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## Secondary School Coaches' Perceptions of Sport-Related Concussions: A Qualitative Approach

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### Abstract

**Purpose:** This study was conducted to understand current perceptions of secondary school coaches on concussion culture, safety, and management. **Method:** In this consensual qualitative research study, 17 secondary school coaches participated (12 males, 5 females). Participants were recruited through the state secondary school athletic associations. Participants were interviewed over Zoom using a semi-structured interview guide to allow for flexibility (16 questions). All interviews (30 - 60 minutes in length) were recorded and transcribed. A codebook, including themes and subthemes, was created and data were analyzed using thematic analysis. The researchers each reviewed the transcripts separately. The initial codebook was determined using a sample of transcripts; following consensus, another subsection of transcripts was analyzed to determine codebook effectiveness. The research team went through 5 phases of analysis to ensure agreement on the themes and subthemes of each transcript. Trustworthiness was established through peer review and member checks. **Results:** We discovered four themes 1.) reporting, 2.) concussion education, 3.) awareness, and 4.) culture. Participants described their players' preferences, attitudes, and willingness for reporting and to whom players report. Coaches indicated that players primarily report concussions to their coaches and may apprehensively report to the athletic trainer. The concussion education that coaches receive was described, including the platforms, type, frequency, and suggestive changes. Many participants described their annual concussion education as repetitive and needing updates. Emphasis was placed on the lack of player education. Coaches identified a need for content to improve players' concussion reporting and education. Lastly, participants emphasized the culture surrounding concussions in their sport and the preferences on concussions from both player and coach perspectives, the attitudes of the players in their sport surrounding concussions, past attitudes and culture in their sport, player safety, and long-term concerns. **Conclusions:** Secondary school coaches expressed the current mandated concussion education video was the same annually and could be updated with new information and be more engaging, while also expressing the need for educational content for students. Further efforts should be placed on concussion informational videos, fact sheets, and education for students to increase reporting behaviors, improve sports culture regarding concussions and enhance player safety.

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### ABSTRACT

**Purpose:** This study was conducted to understand current perceptions of secondary school coaches on concussion culture, safety, and management. **Method:** In this consensual qualitative research study, 17 secondary school coaches participated (12 males, 5 females). Participants were recruited through the state secondary school athletic associations. Participants were interviewed over Zoom using a semi-structured interview guide to allow for flexibility (16 questions). All interviews (30 - 60 minutes in length) were recorded and transcribed. A codebook, including themes and subthemes, was created and data were analyzed using thematic analysis. The researchers each reviewed the transcripts separately. The initial codebook was determined using a sample of transcripts; following consensus, another subsection of transcripts was analyzed to determine codebook effectiveness. The research team went through 5 phases of analysis to ensure agreement on the themes and subthemes of each transcript. Trustworthiness was established through peer review and member checks. **Results:** We discovered four themes 1.) reporting, 2.) concussion education, 3.) awareness, and 4.) culture. Participants described their players' preferences, attitudes, and willingness for reporting and to whom players report. Coaches indicated that players primarily report concussions to their coaches and may apprehensively report to the athletic trainer. The concussion education that coaches receive was described, including the platforms, type, frequency, and suggestive changes. Many participants described their annual concussion education as repetitive and needing updates. Emphasis was placed on the lack of player education. Coaches identified a need for content to improve players' concussion reporting and education. Lastly, participants emphasized the culture surrounding concussions in their sport and the preferences on concussions from both player and coach perspectives, the attitudes of the players in their sport surrounding concussions, past attitudes and culture in their sport, player safety, and long-term concerns. **Conclusions:** Secondary school coaches expressed the current mandated concussion education video was the same annually and could be updated with new information and be more engaging, while also expressing the need for educational content for students. Further efforts should be placed on concussion informational videos, fact sheets, and education for students to increase reporting behaviors, improve sports culture regarding concussions and enhance player safety.

**Keywords:** concussion education, coach perceptions, reporting

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## INTRODUCTION

Sport-related concussions are prevalent in the United States, with approximately 1.1 - 1.6 million occurring annually.<sup>1</sup> In the secondary school setting, roughly 3.89 concussions occur per 10,000 athlete exposures.<sup>2</sup> These findings suggest that sport-related concussions are prevalent in secondary school student-athletes. Concussion management includes recognition, return to play, return to learn, and education.<sup>3</sup> Concussion reporting is typically low among secondary school student-athletes.<sup>4</sup> Appropriate education is necessary to increase reporting as well as enhance a general understanding of sport-related concussions.

Current research suggests that appropriate concussion education can improve concussion reporting behaviors and knowledge.<sup>5,6</sup> Despite increased efforts for concussion awareness, there are still barriers for student-athletes to report concussions. Research has shown that student-athletes have a fear of losing playing time, a misconception of concussion, fear of letting their team down, and a lack of concussion knowledge.<sup>7</sup> Currently, there is no uniform concussion education approach for student-athletes, parents/guardians, or coaches across the United States. Each state, school, and the school district may set different parameters related to concussion education. For example, in the state of Iowa, the concussion law states that the school district and non-public schools are to provide parents/guardians of each student from 7-12<sup>th</sup> grade a concussion information sheet. Both the student-athlete and parent/guardian are to sign and return a copy of the information to participate in interscholastic athletics.<sup>8</sup> Outside of the concussion information sheet, there is no standardization of concussion education best practices for parents/guardians and student-athletes. While concussion education efforts have been enhanced for student-athletes and their parents, it is important to also enhance education for coaches.

Coaches are with student-athletes regularly and can make an impact on student-athlete concussion reporting behavior. While having a trained healthcare provider, such as athletic trainers, on site is best practice for concussion management,<sup>9</sup> student-athletes often do not have access to athletic trainers. Therefore, having coaches recognize the signs and symptoms of sports-related concussions is vital for appropriate triage. Coaches demonstrate knowledge consistent with best practices related to concussion, but still lack access to resources for concussion information.<sup>10</sup> When coaches encourage student-athletes to report concussion signs and symptoms, as well as understand the risks of playing with a concussion, student-athletes are more likely to report a possible concussion. Therefore, understanding current coach concussion knowledge, the culture surrounding sport-related concussion reporting, and student-athlete reporting behaviors can improve concussion knowledge and influence student-athlete reporting. The purpose of this study was to understand current perceptions of coaches of Iowa interscholastic athletic associations on concussion culture, sports safety resources, and concussion management. Due to the nature of qualitative research, no proposed hypothesis was made. However, the following questions helped guide the research. In Iowa secondary schools, will current concussion culture and awareness impact concussion reporting behaviors among secondary school athletic coaches? Will reduced resources and education surrounding concussions result in decreased evidence-based concussion management, return to learn, and return to play protocols? Will coaches with access to an athletic trainer have increased concussion reporting and perceptions of concussion?

## METHODS

### Design

This study used the Consensual Qualitative Research (CQR) analysis process.<sup>11</sup> The CQR approach has been previously used in athletic training research related to concussions.<sup>12</sup> The CQR approach incorporates multiple researchers to gain different perspectives during data collection and allows for an in-depth look at the participant's responses and own experiences. This study was designed to assess coaches' perceptions and experiences with concussion culture, education, and management.

### Participants and Setting

Study participants were recruited through state high school athletic associations for boys and girls through an email blast and social media posts. Participants were included in this study if they were a coach within the state high school athletic associations for boys and girls and completed consent to participate forms. Exclusion criteria included coaches who are not coaches in the state high school athletic associations for boys and girls. Interested participants reached out to investigators for initial screening. Following an initial screening, participants were scheduled for an interview. This study was reviewed by the university institutional review board and deemed exempt research. We used criterion sampling for recruitment. This study was designed to assess coaches' perceptions and experiences with concussion culture, education, and management. A total of 17 interviews were conducted, at which point data saturation was determined to be met. The average age of participants was  $46.94 \pm 11.11$  years. Table 1 outlines participant characteristics and demographics.

**Table 1.** Participant characteristics and demographics

Participant Demographics	Frequency
Participant Age	46.94 ± 11.11
Participant Gender	
Male	12
Female	5
Participant Race	
White	17
Participant Education	
Some college	1
Associates degree	1
Bachelor's degree	8
Master's degree	7
Years Coaching	18.87 ± 6.67
Level Coaches	
All levels	3
Varsity	13
Sophomore	1
Sport Gender	
Boys	2
Girls	11
Both	4
Sports Coach	
Basketball	6
Cross-country/track	6
Volleyball	3
Golf	3
Soccer	2
Swim and Dive	1
Athletic Class	
1A	8
2A	2
3A	2
4A	5
5A	0
School Location	
Rural	10
Suburban	1
Urban	6
AT access	15
AT access practices	10
AT access games	14

### Instrumentation and Procedures

A semi-structured interview was conducted with 10-11 questions (open response) to guide the conversation. A script was developed by two members (RW, MF) of the research team (Table 2).

**Table 2.** Interview Script<sup>a</sup>

<b>Interview Questions</b>	
1)	How would you describe your concussion education training? a) Can you expand or elaborate?
2)	Has it changed your perspective of concussions or increased your knowledge? a) Can you expand or elaborate?
3)	Do you believe your players report concussions to you?
4)	Do you believe your players report concussions to their parent?
5)	Do you believe your players report concussions to their AT?
6)	Are they more likely to report to one of the three (coach, parent or AT) over another individual?
7)	What do you notice about your players reporting behaviors around concussion? a) Ask to elaborate
8)	What type of questions or concerns do players come to you about regarding concussion or concussion management
9)	Do you receive pressure regarding concussions, such as player safety or return to play? a) If yes, ask from who or for them to elaborate on the type of pressure they receive b) If no, ask to expand why they think they do not receive pressure
10)	What is your opinion on current concussion legislation in Iowa? a) Ask to expand or elaborate if need
11)	What is your opinion about your school's current concussion protocols? a) Ask to expand or elaborate if needed
12)	Do you think that concussion awareness is prominent in your community? a) Why or why not?
13)	What would you like to see happen in your sport, related to concussion management, education or culture? a) Ask them to elaborate or emphasize each aspect if they have not talked about it yet.
14)	What are your needs as a coach to promote good concussion management? a) Ask for clarification when needed
15)	What concussion education materials or resources would be helpful to you as a coach?
16)	How would you prefer content delivered to you/ how frequently?
<b>Demographics</b>	
1.	Age
2.	Sex
3.	Race/ethnicity
4.	What is the student population of your school?
5.	What is the athletic class the school competes at (1A, 2A, 3A, etc.)
6.	Is your school rural or urban?
7.	What sport do you coach? a. Level b. Boys/girls
8.	How long have you been coaching?
9.	Does your school have an athletic trainer? a. Do they cover practices? b. Do they cover games?
10.	What is your educational background?
11.	How frequently do you receive concussion education?

<sup>a</sup> = Interview questions in original format

Face and content validity was established by the research team and an external reviewer. Reviewers provided feedback on the interview script for appropriateness. Suggested feedback was taken into consideration and a final draft was made. Two pilot interviews were conducted with no changes made after. The primary investigator (RW) sent out emails to participants inviting them to participate. The email included the study purpose, the contact information of investigators, and an inquiry to participate in the study. Upon agreement to participate in the study a scheduled interview was made. Before scheduled interviews, participants signed and returned informed consents for participation. The interviews were held using the Zoom platform and conducted until

data saturation was met (roughly 30-45 min). The audio recording was transcribed using Zoom transcription and checked for accuracy. All participants were independently interviewed and used member checking, in which, the participants approved the transcripts for accuracy and clarity.

### Data Analysis

Following data saturation and the completion of interviews, all identifiable information was redacted from transcription to maintain confidentiality. Data were analyzed using thematic analysis. A thematic approach was used to code and categorize main themes and subthemes through data collection. Specifically, a three-person research team developed steps to identify the main themes from the data through a codebook. The three members of the research team independently reviewed the transcripts and separately generated a list of themes. Before data collection, the research team did not establish preexisting themes. The themes were developed based on the data collected and responses from participants. One research team member served as the internal auditor. This researcher confirmed data saturation was achieved and verified the study team members' interpretation of data. This eliminated any bias and maintained a team consensus. All researchers reviewed each transcription and coded the transcripts into summarized themes rooted in the data. When a discrepancy occurred between team members, the internal auditor reviewed the theme discrepancy, discussed it with each member, and came to a consensus. Data interpretation includes 1.) an initial code domain, 2.) core ideas from each domain, and 3.) multiple interviews for categories and themes for cross-analysis.

Following the initial development of themes, the researchers met to reach a consensus on the main themes and subthemes. Another set of transcripts were then reviewed, with the main themes and subthemes in mind, to code the transcripts. The researchers used a spreadsheet to record the coding of transcripts using agreed-upon themes. The researchers went through 5 phases of analysis. During the first phase, researchers reviewed three transcripts, identified categories of key words, developed categories into themes, identified the themes of the categories, created an initial code book, and then met to reach a consensus on agreed-upon themes. During phase two, the researchers reviewed one transcript from phase 1 and one additional transcript with the approved initial code book. The researchers then met again to create a consensus and no changes were determined. During phase three, the researchers reviewed five transcripts and followed the same process outlined in phase 2. Phase four allotted the researchers to review five transcripts and meet to create a consensus. No changes to the code book were made. During the final phase the remaining transcripts were reviewed. This was done until all transcripts were reviewed using agreed-upon coded themes.

To maintain consistency, one additional study team member was used for internal consistency among study team members for consensus and coding checks to reach final consensus and coded themes. Further, researchers met regularly for data collection, analysis, and writing to maintain consistency throughout the study process. Upon completion of the identified themes and categories, frequencies were calculated.

## RESULTS

Four themes were discovered through thematic analysis including 1.) reporting, 2.) concussion education, 3.) awareness, and 4.) culture. The subtheme associated with each theme is included in Table 3.

### Reporting

Participants described their players' preferences and attitudes for reporting, including who they report to and their willingness to report. Coaches, largely, suggested that players reported concussions to their coaches and, with some apprehension, reported to their athletic trainers.

One participant emphasizes the hesitancy of reports: *"They are a little timid, to begin with, but they do open up once I talk with their parents. Like okay, you might not be acting quite right so let's figure out what's going on because we don't want to cause any more damage. Once again, they are reluctant at the beginning but get a little more open to reporting it after a little encouragement."*

While another participant focused on reporting related to the overall athletic program being new: *"I'm in a good stage of our athletic program because I work in a school that's only been a high school for 12 years. So, the kids that are athletes are just now feeling success, and the ability to perform is hitting home now. In that sense, so their injuries, they report easier because they don't understand it quite yet. The program hasn't been [around] for years, where it's like, I got to be out there."*

Another participant focused on how the emphasis of the coach letting the players know it is OK to report has facilitated reporting, yet there is apprehension on the player's part to report to an athletic trainer: *"I've made it very clear that you don't lose a starting*

position because of concussion, you don't lose your spot. Now you might lose a little playing time coming back as we ease you back in. So once we know you're fully ready to go, you're back into your spot. [For example] I had a starter this last year that was very mad at me for bringing the [athletic] trainer into it."

Theme	Subthemes	Sub-Category Notes
Reporting	Preferences	Who they report to
	Attitudes	Willingness to report
Concussion Education	Platforms	Mode delivery/ type/ method/ frequency (current)
	Content	
	Exposure	
	Suggested changes	Future frequency, future changes
Awareness	Barriers	Athletic trainer availability
	Facilitators	Athletic trainer availability. Protocols, legislation
	Communication	Flow of communication at school
	Resources	Fact sheets, baseline testing
	Pressure	Related to having an AT, increased communication
Culture	Preference	Sport culture
	Attitudes	Toughness, "bell rung"
	Safety	Long term concerns
	Pressure	Lack of culture, no support, mental toughness

**Table 3.** Themes and sub-themes

### Concussion Education

Participants described concussion education via different platforms, the mode, the type, frequency, and suggestive changes. Many participants described the repetitive nature of the required annual coaches' concussion education without any change over the past few years. Further, participants placed emphasis and focus on the lack of player education. Many participants felt more initiative should be made for developing content for players to help with promoting concussion reporting and awareness.

Specifically, one participant focused on the coaches' education being the same every year: *"It can be somewhat repetitive. Ours is the state required. [It is the] online course we have to take."*

Another emphasized that the same video yearly makes is more likely to not pay as close attention to the content: *"It's the same every year. I mean because it's the same stuff and I've been doing it for a lot of years, I don't have to listen to the information to answer the questions."*

### Awareness

Participants discussed concussion awareness and barriers related to the athletic trainer availability, facilitators including protocols and legislation, the flow of communication at the school, and resources that are currently available.

Some participants discussed the state law and how it was effective: *"I think it's good. I think they're erring on the safe side, which I think is good. I think it's very, very good. As coaches we want to win games, we [don't want to] lose the games. I think they're doing the right things by erring on the side of safety and I think that's key."*

Another respondent discussed the awareness in the community: *"I would say it's much more prominent than when I was a player here and when I was an athlete, their athletic trainer and the student [aides] they have, are more aware of things. We have ImPACT testing that all the kids have to do and you know kids don't put up a struggle about having to do [ImPACT]. You just have to do [it] to play. I think having the parents sign off on those sheets to also understand, this is something that we take pretty seriously I think is a good side as well."*



### **Culture**

Participants emphasized the culture surrounding concussion in their sport and the preferences on concussion reporting from both player and coach perspective, the attitudes of the players in their sport surrounding concussions, past attitudes and culture in their sport, player safety, and long-term concerns coaches and players may experience. Participants also emphasized the pressure surrounding concussions including mental toughness, lack of positive concussion reporting culture, and lack of support for concussion education, awareness, and management.

One participant discussed some of the pressures they received and the culture of the sport: *"I think it just depends on their investment into whatever sport is going on if you have somebody that has a lot of potentials to do very well at the sport and possibly play at the next level. Parents are always the first ones to say 'hey we got to get him back into play or we got to get her back into play.' And then that kind of filters down into the kids as well. If they know [about] missing playing time they're going to be missing opportunities to play for scouts or college coaches there. They're going to try to rush back but I don't take any stake in it when they're trying to tell me how to run the team because even though they might not like it, I know they're going to thank me in the long run."*

Another participant emphasized the need to continue to educate and create better culture and awareness: *"I think that it would be great if we could get the parents to have to sign a statement [saying] they know about concussions and there are a couple of other statements on this form that they're supposed to fill out. But it would be nice to see if we could get them to watch some kind of educational film or something about concussions and that way you know [they have the information]. I have to send a certificate to the school that says I did it. So, it would be great if we could get them to do it too. There is a lot of old-school people that think that just move on, keep playing. And in, even in the refereeing community, you know there are some people that, that, you know, if a player takes a pretty good hit, you know, they'll just let play continue which I don't believe in."*

### **DISCUSSION**

Overall secondary school coaches expressed regular reporting of concussions by student-athletes. The coaches expressed that the current mandated concussion education video for coaches was the same annually and could be updated with new information and be more engaging, while also expressing the need for educational content for student-athletes and parents/guardians. The findings from this study highlight the importance of continuing to educate coaches on current concussion management strategies. The discussion will highlight each theme of discovery and the following proposed research questions: in Iowa secondary schools, will current concussion culture and awareness impact concussion reporting behaviors among secondary school athletic coaches? Will reduced resources and education surrounding concussions, result in decreased evidence-based concussion management, return to learn, and return to play protocols? Will coaches with access to an athletic trainer have increased concussion reporting and perceptions of concussions?

### **Reporting**

While concussions are prevalent in sports, concussion awareness and knowledge have gradually increased to emphasize concussion reporting. The theory of planned behavior (TPB) emphasizes that knowledge is a vital predictor for controlling factors, changing reporting, or influencing behavior. One of the strongest components of the TPB is the intention to perform a specific behavior. Concerning concussions, intention to report and knowledge of concussions can be associated with TPB. Results from this study support intention to report with coaches describing their players reporting preferences to be towards the coach and some apprehension to the athletic trainers. The coaches did, however, provide the support that attitudes towards reporting concussions have been more positive and that they are willing to report, minus the few student-athletes who may try to hide their concussion. Understanding the coaches' perspective on player reporting is important to gather insight to develop initiatives to improve reporting strategies.

Research has shown that intentions to report may differ by sex, with Weber et al reporting sex differences between males and females on indirect intentions to report concussions, and those who participated in non-contact or limited contact sports had an increase in intentions to report concussions compared to student-athletes who participated in contact sport participation.<sup>13</sup> However, intention to report and the behavior for reporting concussions are different, and this study did not quantify any changes to reporting behaviors by sex. It is important to recognize that participants in this study primarily coached female sports, perhaps supporting previous research that has shown females are more likely to have intentions to report than males.<sup>13,14</sup>

Additional research has explored reporting intentions, knowledge, and attitudes towards sport-related concussions in youth athletes between middle school and high school age. The study reported that those who were in urban areas demonstrated a higher odds of concussion knowledge level compared to rural and schools with low socioeconomic status (SES) demonstrated odds of lower

concussion knowledge. This finding demonstrates that there may be factors associated with the location of schools, SES differences related to concussion education, and intention to report.<sup>14</sup> While our study did not specifically look at intentions to report, it should be noted that findings in the literature related to urban and rural settings are important when looking at delivering educational material and increasing reporting behaviors. Specifically, Iowa is a unique state that has a large portion of rural cities and areas of low SES. The majority of participants coached at schools with less than 500 students per school making them the lowest athletic class (1A) and more likely to not have access to appropriate health care providers. Making sure that we are providing resources to areas that may be limited in access may improve concussion knowledge and reporting. Due to the need to enhance concussion reporting, education, and knowledge to make changes in concussion culture, it is important to learn more about current patterns related to coaches.

### **Concussion Education**

Participants described concussion education delivery through various platforms and differences in mode, type, and frequency. Further participants described the repetitive nature of the required annual coaches' concussion education pointed out that there hasn't been any change to the content over the past few years. Iowa's concussion laws require concussion education for parents, coaches, and players to increase concussion awareness and to be able to recognize the signs and symptoms of injury. However, the delivery of education is typically through the Centers for Disease Control and Prevention's (CDC) HEADS UP concussion fact sheet and an informational sheet signed by parents.<sup>8,15,16</sup> Further, Iowa athletic coaches are required to submit annual concussion training through the National Federation of High Schools concussion education training partnered through the CDC.<sup>8,17,18</sup> While it is unclear if the coaches' training tool has made modifications over the years, coaches reported that it is the same annually, with coaches who are seasoned stating they can passively listen or just take the quiz without the refresher. It is important to continue to update coaches on concussion education. A recent content analysis of concussion education efforts for coaches found that most coach concussion education resources address the majority of concussion education topics including management, prevention, and recognition, but not all of them were covered.<sup>19</sup> Another study focused on youth hockey coaches and found that overall concussion knowledge was appropriate but targeting efforts more towards sports-specific education could be beneficial.<sup>20</sup>

Research has shown that concussion education is important, but knowledge and behavior are not directly related.<sup>21</sup> Coaches are in the unique position to see players frequently, build rapport and relationships, and are often looked up to by players. Supportive coaches who understand concussion education, recognize the signs and symptoms of concussions, and support the management process, may have a direct impact on their players. Developing coach concussion education that not only improves concussion knowledge and recognition but can target planned behavior and influence both coach intentions and improve player reporting behaviors is needed. Research has suggested that online educational tools may help improve overall concussion knowledge, targeted in-person educational efforts may be more effective at reducing concussion incidence.<sup>22</sup> In this study, many coaches emphasized the lack of player education on concussions. Many participants felt more initiative should be made for developing content for players to help with concussion reporting and awareness. It is important to have players engage in concussion education that is not fact sheet driven but can help influence the understanding of concussion and improve reporting intentions, increase awareness surrounding concussions and long-term effects, and promote positive attitudes around concussions.

### **Awareness**

Participants discussed concussion awareness and barriers related to the athletic trainer availability, facilitators including protocols and legislation, the flow of communication at the school, and resources that are currently available. Many participants highlighted that awareness is growing in the community. Concussion research has been around for a long time; however, the initial Iowa state concussion law went into effect in 2013, and since then there has been more awareness at the local level, particularly at the high school setting. The high school athletic associations require coaches to complete training and the state concussion law requires parents and players to review a concussion information sheet and sign it acknowledging that they read through the signs and symptoms.<sup>8</sup> While there is still room for improvement, awareness has increased throughout the communities, yet continual efforts should be made for positive concussion awareness at all levels and not just mandated by the state high school associations. It is still unclear what concussion education is available at the youth sports level and club levels and how that influences overall concussion awareness of coaches, players, and parents.

### **Culture**

Participants emphasized the culture surrounding concussion in their sport and the preferences on concussion reporting from both player and coach perspective, the attitudes of the players in their sport surrounding concussions, past attitudes and culture in their sport, player safety, and long-term concerns coaches and player may experience. Participants also emphasized the pressure surrounding concussions including mental toughness, lack of positive concussion reporting culture, and lack of support for concussion education, awareness, and management. This study is one of the first to examine Iowa-specific coaches and the role

the state concussion education may play on these factors. Further, as Iowa has a broad demographic of resources available to communities, this study was able to highlight the differences in resources available and the nature of small communities, and the mental toughness or culture shift by sports.

### Recommendations

Based on the interviews conducted in this study, it is recommended that coaches undergo concussion education training that is regularly updated, and the delivery platform is varied. Further, it is recommended that coaches be involved in player concussion education and that players are a key focus on education efforts. Concussion education efforts should be targeted towards players with recommendations that it is also appropriate for various stakeholders.

### Limitations

Though we achieved data saturation and valuable insights from coaches in the state of Iowa, this study is not without limitations. This study was voluntary, and participants were recruited for participation, which could lead to sampling bias due to self-selection or self-interest in participating and expressing experiences and knowledge of concussion.

### CONCLUSIONS

Future efforts should be placed on concussion informational videos, fact sheets, and education for student-athletes and their parents/guardians to help increase reporting behaviors, change the culture of concussions in each sport and enhance player safety. Clinicians should recognize the importance of incorporating coaches into concussion education and the opportunities to change reporting behaviors among athletes. Clinicians should also work alongside coaches to inform players on appropriate player safety and concussion management.

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