

Concussion Knowledge and Reporting Behaviors Among Collegiate Athletes

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Abstract

Objective: The purpose of the current study was to explore knowledge surrounding sport-related concussions (SRCs) and the impact on reporting behaviors in collegiate athletes, including sex differences. **Design:** Cross-sectional. **Setting:** Institutional. **Participants:** Participants were 986 collegiate athletes (607 men), aged 19.7 years (SD = 1.4) from 6 institutions, who completed a survey, including items on personal/sport demographics and SRC knowledge and reporting behaviors. **Interventions:** Athletes were given a short (15-minute) survey to complete during team meetings and preparticipation physicals. **Main Outcome Measures:** Athletes' scores on the survey, and reporting behaviors (ie, whether or not they failed to report a suspected SRC and reasons for not reporting SRCs), were examined. **Results:** Independent samples *t* tests revealed female athletes scored significantly higher than male athletes on total SRC knowledge [$t(926.6) = -10.6, P < 0.01$] and symptom knowledge [$t(859) = -7.0, P < 0.01$]. Approximately one-quarter of athletes reported continuing to play after sustaining a suspected SRC. Chi-square analyses exposed significant differences between male and female athletes failing to report a suspected SRC ($\chi^2 = 7.69, P < 0.01$). **Conclusions:** Given the current findings, educational efforts aimed at collegiate athletes may not be enough. Furthermore, it is apparent that sex differences exist in SRC knowledge and reporting behaviors among collegiate athletes.

Key Words: concussion, mTBI, concussion reporting, symptoms, collegiate sport

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INTRODUCTION

Recently, sport-related concussions (SRCs) have been a growing concern in collegiate sports because of the acute and potential long-term consequences of the injury. As a result of this growing concern, SRC awareness has dramatically increased.¹ Current SRC consensus statements provide guidelines and recommendations for recognition, evaluation, and management of SRCs.^{2,3} In an effort to improve SRC awareness and knowledge among collegiate athletes, the National Collegiate Athletic Association (NCAA) began mandating concussion education for all athletes in 2010.⁴ Although previous research suggests that 98% of surveyed NCAA schools comply with preseason educational efforts, more research is needed to understand the impact of education on collegiate athletes' SRC knowledge and reporting behaviors.^{5,6} Specifically, it is unknown whether an increase in education results in a subsequent lasting increase in SRC awareness and knowledge, and whether that knowledge affects the reporting of suspected concussive injuries.

Despite the recent increase in SRC educational initiatives in collegiate athletics, little is known about SRC knowledge among collegiate athletes, especially female athletes. Previous research has examined general SRC knowledge and the influence of knowledge on SRC reporting behaviors; however, many of these studies have focused on high school athletes.^{1,7} Register-Mihalik et al¹ reported that, overall, high school athletes were generally knowledgeable about SRC, specifically signs and symptoms of SRC. However, a gap in knowledge of less common SRC signs and symptoms was present. Wallace et al⁷ found only 57% high school athletes were able to identify nausea as a symptom of concussion. Globally, high school athletes also had difficulty identifying sleep difficulties, foggy, difficulty concentrating, and behavioral changes as byproducts of SRC.^{1,7,8} Sports medicine professionals rely heavily on subjective symptom reporting to recognize an SRC; therefore, it is imperative that athletes are able to recognize the signs and symptoms they are experiencing as those of an SRC.

Few studies have examined SRC knowledge among collegiate athletes.^{9,10} Miyashita et al noted sport-related differences in knowledge surrounding SRC between women's soccer and men's basketball, and men's soccer and men's basketball, with men's basketball players seeming to have a greater knowledge about SRC before an educational intervention. In another study exploring collegiate athletes' knowledge about SRC and the potential outcomes following the injury, Kaut et al⁹ noted over half of the athletes reported not understanding the possible problems that may arise from SRC. Similarly, Kroshus noted limited knowledge in a collegiate population of ice hockey players, especially regarding attitudes toward SRC and intentions to report, with a high number of unreported suspected SRCs.¹¹ The previous

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research on collegiate athletes' knowledge of SRC has primarily focused on male athletes and very limited women's sports.

Concussion education efforts over the past 2 decades have increased athletes' knowledge and awareness of SRCs,¹⁰ but there is an evident disconnect between education efforts and shifts in disclosure behaviors. Although educational efforts are encouraged and important, current research suggests that increased knowledge may not increase SRC reporting in athletes.^{11,12} Several researchers^{1,7,13,14} have investigated SRC reporting behaviors among high school athletes and have found that more than half of suspected SRCs are not reported to an authoritative figure. Among high school athletes, the top reasons for not reporting a suspected SRC were not thinking the injury was serious enough to warrant medical attention, not wanting to lose playing time, and not wanting to let their team down.^{1,7,13} These data support the idea that knowledge alone may not always equate to behavior changes, and suggests that educational efforts may not influence SRC reporting. Similar findings are present in the collegiate population.^{15,16} Delaney et al¹⁵ noted almost 20% of collegiate athletes reported continuing to play while experiencing symptoms of an SRC. Kerr et al¹⁶ noted approximately one-third of former collegiate athletes who had previously sustained a self-reported SRC reported not disclosing their injury to anyone; this non-disclosure was highest in collision sports (football), compared with contact and noncontact sports.

When exploring the reasons for nondisclosure, previous research conducted in the collegiate population has shown SRC knowledge may not predict reporting behavior, especially among male athletes. Among male, college-aged ice hockey athletes, SRC knowledge did not predict reporting.¹¹ Male collegiate ice hockey athletes' perceived outcomes of short-term athletic participation (including not being able to practice or play when they felt ready, being withheld from a game, and hurting the team's performance) had a negative association with reporting intention.¹¹ Moreover, male athletes, in both high school and college, have been shown to withhold SRC symptom information from medical professionals for reasons associated with their athletic identity, male athlete stigmas, and perception of social referents that includes coaches and teammates.^{7,11}

Much of the reporting-behavior research in the collegiate population is restrictive to male sport athletes or limited women's sports; therefore, little is known about how reporting of a suspected SRC may differ among female collegiate athletes among multiple sports. Wallace et al⁷ investigated sex differences in reporting behaviors and knowledge of SRC symptoms in high school athletes and found that male and female athletes have similar symptom knowledge, but female athletes are more likely to report concussive injuries compared with male athletes. Furthermore, Kurowski et al¹⁷ found that female sex was more likely to be associated with increased SRC knowledge and self-reporting behaviors. In studies exploring collegiate athletes, Kaut and colleagues noted female athletes had similar rates of returning to play while symptomatic from a suspected SRC,⁹ whereas Kerr noted a higher prevalence of not reporting a suspected SRC in male athletes.¹⁶

The current study aims to address limitations of previous research by exploring SRC knowledge in a collegiate population of both male and female athletes across multiple sports, and furthermore, exploring how that knowledge has affected their past reporting behaviors. Therefore, the purpose

of the current study was to explore SRC knowledge in collegiate athletes, including differences in symptom and total SRC knowledge between male and female collegiate athletes, and furthermore, to examine what, if any effect, these knowledge differences may have on reporting behaviors.

METHODS

Participants

Participants for this cross-sectional study were NCAA collegiate student-athletes from Division-I (n = 4) and Division-II (n = 2) athletics programs in Pennsylvania, Ohio, Michigan, and South Carolina. Both male and female collegiate student-athletes between the ages of 18 to 24 years of age who participated in an NCAA-sanctioned sport at their institution were recruited for participation. In an attempt to reduce response bias, participants were excluded if they had sustained a concussive injury within the previous 3 months, had lingering concussive symptoms from an injury they sustained longer than 3-months prior, or if they were actively undergoing treatment for prolonged issues related to concussive injuries at the time of survey completion.

Instrumentation

A single-time, 15-minute survey was used to collect information on personal and sport demographics, SRC history, SRC knowledge, and SRC reporting behaviors. The survey further asked whether or not the athlete had ever received formal SRC education. The survey was assessed for face validity by 3 content experts. Athlete knowledge of SRC was assessed using a series of 6 questions in which participants were asked to recognize the signs and symptoms of SRCs from a list, identify complications related to multiple SRCs and continuing to participate with an SRC, and answer questions pertaining to general SRC knowledge. From this assessment a symptom knowledge score (maximum of 34) and total knowledge score (maximum of 49) were obtained. A higher score reflected a greater understanding of SRC. The knowledge instrument was originally developed by Register-Mihalik et al¹ with a Cronbach α of 0.72. An additional 7 signs and symptoms of SRC (eg, fogginess) were added to update the instrument to be consistent with current advances in SRC identification and management. The adapted SRC knowledge instrument had a Cronbach α of 0.77.

Concussion reporting behaviors were assessed through a method previously established by McCrea et al,¹³ which was then adapted by Wallace et al.⁷ Participants were first asked whether they had ever sustained a potential SRC that they did not report to a coach, teammate, parent, or athletic trainer. They were then asked how many unreported SRCs they had sustained and whether they had ever continued participating in a practice or game while experiencing SRC symptoms. Those reporting a history of SRC nondisclosure were then asked to identify from a list the reasons why they did not report a possible SRC to anyone. The list included 15 possible reasons for not reporting an SRC (eg, not wanting to miss playing time, not thinking the signs and symptoms were serious enough to warrant medical attention, not wanting to appear weak to teammates and/or coaches), as well as space for participants to list additional reasons for nondisclosure.

Procedure

Institutional Review Board (IRB) exempt approval was first obtained at all institutions. An informative e-mail about the study was then sent to the head athletic trainers at the 6 participating institutions. The sports medicine team of certified athletic trainers at each institution acted as communication and data collection scheduling liaisons between the research team and collegiate student-athletes. Data collection consisted of participants voluntarily agreeing to participate by completing the anonymous survey on an iPad or via paper and pencil. The study survey was completed during team meetings before or after a team practice, or as the participant was receiving treatment in an athletic training clinic. Participants were informed that they could terminate the survey at any time without penalty. Upon completion, all paper and pencil responses were entered into the Qualtrics online survey platform and then downloaded as an IBM Statistical Package for the Social Science (Version 24) data file for statistical analyses.

Statistical Analysis

Descriptive statistics were completed for sex, age, race, sport, and previous SRC history to gain a better understanding of the participant sample. Differences between male and female athletes' total and symptom knowledge scores were investigated using multiple *t* tests. Chi-square analyses were used to determine whether there were any relationships between sex and nondisclosure of a suspected SRC, and a logistic regression analysis was used to explore the predictive power of sex and SRC knowledge on reporting behavior. Furthermore, frequencies were assessed to explore reasons for not reporting a suspected SRC. All analyses were completed using SPSS with statistical significance set at $P \leq 0.05$.

RESULTS

Demographics

Participants in the current study were 986 collegiate student-athletes (607 men), aged 19.7 years (SD = 1.4; range = 18–24 years) from 6 participating institutions. An independent samples *t* test revealed male athletes (19.8 years, SD = 1.4) were significantly older than female athletes (19.5 years, SD = 1.2; $t(905.4) = 2.9, P < 0.01$). Participants represented a number of different sports, including: football ($n = 236$; 24.3%), women's lacrosse ($n = 115$, 11.7%), baseball/softball ($n = 103$, 10.4%), men's and women's soccer ($n = 94$, 9.7%), and wrestling ($n = 58$, 5.9%), among others. Respondents were primarily white ($n = 740$, 75.1%). Of the participants, 293 (30.0%) had previously sustained an SRC (185 men). Furthermore, all athletes reported previously receiving formal SRC education. See Table 1 for more demographic information.

In the current sample ($N = 986$), athletes had an average score of 26.7 (SD = 4.7) on the symptom checklist. Scores ranged from 12 to 34, with a highest possible score of 34. On the total knowledge survey, athletes ($N = 936$) had an average score of 40.3 (SD = 5.1). Total knowledge scores ranged from 20 to 48, with the highest possible score on the survey being a 49. In addition, athletes reported whether or not they had ever failed to report a suspected SRC during practice or game.

TABLE 1. Demographic Information

Sex	N (%)
Male	607 (61.5%)
Female	380 (38.5%)
Sport	Total
Football	236 (24.3%)
Lacrosse	115 (11.8%)
Baseball/Softball	103 (10.6%)
Soccer	94 (9.7%)
Basketball	82 (8.4%)
Wrestling	58 (6.0%)
Ice hockey	40 (4.1%)
Cross country	39 (4.0%)
Volleyball	36 (3.7%)
Tennis	38 (3.9%)
Water polo	31 (3.2%)
Field hockey	23 (2.4%)
Track and field	23 (2.4%)
Swim and dive	21 (2.2%)
Rowing	16 (1.6%)
Golf	10 (1.0%)
Bowling	8 (0.8%)
Race	N (%)
White	740 (75.1%)
Black	145 (14.7%)
Multiple	54 (5.5%)
Hispanic/Latino	31 (3.1%)
Asian	7 (0.7%)
Hawaiian/Pacific Islands	2 (0.2%)
American Indian/Alaskan Native	2 (0.2%)
Other	5 (0.5%)

Two hundred twenty athletes (23.8%) recounted failing to report a suspected concussive injury during a practice, whereas 229 athletes (24.7%) stated they had not reported a potential SRC during a game.

Sex Differences in Knowledge About and Symptom Recognition of Concussions

Independent samples *t* tests revealed female athletes scored significantly higher than male athletes on total SRC knowledge ($t(926.6) = -10.6, P < 0.01, 95\% \text{ CI}, -3.7 \text{ to } -2.6$) and symptom knowledge ($t(859) = -7.0, P < 0.01, 95\% \text{ CI}, -2.6 \text{ to } -1.5$). In the current sample, scores on the total knowledge survey ranged from 20 to 48 for men ($M = 39.1, SD = 5.4$) and 28 to 48 for women ($M = 42.3, SD = 3.7$), with higher scores representing greater knowledge surrounding SRCs. Similarly, scores on the symptom checklist ranged from 12 to 34 for men ($M = 25.9, SD = 4.7$) and 14 to 33 for women ($M = 28.0, SD = 4.3$), with higher scores indicative of greater symptom knowledge. Looking at sport-by-sport comparisons, female soccer players scored significantly higher than male soccer players on both the total knowledge survey

TABLE 2. Sport-By-Sport Comparisons of Total Knowledge and Symptom Knowledge

Sport	Total Knowledge M (SD)	Symptom Knowledge M (SD)
Soccer		
Male	40.24 (4.69)	25.81 (4.52)
Female	42.97 (2.97)	29.00 (2.66)
Basketball		
Male	38.35 (6.21)	25.93 (4.84)
Female	43.06 (2.45)	28.82 (2.41)
Softball/Baseball		
Male	40.50 (3.64)	27.13 (3.52)
Female	42.06 (3.19)	28.51 (2.56)

($t(68.36) = -3.03, P < 0.01$) and the symptom knowledge survey ($t(83.71) = -4.14, P < 0.01$). Similar findings were noted for men’s and women’s basketball and men’s and women’s track and field. Further findings can be found in Tables 2 and 3.

Sex Differences in Reporting Behaviors of Suspected Concussions

Chi-square analyses exposed significant differences between groups regarding whether or not they had ever failed to report a suspected SRC ($\chi^2(1, N = 925) = 7.7, P < 0.01$), with male athletes failing to report suspected SRCs more frequently than female athletes. Furthermore, reporting behaviors were significantly different between male and female athletes during games ($\chi^2(1, N = 927) = 10.9, P < 0.01$), showing that male athletes were significantly more likely to continue participation in a game when they were experiencing symptoms of a suspected SRC. In practices, there was no significant difference between male and female athletes in reporting a suspected SRC; however, there was a trend suggesting men were more likely to continue participation after incurring a suspected SRC ($\chi^2(1, N = 926) = 5.2, P = 0.07$). A logistic regression assessed the predictive utility of total SRC knowledge and sex on SRC reporting behaviors (Table 4). The full model was significant ($\chi^2 = 23.2, P < 0.01$), suggesting that as knowledge increased, athletes were more likely to report a suspected SRC. Similarly, women were more likely to report a suspected SRC. However, Nagelkerke’s R^2 of 0.04 indicates a very weak relationship with little clinical significance, suggesting the SRC knowledge may not have a large impact on SRC reporting behaviors.

Reasons for Not Reporting a Suspected Concussion

Overall, 242 male athletes (39.9%) and 123 female athletes (32.4%) reported failing to report at least one suspected SRC. Male and female athletes reported similar reasons for not reporting a suspected SRC. The top 3 reasons male athletes reported not disclosing a suspected SRC were “I didn’t want to miss a game” ($n = 98, 40.5\%$), “I did not want to lose playing time” ($n = 98, 40.5\%$), and “I did not want to let my team down” ($n = 82, 33.9\%$). Similarly, female athletes reported the same top 2 reasons “I didn’t want to miss a game” ($n = 40, 32.5\%$) and “I did not want to lose playing time” ($n = 38, 30.9\%$); however, the third most cited reason for not

TABLE 3. Results of t Test for Sport-By-Sport Comparisons of Total Knowledge and Symptom Knowledge

Sport	t	df	P
Soccer			
Total knowledge	-3.03	68.36	0.004†
Symptom knowledge	-4.14	83.71	0.000†
Basketball			
Total knowledge	-4.10	43.55	0.000†
Symptom knowledge	-3.40	62.63	0.001†
Baseball/Softball			
Total knowledge	-2.12	94	0.036*
Symptom knowledge	-2.08	97	0.040*

* Significant at $P < 0.05$.
 † Significant at $P < 0.01$.

reporting a suspect concussion for female athletes was “At the time I did not think it was a concussion” ($n = 27, 22.0\%$). Further information regarding reasons for not reporting a suspected concussion can be found in Table 5.

DISCUSSION

Overall, findings from the current study suggest collegiate athletes have a basic understanding of SRCs, including the signs and symptoms. However, no athletes in the current sample were able to correctly answer all questions surrounding SRCs on the knowledge survey, suggesting further educational efforts may still be necessary. Despite recent recommendations for increased SRC education^{2,3} and changes in NCAA regulations requiring SRC education for all athletes,⁴ many athletes still fail to correctly identify all signs and symptoms of an SRC. In addition, many athletes report continuing to participate in games and practices after sustaining a possible injury, suggesting a lack of understanding surrounding the consequences of SRCs, similar to findings in previous studies.^{9,16}

Furthermore, female collegiate athletes have better knowledge surrounding SRCs, including the signs and symptoms of the injury, which is consistent with previous findings in a high school population.¹⁷ This may highlight that despite NCAA educational efforts, there is not a noticeable difference in recognition of SRCs from high school to college. In addition, female athletes are more likely to report a suspected SRC, compared with male athletes, also extending previous research in high school athletes.^{7,16,17} Findings from the current study demonstrate as knowledge surrounding SRC increases, athletes are more likely to report a suspected concussion, contrary to previous findings.^{11,12} The impact of this finding, however, was relatively small, suggesting that although increasing knowledge surrounding SRCs may be helpful, it

TABLE 4. Results of a Logistic Regression Analysis Predicting Reporting a Suspected Concussion

Variable	B	SE	Wald	P	Odds Ratio
Sex	-0.72	0.21	11.67	<0.01	0.49
Total knowledge	-0.07	0.02	8.50	<0.01	0.93

TABLE 5. Reasons for Not Reporting a Suspected Concussion for Male (N = 242) and Female (N = 123) Athletes

Reason	Total Males (%)	Total Females (%)
I did not want to miss a game.	98 (40.5)*	40 (32.5)*
I did not want to lose playing time.	98 (40.5)*	38 (30.9)*
I did not want to let my team down.	82 (33.9)*	24 (19.5)
At the time I did not think it was a concussion.	71 (29.3)	27 (22.0)*
I did not think it is a serious injury.	61 (25.2)	21 (17.1)
I did not want to have to go to the doctor.	59 (24.4)	26 (21.1)
I thought my teammates would think I am weak.	41 (16.9)	13 (10.6)
I thought my coach would think I am weak.	39 (16.1)	14 (11.4)
I thought my coach would get mad.	37 (15.3)	13 (10.6)
I was worried that I would have to miss school and get behind on my school work.	35 (14.5)	15 (12.2)
My team was going to the playoffs when it happened.	25 (10.3)	9 (7.3)
I thought my parents would be upset.	16 (6.6)	9 (7.3)
I was concerned it would affect my chances of playing professional sports.	12 (5.0)	3 (2.4)
I had an exam or project due that I did not want to make up.	9 (3.7)	3 (2.4)
I did not have health insurance and could not go to the doctor.	5 (2.1)	2 (1.6)

* Top 3 reason for not reporting suspected concussion.

may be important to use other measures, such as challenging preconceived stereotypes and social norms in athletics, to increase reporting behaviors.

The difference in reporting may be in part because of male athletic identity and stigmas, and perceived perceptions of coaches and teammates, as previously reported by Wallace et al.⁷ Our findings regarding reasons for not reporting a suspected SRC may support this, as one of the top reasons for male athletes failing to report a suspected injury was not wanting to let their team down. At the very least, it is important to continue to explore athletes' reasons for not reporting suspected SRCs to better understand how to encourage reporting.

In the current study, over a third of student-athletes reported previously not disclosing a suspected SRC. While much of the educational efforts to date have been geared toward increasing knowledge and recognition of SRCs, it may also be important to change perceptions around athletic identity and stigmas surrounding playing through pain and injury to attempt to increase reporting of suspected concussive injuries. Previous work by Kroshus et al¹⁸ examined social norm theory on concussion education and reporting behaviors. Our findings of male athletes reporting not wanting to let others down further support the work done by Kroshus et al, suggesting that changing perceived norms surrounding reporting suspected injuries, and highlighting social/gender roles may be beneficial to increase reporting behaviors, rather than solely focusing on increasing education. Social comparison theory suggests individuals will act in a way that is consistent with their comparison group¹⁹; thus, if they have preconceived expectations of how their teammates will act (ie, playing through injury and not reporting a suspected concussion), then they will be more likely to act similarly. Furthermore, through social role theory, it is understood that there are different expectations for behavior based on sex and gender roles,²⁰ which would further illuminate why male

athletes tend to report suspected injuries less often than female athletes. Exploring the interpersonal reasons for reporting or not reporting (eg, others' attitudes/pressure) may help garner understanding of why athletes choose not to disclose a suspected injury.²¹

This is not to say that education is unimportant, as nearly one-third of male athletes and one-quarter of female athletes in the current study stated they had previously failed to report a suspected SRC, because they did not know they were dealing with a concussive injury. Similarly, many athletes (25.2% men and 17.1% women) reported not believing their injury was serious enough to report, suggesting a lack of knowledge or understanding surrounding SRCs and their effects. Although previous research has found similar findings in a high school population,^{1,7,13} the current findings are important, because this study is one of the first to explore sex differences in knowledge surrounding SRCs in collegiate athletes across multiple sports. In addition, this study extends previous knowledge by further exploring how athletes' knowledge and understanding around SRCs, as well as sex, may affect reporting behaviors. It is important to note this study supports the belief that increasing knowledge can positively affect reporting behaviors, although the clinical impact may be small. It is also important to explore whether or not the current educational efforts are in fact increasing knowledge and recognition of SRCs.

This study is aided by many strengths, including a large sample size, representation of many sports, and surveying both male and female athletes, allowing sport-by-sport comparisons. In addition, the athletes ranged from ages 18 to 24 years, thus representing first-year college athletes, and those who have been playing collegiate sports for multiple years. Furthermore, athletes were asked to respond based on previous reporting history, not simply hypothetical situations, in an attempt to garner true information surrounding reporting behavior. Although the current study has many strengths, the study also has a few limitations, including

a large percentage of male athletes, specifically football players. This study was also limited by its inability to calculate a response rate, thus the potential for nonresponse bias should be considered when interpreting the survey results. Furthermore, although the findings suggest increasing knowledge will increase reporting of suspected SRCs, it is not within the scope of the current study to understand whether increasing educational efforts is, in fact, increasing knowledge, and therefore increasing reporting. Future research should explore whether the educational efforts currently put into place in high school and collegiate athletics are actually increasing knowledge and thus affecting athletes' reporting of suspected SRCs, and how education may challenge current social norms regarding SRCs. In addition, although having a true measure of unreported injuries may be beneficial, it is impossible to note whether the athletes' current SRC knowledge is different from when the athlete played through a suspected injury.

Overall, the current study adds to the field by suggesting female collegiate athletes have greater knowledge surrounding SRCs and are more likely to report suspected SRCs, although the clinical significance may be relatively small. It is important to note, however, that many athletes, both male and female, reported not knowing an injury was an SRC or not believing it to be serious, as reasons for not reporting a suspected injury, which may be improved by increasing knowledge and recognition of SRCs, including recovery and return-to-play. In addition, the current findings demonstrate that many athletes are continuing to not report suspected SRCs because of athletic identity and stigmas associated with being an athlete (eg, not wanting to let teammates down), giving an increased necessity for understanding perceptions around the injury and reporting suspected SRCs. An approach to concussion education utilizing social norms theory, especially exploring social comparison theory and social role theory, may be more beneficial than previous approaches.

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