parents and coaches of youth athletes to understand the potential effects of concussion and to know the proper ways to recognize and manage this sports-related injury.

The goal of this DNP project was to increase the education provided for parents and coaches of youth athletes regarding concussions signs, concussion symptoms, and concussion management. Elimination of concussions is not attainable, therefore

education is an extremely important component of providing quality care for athletes with this serious sports injury.

Chapter II

Review of Literature

This literature review was intended to find available information on youth concussions, symptomology of concussions in the youth population, and recommended management strategies for athletes following concussion.

A literature search was conducted utilizing CINAHL Plus with Full Text, PubMed, UpToDate, and SAGE Premier 2020. Key terms used to identify potential articles included concussion, concussion guidelines, concussion in youth sports, concussion management, and concussion symptoms.

A concussion is a “disruption of brain function and metabolism caused by a blow to the head or sudden jolt to the body that shakes the brain violently against the walls of the skull, often resulting in a transient loss of neurological function” (Worley, 2019). Mild traumatic brain injury (Mtb) is often used interchangeably with the term concussion. Although considered mild, concussions may potentially cause significant health problems that are often very imperceptible, therefore making diagnosis and treatment problematic. These risks are even greater with repetitive injuries to the head.

Concussion Impact

Concussions make significant impacts to many athletes every year. According to the University of Pittsburgh Medical Center (UPMC), roughly 1.7 to 3 million athletes

will suffer a concussion per year, and five out of ten of these concussion are not reported or detected by an athlete or coach (Concussion Statistics and Facts: UPMC: Pittsburgh, n.d.). In 2014 alone, nearly 812,000 children were evaluated in emergency departments across the United States for concussion symptoms or complaints (TBI: Get the Facts, 2019).

Aside from health care impacts, concussions can create significant financial impacts as well. While less expensive to treat than other forms of severe TBI, concussions “accounted for nearly 81 percent of the \$1.59 billion in healthcare costs for pediatric TBIs” (Graves, 2014, paragraph five). These health care costs impact not only the individual, but also create significant societal concerns when discussing the increasing cost of healthcare.

Provided the statistics and economic impact, one may assume that concussion information would be readily available to parents of youth athletes. Unfortunately, that is not always the case. According to Feiss, Lutz, Moody, and Pangelinan (2019), 47 states require distribution of concussion information to parents prior to their child participating in youth sports, but only 41 of those states require a signature verifying that the information was provided to the parent. Therefore, “once their child has sustained a concussion, a parent may lack the requisite knowledge to recognize symptoms, follow concussion management protocols, and adhere to safe return-to-play guidelines” (Feiss, et al., 2019).

Concussion Symptoms

Concussions often present with a vast array of symptoms, which is one of the main reasons making a diagnosis is difficult. In addition to the potential of having many

symptoms, each individual may not experience the same symptoms, thus further increasing the chances of missing the injury. “Headache, confusion, memory problems, blank staring, slowed speech, dizziness, vomiting, and emotional lability” are all potential symptoms that athletes may experience following a concussion (Meehan & O’Brien, 2020b, sideline evaluation section). “Mental fog, numbness, tingling, issues with balance, loss of consciousness, and increased nervousness” (Gioia, 2008, pg. 231) are also considered symptoms that may arise following a mild traumatic brain injury but are less common than those mentioned previously.

There is a lack of clinical devices to utilize for detection and diagnosis of concussions therefore, symptomology is the best available option to employ. According to Gioia et al. (2008), symptoms such as loss of consciousness, headache, and memory problems are the symptoms most focused on while assessing for concussion, which can lead to missed diagnosis due to the blatant disregard to the considerable quantity of other indications of concussion.

A significant disadvantage to relying on symptoms for diagnosis of concussion is that athletes must self-report what they are experiencing. According to Mark E. Halstead et al. (2018), athletes were either delaying or completely failing to report concussion symptoms due to three main causes: they did not want to be removed from competition, they were fearful of the coach or whomever they were reporting to, or they did not understand that the symptoms they were experiencing were concussion related.

Concussion Management

Concussion management is important to understand because more times than not parents, rather than healthcare workers, will be supervising athletes after the concussion.

Previously suggested treatments for athletes following concussions included keeping the athlete at home, isolated, with very little physical activity or “brain use.” More recent research has suggested that not only does removing the athlete from everyday life not provide improvement in condition, but inactivity and social isolation may actually make concussion symptoms worse (Worley, 2019). “Patients showed better improvement with early, modified re-engagement in daily physical activity and mental activity (Thomas et al., 2015, pg. 220).

As the same with inactivity, immediate return to life’s normal activities may also result in increased symptomology and worsened condition. It is important for athletes who suffer from concussion to maintain a relatively normal routine, but adaptations to said routine should be made, including targeted rehabilitation that consists of prescribed, light cardiovascular physical activity (Tong & Almquist, 2017). Prior research suggested eliminating electronic devices such as TVs and cell phones following concussions however, such practices may increase the feeling of social isolation and thus increase symptoms for the athlete (Halstead et al., 2018). “Subsystem threshold cognitive activity” is the idea of keeping brain activity below the level that would incite a symptom response, such as headache or fatigue, which is the goal in managing these athletes (Master, Gioia, Leddy, & Grady, 2012). Also, previous management strategies such as waking athletes from sleep every two to three hours is no longer recommended, as decreased symptomology has been found as result of increased sleep in post-concussive athletes (Worley, 2019).

Although additional research has been completed and introduced that has changed post-concussion management, some of the original treatment principles remain the same.

Immediate removal from the sport following concussion and avoidance of driving a vehicle, if of age, for 24 hours is still best practice (Halstead, et al., 2018). Treatment of symptoms also remains vital. Headaches following concussion are oftentimes best treated with acetaminophen or NSAIDs, nausea is best treated with ondansetron, and sleep disturbances should be treated with melatonin (Meehan & O'Brien, 2020a).

Return to School

Returning athletes to school is a challenging decision for both healthcare providers and parents to make. Returning the athlete back to a normal schedule is important, but this return should be completed in an incremental fashion. Limiting workloads, shortening classes, and postponing extensive and stressful tests are methods in which a student athlete can be slowly and progressively reintroduced back into the classroom post-concussion (Meehan & O'Brien, 2020a). Worley (2019) suggests that students should only return to school if they can concentrate on one subject for 30 minutes or greater, and that all homework should be greatly reduced or eliminated for the student until all symptoms resolve.

According to Darling et al., (2015), returning to school too early for some student athletes may result in worsening of symptoms. Of the symptoms, blurred vision and sensitivity to light and sound are the most common complaints following early return to the classroom.

Unlike athletic competition, legislation requiring “medical clearance” to adjust, accommodate, or modify the education process does not exist (Mcavoy, Eagan-Johnson, & Halstead, 2018). Therefore, education professionals are given the ability to make preliminary decisions regarding what comprehensive educational adjustments a student

with a concussion requires during the first several weeks, and should not wait for medical counsel to determine appropriate educational alterations (Mcavoy, et al., 2018).

Collaboration with healthcare professionals should take place if initial academic adjustments are not sufficient for the student to remain free of symptoms while returning to school (Mcavoy, et al., 2018).

Return to Play

The final step in recovering from a concussion is return to play. While some guidelines do exist that provide recommendations, return to play does vary for each individual. Blanket guidelines such as never returning to play on the day of injury (Darling et al., 2015) and waiting a minimum of five days to return to play (Meehan & O'Brien, 2020a) provide for some guidance, but symptomology for the individual is the more important driver of return to play.

According to Halstead et al. (2018), premature re-entry into athletics increases the chance of re-injury and/or prolonged recovery time. Meehan & O'Brien (2020a) suggest returning to the sport when the athlete has a normal neurological examination and they have been symptom free without the use of medication. Many states perform baseline cognitive examinations on all athletes, and return to play post-concussion should not take place until the athlete returns to his or her baseline on the cognitive exam, as well as returning to the maximum level of their sport without symptoms returning (Darling et al., 2015). According to Worley (2019), return to play should only take place after the student-athlete has successfully made a full return to the classroom without restrictions.

Return to play should follow a step-wise protocol, beginning when “athletes are symptom free, even during provocative maneuvers; have had a normal neurological

exam, are back to school full time with no restrictions; are off any medications prescribed for concussion symptoms, and when neurocognitive testing, if performed, is back to baseline” (Sprouse, Harris, Sprouse, Humerick, & Miller, 2016). According to the CDC (Returning to Sports and Activities, 2019), return to play should follow a six step progression:

1. Back to regular activity (such as school)
2. Light aerobic activity
3. Moderate activity
4. Heavy, non-contact activity
5. Practice & full contact
6. Competition

Once the step-wise approach for activity return has been completed, a healthcare provider must officially declare that the athlete can safely return to sport participation (Sprouse, et al., 2016).

Summary

Literature identifying common concussion symptomology, concussion management recommendations, return to school recommendations, and return to play recommendations can easily be obtained. While research indicated that while recommendations and guidelines do exist regarding concussions, a vital aspect in the proper management of concussion is solely dependent upon the individual’s symptoms. Therefore, it is important for parents and coaches to understand symptoms in order provide the highest quality of care for the athlete.

Chapter III

Methodology

Concussions in youth athletes should be a large concern to all healthcare providers. While eliminating concussions likely will not happen, work can be completed to reduce the impact of these brain injuries overall, as well as reduce the recurrence of concussions. The goal of this DNP project was to increase the education provided for parents and coaches of youth athletes regarding concussions signs, concussion symptoms, and concussion management. By providing education to parents and coaches of youth athletes, knowledge and understanding of this injury will allow for improved identification of concussion. This chapter details the design of this scholarly project.

Project Design

This study was designed to determine if knowledge of concussion was improved with increased education about the injury being introduced to parents and coaches of youth athletes in grades seven through twelve. The education was provided in a voice recorded video, with a questionnaire given prior to the lecture and an identical questionnaire that followed the education. The questionnaires allowed for this researcher to measure the knowledge level of parents and coaches of youth athletes regarding concussion signs, concussion symptoms, and management of concussion. The second questionnaire allowed this researcher to measure the knowledge level of parents and

coaches of youth athletes after the educational video was provided. Quantitative data was analyzed to determine if the educational opportunity increased understanding of concussion signs, symptoms, and management strategies. The use of quantitative data allowed for descriptive statistical analysis to be performed. The diagram below depicts the design of this study.



Figure 2. Study Design

Setting and Participants

Parents and coaches of youth athletes were the target population of this study. The participants were provided the questionnaires and educational video through the survey software Qualtrics. The target population was recruited from area school districts as well as social media platforms. All individuals who participated received both questionnaires. To be included in this study, individuals were required to be a parent or coach of a youth athlete in grades seven through twelve who participate in athletic competition that is sanctioned by state athletic associations. Individuals were required to be English speaking and older than 18 years of age to participate. Individuals were excluded from this study if they were not a parent or coach, if they were non-English speaking, if they were younger than 18 years of age, or if they were a parent or coach of an athlete who is either not in grades seven through twelve or that participates in athletic competition that is not sanctioned by state athletic associations.

Protection of Human Subjects

An Institutional Review Board (IRB) application was submitted to the Pittsburgh State University Committee for the Protection of Human Research Subjects (CPHRS) for review and approval. All participation was voluntary and involved adults over the age of 18 years. Individuals were able to stop participating in the study at any time if they choose to do so. All study measurement tools were completed voluntarily and anonymously. No deception of the participants was utilized at any time, and participants remained free from harassment throughout the duration of the study. There was minimal risk associated with participation in this research study. Participant responses were used solely for this project and was not used against them in any way. This study did not place participants at risk for criminal or civil liability that could be damaging to their financial standing, employability, insurability, reputation, or be stigmatizing. Consent for this study was indicated through completion of the questionnaires. To ensure confidentiality, the collected information did not contain any participant identifiers and was anonymously provided through the use of the Qualtrics software. At completion of the project, all data collected throughout the duration of the study was destroyed.

Ethical Considerations

There were very few ethical considerations to consider for this study. Participation in the educational offering was strictly voluntary. The format of the study did potentially lead to identification of participants due to replies to the questionnaires. However, participants were instructed to keep any identifiable factors, such as name, free from the questionnaire at all times. Another concern was excluded individuals participating in the study, which potentially skewed the measurement of efficacy of the

education provided. The final concern was the ability to fabricate the questionnaires to increase statistical significance of the study.

Instruments

The study utilized two identical questionnaires to collect data. The questionnaires required identification of participant subgroup (parent or coach). Questions regarding concussions, concussion signs and symptoms, and concussion management strategies were on both questionnaires.

A questionnaire tool was utilized for this study. The questionnaires consisted of questions regarding concussions, concussion signs and symptoms, and management of concussions. The questionnaires had identical questions to gauge the efficacy of the education provided. The study focused on the following research questions:

- Will educating parents of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?
- Will educating coaches of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?

Content Validity

The questionnaires utilized in this study were previously utilized in a similar study measuring player and parent knowledge and awareness of concussion (Hecimovich, King, & Marais, 2016). A similar version of the questionnaire was utilized in a separate study and found to have an acceptable reliability ($\alpha = 0.83$) (Mcleod, Schwartz, & Bay,

2007). For this study, questions regarding demographic information were withheld. Slight terminology changes were also incorporated into this version of the questionnaire.

Procedure

The timeline of the project was as follows: The proposal defense took place on December 4th, 2020 with the project committee consisting of two PSU IRB School of Nursing faculty members and one Department of Health, Human Performance and Recreation faculty member. Upon approval from the defense proposal, the proposal was sent to Pittsburgh State University's IRB committee for approval. The project was then dispersed to participants once approval by the IRB committee was obtained.

This project consisted of an educational opportunity and questionnaires to determine whether increased education to parents and coaches of youth athletes will increase knowledge regarding concussions in the same population. The educational opportunity was provided utilizing the Qualtrics survey software. All participants were entered voluntarily and completed the questionnaires in the correct order. All participants received the same educational material. Participants were able to email this researcher any questions they had regarding the questionnaires and the education provided.

Data was collected from the Qualtrics survey software and maintained on a password protected computer. All data remained on the password protected computer for the duration of the study. Collected data from the questionnaires was analyzed using descriptive analysis and was reported in upcoming chapters of the project. Data that was collected was then compiled, and copies of the aggregated data were shared with the school districts as well as posted on social media platforms.

Summary

Concussions are a very concerning medical problem, especially in our youth athletes. Inability to recognize signs and symptoms or concussions, as well as not understanding management strategies, could further impede on the health of the athlete. The goal of this DNP project was to increase the education provided for parents and coaches of youth athletes regarding concussions signs, concussion symptoms, and concussion management. This author proposes that by offering educational opportunities involving these topics, knowledge of concussions will increase. The results of this study were statistically analyzed to determine if the education provided does make a positive impact on knowledge of concussion. The results of this study are discussed in chapter IV.

Chapter IV

Evaluation Results

The purpose of this DNP project was to increase the education provided to parents and coaches of youth athletes regarding concussions, concussion symptoms, and concussion management. A pre-test, educational video, and posttest design was utilized to evaluate knowledge of concussions, concussion signs and symptoms, and management of concussions. The questions that were evaluated during the project include:

- Will educating parents of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?
- Will educating coaches of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?

Sample

The demographic characteristics of the convenience participant sample includes 64 individuals who identified themselves as being either a parent or coach of a youth athlete in grades seven through twelve. To participate in the survey, participants were required to be parents of athletes who participate in athletic competition that is sanctioned

by state athletic associations. Of those who participated in the study, 57.81% were parents ($n=37$) and 42.19% were coaches ($n=27$).

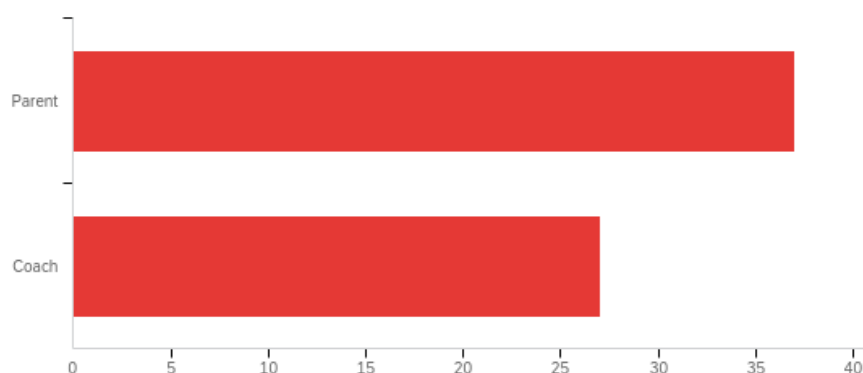


Figure 3. Project Demographic Data

All participants also identified as being English speaking and older than 18 years of age. Upon approval of the Pittsburg State University research committee and the Institutional Review Board, data was collected between January 18, 2021, and January 29, 2021.

Analysis of Project Questions

This study utilized a pretest/posttest questionnaire to evaluate whether knowledge of concussions was increased in coaches and parents following an educational video. Data from the initial questionnaire was compared to data from the second questionnaire to determine if knowledge of concussion was changed.

Project Question One. For each of the following symptoms, please check Yes if you think it is a symptom of a concussion. Please check No if you think it is not a symptom of a concussion. If you don't know, please check Don't Know (Bold symptoms are correct)

Table 1 Concussion Symptom Data Table

Symptoms	Initial Questionnaire			Second Questionnaire		
	Yes	No	Don't Know	Yes	No	Don't Know
Unusual sense of smell	(n=13) 20.31%	(n=33) 51.56%	(n=18) 28.13%	(n=9) 14.06%	(n=53) 82.81%	(n=2) 3.13%
Unusual sense of taste	(n=9) 14.06%	(n=39) 60.94%	(n=16) 25.00%	(n=9) 14.06%	(n=53) 82.81%	(n=2) 3.13%
Loss of memory	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%
Blurred Vision	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%	(n=63) 99.44%	(n=1) 1.56%	(n=0) 0.00%
Chest pain	(n=6) 9.38%	(n=47) 73.44%	(n=11) 17.19%	(n=10) 15.63%	(n=52) 81.25%	(n=2) 3.13%
Dizziness	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%
Confusion	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%
Headache	(n=63) 99.44%	(n=1) 1.56%	(n=0) 0.00%	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%
Nosebleed	(n=29) 45.31%	(n=22) 34.38%	(n=13) 20.31%	(n=15) 23.44%	(n=43) 67.19%	(n=6) 9.38%
Blacked out	(n=61) 95.31%	(n=1) 1.56%	(n=2) 3.13%	(n=60) 93.75%	(n=4) 6.25%	(n=0) 0.00%
Sharp burning pain in neck	(n=38) 59.38%	(n=15) 23.44%	(n=11) 17.19%	(n=21) 32.81%	(n=38) 59.38%	(n=5) 7.81%
Feeling sick	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%	(n=59) 92.19%	(n=3) 4.69%	(n=2) 3.13%
Numbness/tingling in arms or hands	(n=44) 68.75%	(n=14) 21.88%	(n=6) 9.38%	(n=27) 42.19%	(n=33) 51.56%	(n=4) 6.25%
Weak feeling when moving your neck	(n=45) 70.31%	(n=12) 18.75%	(n=7) 10.94%	(n=27) 42.19%	(n=35) 54.69%	(n=2) 3.13%
Trouble sleeping	(n=45) 70.31%	(n=14) 21.88%	(n=6) 9.38%	(n=52) 81.25%	(n=12) 18.75%	(n=0) 0.00%
Problems studying or doing class work	(n=63) 99.44%	(n=1) 1.56%	(n=0) 0.00%	(n=64) 100.00%	(n=0) 0.00%	(n=0) 0.00%

Respondents were provided a list of symptoms and asked to determine whether they were concussion symptoms. 100.00% ($n=64$) of respondents correctly identified “loss of memory”, “dizziness”, and “confusion” as symptoms of concussion on both questionnaires. Participants correctly identified “trouble sleeping” ($n=52$), “problems studying or doing class work” ($n=64$), and “headache” ($n=64$) as symptoms of concussions greater on the second questionnaire. The number of correct responses decreased for “blurred vision” ($n=63$), “blackout” ($n=60$), and “feeling sick” ($n=59$) on the second questionnaire. The participants significantly improved identification of symptoms that are not concussion symptoms in the second questionnaire in comparison to the initial questionnaire.

Respondents misidentified several symptoms as being symptoms of concussion in the initial questionnaire. 45.31% ($n=29$) of participants identified “nosebleed”, 59.38% ($n=38$) of participants identified “sharp burning pain in neck”, 68.75% ($n=44$) of participants identified “numbness/tingling in arms or hands”, and 70.31% ($n=45$) of participants identified “weak feeling when moving neck” as symptoms of concussion. These results significantly improved in second questionnaire, with 23.44% ($n=15$) of participants identifying “nosebleed”, 32.81% ($n=21$) of participants identifying “sharp burning pain in neck”, 42.19% ($n=27$) of participants identifying “numbness/tingling in arms or hands”, and 42.19% ($n=27$) of participants identifying “weak feeling when moving neck” as symptoms of concussion.

Table 2 Concussion Symptom Paired Sample Statistics

	Mean Difference	Std. Deviation	t	df	Sig. (2- tailed)
Unusual sense of smell	.562	.924	4.872	63	.001
Unusual sense of taste	.437	.941	3.721	63	.001
Loss of memory	X	X	X	63	X
Blurred Vision	.016	.125	1.000	63	.321
Chest pain	.219	.786	2.226	63	.030
Dizziness	X	X	X	63	X
Confusion	X	X	X	63	X
Headache	.016	.125	1.000	63	.321
Nosebleed	.437	.833	4.200	63	.001
Blacked out	.078	.324	1.930	63	.058
Sharp burning pain in neck	.453	.688	5.265	63	.001
Feeling sick	.016	.281	.444	63	.658
Numbness/tingling in arms or hands	.328	.757	3.467	63	.001
Weak feeling when moving your neck	.437	.710	4.930	63	.001
Trouble sleeping	.047	.677	.554	63	.581
Problems studying or doing class work	.016	.125	1.000	63	.321

Paired Samples *t* tests were calculated to determine if there was statistical difference between participant knowledge of concussion symptoms after the educational opportunity. “Unusual sense of smell” ($t=4.872$, $p=.001$), “Unusual sense of taste” ($t=3.721$, $p=.001$), “Chest pain” ($t=2.226$, $p=.030$), “Nosebleed” ($t=4.200$, $p=.001$), “Sharp burning pain in neck” ($t=5.265$, $p=.001$), “Numbness/tingling in arms or hands” ($t=3.467$, $p=.001$), and “Weak feeling when moving your neck” ($t=4.930$, $p=.001$) all had statistical difference in response, indicating that education decreased participant

misidentification of concussion symptoms. The correlation and t value for “Loss of memory”, “Dizziness”, and “Confusion” cannot be computed due to the standard error of the difference being zero, as indicated by “X” in Table 2.

Project Question Two. True/False Questions (Please check True or False OR Don’t

Know for the following statements) (Bold statements are correct)

Table 3 Concussion Symptom and Management Table

Statement	Initial Questionnaire			Second Questionnaire		
	True	False	Don’t Know	True	False	Don’t Know
An athlete who reports having a headache after a concussion will likely have other symptoms	($n=37$) 57.81%	($n=20$) 31.25%	($n=7$) 10.94%	($n=39$) 60.94%	($n=21$) 32.81%	($n=4$) 6.25%
A concussion only occurs when the athlete blacks out	($n=2$) 3.13%	($n=62$) 96.88%	($n=0$) 0.00%	($n=2$) 3.13%	($n=61$) 95.31%	($n=1$) 1.56%
A concussion requires the athletes to be taken out of the game or training right away	($n=60$) 93.75%	($n=3$) 4.69%	($n=1$) 1.56%	($n=63$) 98.44%	($n=1$) 1.56%	($n=0$) 0.00%
An athlete who shows any sign or symptom of concussion should not be allowed to return to play.	($n=60$) 93.75%	($n=4$) 6.25%	($n=0$) 0.00%	($n=61$) 95.31%	($n=3$) 4.69%	($n=0$) 0.00%
Youth athletes should be allowed to return to play in a slow step-by-step way after having a concussion if symptom free	($n=58$) 90.63%	($n=4$) 6.25%	($n=2$) 3.13%	($n=60$) 93.75%	($n=4$) 6.25%	($n=0$) 0.00%

Many participants (92.71%) identified the correct statements within question two on the initial questionnaire. The second questionnaire yielded a greater number of

participants who identified “A concussion requires the athletes to be taken out of the game or training right away” ($n=63$), “A concussion requires the athletes to be taken out of the game or training right away” ($n=61$), and “Youth athletes should be allowed to return to play in a slow step-by-step way after having a concussion if symptom free” ($n=60$) as correct statements within the question. Paired Samples t tests were calculated to determine if there was statistical difference between participant knowledge of concussion symptoms and management strategies after the educational opportunity. There was no statistical difference in participant responses from the initial questionnaire to the second questionnaire.

Table 4 Concussion Symptom and Management Paired Sample Statistics

	Mean Difference	Std. Deviation	t	df	Sig. (2- tailed)
An athlete who reports having a headache after a concussion will likely have other symptoms	.062	.753	.664	63	.509
A concussion only occurs when the athlete blacks out	.031	.307	.814	63	.419
A concussion requires the athletes to be taken out of the game or training right away	.016	.218	.574	63	.568
An athlete who shows any sign or symptom of concussion should not be allowed to return to play.	.016	.218	.574	63	.568
Youth athletes should be allowed to return to play in a slow step-by-step way after having a concussion if symptom free	.031	.397	.629	63	.531

Project Question Three. Scenarios (Please check the box next to the answer that you think is correct) A youth football player receives a direct blow to the side of his head from another player and falls to the ground. As he gets up, he experiences mild dizziness

and has a headache. Should the football player continue to play football? (Bold answer is correct)

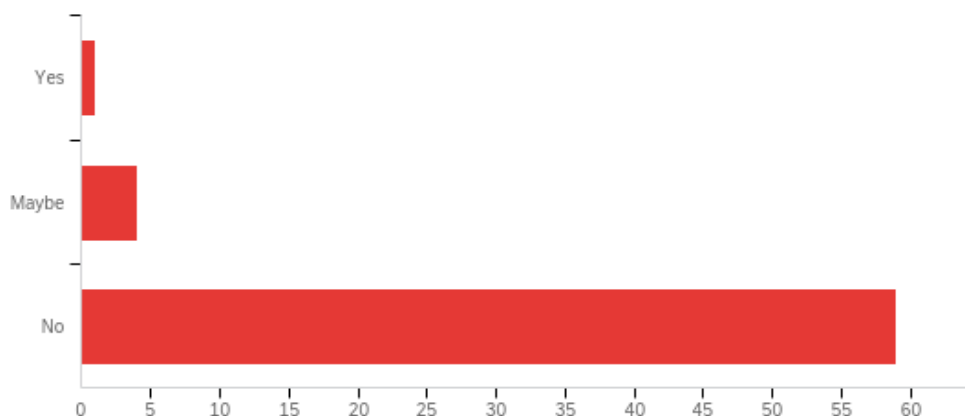
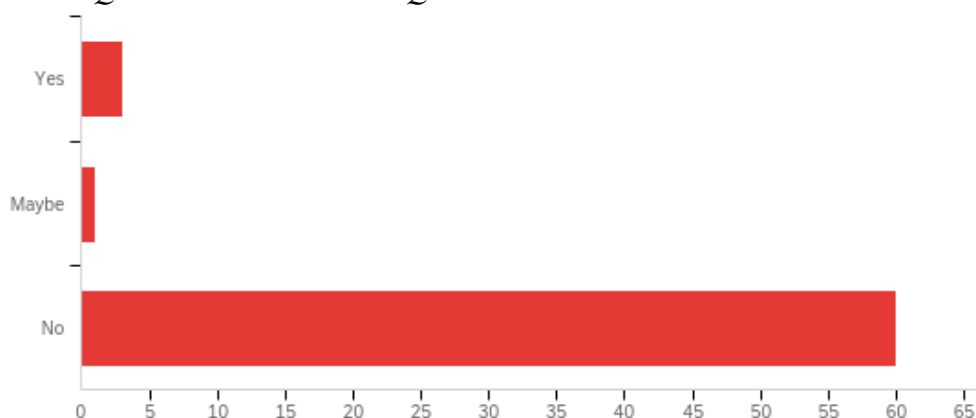
Table 5 Scenario Question One Data Table

	Initial Questionnaire	Second Questionnaire
Yes	(<i>n</i> =1) 1.56%	(<i>n</i> =3) 4.69%
Maybe	(<i>n</i> =4) 6.25%	(<i>n</i> =1) 1.56%
No	(<i>n</i>=59) 92.19%	(<i>n</i>=60) 93.75%

The majority of participants (*n*=59) correctly identified “no” as the answer to project question three in the initial questionnaire, and an even greater number of participants (*n*=60) selected the correct response in the second questionnaire. The number of incorrect responses, or “yes”, also increased from the initial questionnaire (*n*=1) to the second questionnaire (*n*=3). The number of “maybe” responses decreased from initial questionnaire (*n*=4) to the secondary questionnaire (*n*=1). Paired Samples *t* test were calculated to determine if there was statistical difference between participant knowledge of proper concussion management strategies in scenario question following the educational opportunity. There was no statistical difference in participant response from the initial questionnaire to the second questionnaire.

Table 6 Scenario Question One Paired Sample Statistics

	Mean Difference	Std. Deviation	t	df	Sig. (2- tailed)
A youth football player receives a direct blow to the side of his head from another player and falls to the ground. As he gets up, he experiences mild dizziness and has a headache. Should the football player continue to play football?	.016	.418	.299	63	.766

*Figure 4. Initial Questionnaire Scenario Question One Data**Figure 5. Second Questionnaire Scenario Question One Data*

Project Question Four. Scenarios (Please check the box next to the answer you think is correct) A youth basketball player receives a hit to the head during a game. As the player is evaluated on the sideline, it is found that she is awake, had no loss of memory, feels fine at rest, and when she is asked to jog behind the bench she has only a mild headache. Should the player return to play? (Bold answer is correct)

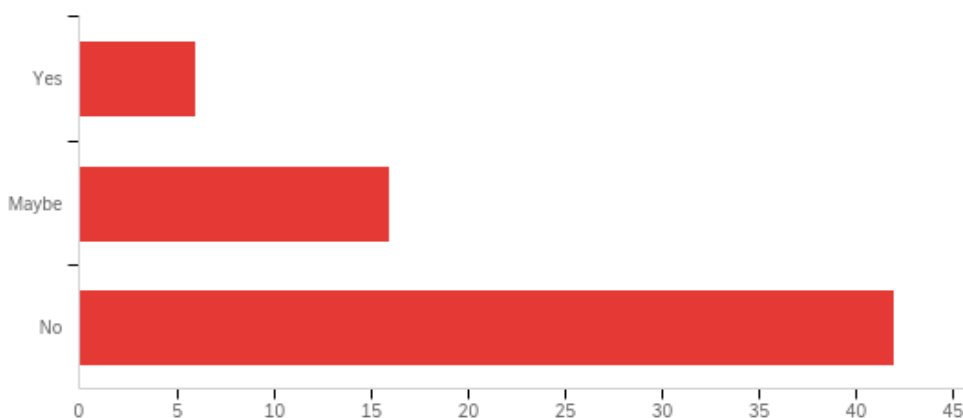
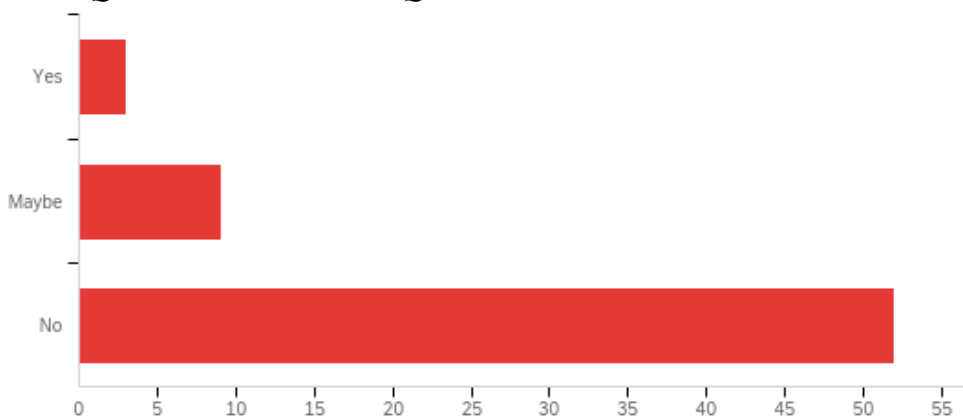
Table 7 Scenario Question Two Data Table

	Initial Questionnaire	Second Questionnaire
Yes	(<i>n</i> =6) 9.38%	(<i>n</i> =3) 4.69%
Maybe	(<i>n</i> =16) 25.00%	(<i>n</i> =9) 14.06%
No	(<i>n</i>=42) 65.63%	(<i>n</i>=52) 81.25%

A majority of participants (*n*=42) correctly identified “no” as the answer to project question four in the initial questionnaire, and more participants (*n*=52) correctly identified the correct answer in the second questionnaire. Collected incorrect responses, or “yes” decreased from the initial questionnaire (*n*=6) to the second questionnaire (*n*=3). The number of “maybe” responses also decreased from the initial questionnaire (*n*=16) to the second questionnaire (*n*=9). Paired Samples *t* tests were calculated to determine if there was statistical difference between participant knowledge of proper concussion management strategies in scenario question two following the educational opportunity. There was a statistically significant difference between the initial questionnaire and the second questionnaire ($t=2.267$, $p=.027$), indicating that education increased participants knowledge of proper concussion management.

Table 8 Scenario Question Two Paired Sample Statistics

	Mean Difference	Std. Deviation	t	df	Sig. (2- tailed)
A youth basketball player receives a hit to the head during a game. As the player is evaluated on the sideline, it is found that she is awake, had no loss of memory, feels fine at rest, and when she is asked to jog behind the bench she has only a mild headache. Should the player return to play?	.203	.717	2.267	63	.027

*Figure 6. Initial Questionnaire Scenario Question Two Data**Figure 7. Second Questionnaire Scenario Question Two Data***Summary**

Prior to education, a strong majority of parents and coaches (95.05%) correctly identified symptoms and management strategies of concussions within questions one and

two of the initial questionnaire. Although participants often identified correct responses, they frequently misidentified responses (40.63%) on questions one and two as being concussion related as well. A large percentage (78.90%) of participants correctly identified the proper management of an athlete with a concussion in questions three and four of the initial questionnaire.

Following the educational offering, results of the second questionnaire indicated that correct symptom and management strategy identification had increased (96.09%). 100.00% ($n=64$) of participants correctly identified “loss of memory”, “dizziness”, “confusion”, “headache”, and “problems studying or doing classwork” as being symptoms of a concussion. Participant’ misidentification of symptoms and uncertainty of concussion management decreased significantly (26.34%) in the second questionnaire. The results of scenario question two on the second questionnaire indicated that the educational offering increased the participant identification of proper management of an athlete with a concussion (87.50%).

The purpose of this project was to increase the education provided to parents and coaches of youth athletes regarding concussions, concussion symptoms, and concussion management. Findings from this small, convenient sampling study indicate the need for increased concussion education to parents and coaches of youth athletes. The results of this study should not be generalized, but rather repeated in a larger study population. Chapter five discusses future recommendations for research, limitations of the study, and conclusions.

Chapter V

Relationship of Outcomes to Research

The purpose of this DNP project was to increase the education provided to parents and coaches of youth athletes regarding concussions, concussion symptoms, and concussion management. The study obtained data from parents and coaches of youth athletes by utilization of two identical questionnaires. The initial questionnaire measured baseline participant knowledge of concussions prior to education being provided, and the second questionnaire measured participant knowledge of concussions following an educational presentation. The study focused on the following research questions:

- Will educating parents of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?
- Will educating coaches of youth athletes on concussion signs, concussion symptoms, and concussion management result in an increased knowledge of concussions?

Participant Knowledge of Concussion Symptoms. The study found that participants benefitted from increased knowledge of concussion symptoms. The initial survey revealed that most participants correctly identified symptoms of concussion, but also misidentified symptoms that are not concussion related. 45.31% ($n=29$) of

participants identified “nosebleed”, 59.38% ($n=38$) of participants identified “sharp burning pain in neck”, 68.75% ($n=44$) of participants identified “numbness/tingling in arms or hands, and 70.31% ($n=45$) of participants identified “weak feeling when moving neck” as symptoms of concussion.

The second questionnaire yielded a higher number of participants who correctly identified concussion symptoms. 100.00% ($n=64$) of participants correctly identified “loss of memory”, “dizziness”, “confusion”, “headache”, and “problems studying or doing classwork” as being symptoms of a concussion. Participants who misidentified symptoms as concussion symptoms decreased in the second questionnaire, with 23.44% ($n=15$) of participants identifying “nosebleed”, 32.81% ($n=21$) of participants identifying “sharp burning pain in neck”, 42.19% ($n=27$) of participants identifying “numbness/tingling in arms or hands” and 42.19% ($n=27$) of participants identifying “weak feeling when moving neck” as symptoms of concussion.

The study performed by Hecimovich, et al. (2016) focused on players and parents, but yielded similar results as this study indicating that there is a need for increased concussion education in parents, primarily in association of symptoms to concussion. According to Meehan and O’Brien (2020b, sideline evaluation section), some of the more common symptoms of concussion include “headache”, “confusion”, and “dizziness”. Participants in this study easily identified these symptoms in the first questionnaire (headache ($n=63$), confusion ($n=64$), dizziness ($n=64$)) and later increased identification in the second questionnaire (headache ($n=64$), confusion ($n=64$), and dizziness ($n=64$)). Gioia, et al., (2008) noted that while “loss of consciousness”, “headache”, and “memory problems” are commonly identified concussion symptoms, many other symptoms are

often missed due to focus on these primary symptoms. This study supports this claim as while many participants identified “loss of consciousness” ($n=61$), “headache” ($n=64$), and “memory problems” ($n=64$) in the initial questionnaire, they also frequently did not select “trouble sleeping” ($n=45$) as a concussion symptom.

Participant Knowledge of Concussion Management. The study found that the majority of participants (over 90%) identified the correct concussion management strategies on the initial questionnaire. The second questionnaire yielded a greater number of participants who identified “a concussion requires the athletes to be taken out of the game or training right away” ($n=63$), “a concussion requires the athletes to be taken out of the game or training right away” ($n=61$), and “youth athletes should be allowed to return to play in a slow step-by-step way after having a concussion if symptom free” ($n=60$) as proper concussion management strategies. Somewhat disconcerting that is after education, 14.06% ($n=9$) of participants remained unsure of proper concussion management of an athlete who hits her head during a game. The Hecimovich, et al. (2016) study showed decreased uncertainty amongst participants regarding that scenario. The researcher speculates that information presented to participants of this study may not have been fully retained.

Evaluation of Theoretical Framework

The health promotion model is a guide that leads evaluation of the multidimensional nature of individuals as they choose to partake in healthy behaviors to improve quality of life (Srof & Velsor-Friedrich, 2006, pg. 366). The model was utilized as the basis for research and provided the conceptual framework for the incorporation of education by utilizing evidence-based practice. Participants of the study were educated on

concussions, concussion symptoms, and concussion management. The provided education contained information regarding concussions and their symptoms and proper management strategies.

The parents and coaches who participated in this study were actively pursuing to regulate their behaviors. The participants interacted with their environment and experienced observable change as a result of the provided education. Reconfiguration within study participants was observed as evidenced by the outcomes of the study. Utilization of Pender's health promotion model provided a guide to confirm knowledge of concussions, concussion symptoms, and concussion management was increased in parents and coaches of youth athletes following the educational intervention.

Evaluation of Logic Model

The logic model of this study identified the goal of this project, which was to increase knowledge of concussions in parents and coaches of youth athletes. The goal was obtained by utilization of pretest and posttest questionnaires and an educational intervention. Study results indicate that the project was successful in increasing participation knowledge of concussions, concussion symptoms, and concussion management.

Limitations

One limitation to this study is the bias that was introduced by the sampling method. Interest in the topic and previous concussion education could have both increased and decreased study participation. Another limitation to the study is that all surveys were completed without supervision, therefore participants were unable to ask for clarification of questionnaires and the provided education. Additionally, the study design

did not allow for identification of participants, therefore individuals who did not meet inclusion criteria for the study may have participated. A final limitation of the study may have been the style and formatting of the questions on the questionnaires. The question regarding symptoms allowed for participants to select “Don’t Know”, which may have skewed data on that question.

Implications for Future Projects and/or Research

The study findings revealed several areas for future research. Literature supports increasing concussion education to parents and coaches of youth athletes. In this study, the educational intervention did result in increased knowledge of concussion amongst participants, but some respondents were still unable to correctly identify symptoms and proper management strategies of concussions. To better assess knowledge retention, a follow-up questionnaire several weeks after the educational intervention should be considered.

Improvement of questionnaire distribution should also be considered in future research. Providing participants the ability to ask for clarification regarding the questionnaires and educational intervention via supervised completion may be useful for data collection. This strategy would help to eliminate any potential confusion that may arise while completing the questionnaires.

Implications for Practice/Health Policy/Education

The results of this study indicate that there is a need for increased education of concussions, concussion symptoms, and concussion management for parents and coaches of youth athletes. Advanced Practice Registered Nurses (APRNs) can utilize the data collected in this study in many ways. First, APRNs can increase education regarding

concussions to parents of youth athletes in the clinic setting. Next, APRNs can provide education material regarding concussions, concussion symptoms, and concussion management to school districts for dissemination to parents and coaches of youth athletes. Finally, APRNs can advocate for their patients and work with state legislators to develop a mandate that requires school districts to increase educational opportunities regarding concussions for parents and coaches. Legislative involvement would make educational opportunities mandatory, therefore concussion knowledge would likely be increased in parents and coaches.

Conclusion

The purpose of this DNP project was to increase the education provided to parents and coaches of youth athletes regarding concussions, concussion symptoms, and concussion management. The participants of this study were coaches and parents of youth athletes in grades seven through twelve, English speaking, and 18 years of age or older. Participants were asked questions to measure concussion knowledge prior-to and following an educational presentation.

The study conducted in this project included the use of two identical questionnaires and an educational presentation. The results of the initial questionnaire indicated the need for additional concussion education for parents and coaches of youth athletes. Participants were provided an educational presentation, and the second questionnaire indicated that knowledge of concussions increased after education was provided. It is this researcher's hope that this study will encourage healthcare providers to advocate for increased concussion education for parents and coaches to help identify

concussion symptoms in youth athletes and understand concussion management strategies.

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APPENDIX

Appendix A:
Pre-Test

1. Which best describes you?
 - ☐ Parent
 - ☐ Coach
2. I am a parent or coach of a youth athlete in grades seven through twelve who participate in athletic competition that is sanctioned by state athletic associations, I am English speaking, and I am older than 18 years of age.
 - ☐ True
 - ☐ False
3. For each of the following symptoms, please check Yes if you think it is a symptom of a concussion. Please check No if you think it is not a symptom of a concussion. If you don't know, please check Don't Know

	Yes	No	Don't Know
Unusual sense of smell			
Unusual sense of taste			
Loss of memory			
Blurred vision			
Chest pain			
Dizziness			
Confusion			
Headache			
Nosebleed			
Blacked out			
Sharp burning pain in neck			
Feeling sick			
Numbness/tingling in arms or hands			
Weak feeling when moving your neck			
Trouble sleeping			
Problems studying or doing class work			

4. True/False Questions (Please check True or False OR Don't know for the following statements):

	True	False	Don't know
An athlete who reports having a headache after a concussion will likely have other symptoms			
A concussion only occurs when the athlete blacks out			
A concussion requires the athletes to be taken out of the game or training right away			
An athlete who shows any sign or symptom of concussion should not be allowed to return to play			
Youth athletes should be allowed to return to play in a slow step-by-step way after having a concussion if symptom free			

Scenarios (Please check the box next to the answer you think is correct)

5. A youth football player receives a direct blow to the side of his head from another player and falls to the ground. As he gets up, he experiences mild dizziness and has a headache. Should the player have continued to play football in this situation?
 - ☐ Yes
 - ☐ Maybe
 - ☐ **No**
6. A youth basketball player receives a hit to the head during a game. As the player is evaluated on the sideline, it is found that she is awake, had no loss of memory, feels fine at rest, and when she is asked to jog behind the bench she has only a mild headache. Should the player return to play?
 - ☐ Yes
 - ☐ Maybe
 - ☐ **No**

Appendix B:

Post-Test

1. Which best describes you?
 - Parent
 - Coach
2. I am a parent or coach of a youth athlete in grades seven through twelve who participate in athletic competition that is sanctioned by state athletic associations, I am English speaking, and I am older than 18 years of age.
 - True
 - False
3. For each of the following symptoms, please check Yes if you think it is a symptom of a concussion. Please check No if you think it is not a symptom of a concussion. If you don't know, please check Don't Know

	Yes	No	Don't Know
Unusual sense of smell			
Unusual sense of taste			
Loss of memory			
Blurred vision			
Chest pain			
Dizziness			
Confusion			
Headache			
Nosebleed			
Blackout			
Sharp burning pain in neck			
Feeling sick			
Numbness/tingling in arms or hands			
Weak feeling when moving your neck			
Trouble sleeping			
Problems studying or doing class work			

4. True/False Questions (Please check True or False OR Don't know for the following statements):

	True	False	Don't know
An athlete who reports having a headache after a concussion will likely have other symptoms			
A concussion only occurs when the athlete blacks out			
A concussion requires the athletes to be taken out of the game or training right away			
An athlete who shows any sign or symptom of concussion should not be allowed to return to play			
Youth athletes should be allowed to return to play in a slow step-by-step way after having a concussion if symptom free			

Scenarios (Please check the box next to the answer you think is correct)

5. A youth football player receives a direct blow to the side of his head from another player and falls to the ground. As he gets up, he experiences mild dizziness and has a headache. Should the player have continued to play football in this situation?
- ☐ Yes
 - ☐ Maybe
 - ☐ **No**
6. A youth basketball player receives a hit to the head during a game. As the player is evaluated on the sideline, it is found that she is awake, had no loss of memory, feels fine at rest, and when she is asked to jog behind the bench she has only a mild headache. Should the player return to play?
- ☐ Yes
 - ☐ Maybe
 - ☐ **No**