An examination of concussion education programmes: a scoping review methodology

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ABSTRACT

Objectives The primary purpose was to review the literature on concussion education programmes. The secondary purpose was to inform knowledge translation strategies for concussion researchers and practitioners.

Design Research on concussion education programmes is relatively new. As a result, the current study implemented a scoping review methodology, which is a type of literary search used to provide a preliminary assessment of the size and scope of a body of literature, as well as identify strengths, weaknesses and gaps in the research.

Methods A five-stage process for conducting a scoping review was followed for this study: (a) identifying the research questions, (b) identifying relevant studies, (c) identifying the study selection criteria, (d) charting the data and (e) reporting the results.

Results Concussion education programmes have been developed and implemented with populations ranging in age from 9 to 49 years and have used interactive oral presentations, educational videos and computer-based learning programmes. Although the content of these programmes varied, the topics generally addressed salient aspects of concussion injury and recovery. Quantitative instruments have been the preferred methods for assessment.

Conclusions Education programmes aimed at improving participants' long-term concussion knowledge, behaviours and attitudes of concussions are needed. Researchers must consider using a knowledge translation framework to enhance concussion education programmes. The application of such a framework can lead to novel and interesting ways of disseminating information about concussive injury and recovery.

INTRODUCTION

Sports-related concussions affect athletes of all age and skill levels, as well as parents, family members, coaches and clinicians.[1 2] Concussions have a symptomatology that ranges from headaches, dizziness and nausea to irritability, anxiety and depression.[3] The severity of these symptoms is influenced by a number of factors such as age, gender and history with the injury.[3] The growing awareness surrounding the short-term and long-term consequences of concussions has concerned stakeholders in sport, and more recently, governments. In May 2014, American President Barack Obama held a summit on youth sport concussions at the White House where he convened leading experts to discuss the future of concussive injury and recovery. The president's decision to make concussions a public health issue is indicative of the growing awareness about the injury and its impact on public health, both inside and outside the sporting community. Additionally, concussion awareness has influenced legislative branches of American government to mandate concussion education in all 50 states.[4 5] Despite an ever-increasing body of research and public awareness about concussive injury and recovery, relatively little is known about the most effective ways to disseminate this information to knowledge users (ie, athletes, coaches, parents and clinicians).[3 6] Knowledge translation (KT) strategies could be the 'missing link' to improving the dissemination of concussion information to these knowledge users (ref. 7, p. 69).

KT is defined as "the dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge…".[8] KT aims to bridge the knowledge gap between the scientific community and knowledge users.[9] The knowledge to action cycle is one framework to examine the knowledge gap.[10] The knowledge to action cycle comprised two sections, whereby (a) the knowledge funnel consists of refining information from basic research to the creation of a knowledge tool/product, and (b) the action cycle represents the process of implementing and evaluating the knowledge tool/product. This framework has been suggested as a potential approach to examine the KT of concussion research.[6] One of the most recommended and widely implemented concussion KT strategies to date is concussion education.

It is imperative that concussion education strategies are adapted to the specific audience/local context (eg, student-athletes vs physicians), that barriers and facilitators of knowledge use are assessed and the proper intervention strategy is chosen, implemented and evaluated.[8] Unfortunately, these elements have not been consistently used when developing concussion education strategies. For example, concussion education has been dominated by passive educational strategies, such as printed materials and handouts (eg, CDC's *Heads Up* concussion initiative)[11–14] and concussion-related websites.[3 6 15] Printed materials and handouts have allowed for concussion information to be disseminated to people inside and outside the sporting community;[11] however, some have questioned whether passive education could lead to behaviour change when used as a standalone strategy.[16] Additionally, concussion-related websites often contain medical jargon,[15] making the content difficult to understand for non-medical knowledge users.[9] Taken together, the current concussion education strategies may not have been properly adapted to the local context (eg, websites) and that the type of strategy (eg, handouts) may not be most effective.

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As a result, other types of strategies need to be implemented and evaluated, such as concussion education programmes, which some feel are a more optimal type of concussion education strategy given their interactive nature.[7] Although there is no agreed-upon definition, concussion education programmes will be operationally defined as any formal programme that teaches a population about aspects of concussions that is beyond passive materials (eg, handouts and websites). Because little is known about the breadth of research on concussion education programmes, a detailed review focusing on the state of concussion education programmes is timely. This review would also help advance the science and practice of KT strategies with concussions.

According to Grant and Booth,[17] there are at least 14 types of literature reviews that have been used to summarise bodies of research. Selecting a type of review depends on a number of factors such as the breadth of literature in a given area and intended outcomes of the review.[17 18] Scoping reviews are literary searches that are used to provide a preliminary assessment of the size and scope of a body of literature as well as identify strengths, weaknesses and gaps in the research.[18 19] Scoping reviews have been used to summarise bodies of literature on concussion rehabilitation strategies[20] and on other health-related issues like Alzheimer's disease,[21] HIV rehabilitation[22] and in settings such as trauma centres[23] and intensive care facilities.[24] Because research on concussion education programmes is relatively new, a scoping review is ideal to determine the state of these education programmes. Therefore, the first purpose of this study was to review the literature by identifying strengths, weaknesses and gaps in concussion education programmes using a scoping review methodology. The secondary purpose was to inform KT strategies with concussions.

METHODS

Levac *et al*'s[19] five-stage process for conducting a scoping review was followed for this study. Specifically, the five stages included (a) identifying the research questions, (b) identifying relevant studies, (c) identifying the study selection criteria, (d) charting the data and (e) reporting the results. The first four stages will be described in this section, whereas the fifth stage will be detailed in the 'Results' section.

Identifying the research questions

The specific research questions guiding this work were: what populations have been included in concussion education programmes? What types of education programmes have been developed to disseminate concussion information? What is the content of concussion education programmes? What instruments have been used to assess concussion education programmes? What are the outcomes of these programmes?

Identifying relevant studies

Databases commonly used with other literary searches on concussions were used to locate articles for this study, including ERIC (ProQuest), Medline, PsycINFO, SPORTDiscus and Web of Science. Keywords related to *concussions* (ie, concuss* OR "brain concuss*" OR "brain injur*" OR "sport concuss*") and *education programs* (ie, educat* OR "educat* intervention*" OR "concuss* educat*" OR "educat* program*") were entered into each database. The search was refined by searching the databases for *concussion* 'AND' *education program* keywords.

Identifying the study selection criteria

In order to meet the selection criteria for this scoping review, articles must have (a) been written in English; (b) been an original article (ie, not a review study or book chapter); (c) had a full-text copy available in one of the selected databases by 21 February 2014; (d) described an educational programme that teaches a population about concussions, not including websites, handouts or other types of passive educational materials; and (e) used the term 'concussion' as defined by the Concussion in Sport group.[3] Given that concussions are classified as a type of mild traumatic brain injury (mTBI), it is challenging to distinguish between mTBI and concussion. Indeed, experts have noted the terms are "often used interchangeably in the sporting context and particularly in the United States literature" (ref. 3, p. 250). However, the terms refer to different injury constructs.[3] As a result, the current study selected articles that educated a population about 'concussions'.

Charting the data

The research process is presented in figure 1 and outlines the number of articles included and discarded at each stage as well as the rationale for their exclusion.

RESULTS

A total of 5938 records were retrieved from the five databases selected for this study. The initial search revealed seven articles that matched the selection criteria. Two additional articles were located via manual search. A total of nine articles were included in this scoping review. Disputes regarding article inclusion/exclusion were resolved by consensus among the authors. Table 1 provides a detailed description of each of the nine studies in relation to the purpose and research questions identified for this scoping review. The remainder of this section will provide a synthesis of the main findings from each of the studies.

Overall, the concussion education programmes included in this review were designed and implemented for populations that ranged from 9 to 49 years of age. Specifically, six concussion education programmes were developed for athlete populations,[25–30] one for elementary and high school students,[31] one for university students[32] and one for coaches.[33]

The nine concussion education programmes included in this review can be divided into interactive oral presentations, educational videos and computer-based learning programmes. Despite variations in the type of programme, each was administered at one time point only. Four studies used interactive oral presentations to educate their populations about concussions,[29–32] which consisted of a lecture-style format, with brief video segments and discussions incorporated within the seminar. Three of these interactive oral presentations lasted between 20 and 30 min[29 30 32] while one was 40–60 min in length.[31] Two other concussion education programmes were based on an educational video created by ThinkFirst, a Canadian non-profit organisation dedicated to preventing brain and spinal cord injuries, called *Smart Hockey: More Safety, More Fun*.[25 26] The concussion education video lasted approximately 25 min. Another three studies mainly used computer-based learning programmes to disseminate their concussion education programme.[27 28 33] It was unclear how long participants were exposed to computer-based learning programmes.

The content of concussion education programmes varied greatly among the nine studies. The most popular features were concussion symptoms,[28–32] followed by management strategies,[29 32 33] long-term sequelae[29–31] and the return to play protocol.[26 30 32] Interestingly, only one of the nine studies[33] noted the content of their concussion education programme was based on peer-reviewed expert guidelines.[34 35]

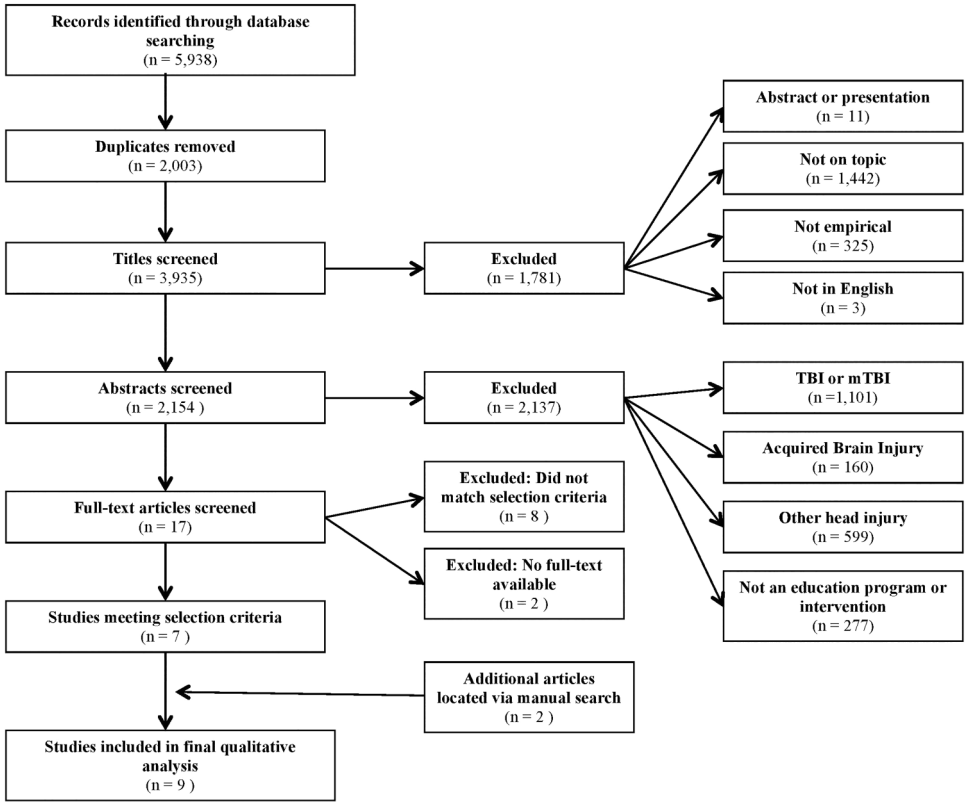

Figure 1 Illustration of research process. TBI, traumatic brain injury.

The instruments used to assess the concussion education programmes can be grouped into three categories: questionnaires and surveys, quizzes and other methods. Questionnaires and surveys were used by six studies to assess their concussion education programmes.[25 26 28–30 33] The Rosenbaum Concussion Knowledge and Attitudes Survey (RoCKAS)[36] is one of the few standardised questionnaires used to assess the concussion knowledge and attitudes of students 13–20 years old. Interestingly, the RoCKAS was only used in one study.[29] Three studies assessed their concussion education programmes using quizzes,[27 31 32] which involved a combination of free-response, true/false and multiple-choice questions. Finally, two studies used other methods to assess their concussion education programmes. For example, Cook *et al*[25] examined the effect of their intervention by recording the number and type of aggressive penalties taken by youth ice hockey players during games. Using another method, Miyashita *et al*[30] partially evaluated their concussion education programme by analysing collegiate athletes' responses to 'six qualitative questions' (ref. 30, p. 350) in order to create a score that represented the athletes' knowledge of concussions. In sum, the instruments used to assess concussion education programmes have predominantly used quantitative methods such as pre-presentation and post-presentation quizzes, questionnaires and surveys. Behaviour change[25] and qualitative methods[30] are two rarely implemented methods that might be useful for evaluating concussion education programmes in the future.

The main outcomes of the studies revealed that some education programmes did not improve participants' knowledge, attitudes or behaviours related to concussions.[26 27 29] Despite this, the majority found that participants in the experimental groups demonstrated improved concussion knowledge immediately after exposure to the concussion education programme compared with their pre-presentation quiz scores or a control group.[25 26 28 29 31–33] One study from Glang *et al*[33] reported short-term improvements in the experimental group's intention to take appropriate actions, such as removing an athlete from play who potentially suffered a concussion. Long-term improvements in concussion knowledge were reported up to 7 months after exposure to a concussion education programme.[25 26 30] For example, Cook *et al*[25] found that youth ice hockey players in the experimental group took fewer aggressive penalties than the control group after being exposed to their education programme, which provides some evidence of behaviour change. Collectively, the majority reported short-term benefits after being exposed to their concussion education programme,[25 26 28 29 31–33] while findings regarding the long-term benefits, such as improvements in participants' knowledge and behaviours,[26] and attitudes,[29] of concussions, were less clear. Details on participants' pre-intervention concussion knowledge were not provided. Only one study articulated that background information was not available.[31] Presenting this information would provide insights on the outcomes of concussion education programmes, particularly with respect to those that did not find improvements in the experimental conditions.

DISCUSSION

The objective of this scoping review was twofold. The first purpose was to review the literature on concussion education programmes, and the second purpose was to inform concussion KT strategies. Results from this study determined that there are variations in contemporary concussion education programmes. This section will address the strengths, weaknesses and gaps in

Table 1 Characteristics and main findings from studies that met inclusion criteria

Studies	Methodology	Participants	Programme	Instruments	Main outcomes
Bagley *et al*[31]	Non-randomised, pre-post study without a control group.	599 male (n=309) and female (n=290) students were grouped into three age categories: 9–12 (n=104), 13–15 (n=310) and 16–18 (n=148) (n=37 age unknown)	*Content:* signs and symptoms, short-term and long-term consequences, and strategies for responding to concussions *Delivery:* 40–60 min audiovisual presentation that contained video segments, demonstrations, case studies of professional and high school athletes, personal testimonies and question/answer period	Identical pre- and post-programme quizzes containing free-response, T/F, and multiple-choice questions	Improvements in absolute pre- and post-quiz scores were observed across all participants ($p<0.0001$). More athletes 13 and older passed the post-presentation quiz ($p<0.0001$). Women showed greater improvement than men ($p<0.0001$)
Cook *et al*[25]	Randomised controlled, post-only study. Two groups: experimental (n=45) and control (n=30)	75 male ice hockey players 11–12 years old	*Content:* medical information, training lessons and personal statements *Delivery:* experimental group watched 'Smart Hockey' video. Control group received no intervention	Two methods of assessment: two 'player questions' assessed concussion knowledge and game-by-game penalty analysis to determine video's effect on behaviour	Experimental group showed improvements in knowledge and reduction in aggressive penalties that were each maintained at 3 months ($p<0.05$)
Cusimano *et al*[26]	Cluster randomised controlled, pre-post study. Two groups: video (n=61) and no-video (n=74)	135 youth ice hockey players 10 years old (n=89) and 14 years old, (n=46). Gender was not reported	*Content:* mechanisms of concussion, in-game tactics to reduce high-risk manoeuvres, and return to play guidelines *Delivery:* Video group watched the ThinkFirst's 'Smart Hockey: More Safety, More Fun'	Two questionnaires were developed to assess athletes' knowledge, and attitudes and behaviours. They were administered at three time points: immediately before and after video, and 2 months later	Increase in players' knowledge immediately following the video ($p<0.001$). 10-year old group showed post-video improvement but decreased average scores at 2 months (measure of significance were not provided). The 14-year-old group showed concussion knowledge retention at 2 months (measure of significance were not provided). No differences in players' attitudes and behaviours ($p=0.507$)
Echlin *et al*[27]	Randomised controlled, pre-post study. Three groups: DVD (n=16), interactive computer module (ICM) (n=20), and control (n=22)	58 male ice hockey players 16–21 years old	*Content:* not explicitly stated *Delivery:* experimental groups received either the ThinkFirst DVD or ICM intervention. Control group received no intervention	26 multiple-choice and T/F questions on injury knowledge and treatment protocol. Questions were readministered immediately after intervention, and at 2 and 4 months	No significant differences in knowledge acquisition between groups, across the times measured ($p>0.05$)
Glang *et al*[33]	Randomised controlled, post-only study. Two groups: experimental (n=40) and control (n=35)	75 male (n=52) and female (n=23) youth sport coaches. 75% self-identified as being between 30 and 49 years old	*Content:* prevention, recognition, and management based on expert guidelines[34 35] *Delivery:* experimental group completed computer modules designed to deliver concussion education. Control spent 15–20 min reviewing CDC materials	Questionnaire assessed general knowledge, symptoms, misconceptions, self-efficacy and behaviour intention, and programme satisfaction and acceptability	Experimental group scored higher in general knowledge (η^2 =0.37), symptoms (η^2=0.46), misconceptions (η^2=0.12), self-efficacy (η^2=0.29) and intention to take appropriate actions (η^2=0.17)
Goodman *et al*[28]	*Study 1* Randomised controlled, post-only study. Two groups: experimental (n=65) and control (n=65) *Study 2* Randomised controlled, post-only study. Two groups: experimental (n=16) and control (n=17)	*Study 1* 130 ice hockey players aged 11–12 (n=44), 13–14 (n=38) and 15–17 years old (n=48). Gender was not reported *Study 2* 39 ice hockey players 13–14 years old. Gender was not reported	*Content:* concussion symptoms *Delivery:* experimental group played a computer game where they stacked icons that represented concussion symptoms and non-symptoms. Control group played the same game but icons were not related to concussion	A 36-item questionnaire was developed and administered after playing the game. Time to complete the questionnaire was also recorded. Computerised feedback questionnaire provided to assess game attributes	*Study 1* Experimental group answered more questions correctly ($p<0.05$) and faster than control ($p<0.05$). The game 'held the interest' of 90% of 11–12 year olds, 75% of 13–14 year olds and 60% of 15–17 year olds *Study 2* Experimental group completed questionnaire faster than control group ($p=0.015$). Compared to study 1, 13–14 year olds thought the game was easier to play. No differences found in symptom recognition ($p=0.055$)

Continued

Table 1 Continued

Studies	Methodology	Participants	Programme	Instruments	Main outcomes
Koh[32]	Incidence cohort, pre-post study without a control group	208 male (n=136) and female (n=72) university students from 18 to 32 years old registered in a snowboarding class	*Content:* concussion definition, mechanism of injury, signs and symptoms, post-concussion management and return-to-play *Delivery:* 30 min concussion safety session using slides, videos and oral presentation	A 20-item quiz was developed. Identical quizzes were administered pre- and post-educational intervention	Significant increase in snowboard-related concussion knowledge and awareness after being exposed to the concussion safety session (p=0.00)
Manasse-Cohick and Shapley[29]	Non-randomised pre-post study without a control group	160 high school football players. Information on athletes' age and gender was not provided	*Content:* general information about concussions, causes and symptoms, management, short-term and long-term, and underreporting. Based on Rosenbaum and Arnett's[36] survey. *Delivery:* a 5 min modified video of CDC's 'Heads Up: Concussion in High School Sports—Information for Coaches' followed by a 20 min PowerPoint presentation, and a question and answer period	Participants answered identical pre- and post-questionnaires. The Rosenbaum Concussion Knowledge and Attitudes Survey was used. Developed for students aged 13–20 years, it contains three indices: concussion knowledge index, concussion attitude index, and validity scale	Significant increase found in post-intervention concussion knowledge index (p<0.000) (Cohen's d=1.05) but not with respect to the concussion attitude index (p=0.508)
Miyashita *et al*[30]	Cross-sectional, pre-post study without a control group. Pre-intervention surveys were completed during pre-participation physical tests. Post-intervention surveys were completed 5 months (soccer) and 7 months (basketball) months after the intervention	50 male (n=27) and female (n=23) National Collegiate Athletic Association division II basketball and soccer players average 19.68 years old	*Content:* definition of concussion, signs and symptoms, reporting process, 'take-home guide', return-to-play protocol, and long-term sequelae. Based on 'athletic Training Education' courses taught by lead investigator *Delivery:* 20 min PowerPoint presentation with 10 slides	Pre- and post-intervention surveys contained four quantitative questions to obtain athletes' previous medical history and six qualitative questions to ascertain athletes' concussion knowledge	Athletes scored significantly fewer incorrect scores on the post-intervention surveys (p<0.0001)

the existing literature and recommend strategies to improve future concussion education programmes.

Findings from this scoping review indicated that younger athletes scored worse on post-education programme assessments than older athletes.[26 31] Davis and Purcell[37] found that athletes under the age of 14 experienced different symptoms than adults, which they attributed to differences in physical and cognitive maturity, neuroplasticity and protective abilities. Furthermore, youth athletes' concussion symptoms typically persist for longer periods of time.[38 39] Experts have highlighted the importance of evaluating and managing youth and adult concussions differently.[3 37] As a result, we recommend that concussion education programmes are created, disseminated and assessed according to age group,[9] which is consistent with the knowledge to action cycle.

There was discrepancy in the content of concussion education programmes. Often, authors provided few details about the content of their education programmes, including whether they were based on empirical research and/or expert guidelines. A number of guidelines and recommendations have been forwarded regarding best practices for concussion evaluation, management and return to play (activity) strategies.[3 40 41] Despite the availability of these guidelines, it remains unclear whether most of the concussion education programmes reviewed in this article were based on peer-review papers or expert guidelines and recommendations. We advise future research and intervention efforts to report the origins of the concussion information and content used in their programmes.

Evaluation of outcomes is standard practice in research and part of the knowledge to action cycle.[9] In the reviewed studies, quantitative instruments such as quizzes, questionnaires and surveys were the most common evaluation methods. Additionally, two studies[25 30] evaluated the outcomes of their concussion education programmes using different methods that might prove beneficial for future investigations. For example, Cook *et al*[25] evaluated hockey players' on-ice behaviours following their intervention. Evaluating the behavioural outcomes of concussion education programmes is important given that behaviour change such as reducing athletes' aggressive and reckless behaviours, as well as improving concussion-reporting behaviours,[42–44] are important goals of concussion education. Given that health-related behaviour change has long been the focus of research and intervention,[45] we recommend that research on concussion education programmes should focus more attention on assessing the behavioural outcomes of their interventions. Another strategy from Miyashita *et al*[30] used a form of qualitative methods. However, the manner in which their data were collected and analysed suggests that qualitative methods were not used to their full potential. In brief, qualitative research is focused on providing detailed descriptions of human interactions, behaviours and experiences using methods that range from ethnography and document analysis to individual or group interviews.[46] Interviewing is the most commonly used qualitative data collection strategy[46] and has been recommended as an effective tool to evaluate KT interventions.[47] One type of interviewing technique, focus groups, has commonly been used in health and management settings to help determine the effectiveness of interventions and programmes.[48 49] Focus group interviews would allow participants to use their own words to provide a detailed description of the intervention, as well as offer insights on its strengths and weaknesses.[9] Moreover, given that concussion education programmes are in their early stages of development, implementing qualitative focus group interviews would help advance the science and practice of concussion education programmes and concussion KT strategies.

Some of the weaknesses of the concussion education programmes reviewed in this study included limited use of interactive tools, delivery of education at one time point only and lack of long-term assessment. More research is needed to elucidate the factors that would improve participants' long-term knowledge, attitudes and behaviours after being exposed to a concussion education programme. One potential avenue to help overcome these limitations is to develop concussion education programmes that are delivered over multiple education sessions and the outcomes are assessed over longer periods of time, such as 6 months and 12 months post-delivery.

To further develop concussion education programmes, researchers should explore social media platforms such as Facebook, Twitter and YouTube[50–52] or a combination of different strategies. For example, Sullivan *et al*[51] hypothesised that Twitter, which allows users to 'tweet' messages up to 140 characters in length, could be an appropriate platform to disseminate concussion information and management strategies through short, coherent posts. However, social media platforms have yet to be incorporated into a concussion education programme. Another approach could be to integrate several different strategies such as videos, case studies, social media, handouts, oral presentations and discussions over a number of education sessions to accommodate different learning styles.[7] More research is needed before we can conclusively recommend the best strategy for concussion education. Ultimately, researchers should consider the knowledge to action cycle when developing and implementing concussion education programmes, which will help to ensure that barriers and facilitators to knowledge use are assessed, the best strategy is selected and implemented, and the relevant outcomes are evaluated.

CONCLUSIONS

Despite being in their early stages of development, research suggests that interactive concussion education programmes can be an effective concussion KT strategy. Based on the findings from this scoping review, the following can be concluded:

- Concussion education programmes should use KT frameworks such as the knowledge to action cycle when developing, implementing and evaluating their programmes.
- Researchers must explicitly articulate the origins of concussion information that form the foundation of their education programmes.
- Given that qualitative methods have been suggested as a useful tool to evaluate KT interventions,[47] focus group interviews may be an ideal methodology to evaluate concussion education programmes.
- Researchers must develop concussion education programmes aimed at improving participants' long-term knowledge, attitudes and behaviours.
- Future research and intervention should consider implementing concussion education programmes that integrate multiple strategies and social media platforms.

What is already known on the subject?

- Concussions are a contentious issue in modern sport.
- The effectiveness of using passive concussion education strategies such as handouts and websites has been questioned.
- Educating members of the sporting community about concussions is imperative to help prevent future injuries, as well as identify symptoms and manage recovery.

What this study adds?

- Despite calls from experts,[3 6 7] concussion education programmes have largely been developed without knowledge translation frameworks.
- The outcomes of concussion education programmes have primarily been evaluated using questionnaires, surveys and quizzes. Behaviour change[25] and qualitative methods[30] are evaluation strategies that have rarely been implemented but are worthy of further investigation.
- A number of studies reported short-term improvements in participants' knowledge, attitudes and behaviours; however, the findings regarding the long-term benefits of concussion education programmes were less clear.

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Pharmacy and hospital collaboration

With a $1.3 million grant, the Boston Medical Center will join with the US pharmacy, CVS, to study how to better dispense Narcan, used to treat opiate overdoses. All CVS pharmacies in Rhode Island and Massachusetts now keep Narcan in stock on a non-prescription basis. *Editor's note*: This is a splendid example of the sort of collaboration with pharmacies that is long overdue. (Noted by IBP)

Opposition to Seattle gun tax plan

Critics of Seattle's proposed new gun tax claim the study on which it is based is flawed. The study showed that "…someone admitted … for a gun shot injury is 30 times more likely to be re-admitted for an additional gunshot injury than other non-injury patients admitted to the (same) hospital." Critics claim the subjects were all criminals but quote figures showing that only about one-half had a previous arrest. (Noted by IBP)

Dangerous inflatable rides

Injuries on inflatable objects like bouncy houses are increasing in the USA. The number of injuries has increased from about 5000 to 17 000 in 10 years. Manufacturers recommend many safety measures but most are too detailed. It makes more sense to simply discourage the use of this type of 'entertainment' or to strengthen safety standards as onsumer product safety commission (CPSC) is now doing. (Noted by IBP)

More shootings in New York

For the second year, shootings in New York City have increased. There had been a major decline since the end of the 1990s. The new trend has taken on a political dimension, with the mayor's attempt to improve police–community relations being blamed. Police remain sceptical, because stop and frisk tactics are discouraged. This, in turn, reflects several well-publicised shootings by police, often of black victims. The mayor insists the shootings are due to 'a relatively small set of gangs and crews.' (Noted by IBP)