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International cricket injury surveillance: A media-based injury report on the ICC men's Cricket World Cup 2015

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ABSTRACT

Effective injury prevention strategies rely on accurate injury surveillance data. It became apparent that the ICC men's Cricket World Cup (CWC) 2015 One-Day tournament was not planning to have official injury surveillance. Therefore, the aim was to prospectively quantify the number and type of media-reported injuries from all CWC competing teams. Injury data were collected prospectively throughout the 49 tournament matches. The study group monitored the tournament website, official team web pages and major news websites to track availability and injury status of all 219 tournament players. Captured data included time-loss and non-time-loss injuries and also recorded the injured player position, injury site and injury onset activity. The media reported 31 total injuries from 23 players (12% of players), which resulted in these players missing a total of 69 matches. Positionally, fast bowlers (12) and batsmen (11) had a similar injury incidence, but fast bowlers missed 35% more matches (31) compared to batsmen (23). Anatomically, 17, 8 and 6 injuries occurred in the lower limb, abdominal/trunk and upper limb respectively. Crucially, hamstring injuries (17) followed by abdominal/trunk side-strains (15), hand (9), lower back (7) and shoulder injuries (6) accounted for the most tournament matches missed. Across the tournament, 4% of players experienced an injury during bowling, 4% during training and 3% while batting. Injuries reported to the media may not include all the injuries experienced by all players with teams possibly not wanting to disclose their likely playing team, too far in advance. Nevertheless, this unofficial 2015 CWC data provides a useful addition to previous injury surveillance studies and demonstrates the need for more formal and rigorous injury surveillance programmes. The large proportion (>10%) of injured players, demonstrates the importance of implementing injury prevention practises to maintain a team's overall competitive strength.

1. Introduction

Cricketers are at risk of experiencing either acute or overuse injuries (Stretch., 2003); such injuries may be personally devastating for the injured cricketer and may also affect the overall team strength. Cricket injury surveillance helps in identifying the injury-prone body areas and also to analyse the injury aetiology. This, in turn, allows the targeted implementation of preventative measures designed to reduce future sports injuries.

Effective cricket injury surveillance requires the approval of the sporting bodies and event organisers (Orchard et al., 2005). It also depends heavily on the quality of injury reporting by the medical staff, coaching staff and players (Ranson et al., 2013). Injury surveillance in cricket is meticulously conducted by several international cricketing boards (Frost & Chalmers, 2014; Orchard et al., 2002; Ranson et al., 2013). Analysis of these injury surveillances and the subsequently published studies have helped understand the extent of cricket injuries and establish their aetiology. In addition to identifying the most injury-prone player position, further analysis has helped improve the understanding of the injury mechanisms.

Injury surveillance studies have provided various explanations to describe injury prevalence rates, injury-prone positions, most frequently injured body areas and likely injury risk factors. Longitudinal studies undertaken on elite Australian male

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cricketers highlighted the increased injury risk of the fast bowling position (Orchard et al., 2002). A six-year observational study of South African national cricketers concluded that bowling accounted for the majority (40%) of all injuries (Stretch, 2003). Identification of injury prevalence among elite Australian male cricketers revealed that lumbar stress fractures (1.9%), hamstring strains (1.4%), abdominal/trunk side-strains (0.9%), and wrist/hand fractures (0.8%) (Orchard, Kountouris, & Sims, 2016 a) were the most common injuries during ten playing seasons. These injury findings have been consistently similar across different elite cricket cohorts. Based on these findings, several explanations have been proposed to understand the injury aetiology. Association between bowling style and lumbar injuries, the correlation between throwing workload and shoulder injuries, the relationship between front foot landing mechanics and knee injuries are some examples of on-going studies exploring injury aetiology in cricket.

Limited over international tournaments like the CWC may cause an acute spike in the workload of the cricketers. An association between bowling workload and injury has been suggested, with bowlers bowling a total match bowling workload of >50 overs in first-class games and a bowling workload of >30 overs in the second innings have been predicted to have a higher injury risk (McNamara, Gabbett, & Naughton, 2017). An extended period of low bowling workloads during Twenty20 matches and unprepared high bowling workloads in first-class matches has also been speculated as an aetiology for injury (Orchard et al., 2015). Prospective cohort studies amongst elite cricketers also suggest that increased throwing workload is a risk factor for the development of upper limb injury (Orchard et al., 2015). Fewer rest days and a significant increase in throwing workloads a week before the injury onset also have been observed as a cause for shoulder injuries (Saw, Dennis, Bentley, & Farhart, 2011). Research findings like these help team coaches, medical and conditioning staff to design, plan and implement strategies to reduce injury occurrence to their players. Hence, cricket injury surveillance is an essential step toward injury prevention and management.

The International Cricket Council (ICC) is the global governing body for cricket, and they conduct three formats of international championship tournaments, Test, One-Day and Twenty20 ("ICC Three Game Formats," 2015). To date, the most popular international cricket tournament based on spectator attendance has been the 50-over ICC men's CWC ("Cricket World Cup Crowd Attendances," 2015). The ICC has hosted 20 different national teams, across the eleven editions of the ICC men's CWC tournament ("ICC Cricket World Cup," 2015). Worldwide, the 50-over men's CWC is one of the most viewed international sporting events, with over 2.2 billion watching the ICC men's CWC 2015 ("ICC Cricket World Cup," 2015). Despite the 47-year tournament's history and popularity, there has only been a single official injury surveillance study undertaken, during the 2011 CWC (Ranson et al., 2013).

In the lead up to the 2015 ICC CWC, the information provided by ICC administrators verified that there was to be no official injury surveillance undertaken during the upcoming CWC tournament jointly hosted by Australia and New Zealand. Bureaucratically, it would be challenging to obtain injury incidence data from all teams without official permission and team management cooperation. Fortuitously, other sports injury surveillance studies have been conducted through media reports in the absence of official tournament injury surveillance. A 2009 injury surveillance study of 471 professional German football players, was solely conducted using media reports released to a sports magazine because no official injury surveillance was administered (Faude et al., 2009), in the study they recorded that 83% (392 injured players) of the players were injured during the 2004/05 playing season. This suggests that, in the absence of official sports injury surveillance, the collection of media reported injuries may be used to estimate a tournament's injury prevalence. Therefore, it would be possible to collect injury information relating to the participating squads of the ICC men's CWC 2015 using official media channels. Reported injuries could then be collated with players missing subsequent matches. Therefore, this study was aimed at obtaining and analysing all media reported injuries during the ICC men's CWC 2015.

2. Methods

2.1 Study design

Observational descriptive study.

2.2 Participants

The ICC men's CWC 2015 took place from 14 February to 29 March 2015. The last date for each playing nation to submit their 15-man squad to the ICC was 7 January 2015; however, a replacement player could be added later at the expense of another player for injury or disciplinary reasons. A total of 14 playing nations and 219 players contested the 2015 tournament. Among the 219 players, 47% were specialist batsmen, 46% bowlers and 7% wicket-keepers, with the mean age being 28 ± 4 years (refer to Table 1).

Table 1: Profiles of players competing in the ICC men's Cricket World Cup 2015

Player position	n	%
Right-handed specialist batsman	67	31
Left-handed specialist batsman	37	17
Right fast-medium bowler	22	10
Right medium-fast bowler	20	9
Wicket-keeper	15	7
Right off-break bowler	12	6
Slow left-arm orthodox	11	5
Right fast bowler	9	4
Right leg-break bowler	7	3
Right medium bowler	6	3
Left fast bowler	4	2
Left medium-fast bowler	4	2
Left fast-medium bowler	3	1
Left medium bowler	2	1
Total	219	100

n = number of players

2.3 Player characterisation

All player positions were characterised according to their designated position prior to the commencement of the tournament (Orchard et al., 2005). For this study, the bowler profiles were defined according to the universally accepted characterisation as listed on ESPN ("Wisden Cricinfo," 2015, Orchard et al., 2016 b). For injury surveillance purpose in this study, all the player positions such as fast, fast-medium, medium-fast, medium bowlers were grouped and classified as fast bowlers (Orchard et al., 2005). Within the spin bowlers' category, all types of spin bowlers, off-break bowlers, slow orthodox bowlers, and leg-break bowlers were included. As the position of an "all-rounder" is not recommended for injury surveillance purpose (Orchard et al., 2005, 2016 b), we did not include the term in this study. The player positions of wicket-keeper and batsmen were also characterised according to the universally accepted listing on ESPN ("Wisden Cricinfo," 2015), this method is also recommended by both the international consensus statements on injury surveillance in cricket (Orchard et al., 2005, 2016 b).

2.4 Data collection

Data collection commenced from 7 January 2015 till the 49th match on 29 March 2015. Prior to the tournament start, information on each squad for the 14 teams was collected from several websites ("ICC Cricket World Cup," 2015, "Match Schedules and News Online," 2015 & "Making cricket CRICHQ," 2015). Player information including, date of birth, batting handedness, bowling arm and predominant playing position were collected and cross-checked between the source websites. Injury information was collected from over twenty national and international news websites, and any media reported injuries were cross-checked with source websites. In addition, each match during the ICC CWC 2015 tournament ("ICC Cricket World Cup," 2015), was monitored for checking the accuracy of reports relating to players missing matches. Collected injury information included, each injured player's position, injured body area, activity at the time of injury and the number of matches missed due to injury. Screenshots of all the injury-related media reports from all source and media websites collected during the 2015 ICC CWC are archived for future data reference.

2.5 Data analysis

Data were collated using a Microsoft Excel spreadsheet which summarised player descriptive data, tracked injury variables and tournament day availability.

The tournament injury prevalence was calculated as follows: Sum of all tournament injuries/sum of all tournament players multiplied by 100.

Injury prevalence per playing position was calculated as follows: Sum of injuries per playing position/sum of all tournament players multiplied by 100.

Percentage of injuries per body area, per playing position, was calculated as follows: Sum of injures per body area, per playing position/ sum of all tournament injuries multiplied by 100.

Percentage of injuries per body area was calculated as follows: Sum of injuries per body area/ total number of injuries multiplied by 100.

Injury prevalence per activity at the time of an injury was calculated as follows: Sum of injuries per activity/ sum of all tournament players multiplied by 100.

For the sake of this study, "*if a player missed a match due to an injury, it was considered a match time-loss injury, if there was a media report of a player being injured and if the same player was subsequently recorded playing a match the same day or the next day it was considered a non-time-loss injury"*. The total number of matches missed due to the injury was calculated by summing the first day of any match missed due to the reported injury and the reported unavailability of the same player to play subsequent matches after the injury onset. For replaced players, the number of matches missed was calculated from their first CWC 2015 match appearance till the last game date that they were replaced.

3. Results

Over the course of the tournament, 31 players sustained injuries. Therefore, the tournament injury prevalence was 14%. Between the playing positions, fast bowlers and batsmen, a similar prevalence of match time-loss injuries were recorded, as shown in Table 2.

Table 2: Injury prevalence by playing position

Player position	Time-loss injuries		Non-time-loss injuries		Total injuries	
	n	%	n	%	n	%
Fast bowler	12	5	3	1	15	7
Batsmen	11	5	1	0.4	12	5
Spin bowler	3	1	-	-	3	1
Wicket-keeper	1	0.4	-	-	1	0.4
Total	27	12	4	2	31	14[a]

n = number of injuries, [a] Sum of all injuries (31) / sum of all tournament players (219) x 100 = 14%

Overall, fast bowlers had the highest injury prevalence during the tournament. Knee and foot injuries were more prevalent in fast bowlers. No lower back injuries were reported amongst fast bowlers.

Table 3: Injured body parts by playing position

Body part	Fast bowler		Batsmen		Spin bowler		Wicket -keeper		Total	
	n	%	n	%	n	%	n	%	n	%
Hamstring	1	3	3	10	1	3	-	-	5	16
Abdominal / Trunk side-strain	3	10	2	6	-	-	-	-	5	16
Knee	3	10	1	3	-	-	-	-	4	13
Foot	3	10	1	3	-	-	-	-	4	13
Hand	1	3	1	3	1	3	-	-	3	10
Lower back	-	-	2	6	1	3	-	-	3	10
Shoulder	1	3	-	-	-	-	1	3	2	6
Elbow		-	1	3	-	-	-	-	1	3
Pelvis	1	3	-	-	-	-	-	-	1	3
Quadriceps	-	-	1	3	-	-	-	-	1	3
Calf	1	3	-	-	-	-	-	-	1	3
Achilles	1	3	-	-	-	-	-	-	1	3
Total	15	48	12	39	3	10	1	3	31	100

n = number of injuries

Of all sustained injuries, hamstring injuries and abdominal/trunk side-strains caused the tournament players to miss the most number of matches.

Table 4: Overall matches missed per injured body part

Body part	Total number of injuries for all players per injured body part	Overall matches missed
Hamstring	5	17
Abdominal/Trunk side- strain	5	15
Knee	4	4
Foot	4	6
Hand	3	9
Lower back	3	7
Shoulder	2	6
Elbow	1	-
Pelvis	1	2
Quadriceps	1	2
Calf	1	1
Achilles	1	-
Total	31	69

Four percent of the tournament players sustained an injury while bowling in matches and three percent while batting in matches. Four percent of players got injured while training but information on whether it was specifically cricket training or gym training was not reported. The activity at injury onset for two injuries reported prior to the tournament start was unknown, so they are reported as "prior to tournament" in Table 5.

Table 5: Injury prevalence by activity

Activity	Injuries	
	n	%
Bowling	9	4
Training	9	4
Batting	6	3
Fielding	5	2
Prior to tournament	2	1
Total	31	14 [a]

n = number of injuries

[a] sum of all injuries (31) / sum of all tournament players (219) x 100 = 14%

During the tournament, fast bowlers missed the highest number of matches (31) due to the sustained injuries, and this was followed by batsmen missing 23 matches, spin bowlers missing 12 matches and wicket-keepers missing three matches.

4. Discussion

Executing injury surveillance even with official permission requires strict compliance from the participating teams, even in the 2011 official CWC injury surveillance study, only 5 of 14 participating national teams agreed to participate (Orchard et al., 2005). A conjoined injury surveillance programme initiated by the ICC with cooperation from all the competing national squads during every CWC could help create direction for an evidence-based cricket injury prevention programme. Most of the existing injury surveillance reports have been conducted among elite or sub-elite cohorts separately in different countries. There is no platform to compare the injury aetiology of one country's cricket squad to another. When injury surveillance is carried out between competing nations as in the ICC CWC, it will help to determine and compare injury incidence. This will also help determine possible aetiology for those injuries and successively help create targeted injury prevention programmes, which could be implemented across all levels of cricket around the world.

The current study objective was to conduct media-based injury surveillance prospectively during the tournament. Although some players were benched during the tournament, information regarding the reason for not playing matches was not always available. As all injury data were obtained from media releases, a likely limitation of this study is biased media reporting. Injury information reports for newer players, particularly those from lower-ranked teams may have been considered less newsworthy so injuries to those players may not have been reported on media. Another limitation of the study was the reluctance of some lower-

ranked teams to update information on their cricket board websites regarding their players' statistics, injuries and status of their 15 member playing squad ahead of every match, and this means that injuries sustained by players from those squads may not have been available and would not be recorded in this study data. The percentages of playing positions were similar between players who were predominantly specialist bowlers and batters. Overall, 31 players missed 69 matches, the number of injuries reported is the same as the number of players injured, because there was no report of the same player experiencing a second injury or having a recurrent injury to the same body part.

Among the player positions, fast bowlers missed the highest number of matches due to injuries relatively, fast bowlers experienced the highest percentage of total injuries and match time-loss injuries when compared with other playing positions, as shown in Table 2. One of the most recent injury surveillance studies, undertaken amongst elite senior male cricket players during the season 2006-2007 to season 2015-2016 highlighted that batsmen (7%) had the second-highest injury prevalence compared to other positions (Orchard et al., 2016 b) similarly in the current study batters (5%) experienced the second-highest injury prevalence and also missed a total of 23 matches.

The hamstring was the most injury-prone body area amongst the current study participants, and this matched the finding of injury surveillance undertaken on elite New Zealand cricketers from 2002/2003 to 2007/2008, which identified hamstring strains/tears (11%) as the most common specific diagnosis (Frost & Chalmers, 2014). Detailing injuries by specific diagnosis in the current study, hamstrings (16.1%) and abdominal/trunk side-strains (16%) both equally accounted for the highest percentage of injuries recorded, however hamstrings caused players to miss 17 matches (25%) which was higher than the 15 matches (22%) missed due to abdominal/trunk side-strains. The hamstring injuries were more commonly experienced by batsmen (10%) when compared to all other playing positions. A similar finding has been reported amongst elite Australian cricketers during 50-over international matches where batsmen had the highest hamstring injury incidence (at 31.3 injuries per 1000 team days) (Orchard et al., 2017).

A proposed explanation for the relatively higher hamstring injury incidence among the batters maybe that batsmen are required to sprint more (Petersen et al., 2011) during a 50-over match in comparison to a multi-day match. Due to the limited-overs nature of a 50-over match, there is a requirement to take every opportunity to score runs to improve a team's match-winning prospects. Consequently, batsmen may acquire more runs through running between the wickets (Orchard et al., 2017), as boundary runs may not be as easily scored given Australian stadiums tend to be relatively larger cricket grounds ("ICC Cricket World Cup," 2015)

In the current study, fast bowlers (48%) had the highest tournament injury prevalence amongst all playing positions. Majority of the injuries for the fast bowlers occurred on the trunk, knee and foot. Abdominal/trunk side-strains caused the fast bowlers to miss the most number of matches. Previous studies have reported that abdominal/trunk side-strains mostly occur on the contralateral side to the bowling arm, with either the internal oblique or the external oblique muscle being mostly affected (Bayne et al., 2011). Abdominal/trunk side-strains have also been reported to have a recurrence rate of 30% and has been cited as a common risk factor for injury amongst fast bowlers (Nealon & Cook, 2018). Till date, most reports on abdominal/trunk side-strains have suggested it may be an increased workload-related overuse injury. As the current study was designed as an observational study, we could not conclude on the possibility of workload related aetiology being behind the abdominal/trunk side-strain prevalence of fast bowlers. Future research could be directed into investigating cricket-related abdominal/trunk side-strain injuries. While most cricket injury surveillance studies have reported a high lumbar injury prevalence amongst fast bowlers, surprisingly no lower back injuries were reported amongst fast bowlers.

In the current study, as shown in Table 5, bowling during matches was one of the most common activities the players were undertaking at the time of injury onset. Of the 69 matches missed due to injuries, fast bowlers missed 31 matches which is the highest proportion among all player positions. While fast bowlers encountered 12 match time-loss injuries and missed 31 matches, the batsmen missed 23 matches due to 11 match time-loss injuries. Estimating injury severity using time-loss is suggested according to the international injury surveillance consensus (Orchard et al., 2005). Therefore analysing the results of the current study, it could be concluded that although the number of match time-loss injuries between fast bowlers and batsmen was similar, fast bowlers may have been affected the most due to injuries.

Even though the current study's report of 29 new injuries was collected through media reports, all the injury reports were checked across multiple sources before and after a match. Another method used to verify the reported injury was to double-check if the injured player missed the next match after the reported injury. In the current study, only four non-time-loss injuries were recorded. The low number of non-time-loss injuries recorded in the current study may have been due to these less severe injuries being less newsworthy. This is acknowledged as a limitation in the current study, as many non-time loss injuries potentially were not reported and hence not recorded. As all injury reports were media injury reports associated with the matches missed by players, there was a high percentage of 85% (23/27) of time-loss injuries recorded. It must be noted that many injuries during international cricket competitions may not be reported to the media and it reinforces the recommendation by the international cricket injury surveillance consensus that prospective longitudinal study supported by the tournament organisers and team management is necessary.

5. Conclusion

Despite this study design being based on media reports of cricket injuries, this is the only study to our knowledge to report on the injury patterns for the 2015 CWC tournament. This study has reported that fast bowlers were the most injury-prone, hamstrings as the most injured body part and bowling as the most common activity at the time of an injury. This current study also reinforces the appeal made by the international cricket injury surveillance

consensus group (Orchard et al., 2005, 2016 b) to implement effective cricket injury surveillance across cricket playing nations and during major cricket tournaments.

Conflict of Interest

The authors declare no conflict of interests.

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