

2023

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10.1080/24733938.2023.2253191

Merrick, N., Badenhorst, M., Morgan, A., & Fortington, L. (2023). Community perspectives on spinal cord injury in rugby union: Facts and fears. *Science and Medicine in Football*. Advance online publication. <https://doi.org/10.1080/24733938.2023.2253191>

10.1080/24733938.2023.2253191

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To cite this article: Nicole Merrick, Marelise Badenhorst, Ashlee Morgan & Lauren Fortington (01 Sep 2023): Community perspectives on spinal cord injury in rugby union: facts and fears, Science and Medicine in Football, DOI: [10.1080/24733938.2023.2253191](https://doi.org/10.1080/24733938.2023.2253191)

To link to this article: <https://doi.org/10.1080/24733938.2023.2253191>



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Published online: 01 Sep 2023.



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Community perspectives on spinal cord injury in rugby union: facts and fears

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ABSTRACT

Introduction: The sport of rugby union, henceforth rugby, is associated with a risk of spinal cord injury (SCI). Perceived risks can impact participation. Understanding community perspectives on rugby-related SCI may provide insight for addressing concerns around risk. The aim of this study was to explore community perspectives through social media discussion about SCI in rugby union.

Methods: Posts about SCI in rugby union were identified using the advanced search function on Twitter. Data (content as original post, retweet, quote tweet and comments) were included if focused on Rugby Union and written in English. Inclusion dates (July 2018 to June 2019) were chosen to capture a period when several SCI ($n = 4$) occurred in community rugby in Australia. Data were analysed using a thematic approach.

Results: Four themes were derived from the collected data. The 'pendulum swing' relates to the disparate views of rugby, from being overly cautious to too dangerous to play. The 'role of rugby culture' described engrained behaviours and attitudes on and off-field toward safety. 'Media influence' describes the emotive narrative used when reporting rugby-related SCI. 'After the injury' looks at expressions of sympathy and inspiration. These findings showed how individuals' views of SCI were influenced through rugby culture, trust in governing bodies and the news media.

Conclusion: By 'listening in' to community views, their most pertinent safety concerns can be addressed. Both facts and fears on rugby-related SCI were evident, and these extreme views can be balanced with evidence-based education and sensible risk management.

ARTICLE HISTORY

Accepted 22 August 2023

KEYWORDS



Athletic injuries; sports medicine; safety; primary prevention

Introduction

Spinal cord injury (SCI) is an example where both fears and facts influence decisions about participation in the sports where these injuries have been documented. Despite its popularity worldwide, the sport of rugby union is associated with a risk of SCI, which presents a concern for rugby stakeholders, participants and the wider rugby community (Banerjee et al. 2004; Badenhorst et al. 2018). Chan et al. (2016) identified that between 2% and 33% of acute SCI in several countries were caused by sports incidents. Specifically, in rugby union, the incidence of SCI has been reported to range from 0.24 to 4.52 per 100,000 players (Carmody et al. 2005; Swain et al. 2010; Brown et al. 2013; Hutton et al. 2016; Reboursiere et al. 2018). Several safety strategies for injury control (Fuller 2008; Rugby Australia 2023) have been introduced but there remains a low but real risk of SCI in sport (Hutton et al. 2016; Chan et al. 2016) and there has long been debate about acceptability of this risk (Fuller 2008; Quarrie et al. 2017). While there have been calls claiming rugby is too dangerous and the risk of injury is therefore unacceptable, several authors refute these claims on the basis that the risk of injury is similar to that of other sports (Tucker et al. 2016; Quarrie et al. 2017) and common activities of everyday life (Fuller 2008).

Determining what is an acceptable risk of injury in sport requires finding a balance between societal perceptions of risk (Brussoni et al. 2015) and an understanding of injury severity (Cryer and Langley 2012). Whilst some injuries are accepted as simply a part of sports participation, an injury that presents a threat to life or of disability is usually considered unacceptable (Cryer and Langley 2012). Community perceptions of injury risk, whether an accurate reflection of true risk or not, can impact participation rates (Boufous et al. 2004), and influence athlete injury behaviours, such as whether they disclose an injury (Kerr et al. 2014, 2018) or participate in preventative measures (Eime et al. 2004; Verhagen et al. 2010).

Online platforms such as Twitter are an increasingly popular source of health and injury information (Scanfeld et al. 2010). Twitter consumers not only seek information via the site but are primary creators and authors of social media narrative (Boufous et al. 2004; Morgan and Wilk 2021; Morgan et al. 2021). Twitter offers an opportunity to explore dialogue about sport and sport injuries, which may provide valuable insight to inform injury prevention efforts. Previous studies have used Twitter commentary to understand how the general population discusses sports injuries online, highlighting the potential for social media to circulate misunderstanding and misconceptions (Sullivan et al. 2012). Other studies have explored online sentiment towards a sport during a crisis, finding that commentary

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increases in response to an event, fuelling evolving discussion from others online (Morgan and Wilk 2021).

Twitter offers an accessible format of data collection to explore commentary within the community, without the influence of the research team. The aim of this research was to explore community perspectives around SCI in rugby union via the social media platform, Twitter. With this insight, concerns can be addressed through evidence-based education, in turn promoting safe participation.

Methods

Study design

This study followed a pragmatic, qualitative approach. This approach was chosen as the reflexive and flexible methods were best suited to the (Twitter) data due to its short form and, at times, lack of context provided. Codebook thematic analysis uses codes as the building block for analysis. This approach was intended to contribute rigour and trustworthiness to the method (Braun and Clarke 2006), not to increase reliability through consensus but to contribute to theme development, reflect critically on our individual analysis and achieve a deep engagement with the data (Braun and Clarke 2019, 2021).

Ethical approval was sought for this project on the basis that while the posts are in a public forum, the owners of the data posted have not done so with the knowledge that their message could be used for research purposes. A low-risk ethics application was submitted and approved prior to the data collection by Edith Cowan University's Human Research Ethics Committee [2020–01626-TUDDENHAM].

Informed consent

A waiver of consent was approved for this study on the basis that the research presents low to negligible risk. It was considered that, as the posts are deidentified, there is sufficient protection of the Twitter handle privacy, and it would be impractical to obtain consent. In the interests of maintaining anonymity, care has been taken when presenting results. Quotes included in the results have been redacted so that Twitter users whose Tweets were included in this study cannot be identified.

Patient and public involvement

There was no patient or public involvement directly in this study. The study contributes to a PhD program (author NM) which has an advisory group comprised supervisors, community rugby governance and injured players and their family members.

Data collection

Twitter posts were collected retrospectively using a systematic search strategy. Twitter is a social networking service where users can post 'Tweets' to communicate with others on the website <http://www.Twitter.com>. The website

has an advanced search function whereby a user can search using specific words or combinations of words which are contained in the Tweets (X Corp 2023). The advanced search function pulls all Tweets, Retweets (re-posting of a Tweet) and comments pertaining to the search criteria specified by the user. This function allows users to filter Tweets by using highly specific criteria, for example, searching by location, specific users, dates, language, and level of engagement. Twitter's regular search functionality does not support truncations, so the advanced search strategy was used which allows Boolean operators.

Search strategy

Preliminary searches were performed. The terms yielding the greatest number of relevant posts demonstrated that layman's terms are used more than medical terms. This is consistent with a previous study of online media linked with football fatalities (Fortington et al. 2018). Using the advanced search function on Twitter, a series of systematic searches were completed. The search terms used were: 'rugby' AND 'spinal,' 'broken neck,' 'broken back,' 'paralysed,' 'paralyzed,' 'horror injury,' 'freak accident,' 'collapsed scrum,' 'quadriplegic,' 'tetraplegic.' Further searches were 'rugby Australia' AND 'serious review,' 'injury review,' 'safety review.'

Inclusion

Data (Tweet content as original, retweet, quote Tweet and comments) were included if focused on rugby union and written in English. Dates were purposefully selected to capture a period during which there were four highly publicised SCI in community rugby in Australia (July 2018 to June 2019).

All data were screened and included provided they were added to the commentary. For example, a simple retweet without comment or with simple comment such as 'yes this' or similar was not included as the aim of this study is not counting the frequency of posts but to explore community perceptions. Therefore, only content that added to or opposed the original Tweet was included, regardless of the form (i.e., Tweet, quote Tweet or comment). Data were also screened to ensure relevance to the sport of rugby union and all other sports including other forms of rugby (i.e. sevens, league, touch) were excluded.

Data management

Data were exported via Octoparse software (Octoparse Data IncTM) to an MS Excel form where they were de-identified by one author not involved in the initial data cleaning process. Octoparse (Octoparse Data IncTM) is a program which takes otherwise unstructured data from a website such as Twitter, and exports it to a structured and workable data file. Identifying data were replaced with a participant identification code and then imported into NVivo for analysis.

While ID codes are used as one approach for introducing a level of anonymity to the data, ultimately, a web search of the text would still identify the user. Therefore, text redaction and additional checks were taken when presenting the results to

reduce the risk of identification by inference. This continued as an iterative process throughout the analysis and write up and discussed between the researchers prior to submission for publication. Example quotes are similar to the original post, redacted for privacy or clarity in statement.

Data analysis

Data familiarisation

Data analysis commenced with data familiarisation (Braun and Clarke 2021). The included data were read and re-read at length by two authors (NM, MB) to achieve immersion and in-depth familiarisation with the data (Sparkes and Smith 2013). Notes were taken during this process, and there were regular meetings to discuss our thoughts and to reflect on the development of codes and construction of initial themes (Braun and Clarke 2019).

Pilot coding

Two authors (NM, MB) developed the initial codebook using a sub-set of 100 randomly selected data. Each author coded this sub-set of data independently. The codebook was developed inductively with consideration of the research aims. This method has been used in the previous research investigating concussion (Sullivan et al. 2012). As initial categories were developed, codes were classified accordingly. All data in the subset were coded using inductive reasoning.

Development of codes and themes

The data were analysed using a thematic approach (Braun and Clarke 2006, 2019). Data were analysed by the lead author (NM) with co-coding of a 10% subset by two other authors (MB, LF).

The co-coded batches were merged. The codebook was applied deductively where a code existed to which the data fit well. Further coding continued using inductive reasoning, which is a data-driven method free from pre-existing analytic pre-conceptions (Braun and Clarke 2006). Applying both inductive and deductive reasoning provides a more comprehensive form of analysis (Roberts et al. 2019). This coding approach was applied systematically throughout the data set in a flexible and iterative way (Braun and Clarke 2006).

In acknowledging how each author's individual lens (see appendix 1) may influence our interpretation of the research, there was ongoing reflective discussion among all authors throughout the analysis. This was intended to challenge individual assumptions and achieve deep engagement with the data.

Themes were developed as 'analytic outputs' of the coding process (Braun and Clarke 2019). A theme was defined as something considered important, not only about the data but also important to the aim of the research (Braun and Clarke 2006). Thematic maps were used to highlight patterns and relationships between themes as analysis progressed, ultimately presenting the overall conceptualisation of the analysis (Figure 1) (Braun and Clarke 2006).

Results

There were 2627 posts (content) identified. Four themes and 11 sub-themes (Figure 1) were developed from the analysis.

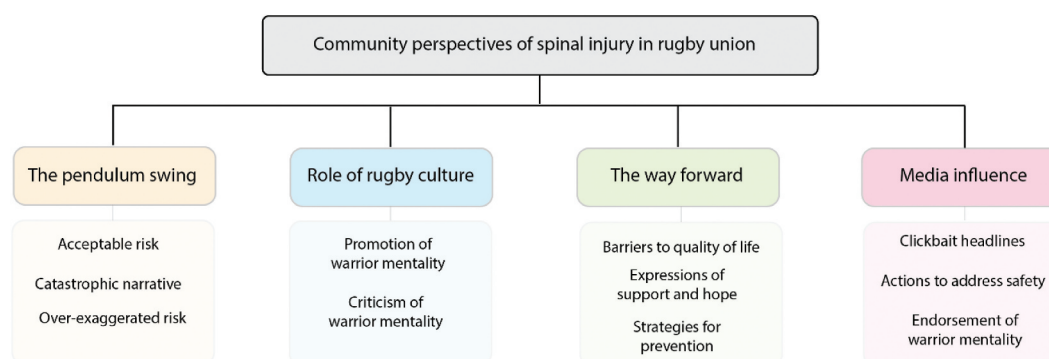


Figure 1. Thematic map of themes and subthemes identified in the data.

Table 1. The pendulum swing: sub-themes and example quotes.

Sub-theme	Quote
Acceptable risk	Everything in life has risk but we don't avoid all risk The benefits of playing rugby outweigh the risks Rugby helps kids learn to assess risks and make decisions Horse riding and skiing cause bad injuries, should they be banned too I taught rugby and soccer and the injuries in soccer were worse Road accidents are the leading cause of childhood deaths, so should we ban cars
Catastrophic narrative	Parents who let their kids play rugby are bad parents My friend's son broke his neck and is in a wheelchair for life now because of rugby Rugby causes people to become paralysed
Over-exaggerated risk	It is just sensationalist clickbait to inflate the risk of rugby with so many other child welfare issues to be concerned about Ramming the dangers of rugby down throats is unproductive Overly dramatic phrasing of a tackle plays to an already entrenched minority pushing an agenda

Theme 1. The pendulum swing

The data included in this theme revealed a continuum of perceptions around risk, demonstrating the variability in risk perception in the rugby community – from finding the risk acceptable to adopting an over-cautious approach. There were three sub-themes: *acceptable risk*, *catastrophic narrative and over-exaggerated risk*. Table 1 displays the sub-themes for theme 1 and example quotes (with amendments for privacy) within each.

The pendulum swing was so named to represent the spectrum of views identified within this theme, from a *catastrophic narrative* to *over-exaggerated risk*. In between these two polarised perspectives was a middle ground, *acceptable risk*, which weighed the benefits of playing against the possible risks involved with sports participation. Results within theme one, **the pendulum swing** addressed concepts of risk, danger and safety strategies to mitigate risk within rugby union.

Sub-theme: acceptable risk

This sub-theme described the risk of injury in rugby union as acceptable with the benefits of participation outweighing the risk. Further, narratives commented on what is an acceptable risk by comparing to other activities, arguing rugby was no more dangerous, or even less dangerous, than other sports. There was sentiment toward frustration and contempt for the risk-averse attitudes that depicted rugby as a sport associated with danger.

Sub-theme: catastrophic narrative

This sub-theme presented a very clear opinion – that rugby is simply too dangerous. The narrative tended to use catastrophic, black-and-white language to describe the inherent risks of playing rugby, often using emotive terms such as ‘broken neck,’ ‘paralysed’ and ‘horrific.’ Quotes in table 1 have been included as they were considered exemplary of or contributing to the catastrophic narrative around rugby SCI.

Sub-theme: over-exaggerated risk

Data within this sub-theme expressed concern that risk was over-exaggerated. While accepting of risks, the commentary specifically addressed concerns about the sport changing unnecessarily, as though to pander to the catastrophic narrative.

Theme 2. role of rugby culture

This theme explored the culture of rugby with two clear sub-themes in analysis: *promotion of the warrior mentality* and *criticism for the warrior mentality* (Table 2). This was a very dominant theme developed during analysis and appeared to be an important element to community perspectives – either as the cause of concern or an influence of the beliefs and attitudes being expressed.

Sub-theme: promotion of the warrior mentality

In these findings, warrior mentality describes a way of thinking, a narrative and the actions taken which are reflected in normalising aggressive play, never accepting defeat and putting your body on the line to win. This sub-theme demonstrated a disregard for safety and the seriousness of injuries, dismissed the need for strategies to improve player safety and encouraged a culture of playing on despite injury.

Sub-theme: criticism for the warrior mentality

In contrast to above, this sub-theme expressed criticism of the warrior mentality. Commentary explored how the culture within rugby might contribute to safety concerns and that contemporary rugby can be both safe to play and enjoyable to watch. Online commentary also called out concepts such as “toxic masculinity” as outdated and dangerous.

Theme 3. the way forward

Within this theme are expressions of sympathy and encouragement or being inspired by those who sustained a SCI playing rugby (Table 3). Data within this theme also included commentary on the prevention and the management of SCI in rugby.

Sub-theme: barriers to quality of life

This sub-theme explored barriers to quality of life such as difficulties and delays in receiving optimal healthcare and funding for a person who has sustained a SCI playing rugby. It also explored the consequences and impacts of rugby SCI for the injured players and their families.

Sub-theme: expressions of support and hope

This sub-theme included inspirational Tweets; injured players as disability advocates or supporting recently

Table 2. Role of rugby culture: sub-themes and example quotes.

Sub-theme	Quote
<i>Promotion of the warrior mentality</i>	Broke my spine playing rugby but came back to play again The game has gone soft Keep playing unless you literally can't Doing what you can with a reduced or injured team is part of it The player welfare brigade who have never set foot on the rugby field should not preach to enthusiasts Rugby has got nothing entertaining left about it now with all the changes
<i>Criticism for the warrior mentality</i>	We should not celebrate aggressive and violent tackles in rugby We need to deter people from buying into the warrior mentality in rugby to avoid being called soft The dinosaurs of rugby are out of date while the rest of rugby engage in research to save the sport and make it safer Modern rugby has changed and no longer subscribes to the old toxic masculine views The problem lies in the culture within schools contributing to injury risk

Table 3. The way forward: *sub-themes and example quotes.*

Sub-theme	Quote
<i>Barriers to quality of life</i>	Financial support took too long Rugby player with a broken neck is waiting on a specialist bed Family going through hell after son sustains a spinal cord injury playing rugby Tragic story of a wonderfully bright young man, made tetraplegic by a rugby injury, who wants to die
<i>Expressions of support and hope</i>	Spinal injured rugby player who returned to the pitch after being paralysed can inspire our young people Paralysed player defies all odds Injured teen is brave and won't let injury define him
<i>Strategies for prevention</i>	Rule changes to increase penalties in some instances may be needed to reduce risk of dangerous play We need more experienced coaches and referees with better training to make schoolboy rugby safer Matching size and weight rather than age for adolescents makes more sense for safety in rugby

injured players, stories of inspiration, determination, perseverance and overcoming the odds. There were expressions of sympathy, stories of hope and encouragement of fundraising efforts. Several hashtags were promoted, including: #lifebeyonدينjury, #worldspinalcordinjuryday, #rugbyfamily, #inspirational, #fighter.

The #fighter hashtag is interpreted as an encouragement of resilience, determination, perseverance and overcoming the odds in the context of traumatic injury.

Sub-theme: strategies for prevention

This sub-theme explored discussion and perspectives related to the way forward in injury prevention and management of SCI in rugby. Codes within this theme represent community perspectives around what is needed to improve safety in rugby, or who is responsible. This included research alerts, personal opinion, SCI awareness and included views around weight dispensation rules, referee and coach training, rule changes and penalties, pitch surface, safety equipment such as helmets and first aid training.

Theme 4. media influence

News highlights reporting on SCI in rugby were included within this theme, with the media identified as a major influencer of community perspectives. Table 4 displays the three sub-themes and a selection of example quotes (with amendments for privacy) within each.

Sub-theme: clickbait headlines

This sub-theme used catastrophic and emotive language to gain the readers' attention and invoke an emotional response.

Sub-theme: actions to address safety

The actions of rugby governing bodies to improve player safety and design injury prevention strategies were featured and purposefully highlighted in this section.

Sub-theme: endorsement of warrior mentality

This sub-theme included codes which demonstrated endorsement of the warrior mentality and the perceived toughness of rugby. The quotes demonstrate the apparent 'celebration' of injury and return from injury.

Discussion

This study explored community perspectives of rugby-related SCI using data from one social media platform. Across the four themes, there were contradictory opinions and fears presented, derived from a passionate culture of supporters who commented, from the overly cautious to somewhat callous perspectives. Fears were evident within these discrepant views, from a fear of serious injury to a fear of ruining the game through safety-driven changes. The fear of injury tended to an overly extreme view through use of emotive language such as 'dangerous' and 'should be banned'. The latter, a fear of changes to the game, reflected the culture described as the 'warrior mentality' ingrained within rugby, with some commentary demonstrating a complete disregard for the seriousness of SCI. Both extremes need to be balanced with evidence-based education that addresses and promotes the middle ground of safety promotion and a common-sense approach to risk.

Rugby has long been regarded as having a culture of risk-taking and sacrificing physical and mental wellbeing for the good of the team, prioritising performance over safety (Light and Kirk 2000). Previous research has identified the role of rugby culture in the social construction of masculinity which

Table 4. Media influence: *sub-themes and example quotes.*

Sub-theme	Quote
<i>Clickbait headlines</i>	Spinal researcher says schools should ban rugby Schoolboy rugby spinal injury victim makes progress Rugby player unable to speak after horror injury
<i>Actions to address safety</i>	New scrum technique to make rugby safer Schoolboy injuries lead to governing body review Rugby's strategy to prevent spinal cord injuries
<i>Endorsement of warrior mentality</i>	The five toughest All Blacks Player shows off head stitches after horror injury Determined to return after spinal injury

has historically embodied dominance, aggression and toughness (Light and Kirk 2000; Pringle 2001, 2005). These attitudes can contribute to unhelpful sports behaviour and present a challenge to sport safety initiatives by supporting excessive aggression (Maxwell and Visek 2009), downplaying the seriousness of injuries (Hughes and Coakley 1991; Daly et al. 2021), or encouraging a culture of non-disclosure of injury symptoms (Kerr et al. 2014, 2018). The views expressed in this study suggest a pervasive warrior mentality within rugby persists.

While on-field rugby may tend toward toughness, a highly supportive off-field nature of the rugby community was also identified in this study. Sport has long been acknowledged as providing a sense of community to players, spectators and other stakeholders through competition, leadership and social opportunities (Warner and Dixon 2011; Kim et al. 2021; Kerr 2021). Maintaining connection to the rugby community has also been demonstrated to be an important aspect of quality of life for spinal cord injured rugby players (Badenhorst et al. 2018) and sport participation an important aspect of community integration and quality of life for people with SCI (McVeigh et al. 2009; Urbański et al. 2013). This sense of community was apparent within the Tweets and speaks to an equally strong culture of inclusion within the sport. Notably, there were perspectives which reflect a change of attitude away from the warrior mentality, describing it as dangerous and contributory to injury. This is consistent with previous studies indicating a change towards a more inclusive environment within rugby is growing (Anderson and McGuire 2010; White and Anderson 2017).

Sport and the media go hand in hand, with football codes featuring strongly in sport news media, contributing to a sense of belonging within the sporting community (Pilar et al. 2019). The media can contribute positively to health messaging but can also be a source of confusion and misinformation (Grilli et al. 2002; Hux et al. 2006; Kennard et al. 2018). In this study, catastrophic dialogue was used to describe rugby-related spinal injuries and emotive language to discuss consequences after an injury. The media also used language that reinforced the dominant narrative of rugby as rough, tough, and dangerous, or promoted playing on despite injury as heroic. While the media may contribute to a pervasive, underlying culture glorifying the warrior mentality, their reach could instead be used to promote a safe sports culture.

The authors of this study reflect that there was a richness of data to be found within the online commentary. Even in short-form Tweets there were important perspectives and messages conveyed. Any limitations with respect to post length might also be balanced against the large network of people sharing their perspectives. Given the popularity of social media and the amount of interest in this topic online, Twitter not only provides an opportunity to understand community attitudes without the influence of the research team but also represents a potential avenue through which to disseminate information.

Only publicly available social media posts were included and the researchers only sourced data from one social media platform. We also limited the search to a purposefully selected time frame when we anticipated there would be conversations regarding SCI, following incidents in Australian rugby.

Additionally, there were occasions where the context and sentiment of the Tweets was difficult to ascertain. In these cases, the Tweet was discussed, and if unable to come to an agreement or solution, the content did not contribute to theme development. This was intended to contribute rigour to the method.

Our findings are most relevant to policy and practice within rugby union in Australia, but the general messages garnered from 'listening in' to community are also valuable to other sport bodies. Community attitudes contribute to, and are shaped by, sports culture and this, in turn, influences participation rates and sports injury behaviours. Success with safety and injury prevention strategies requires engagement with all stakeholders within the rugby community – coaches, parents, players, clubs, governing bodies and media, to facilitate cultural change (Mayer et al. 2018). By harnessing the positive aspects of sport culture, standards of behaviour within the sport can be improved, and helpful injury behaviours can become the norm, creating a safer playing environment for all (Breger et al. 2019).

Recommendations from this study are that the role of culture must be considered when designing injury prevention strategies in rugby. This must first be acknowledged within injury prevention frameworks as a potential influence of injury behaviours and then addressed via implementation strategies which consider all stakeholders. If it is truly fears that prevent people participating in the sport, we need to address those fears. Education sessions to increase awareness of the influence of the warrior mentality and promote safe behaviours could be designed for clubs, coaches, communities (parents, players, spectators) and the media. Reflecting on our initial search terms, the researchers recommend utilising plain language to address community concerns in a genuinely accessible way. Identifying opportunities for further engagement of sport governing bodies with news media is also key, given their influence on community perspectives. Finally, continued research which explores the number and nature of spinal cord injuries is needed to inform these practices. Social media then offers a way to share this information with the wider community and address their safety concerns with facts.

Conclusion

This study identified that there is concern within the community regarding spinal injuries in rugby union. Within the analysed data, it was evident that opinions ranged from the overly cautious to an almost complete disregard for player safety. The use of catastrophic language can lead to misunderstanding and ill-informed perceptions of injury risk. Our findings provide insight into community attitudes and perceptions of SCI in rugby which can be used to inform educational practices and related policy development within the sport.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

NM is supported by an Australian Government Research Training Program (RTP) Fee Offset Scholarship. Award number not applicable.

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Appendix 1. Positioning the researchers

As researchers, the lens with which we each view the world influences our interpretation of the research. All authors are passionate about sport and are committed to player welfare. The first author is a physiotherapist with a clinical background in sport and SCI, completing a PhD investigating SCI in Australian rugby. The second author is also a physiotherapist who completed a PhD investigating rugby SCI in South Africa. Both bring a clinical perspective and a strong commitment to the injured athlete voice. The third author brings a sports management and marketing lens to consider the role and responsibilities of governing bodies in sport. The last author is an injury epidemiologist with an interest in sports injury prevention and a commitment to reducing injuries and optimising athlete safety.