6-17-2020

Prevention of sports injuries in Sri Lanka: What do we know about injuries in our athletes?

Prasanna J. Gamage
Edith Cowan University, p.gamage@ecu.edu.au

Alex Kountouris

Caroline F. Finch
Edith Cowan University, c.finch@ecu.edu.au

Lauren V. Fortington
Edith Cowan University, l.fortington@ecu.edu.au

10.4038/sljsem.v2i1.12
Gamage, P. J., Kountouris, A., Finch, C. F., & Fortington, L. V. (2020). Prevention of sports injuries in Sri Lanka: What do we know about injuries in our athletes?. *Sri Lankan Journal of Sports and Exercise Medicine, 2*(1), 19-29
https://doi.org/10.4038/sljsem.v2i1.12

 DOI: http://doi.org/10.4038/sljsem.v2i1.12

REVIEW ARTICLE

Prevention of sports injuries in Sri Lanka: what do we know about injuries in our athletes?

Prasanna J. Gamage[1], Alex Kountouris[2], Caroline F. Finch[1], Lauren V. Fortington[1]

Abstract

In terms of safeguarding the health and well-being of athletes in Sri Lanka, a primary focus has always been toward the treatment of injuries after they have occurred and promoting rehabilitation back into sport. There has been little attention towards the primary prevention of injuries in Sri Lankan sports. As a developing sporting nation, the benefits of injury prevention are immense: from a public health and financial perspective, through to individual benefits for athletes' physical, psychological and social health. Understanding the reasons behind the lack of motive towards sports injury prevention in the country, and challenges in developing and implementing injury prevention measures in the field is useful so that these reasons can be addressed and overcome. Based on recent experience in conducting injury prevention research among Sri Lankan junior cricketers, this article discusses injury prevention principles in sport and provides directions for future sport injury prevention research in Sri Lanka.

Keywords: Injury prevention, Cricket, Athletic injuries

Introduction

The prevalence of overweight and obese individuals has increased over the last three decades, and is projected to rise to an estimated 58% of the world's adult population by 2030 [1]. A large-scale study from Sri Lanka in 2010 showed an alarmingly high prevalence of overweight and obesity among adults [2]. Consequently, the importance of promoting physical activity, exercise and sports participation is becoming greater every day due to their role in weight management.

In addition to the health benefits, participation in sports and physical activity comes with abundant social and psychological benefits [3]. This is true particularly for adolescent and youth, as social qualities such as leadership; self-confidence, teamwork, and personal enjoyment could positively influence their development and emotional well-being [4].

Participation in sports and exercise is encouraged from early ages of life. Cricket is one of the key sports of interest in the South Asian region. The sport has gained great affection in the region and is particularly enjoyed by junior and school cricketers. As a result, the game of cricket has a strong potential to promote exercise and physical activity among juniors in the South Asian region, including Sri Lanka. However, the benefits of sports participation come with the cost of

[1]*School of Medical and Health Sciences, Edith Cowan University, Perth, Australia.*
[2]*National Cricket Centre, Cricket Australia, Brisbane, Australia.*
Correspondence: Email: p.gamage@ecu.edu.au
https://orcid.org/0000-0003-4565-1598

injuries and the related financial and social burden [5]. Therefore, injury prevention is important in junior sports in order to create a safe playing environment and encourage life-long participation in sports and exercise. Understanding the nature of injuries, injury risks and risk management strategies are essential early measures to prevent injuries and safeguard the health and well-being of the junior sports participants.

Injury prevention in sports - Injury prevention models

The primary objective of injury prevention in sports is to promote safe participation [6]. To accomplish this objective, various injury prevention models have been proposed [6-8]. A four-step model presented by van Mechelen in 1992, 'the sequence of prevention,' was the first of such models in sports injury prevention [7] and was based on the well-established public health approaches used by the World Health Organisation [9]. The model presents four steps: establishing the extent of the injury problem (step 1), establishing the aetiology and mechanisms of injury (step 2), introducing a preventive measure (step 3), and assessing the effectiveness of the preventive measure (step 4). In 2006, Finch introduced a contemporary update to the sports injury prevention model 'the TRIPP framework' (Translating Research into Injury Prevention Practice) [6] (Figure 1). The six-staged model incorporates more detail toward the implementation context of injury prevention. Hence, this framework serves as a useful guide for sports scientists, researchers, governing bodies and policymakers in developing and implementing injury prevention measures in sports.

The first stage of all the models consistently focuses on recognising the extent and nature of injuries through injury surveillance [6]. Injury surveillance is defined as 'ongoing collection of data describing the occurrence and factors associated with injury [10]. The second stage of the TRIPP framework describes establishing aetiology, mechanisms and risks associated with these injuries [6]. The injury characteristics and associated risks among participants in sports can vary based on numerous factors such as age, gender, type of sport, playing level, geographic location. Therefore, information gathered through the first two stages of the TRIPP frameworks laid the foundation for developing appropriate injury prevention measures tailored to participants and context.

Injury prevention in cricket

An overview of injuries in cricket internationally

Cricket is a bat-and-ball sport, widely considered as being non-contact or limited-contact in nature. However, some Australian studies have found cricket to account for a relatively large percentage of all hospital-treated sports injuries [11]. The nature and severity of injuries in cricket are mostly related to the playing task being performed and the physiological demands this places on the players [12]. Acute traumatic injuries in cricket are primarily associated with being struck by the cricket ball, especially during batting and fielding [13]. On the other hand, chronic overuse injuries are frequently reported in fast-bowlers due to high-intensity repetitive movements and increase physical demand placed on them, including high bowling workloads [12].

Epidemiological studies in senior elite cricketers have served to identify important injury data that

have helped to address specific injuries [14]. For example, the majority of injuries in elite senior levels are observed among fast-bowlers compared with batters or fielders [15, 16]. Lower back (lumbar) injuries among fast-bowlers contribute to a considerable number of debilitating injuries and substantial time loss from competitions [14]. Consequently, these scientific evidence have directed most studies to identify injury risks and effective preventive measures among fast-bowlers [17].

At present, there are few research studies that have been conducted in junior cricket and these are limited to Australia [18, 19] and South Africa [20, 21]. Together these studies have highlighted some important directions towards injury risks management and prevention in junior cricket. In South Africa, Stretch and colleagues have conducted several epidemiological studies among schoolboy cricketers [20-22]. The other main contribution comes from Australia with the junior cricket project 'Juniors Enjoying Cricket Safely (JECS)' [18, 23-25]. The JECS project was established to identify injury risks, injury prevention strategies and encourage safe sports participation. Together, the JECS project has published five studies in junior cricket from Australia that have made a significant impact on injury prevention in Australian junior cricket [18, 23-25]. These JECS studies have used validated injury survey questionnaires that have been developed to study injuries in junior level Australian football [26] and cricket [18, 23].

Studies in junior cricket have highlighted some unique differences in injury rates and risk characteristics [18], as opposed to what has already been established in adult cricket [16]. One Australian junior cricket study reported similar rates of injuries across all playing positions (fielding, batting, bowling) [18]. Other studies have suggested that within a junior cricket cohort, there are more acute traumatic injuries than overuse injuries [18, 19], and that injury incidence rates rise with increasing age and level of play [19]. It is essential to recognise the differences in junior formats compared to adults, and account for this when studying injuries. Therefore, translating knowledge of injury risk management gathered from evidence in elite adult cricketers may not be appropriate or accurate in developing injury prevention measures for junior cricket [27].

Injury surveillance in cricket internationally

In senior elite level cricket, several test-cricket playing nations have conducted longitudinal injury surveys and surveillance including Australia [15, 16], South Africa [28], England [29], New Zealand [30] and West Indies [31]. It was observed that only some of the top cricket playing nations such as Australia, South Africa and England have conducted ongoing injury surveillance in cricket [32]. With the aim of promoting injury surveillance at international cricket, guidelines on data collection, injury diagnosis, reporting, and injury definitions for cricket were first published in a consensus statement in 2005 [33], with the latest revision published in 2016 [34]. This provides a unique and standard strategy for cricket injury data collection and reporting, where results can be compared among all cricket playing nations to obtain an accurate picture of injury pattern and develop global strategies in injury prevention.

Success in injury prevention in cricket internationally

Over the last few decades, various measures have been employed to prevent both acute and overuse injuries among cricketers [13, 32]. Effective preventive measures and injury prevention policies in cricket have also contributed to the reduction in fatalities to a greater extent. A recent review of traumatic cricket-related fatalities in Australia by Bruckner and colleagues showed a significant reduction of fatalities over the last 30 years [35]. Only five cricket-related fatalities have been reported over the last 30 years in Australia, and none of them were secondary to head injuries, which was proposed as possibly being due to the use of helmets during batting and fielding. Injury prevention among fast-bowlers, especially related to lumbar spine injuries has been a primary focus over the years due to their impact on player availability. Understanding the biomechanical aspects, injury mechanisms and risks associated with lower back injuries have assisted in preventing injuries among fast-bowlers [13]. Described below are two examples from junior cricket that have showed effective injury prevention among fast-bowlers and batters.

Example 1: A study conducted among Australian junior fast-bowlers aged 12–17 years showed a direct relationship between bowling workload and injuries [36]. This study showed that bowlers with increased bowling frequency have a significantly higher risk for overuse injuries. Besides, bowlers who have short rest periods between bowling sessions also showed a higher risk of sustaining injuries. Understanding the relationship between bowling workload and injuries among fast-bowlers have directed close monitoring of fast-bowling workload both at elite and junior levels [36]. This type of research has encouraged sports governing bodies and policymakers to develop bowling workload guidelines for junior levels fast-bowlers that potentially reduce injury burden among fast-bowlers [37].

Example 2: An Australian study conducted among junior club cricketers aged 8-16 years demonstrated a reduction in head/neck/face injuries through implementing injury prevention measures among batters [19]. In this study, researchers found a high frequency (62%) of head/neck/facial injuries among batters during 2002/2003 season. During the 2004/2005 season, headgear was made mandatory during batting, and the injury frequency dropped significantly to just 4%. This study provided strong support towards the protective benefits of helmet use in cricket batting among junior cricketers [19]. This study demonstrated how injury epidemiology data can help to identify injury burden and risks, prioritise areas of need and implement appropriate injury prevention strategies to reduce injury occurrence among a group of junior cricketers.

Injury prevention research in cricket from Sri Lanka

At present, of all twelve test-cricket playing nations, five nations represent the South Asian region (Sri Lanka, India, Pakistan, Bangladesh and Afghanistan). Despite a substantial representation of test-cricket playing nations, limited data are available on the incidence and nature of cricket injuries from this region, and information is restricted mainly to adults [38]. Consequently, current understanding of injuries

and injury risks associated with playing cricket in this region is generally poor.

Over the last three decades, Sri Lankan cricket has reached top levels internationally, especially in the short-versions of the game. In addition to being the 1996 ICC 50-over Cricket World Cup champions, Sri Lanka became the ICC 20-over champions in 2014, and 50-over finalists in 2007 and 2011. With this reputation of the sport in the country, there is increased competitiveness and participation in cricket at junior, school and youth levels. Despite this high standard of the sport in the country, limited efforts have been taken to identify injuries and injury risks among Sri Lankan cricketers at any level.

To our knowledge, a prospective injury surveillance study among Sri Lankan national squad cricketers over two cricket seasons, conducted by Kountouris et al, is the only published injury data available at elite level [39]. Similar to injury profiles from other test-cricket playing nations, a relatively high number of injuries among fast-bowlers were reported than batters or fielders. The match injury incidence rate among Sri Lankan national squad players was 55 injuries per 10,000 player-hours, and this is similar to the match injury rates reported among Australian [16], New Zealand [30], and West Indian [31] cricketers at the national level. Over the last three years, several research projects have been conducted among Sri Lankan school cricketers to identify injuries and injury risks associated with playing cricket [40-42]. To our knowledge, this is the first injury and injury risk data available for Sri Lankan junior cricket, that would potentially benefit in developing appropriate injury prevention programmes at school level cricket.

Injury survey questionnaire for Sri Lankan context

Sinhala and Tamil are the two main languages in Sri Lanka, and English is considered the official international language. Therefore, any study instruments or questionnaires in academic research in Sri Lanka should be made available for participants to choose from all three languages. In addition to language translation, questionnaires also need to be adapted to match the social and cultural context in Sri Lanka. Ideally, translated and adapted versions should be examined for validity and tested for reliability before their use in the Sri Lankan context. This could be one of the challenges for researchers, and may have acted as a barrier in conducting research surveys in the Sri Lankan context.

In 2017, the Australian-developed English version of the JECS questionnaires was cross-culturally adapted to the Sri Lankan context, translated to Sinhala and Tamil languages, and subsequently tested for reliability and validity to obtain three different study surveys [43]: 1) musculoskeletal injury survey [40], 2) musculoskeletal injury risk perception survey [41], 3) exertional heat illness risk perception survey [42]. These three survey questionnaires now can be used by researchers to examine injuries and risk perceptions among Sri Lankan junior cricketers (Figure 2). The study also demonstrated the methodology for adapting and translating the JECS questionnaires, which can be replicated by researchers from other cricket playing nations, especially in the Indian subcontinent region, to develop similar study instruments to match their context [43]. This is the first time the JECS questionnaires have been adapted and translated to languages other than English, which is to be used outside Australia.

Injury survey among school cricketers

A nation-wide longitudinal injury survey was conducted for the first time among under-15 and under-17 schoolboy cricketers from Sri Lanka [41]. Data were collected prospectively during the 2016 cricket season and report competition injuries over the season. In contrast to what has been reported among national level Sri Lankan cricketers, nearly a half of injuries (46.0%) were sustained by fielders, followed by batters (25.4%) and bowlers (20.3%). Calculated match injury rate was 28.0 injuries per 100 match-player-days (95% CI=26.0-30.2), and this was relatively higher than injury rates reported for Australian and South African junior cricketers [18, 19, 21, 22]. The most common injuries among fielders were abrasions, lacerations, and bruises to the knee or elbow regions. Most of these injuries were minor, and only 19% accounted for match time loss. Facial injuries were common among batters and accounted for 61% of match time loss injuries. Strains and sprains were the most common injuries among bowlers mainly affecting lower back, knee and thigh regions.

Overall, the findings of this study will assist school cricket authorities in Sri Lanka to promote injury prevention programmes at school level and support future research in this area. Considering the large number of injuries among fielders, future research into fielding injury severity and specific mechanisms can be useful in designing preventive measures. Given the relatively high number of match time loss facial injuries among batters, use of helmets during batting is recommended, and school cricket authorities should consider making legislational changes for compulsory helmet use in school cricket. The bowling injury profile among Sri Lankan school cricketers once again confirmed and highlighted the importance of ongoing measures towards preventing lower back and lower limb injuries among bowlers.

Injury risk perceptions among school cricketers

According to the TRIPP framework of sports injury prevention, the second stage is to establish aetiology, risks and mechanisms associated with injuries that assist in developing injury prevention measures [6]. Injury risk perception in sports can be defined as the ability of an athlete to make an appropriate judgement of their own risk of sustaining a sports-related injury [44]. Identifying risk perceptions are important as this will assist in risk modification and injury prevention. A nationwide survey was conducted among under-13 district-level cricketers to identify injury risk perceptions, specifically focusing on musculoskeletal injuries [40].

Injury risk perceptions among this sample of Sri Lankan junior cricketers were generally considered as being appropriate and logical, and were very similar to the perceptions of Australian junior cricketers [24]. However, injury risk perceptions in some instances did not reflect the actual injury risk. Coaches and school cricket teachers can educate and support junior cricketers, in modifying their perceived risk attitudes and beliefs (e.g., misfielding or mishandling the ball is the primary mechanism identified for fielding injuries that can also occur during fielding in the outfield). More research evaluating injury risks is recommended in future, to gain a better understanding of injury risk perceptions among Sri Lankan junior cricketers.

Discussion

Injury prevention is important in Sri Lankan sports. In order to develop and implement successful injury prevention strategies, high-quality injury data is required, which can be obtained through conducting epidemiological studies in the field. Given the considerable lack of injury epidemiology data in Sri Lankan sports, not only in cricket but also in other sports, there is limited understanding of the actual injury burden and underlying injury mechanisms. This will hinder prioritising and developing effective injury prevention interventions for athletes in Sri Lanka. Taking the injury prevention message through to the authorities in the government and sports bodies, and acknowledging its importance to the country is vital, in order to engage and gain their support.

At the organisational level, sports governing bodies should adopt an injury surveillance programme that enables systematic and ongoing injury data recording at least for national level athletes. There are no ongoing injury surveillance systems for sport in Sri Lanka including cricket, which is the most professionally played sport in the country. Having an effective injury surveillance programmes will enable to prioritise injury prevention measures, identify high-risk groups, develop targeted injury preventive measures, and guide future injury prevention research [10]. Lack of trained staff to assess and report injuries can be a limiting factor in maintaining injury surveillance programmes in Sri Lankan set up. Institutional training programmes for allied health sports medicine professional such as sports trainer and physiotherapists can be beneficial for recording athletic injuries for this purpose.

New injury data reported for Sri Lankan school cricket have identified the incidence, nature and related risks, and also highlighted specific injuries among different groups of cricketers. This information can be used to develop and implement tailored injury prevention measures. Implementation of injury prevention programmes to real-life sports field has been a challenge for many years even in developed sporting nations [45]. As sports medicine professionals with a duty of care to protect athletes' health and wellbeing, it is our responsibility to network with sports bodies, policymakers, and sports authorities to implement successful injury prevention programmes. Barriers in implementing and delivering successful injury prevention programmes should be anticipated with appropriate measures to overcome them [46].

Educational institutes, government research organisations and other stakeholders in the field of sports medicine should lead and support clinicians and researchers to conduct sports injury prevention research. Lack of sports medicine research institutes in the country, both in the government and private sectors has limited opportunities, especially for early career researchers. Strong collaborations are needed between the educational institutes and sports medicine organisations within the country as well as internationally. At the same time, more learning opportunities and accredited academic courses for other sports medicine and allied health professionals are required to build a strong athlete support staff. Education of athletes, coaches and support staff on injury prevention is of utmost importance. The success of an injury prevention programme, engagement, and adherence to the recommended injury prevention

strategies are determined by the level of understanding of injury prevention and its benefits by end users.

Summary

This review discussed the importance of conducting scientific research to identify incidence, nature and associated risks among participants in sports, taking a recent research project among Sri Lankan school cricketers as an example. The review highlighted the first two steps of TRIPP injury prevention model and revealed the process of conducting research in the Sri Lankan context. The research studies conducted among Sri Lankan school cricketers over the last three years have identified specific areas that need priority in terms of minimising the injury burden. The next step is to develop appropriate preventive measures, assess what works in the Sri Lankan context and implement them at school level cricket. Barriers and challenges in implementing, maintaining, and monitoring the success of injury prevention strategies should be taken into consideration. Future research in other sports to identify injuries and injury risks are also encouraged, to assist the development of injury prevention among Sri Lankan athletes. Strong collaborations between researchers, sports bodies and government stakeholders are required to support research, develop and implement successful injury prevention interventions in the Sri Lankan context.

Acknowledgements: Aspects of this research are related to the work of the Australian Centre for Research into Injury in Sport and its Prevention (ACRISP), which is one of the IOC centres of research excellence for the prevention of injuries and promotion of health in athletes.

Funding: No sources of funding were used to assist in the preparation of this review.

Conflicts of interest:

Authors declare no conflicts of interest.

Figures:

Figure 1. *The 6-staged TRIPP framework for research leading to sports injury prevention [6].*

Figure 2. *Sample images of the questionnaires: (a) Injury risk perception survey questionnaire (English version), (b)Musculoskeletal injury survey questionnaires (English version), (c)Injury risk perception survey questionnaires (Sinhala version), (d)Musculoskeletal injury survey questionnaires (Tamil version).*

Note: The English, Sinhala and Tamil versions of these questionnaires can be requested from the corresponding author.

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