

A Statewide Cross-Sectional Survey of School Nurses' Knowledge and their Role in the Management of Concussed Students

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ABSTRACT

The school nurse plays a vital role in reintegrating the concussed student into the academic environment. The objective of our survey study was to understand the self-reported level of knowledge of school nurses regarding the diagnosis and management of patients presenting with symptoms of concussion, what responsibilities they have to the concussed student, and to identify the educational resources used. We had a 91.7% response rate and found that most school nurses did not learn about concussions in nursing school; 85% used the CDC HEADS UP website as their educational resource, and the majority reported their knowledge level as fair and wanted more information. Furthermore, 81% took care of at least one concussed student during the past 3 months, 78% had managed the return-to-learn protocol, and 40% managed the return-to-play protocol. Areas for improvement are highlighted and preferred methods to educate were surveyed.

INTRODUCTION

According to the CDC, the rate of the diagnosis of concussion in school-aged children is rising, and the majority of these injuries are sustained off the playing field.¹ Despite this increase, it is believed that the actual incidence of concussion is still underestimated.^{1,2}

While an athletic trainer can manage injuries sustained by students during school-sanctioned events, most students in the United States do not have access to this resource.³ Fortunately, all students, regardless of school setting have one consistent health care provider – the registered professional school nurse (heretofore referred to as school nurse). For this reason, the school nurse plays a pivotal role in identifying potentially concussed students, making appropriate referrals, and managing academic and athletic reentry.⁴⁻⁶

In an effort to better support the concussed student, Rhode Island passed the School and Youth Programs Concussion Act (16-91-3) in 2014, requiring the education of school nurses regarding the signs and symptoms as well as management of concussed students. The goals of our cross-sectional study were to try to gain an understanding of the impact of the mandate on the school nurses. We aimed to determine

the self-reported level of concussion knowledge, resources used to learn about concussions, preferred method of learning, volume of students managed, and required tasks when caring for concussed students. In doing so, we aimed to identify gaps that required intervention to help support the nurse in their growing role in managing the concussed student.

Surveys have been used previously to catalyze broad changes in the field of concussion management. Using a survey, Washington State was able to identify system issues surrounding the care of the concussed student, including a lack of standardized school policies regarding academic accommodations, which informed the creation of a statewide return-to-learn guidelines and training programs.⁷ While some Rhode Island schools and interscholastic athletic leagues may provide their own guidelines, there is currently no statewide approach to the reintegration of a concussed student.

METHODS

Participants and Procedure

During the annual mandatory statewide Rhode Island Certified School Nurse Teacher Association meeting, the authors presented a lecture on the identification and management of the concussed student, as well as standardizing the reintegration of students into the academic environment. Before the lecture, using PollEverywhere™, school nurses were consented into the study and then answered a series of questions. The nurses were able to respond to the questions using their cell phones or iPads and data was captured in real time. Participants were only able to respond once to the questions, with a few questions allowing for more than one answer. To address the technological acumen of the audience, there were a few participants (<5) who were not able to use their cell phones to text their responses, and these participants were instructed to write their answers and submit these to the PI. Participants were explicitly told to only participate in one platform. Finally, the survey was converted to a survey using SurveyMonkey and sent via email to the listserv of school nurses to obtain responses from those nurses who were unable to attend the mandatory conference. It was reiterated that the nurses were only to participate in one platform.

Instrument

The survey contained questions assessing concussion management knowledge and clinical practice in managing concussed students. Additionally, we asked respondents about their preferred learning platform for receiving continued medical education. Personal identifiers were not obtained. The survey can be made available upon request from the first author (NR).

Human Subjects Approval

This study was approved by the Institutional Review Board at Rhode Island Hospital.

Data Analysis

The survey data was transferred to Excel (Microsoft Corporation, Version 14.6.7) for analysis. Descriptive data is reported as frequency with relative percentages.

RESULTS

The Rhode Island Certified School Nurse Teacher Association is the accrediting association for school nurses in the state and has 205 members, including members in both rural and urban areas and spanning the educational spectrum from elementary school through high school.

Characteristics of the Participants

We received responses from 188 school nurses of the 205 school nurses in the state (91.7%). All of the nurses who attended the conference responded. 180 of these responses were submitted during the meeting while 8 responses were submitted afterwards. The majority of respondents were based in elementary school (n = 89, 47.3%), followed by high school (n = 55, 29.3%), and middle school (n = 44, 23.4%).

Concussion Knowledge

As illustrated in **Table 1**, the majority of the nurses (69.1%) reported that they did not learn how to diagnose or manage a concussion in nursing school, and acquired their knowledge with supplemental training. The most common resource used for this further training was the CDC HEADS UP website (85.1%). However, despite supplementing their

Table 1. Concussion knowledge and training of sample

Learn in nursing school n (%)	Further training n (%)	Rate knowledge n (%)	*Knowledge resources n (%)
Yes: 58 (30.9)	Yes: 170 (90.4)	Poor: 25 (13.3)	CDC website: 160 (85.1)
		Fair: 130 (69.2)	NFHS website: 0
		Good: 30 (16)	Other: 40 (21.3)
		Great: 3 (1.6)	

*Could select > 1 response

knowledge with external resources, 69% of the participants still self-rated their diagnosis and management skills to be ‘Fair’ (n = 130, 69.2%) and wanted more educational resources.

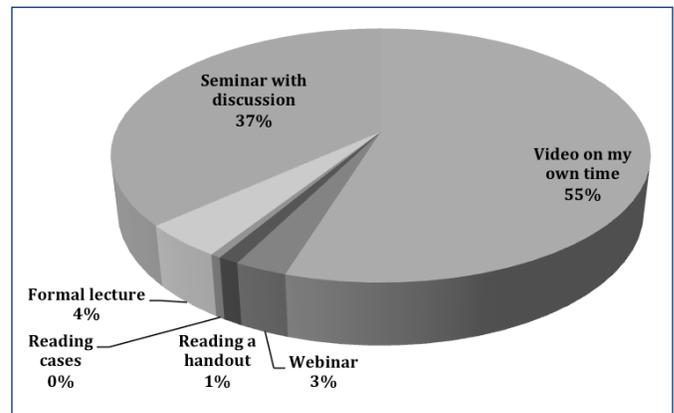
Clinical Practice

Most nurses reported that they had provided clinical care for a concussed student in the past three-months (81%) and with 48.9% of these providing care for between 1–4 students in that time period. The majority of nurses (78%) provided oversight of the return-to-learn process for concussed students, and 40% also reported overseeing the return-to-play recommendations. The majority of nurses (75%) reported that they were tasked with the administrative task of collecting and filing the physician issued return-to-learn and clearance forms from the concussed student. Currently, the ability to estimate the true incidence of concussion remains a challenge, as there is no statewide database for concussed students.

Learning Platform

The type of learning platform preferred by the school nurses was also queried (**Figure 1**). They overwhelmingly stated that video learning or seminars with case based discussion (92%) was their preferred learning format.

Figure 1. Reported Preferred Learning Platform



DISCUSSION

Sport-related concussion has been the subject of great attention in recent years; however, more than half of traumatic brain injuries in those ≤14 years old occur off the sports field.¹ While some high school athletes have the luxury of an athletic trainer to help orchestrate the day-to-day reintegration of cognitive and physical activities of the student while in school, the majority of students do not have access to an athletic trainer. The student’s outpatient health care provider, when available, can make the diagnosis, and offer counseling to the student and the guardian; however, much of the onus of the daily management of the concussed student in the school environment rests with the school nurse.^{5,6}

As is delineated in the Position Statement by the National Association of School Nurses, the school nurse is the health-care provider in the academic setting, and plays an important role in facilitating the integration of the concussed student back into the academic environment.⁸⁻¹³ A concussion affects executive function,¹⁴ which includes working memory and cognitive flexibility and is required for successful planning and fluid intelligence. The negative effects of a concussion on executive function are especially pronounced in younger patients. As outlined by the CDC's return-to-learn guidelines, students are encouraged to return to the classroom in a graded fashion after a short period of cognitive rest and in accordance with the guidelines set by the Consensus statement on Concussion in Sport.¹⁵⁻¹⁷ During reintegration, students report to the school nurse often on a predetermined timetable (hourly, daily, weekly) to assess and manage exacerbation of symptoms. The school nurse works with the administration, guidance counselors, teachers, and all other members of the academic team to orchestrate real-time accommodations to balance a progression of cognitive exertion with symptoms. Additionally, the school nurse can offer feedback to the outpatient health care provider with the goal of having the student re-enter the academic environment to the pre-concussion level of activity efficiently and successfully.⁸

In addition to the roles outlined above, our survey found that nurses were also tasked with taking on roles for which they felt they were not adequately trained. We found that nurses at all levels are being tasked with supervising the return-to-play (RTP) protocol, a task normally done by an athletic trainer. Certified athletic trainers (ATCs) receive many hours of didactic and sideline education in the diagnosis and management of the concussed athlete. In schools with ATCs, these professionals often guide the student through the return-to-play protocol.^{12,13,18} Given that school nurses do not have the educational background to execute the return-to-play protocol as ATCs, it is reasonable that when available, the school nurses relies on the ATC for this. Furthermore, it was even found that school nurses who worked with an athletic trainer were more familiar with academic accommodations than those nurses who did not.¹⁹ As ATCs are not available to every concussed student, this highlights an area of educational intervention, especially for those nurses without access to an ATC.²⁰

The CDC HEADS UP website was the resource most utilized by school nurses to educate themselves about concussion; however, the majority still rated their knowledge only as fair. As educational programs are being created for the school nurses, they vocalized a preference for educational videos that could be viewed on their own time and participating in a case-based seminar with the opportunity for discussion. Currently, there is no formal return-to-learn protocol in the state of Rhode Island. Future educational resources that target school nurses should reflect this.

LIMITATIONS

There are several potential limitations with this survey study. The participating nurses across this state may not represent the nation's school nurses. While other studies around the country suggest the same knowledge deficit among school nurses, further studies will be needed to examine whether these self-reported deficiencies is a nationwide problem. As it stands however, it seems that a national educational program targeting school nurses would be well received. We achieved a very high rate of response (91% of school nurses) but in an effort to obtain as many respondents as possible, we offered multiple modalities to respond. Given these parameters, it is possible that participants could have responded using more than one modality even though they were instructed not to, contributing to bias. Furthermore, we note that while most of the nurses did answer the surveys, we did not achieve a 100% response rate, which may contribute to bias. The experimental design and environment we chose to distribute the survey could have introduced a change in behavior simply as a result of being asked. There was no way to eliminate or measure this but our research protocol was designed to be unobtrusive. Given the novel platform to conduct the survey, the audience seemed enthusiastic to participate.

CONCLUSION

The role of a school nurse continues to evolve as they are now asked to oversee the concussed student's return to both the classroom and the playing field. The increasing awareness of concussion and the concomitant increase in students being diagnosed with a concussion requires that school nurses, who play an instrumental role in the reintegration of the concussed student back into school and athletics, be offered continuing education as new research is available. This study highlights a lapse within the school healthcare system, and efforts should be and can be reasonably made to remedy this in order to improve the care of concussed students.

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