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Concussion Training Programs in High School Athletics

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Abstract

In 2011, the Wisconsin state legislature passed Act 172 requiring the Wisconsin Interscholastic Athletic Association (WIAA) and the Department of Public Instruction (DPI) to develop guidelines and information for educating athletic coaches, athletes, and their guardians about concussion and head injury. The law provided the minimum requirements for concussion training but did not include any component of accountability for compliance; therefore, it was expected that there would be a degree of variability in training programs. The current project evaluated the status of concussion training programs for high school athletic programs in Wisconsin since the enactment of the Wisconsin concussion and head injury law. Data was collected through a review of ninety-seven school district websites and either a phone call or email correspondence with an athletic director, athletic trainer, or appropriate contact from the district. Review of available web materials suggested that about 20% of school districts did not provide concussion training materials on the district web page. Most of the schools without materials online were private schools. Forty-three percent of the digital sources of concussion information included a list of signs and symptoms of concussions. Only 11% of schools included return-to-learn protocols. Digital content was mostly written targeting parents and athletes. Follow-up interviews with twelve of the ninety-seven school districts indicated that 75% of these schools had a concussion training protocol that was mostly designed for parents and coaches, and less than half assessed for understanding or retention after training. Information gained from the current project may create awareness and support initiatives to advocate for improved concussion training practices and policy formation.

Keywords: concussion, training, high school athletics, legislation

1. Introduction

In the United States of America, an estimated 300,000 athletes incur sports-related brain injuries each year¹. The number of students participating in athletic programs increased over the last two decades², leading to a higher number of athletes at risk for sports-related injuries. Among adolescents and young adults in the US, sports were the second leading cause of traumatic brain injury¹. Concussion is a form of mild traumatic brain injury, and reports suggest that 5.5-23% of athletes have a history of concussion³⁻⁵. High school athletes with a history of concussion have documented and often prolonged changes in memory and attention⁶⁻¹⁰. Memory and attention are critical cognitive skills for academic development and success, as suggested by strong correlations between concussion history and lower high school grade point averages¹⁰. With an estimated 0.03-0.1% chance of high school athletes entering professional athletic careers¹¹, the changes in cognitive functions that serve as precursors to academic skills may hinder opportunities for higher education and employment.

Participation in high school athletics is not without benefit¹². So, rather than discourage students from participating in athletic programs, efforts have been made to improve prevention, reaction, and treatment to concussion. The Center for Disease Control developed training programs to assist coaches, athletes, and parents in understanding the signs, symptoms, and effects of concussion¹³. Even with the available training, misconceptions about concussion exist among

the general population as well as coaches¹⁴⁻¹⁵. High school athletes that are older age and female sex were more likely to have a command of concussion knowledge⁵. Knowledge of concussion and the long term effects does not always translate to improved reaction and treatment. High school athletes reported knowledge of signs, symptoms, and longterm effects of concussion, but indicated reluctance to self-report a concussion due to the loss of playing time, the symptoms mistaken for another etiology, or the perception that the coach will think the student's symptoms are insignificant¹⁶. Considering the psychosocial factors related to disclosing concussion symptoms, self-reporting is often unreliable¹⁷.

To alleviate misconceptions and prevent the responsibility of reporting from falling solely on an athlete or coach, concussion training for high school athletes should include all stake holders. In 2011, the Wisconsin state legislature passed Act 172 requiring youth athletic programs to provide information for educating coaches, athletes, and their guardians about concussion and head injury. The law provided the minimum requirements for concussion training but did not include a component of accountability for compliance; therefore, it was expected that there would be a degree of variability in training programs. The goal of the current project was to evaluate the status of concussion training for high school athletic programs in Wisconsin since the enactment of the Wisconsin concussion and head injury law. The research questions addressed included: 1) Were schools implementing concussion training programs? 2) Did programs differ based on demographics of the school district? 3) What content was included in concussion training? and 4) Who was being trained?

2. Participants

Wisconsin school districts were pseudo-randomly selected through the Department of Public Instruction's public and private school online directories. School districts were classified into four categories: urban public, rural public, urban private, and rural private. Towns with 50,000 people or more were classified as urban, while towns with less that 50,000 people were classified as rural. Samples of ninety-seven school districts from those towns were selected. Twenty-three of those schools were urban public schools, twenty-eight rural public schools, twenty-four urban private schools, and twenty-two rural private schools were included in the sample.

3. Methods

3.1 Website Material Review

The study team accessed each school district website and associated links in order to review details of the high schools' concussion training policies, procedures, forms, and handouts. The study team documented whether the school website had any concussion training information or links to information. Of the schools that had web-based information on concussion, a record of the content of all available materials was compiled. Content was categorized into signs and symptoms, return-to-learn, return-to-play, long-term effects, and treatment.

3.2 Follow Up Interviews

After review of web-based concussion information for all ninety-seven high schools, the study team sent e-mail invitations to the athletic directors or athletic trainers. The e-mail described the project and invited participants to respond to questions regarding the district concussion training program via phone interview or e-mail. One follow-up e-mail was sent to individuals who did not respond to the initial e-mail. All consenting participants were asked an initial question, "Does your high school have a concussion training program?" When the participant responded "No," they were asked four follow-up questions focused on the barriers to concussion training implementation and selection. When the participant responded "Yes," ten follow-up questions were asked regarding the type of training available, who was trained and how, and what factors led to the selection of the training paradigm.

4. Results

4.1 Website Material Results

A histogram of the web-based concussion training content divided by the school demographic categories was plotted in Figure 1. The salmon bars represent private urban schools, the dark green bars represent private rural schools, the yellow bars represent public urban schools, and the blue bars represent public rural schools. Nineteen percent of schools had no identifiable resources for concussion training on their websites (internal or external links). Fifteen out of the nineteen schools without web-based concussion training protocols were private schools.

Across the four different demographic categories, signs and symptoms (43% of schools) and return-to-play (26% of schools) were the most common content while return-to-learn (11% of schools) and long-term effects (16% of schools) were the least common content. Public rural schools had more treatment content than the other three school demographic categories. The majority of web-based content was written for parents and athletes, with the most common digital form being the Athlete Parent Agreement Form.



Figure 1. Content of school district website concussion training resources based on school demographics

4.2 Interview Results

Twelve of the ninety-seven school districts responded to the e-mail or phone interview. Interview respondents included two athletic directors and ten athletic trainers. Five of the twelve responses were from rural public schools, three responses were from public urban, two were from private urban and two were from private rural. Three out of twelve (25%) of the interview respondents reported no concussion-training program. The demographics for those schools were one public rural, one private urban, and one private rural. For the school districts without programs, the reported barriers to concussion training implementation included finances, staffing, and access to information. Nine of the twelve (75%) of the interview respondents reported presence of an established concussion-training program. The reasons for program selection included legislative and Wisconsin Interscholastic Athletic Association (WIAA) law or mandate (50%), administrative selection (30%), or research investigation (20%). These programs used a combination of brochures, meetings, and websites for training. 44% of respondents reported no assessment of retention of training information. It was reported that coaches were most likely to receive training (8/9 responses), then parents (7/9 responses), athletes (6/9), and teachers (3/9) (see Figure 2).



Figure 2. Who received concussion training

5. Discussion

Data from the current projects supports three possibilities for improving concussion-training programs for high schools in Wisconsin. First, there exists a possible need to develop a "universal" concussion-training program (regardless of urban or rural, public or private, and access to resources) to support healthy cognitive health for all student athletes. Based on the web review and interview sample, 19-25% of Wisconsin high schools did not have concussion training programs in place, even after the Wisconsin concussion and head injury law was passed in 2011. The majority of the school districts that were lacking training programs were private schools. Private schools do have exemptions from many of the Wisconsin education related laws that might explain the lack of compliance with the concussion and head injury law. Any school with an athletic program has students at risk for traumatic brain injury. These brain injuries may impact a student's overall school performance in the short or long term. From a public health perspective, should private schools be exempt? Perhaps addressing the financial, staffing, and information access barriers would result in higher rates of voluntary compliance with Act 172.

The second area of possible improvement includes the expansion of training beyond coaches and athletes. Evidence suggests that coach education was predictive of the coaches' ability to recognize signs and symptoms¹⁵. Could improvements in identification and reaction to concussion be made if a larger number of high school teachers were trained? Interview responses suggest teachers were the least likely to receive concussion training. However, given the low rates of student self-report to coaches ¹⁶⁻¹⁷ and the changes in memory and attention as a result of concussion⁶⁻¹⁰, it is reasonable to predict that teachers would be effective in identifying signs of concussion based on changes in the athlete's classroom performance. The teacher would then be able to advocate for the necessary academic supports.

The third area of improvement includes the possible expansion of content in training programs. The most common content included in the web-based materials were the signs and symptoms of concussion. Broadening the content of concussion training beyond signs and symptoms to include impact on academic performance, language, and social interactions may help dispel some of the misconceptions and attitudes about concussion. At the same time, more holistic training content may allow stake holders to make informed health choices as well as serve as advocates for healthy habits and lifestyle.

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