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Short Communication

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Retrospective Designs in Sports Injury Surveillance Studies: All is not Lost

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Epidemiological research on sports injury and illness has significantly grown over the past two decades with increased recognition and support from sports governing bodies and international sports organizations. Collective evidence from different sports is suggestive that sports-related injuries can be prevented.[1-4] Epidemiological studies are important to gain insights on the magnitude of the problem in terms of incidence rates, risk, severity and causes and subsequently to develop effective, sports-specific and sustainable injury prevention strategies. Therefore, sports injury surveillance methodologies should be appropriate to the sport as well as to the specific context especially in terms of age, gender, level of participation, tournament or season-based, cross-sectional or longitudinal and if a prevention program needs to be implemented.

Study designs that help address clinical research questions are broadly categorized into experimental and observational types. In sports injury research observational studies are most commonly either prospective or retrospective in nature. Retrospective studies collect historical data over a fixed period of time whereas prospective studies follow a cohort over a set future period of time.[5] Prospective studies are generally considered to be of higher reliability as they can generate real-time knowledge of developments, closely monitor the exposure time, injury outcome and provide more accurate estimation of the risk and incidence. Retrospective injuries on the other hand mostly involve self-reported data based on athlete's memory to recall the events. This can introduce memory recall bias[6] with usually the major injuries being recalled leading to underestimation of the actual injury incidence and thus increasing the risk the retrospective contamination. These issues may actually discourage many sports injury researchers to consider retrospective study designs.

While it is certainly preferable to plan a prospective approach to sports injury surveillance, they can be time-consuming, resource requiring and expensive to undertake owing to the length of data collection and the degree of monitoring involved.[7] Retrospective studies on the other hand are time and resource efficient and may also encourage greater athlete participation compliance especially with team sports and elite athlete populations. Therefore, the value of retrospective designs cannot be undermined. A well-planned retrospective study design can have elements of reliability, validity and credibility to generate systematic high-quality data that may be valuable to provide insights into injury risk factors and mechanisms and develop injury prevention strategies. However, the issues with retrospective study designs should be pre-empted and methods appropriately conceived and implemented.

The key issue with retrospective study designs is memory recall bias. While it may not be possible to avoid it altogether, certain approaches in the methods can be used to minimize its extent. A recent study on competitive Dragon Boating,[8] a traditional sport similar to rowing provides a good example of approaches to minimize the extent of recall bias in retrospective sports injury surveillance studies.

DEVELOP CONTEXT-SPECIFIC INJURY SURVEILLANCE QUESTIONNAIRE

Apparently most retrospective studies are based on self-reported data that is depen

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dent on the athlete's ability to correctly recall the events. This may lead to recall bias and consequently invalid conclusions about injury epidemiology and the association between past and future injuries.[9] An effective approach to provide a systematic and structured form to self-reported data would be to develop a context-specific injury surveillance questionnaire. This ensures consistency in reporting injuries. Many organizations have developed sports-specific injury surveillance systems[10,11] that can serve as a credible basis to develop a customized questionnaire for retrospective injury data acquisition. Ascertaining the reliability and the validity of the questionnaire prior to its implementation can further add to the robustness of the method.

DELIVERY OF THE QUESTIONNAIRES

It is without doubt that physical distribution of questionnaires lead to 100% response rates and a higher likelihood of complete responses.[8] Moreover, the physical presence of the research team members during distribution can serve to ensure completion and correctness of all data fields, clarify questions or doubts related to the type, nature and onset of injury, and exclude the non-sport related injuries. This increases the validity of the responses. However, physical distribution is a time and resource intensive exercise. Now-a-days, online options using the internet provide convenient and cost-free method of delivering the questionnaire to maximum number of recipients over a large geographical area. However, online survey methods in knowledge-based studies have reported low response rates.[12] Online methods are yet to be used on a large scale especially in retrospective sports injury surveillance studies. A few studies have used online survey methods in community-based sports but no information has been provided on the response rates.[13] Moreover, certain barriers related to time, technical issues, data entry and adjustments to the new system have been reported while implementing online surveillance tools.[14]

LIMIT THE LENGTH OF RECALL TIME

While retrospective studies can gather data over any length of time in the past, limiting the length of time over which the athletes are asked to recall the events can reduce the recall bias.[15] It is reasonable to speculate that a longer time frame has lesser likelihood of the accuracy of the recall. While the time frame of recall accuracy and validity is yet to be established, it is logical that shorter time frames have higher recall accuracy. However, evidence suggests a fair degree of success using a 12 month recall period.[8,9,16] It therefore seems advisable to limit the recall time to 12 months in retrospective injury surveillance studies. This also implies that for season-based studies, the data should be collected as soon as possible on completion of the season.

PROVIDE CLEAR INJURY DEFINITION

The potential sources of error in injury surveillance data are unclear and inconsistent injury definitions, misinterpretations of injury types and misdiagnoses.[17] These issues can be substantially minimized using the surveillance questionnaire. Providing clear and context-specific injury definition can facilitate better recall of the events through specific prompts.[18] This strategy can also be used to provide clearly stated criteria for new/acute, recurrent, aggravation and overuse injuries[8] thus enhancing the scope of the study. In addition to injury definition, additional information like providing a brief description of the onset and progress of the injury and if the injury led to missing training and competition likely to result in better recall and better elucidation of the details of the injury and thus enhance the validity of data interpretation. In addition, clear prompts regarding medical attention and time loss in the questionnaire can make it simpler for the athletes to provide information on the severity categorization of the injuries.

ANATOMICAL LOCATION OF INJURY

Many athletes may not be able to clearly distinguish and recall specific body parts. For example, the athlete may report upper limb injury but not able to specifically state whether it was the forearm, elbow or the shoulder. However, body part distribution of injuries is important information to explain the nature and mechanism of injury as some parts like the shoulder and lower back are more susceptible to overuse injuries. Providing an outline sketch of front and back of the human body and the list of different body parts in the questionnaire can stimulate better recall of the specific part injured. In this respect the presence of research team members during the occasion can also be helpful as the athlete can seek help to respond accurately.

USE DIVERSE SOURCES OF INFORMATION

It is quite natural that the athlete may not be able to recall all the injuries sustained in the past over a particular time frame. However, the accuracy of recall may be improved by asking the teammates, team captains, parents, trainers and coaches. In addition, many athletes tend to maintain regular training and event logs. Many a times the athletes also retain copies of medical documents in their diaries. These personal periodic logs and other relevant documents can serve as valuable references during injury documentation to improve the accuracy of the data and should be made use of in retrospective injury surveillance studies.

In summary, retrospective sports injury surveillance studies have the advantage of being time, cost and resource efficient and encourage greater participant compliance. However, the element of recall bias can significantly affect the validity of the data. It is therefore critical for sports injury researchers to pre-empt this possibility and adopt context-specific measures to maximize the accuracy, reliability and validity of the data.

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