

PERSEVERANCE

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Knowledges, Behaviors, Attitudes and Beliefs Concerning Cerebral Concussions Sustained by Quebec University Soccer Players

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On a global scale, soccer is considered to be the most popular and fastest growing sport. Athletes of all genders, ages and cultures participate actively and they are all at risk of sustaining a concussion. Unfortunately, the incidence of concussion is underestimated given that many athletes do not disclose their symptoms for several reasons. Therefore, this project intends to understand the knowledge, behaviors, attitudes and beliefs that university soccer players have concerning concussions. This cross-sectional study was conducted using a self-report online survey that targeted all soccer athletes in the Quebec Interuniversity Sport Network (RSEQ). One hundred and sixty-two athletes completed the survey (61.5% men, 38.5% women). Results show that 42.1% of athletes reported getting a concussion while practicing their sport but only a few (23.2%) reported their symptoms. Also, soccer players' knowledge, attitudes and beliefs were significantly associated with the adoption of self-reported safe behaviors post-concussion. More specifically, knowledge predicted 2.4% of reported adopted behaviors, while attitudes and beliefs explained 41.5% and 20.6%, respectively. Among factors that may contribute to a safe return to play, athletes who reported so were those with good knowledge, beliefs and attitudes about safety behaviors. These findings suggest that all professionals involved in education programs should know how to juggle between theoretical knowledge and motivational techniques to improve the beliefs and attitudes of players about concussions. These elements will assure the development of a future concussion prevention program that will be adapted to university soccer players' needs.

On a global scale, soccer is considered to be the most popular and fastest growing sport. Athletes of all genders, ages and cultures participate actively and they are all at risk of sustaining a concussion (Levy, Kasasbeh, Baird, Amene, Skeen and Marshall, 2012). In fact, Mona and Bouziane (2008) report that concussions in soccer have increased by 250% since the last review, particularly because of the aggressive nature of the game. In short, it remains important to keep in mind that brain injuries account for 22% of soccer injuries (Levy et al., 2012). Unfortunately, the incidence of concussion is underestimated given that many athletes do not disclose their symptoms for several reasons (Davies and Bird, 2015).

Considering the risks that athletes face when they return to play prematurely after a concussion, it is essential to understand the specific determinants of safe return to play behavior following a concussion. Notably, past studies show that the knowledge, beliefs and attitudes that athletes have concerning concussions seems to influence their return to play behaviors (Anderson, Gittleman, Mann, Cyriac and Pomerantz, 2016; Register-Mihalik, Guskiewicz, McLeod, Linnan, Mueller and Marshall al., 2013). For example, a study of football players in high school illustrates that although athletes have very good results on concussion knowledge tests, they do not have a positive attitude towards reporting symptoms to a qualified

person and adopting safe return to play behavior (Anderson et al., 2016). Thus, the aim of the present study is to understand the knowledge, behaviors, attitudes and beliefs that university soccer players have concerning concussions. Our hypothesis is that better knowledge, beliefs and attitudes will be associated with safer reported return to play behaviors following a concussion.

Methods

Participants

This cross-sectional study was conducted using a self-report online survey that targeted all soccer athletes in the Quebec Inter-university Sport Network (RSEQ). Participants were recruited from the nine Quebec RSEQ universities located in the cities of Montreal, Quebec City, Trois-Rivières, Chicoutimi and Sherbrooke. This study received approval from the Research Ethics Committee of the Faculty of Arts and Sciences of the Université de Montréal, but also the approval of the ethics committees of all the universities solicited.

Instruments

Survey questions were drawn from previously validated surveys (Bramley, Patrick, Lehman and Silvis, 2012; Chrisman, Quitiquit and Rivara, 2013; Kurowski, Pomerantz, Schaiper and Gittleman, 2014) and some questions were adapted to the context of Quebec university soccer. Four sections of the questionnaire were developed to measure knowledge, beliefs, attitudes and reported return to play behaviors following a concussion. First, the “knowledge” section, consisting of 45 dichotomous statements (true or false), included questions about the definition of concussion, symptoms, recovery times, complications, recommendations, and symptom management. The “beliefs” section of the questionnaire consisted of fourteen statements that measured the level of agreement or level of importance that athletes place on a particular belief or situation using a seven-point Likert scale ranging from “not at all” in agreement to

“strongly agree” or “not at all important” to “extremely important”. The “attitude” section consisted of twelve statements in which the athlete had to choose the attitude that he considered the most appropriate in the given context. Finally, the behavior section consisted of six scenarios in which the athlete spontaneously chose one of three statements highlighting what he would have done in such a context.

Procedure

All Quebec universities with soccer teams were contacted for this study ($n = 9$). A letter describing the full terms of the research was first distributed to the head coaches of each team and they were free to choose whether or not to participate in the study with their respective athletes. If they agreed to participate, head coaches were responsible for making the hyper-text link to the survey accessible to their athletes and briefly explaining the purpose of the study. The survey took about 15 minutes to complete and all the questionnaires were anonymous.

Analysis

Internal consistency was measured by Cronbach’s alpha for each scale and test-retest stability was measured by the intraclass correlation coefficients for each score. Simple regression analyses were performed between the knowledge, beliefs, and attitudes variables and safe or unsafe return to play behaviors.

Results

A total of 162 Quebec university soccer athletes between the ages of 18 and 29 ($M = 21.3$, $SD = 2.06$) were included in this study. The sample was composed of a larger proportion of men (61.5%). Almost half (42.1%) of athletes had suffered a concussion while practicing their sport. It should be noted that among those who suffered a concussion, only 23.2% said that they had always reported their symptoms to a member of the team at the time of the injury (coach, teammate, medical team, etc.), whereas only 17.7%

said that they had reported their symptoms only a few times (See Table 1).

Table 1. Sample characteristics

| Variables | Categories | N (%) |
|-------------------------------------|--------------------|-------------|
| <i>Gender (N = 161)</i> | | |
| | Female | 62 (38.5%) |
| | Male | 99 (61.5%) |
| <i>Age (N = 161)</i> | | |
| | 16 to 19 years old | 29 (18.1%) |
| | 20 to 25 years old | 125 (77.6%) |
| | 26 to 30 years old | 7 (4.3%) |
| <i>Concussion history (N = 164)</i> | | |
| | Yes | 69 (42.1%) |
| | No | 78 (47.6%) |
| | Doesn't know | 17 (10.3%) |

As shown in Table 2, Cronbach alphas were calculated for each domain and are as follows: knowledge scale (0.80), belief scale (0.60), attitude scale (0.78) and behavior scale (0.71). Following this, test retest reliability was analyzed and the results are as follows: knowledge scale ($r = 0.94$, $p < 0.001$), belief scale ($r = 0.81$, $p = 0.001$), attitude scale ($r = 0.80$, $p = 0.001$), and behavioral scale ($r = 0.93$, $p < 0.001$). Thus, the survey shows good temporal stability.

Table 2. Reliability statistics

| Variables | Internal consistency α | Test-retest Reliability r^* |
|------------|----------------------------------|----------------------------------|
| Knowledges | 0.80 | 0.94 |
| Attitudes | 0.78 | 0.80 |
| Beliefs | 0.60 | 0.81 |
| Behaviors | 0.71 | 0.93 |

Notes: * $p < 0.001$

As shown in Table 3, simple linear regression analysis show that soccer players' knowledge, attitudes and beliefs are all significantly associated with the adoption of safe behaviors post-concussion.

Knowledge predicted 2.4% of adopted behaviors, while attitude and beliefs predicted 41.5% and 20.6%, respectively.

Table 3. Linear regressions on the behavior variable

| Variables | B | SD | t | p | R |
|------------|------|------|-------|--------|------|
| Knowledges | 0.13 | 0.07 | 1.98 | 0.05 * | 0.16 |
| Beliefs | 0.14 | 0.02 | 6.45 | 0.00** | 0.45 |
| Attitudes | 0.15 | 0.01 | 10.66 | 0.00** | 0.64 |

Notes: * $p < 0.05$ ** $p < 0.001$

Limitations

Since most of the responses were self-report, some athletes may experience a social desirability bias in responding. Thus, we created an anonymous survey that can be answered in an uncontrolled environment to limit this factor. However, despite these measures, some athletes may still be afraid to answer without restraint. The low internal consistency of our beliefs scale is another limit to this study. Some items may be inconsistent or athletes may have been influenced by the wording of some questions. Future studies will have to develop revised items in order to improve this component. Finally, we did not observe the behavior undertaken by athletes in real time, which limits our interpretation of the scale.

Conclusions

The present study shows that university soccer players with good knowledge, beliefs, and attitudes are those that report adopting safer behaviors when returning back to play after a concussion. Furthermore, beliefs and attitudes were better predictors of behavior than knowledge. These results are consistent with previous studies that have identified the potential influence that individual athletes' knowledge, beliefs, and attitudes have on the adoption of safe return to play behaviors following a concussion (Anderson et al, 2016; Bagley and al., 2012; Caron, Rathwell, Delaney, Johnston, Ptito, and Bloom, 2018; Chrisman and al., 2013; Kurowski and al., 2014).

Other authors have reported similar findings in different sports. Despite the increased number of concussion education programs and better knowledge about concussions, the most important barrier to adopting safe return to play behavior is the athlete's belief in the reaction of his or her coach (Chrisman and al., 2013). Thus, the athlete may be hesitant to report his symptoms and will continue to play, fearing negative repercussions in terms of progress in his sport if he reports his injury (e.g. withdrawal of the game, loss of a role within the team). Aside from that, an athlete will decide to continue the game even if he is injured to avoid being stigmatized by those around him (Register-Mihalik and al., 2013), or because he believes that reporting an injury shows some weakness (Chrisman and al., 2013). Several others also note the importance of the athlete's attitude in returning to safe play. Naturally, a positive attitude leads the individual to appropriate behavior, whereas the opposite would be equally true (Raudsepp, Viira and Hannus, 2010). Unfortunately, promoting the attitude of some professional athletes, such as "training excessively to ignore the signs and symptoms of an injury", significantly influences the attitude of athletes in all sports (Cusimano, Chipman, Volpe and Donnelly, 2009; Kaut, DePompei, Kerr and Congeni, 2003).

In conclusion, based on the results of this study, we believe that concussion education programs should include knowledge about concussions, but more importantly quality content on the benefits of disclosing the symptoms of a concussion in order to adopt safer return to play behavior by improving the beliefs and attitudes of players about concussion.

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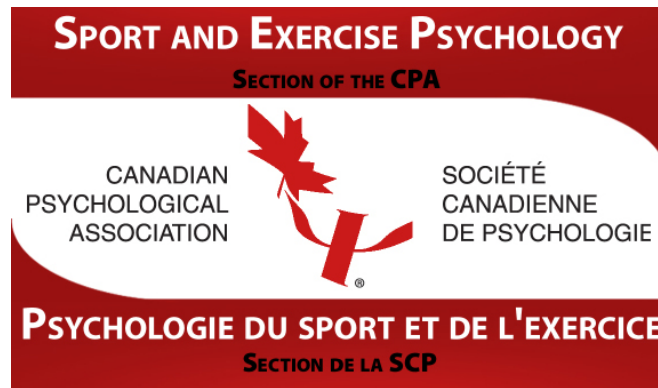
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