Physical Therapy in Sport 67 (2024) 125–130

Contents lists available at ScienceDirect

Physical Therapy in Sport

journal homepage: www.elsevier.com/ptsp

Original Research

Injury profiles in sub-elite Women's Cricket: Exploring incidence, prevalence, nature, onset and body region

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ARTICLE INFO

Handling Editor: L Herrington

Keywords:
Surveillance
Epidemiology
Sports medicine
Female athlete
Team sport

ABSTRACT

Introduction: The rise in participation in sports, like women's cricket, is linked with increased injury risk. Providing high-level longitudinal data is the first step in implementing evidence-based injury prevention strategies.
Design: Prospective cohort study.
Objective: This cohort study aims to describe the injury profiles in sub-elite women's cricket in South Africa during the 2022/23 season.
Methods: Injuries were prospectively recorded using injury surveillance questionnaires, injury surveillance database, and logbooks completed by each team's medical staff. Injury rates were investigated for match and training days, body region, player role, nature, and activity at the time of injury.
Results: Three teams with a total of 44 players (20.86 ± 1.6 years) were included in the study. Injury incidence was 85.23 per 1000 player match days, 15.91 for match time-loss and 69.32 for non-time-loss, with 2.95% of players unavailable for match selection on any day. Fast bowlers had the highest injury incidence. Fielding caused 46.67% of all injuries. Injury incidence was higher in training than in matches. The wrist/hand had the highest injury incidence and caused the most match time-loss.
Conclusion: This study provides valuable insights regarding the current injury rates in sub-elite female cricket players.

1. Introduction

Sustaining an injury has been observed to diminish the likelihood of an individual's selection for professional sport (Hägglund et al., 2013). Injuries result in missed playing time, which reduces the effectiveness of the team's and individual's success in progressing in their career. Various injury prevention models, including the Translating Research into Injury Prevention Practice (TRIPP) framework , were developed to provide a structured approach for sports stakeholders to reduce the risk of injuries (Finch, 2006). The initial phase of the TRIPP model is to create a descriptive injury profile of the population, commonly referred to as injury epidemiology. Subsequently, injury epidemiology will guide the next stage of the injury surveillance framework (Finch, 2006). Epidemiological data can provide valuable insights to relevant stakeholders regarding injury rates, nature, body regions, player roles, and injury-related activities. Further, this information can inform the development of evidence-based injury prevention strategies to be implemented in practice.

Injury epidemiology is a well-researched concept in high-income cricket nations (Orchard et al., 2016). Several injury surveillance studies were published in women's cricket at the elite level cricket. According to a recent systematic review and meta-analysis of women's cricket injury epidemiology the injury incidence was 71.9 injuries per 1000 player hours, 13.3 time-loss injuries per 1000 player hours, and 58.5 non-time-loss injuries per 1000 player hours (Jacobs et al., 2022). According to the review, injury prevalence was higher in elite than

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https://doi.org/10.1016/j.ptsp.2024.04.006
Received 3 August 2023; Received in revised form 14 April 2024; Accepted 15 April 2024
Available online 23 April 2024

non-elite levels and shoulder and knee injuries were the most common. Fast bowlers had the highest injury prevalence, and fielders were the most likely to sustain wrist and hand injuries (Jacobs et al., 2022). Warren et al. (2019) investigated injury patterns in elite women's T20 (20 over) cricket in the United Kingdom (UK). The most common injuries were to the shoulder (1.8 injuries per 100 match days), lower back (1.7), and knee (1.7). The hand (1.7%), head/neck (0.8%), and thigh (0.6%) had the highest time-loss prevalence. The most time was lost due to catching-related injuries (2.5%), and throwing-related shoulder injuries were the most common (2.3 injuries per 100 match days) (Warren et al., 2019).

Orchard et al. (2023) conducted a recent epidemiological study on injury rates in elite male and female Australian cricket players. The most common match time-loss injuries in female cricket players were hamstring strains (3.1 injuries per 100 players per season), concussions (2.3), quadriceps strains (2.4), and shin, foot, and ankle stress fractures (2.0). The authors then compared injury rates between male and female cricket players, establishing that males had higher match time-loss injury incidence and prevalence but similar medical attention injury rates. The observed differences in injury patterns between sexes indicate that injury prevention interventions should be adapted to the specific needs of each sex (Goggins et al., 2020; Orchard et al., 2023).

Despite the evidence of injury epidemiology in elite women's cricket (Jacobs et al., 2022; Orchard et al., 2023; Warren et al., 2019), a knowledge deficit is evident at the sub-elite level. There remains a dearth of information regarding injury profiles in women's cricket at the sub-elite level. Therefore, injury prevention strategies implemented at the sub-elite women's cricket are based on either evidence retrieved at the elite level in women's cricket or the sub-elite level of men's cricket. The objective of this study is to establish the incidence and prevalence of injury in sub-elite women's cricket. Findings from this study will effectively guide injury prevention strategies and provide relevant information to stakeholders working with this population.

2. Methods

The STROBE Sports Injury and Illness Surveillance (STROBE-SIIS) (Bahr et al., 2020) and the International Consensus Statement (Orchard et al., 2016) guided the methodology of this longitudinal injury epidemiology study. The STROBE-SIIS checklist is attached in the Supplementary Table S1. Three teams were invited to participate in this study, and 44 female cricket players were voluntarily recruited. All subjects (including guardians of 18-year-olds and younger) gave their written consent for their data to be used in the study. Ethical approval and permission to conduct this study were obtained from Cricket South Africa's (CSA) Medical Research Comittee, the respective cricket unions' managers, and the Human Research Ethics Committee (Medical) of the University of the Witwatersrand. The three teams in this study participated in the 20-over and 50-over leagues that ran concurrently for the 2022/23 season.

The season started in September 2022 and continued until November 2022 and followed a month break commencing January 2023. During the month break, the injury surveillance was paused and began when practice re-started in January 2023 and continued till March 2023. Only injuries sustained during the official training and matches or other activities related to preparation for the domestic women's league were used as data for this injury surveillance study. During the season, the players were involved in other cricket leagues (club leagues, tournaments, etc.), and injuries sustained during these matches were not included in this injury surveillance study. A total of 20 matches were played by each of the three teams over a total of 6 months (excluding the 1-month break), ten 50 over and ten 20 over matches.

Injury incidence data were obtained in three ways and compared to validate the data used in this study. First, the three medical teams (physiotherapists and biokineticists) were asked to log injuries over the season for data capturing for this study. Secondly, data was extracted from the injury surveillance system. As part of CSA's national injury surveillance, medical health professionals used a platform, *CricketClinic*, to capture all injury and performance stats over the season. Finally, self-administered baseline and weekly questionnaires were administered using the Research Electronic Data Capture (REDCap) software (Harris et al., 2019). These questionnaires were validated and used in previous injury surveillance studies in the cricket population (Olivier et al., 2015). Self-reported questionnaires were completed at the start of the season and weekly for the duration of the season. The questionnaire aimed to capture weekly self-reported non-time-loss injuries as these are frequently missed if they are not medical attention injuries. All self-reported injuries were discussed with the medical team and team coaches to correlate them with those recorded by the medical team in their logbook or on *CricketClinic*. If the medical team knew of the self-reported injuries, the injury was captured as a self-reported non--time-loss injury. All time-loss injuries reported in this study were injuries recorded by the medical health professionals in their logbooks or on *CricketClinic*. The researchers screened the data on a weekly basis, and had weekly meetings with the medical health professionals to compare self-reported injuries with those documented in the logbook, aiming to identify any time-loss and non-time loss injuries. Additionally, they correlated whether injuries were new occurrences or recurrent instances, i.e., the same injury recurring in the same season.

All definitions used in this study are per the 2016 cricket consensus statement (Orchard et al., 2016). Player roles were classified as batters, bowlers, and wicketkeepers. Further sub-analysis was done for slow bowlers, fast bowlers, and wicketkeepers. All injury incidence or prevalence include "match time-loss" and "non-time-loss" injuries. Match time-loss is an injury that prevents a cricket player from being fully available for match selection, from batting, bowling, or keeping wickets as required by the rules or team captain. Non-time-loss is an injury that does not prevent sports participation (Orchard et al., 2016). In this study, player-reported injuries were cross-checked with the medical team and recorded as non-time-loss if the medical team was unaware of the injury. This study investigated match time-loss injuries, training time-loss injuries and missed match and training days. Training time-loss was not included in any incidence or prevalence calculations but rather in a sub-analysis to compare missed match days with missed training days.

Exposure hours were calculated as a sum of the players in each squad multiplied by the number of match days and reported as player match days or exporsue hours. Player match days were reported in recent cricket epidemiology studies (Goggins et al., 2020; Orchard et al., 2023; Warren et al., 2019) to exclude any confusion for mistaking exposure hours per player or team and for different exposure hours per format of cricket. All injury incidence calculations include both new and recurrent injuries. Injury incidence rates are reported as 1000 player match days for comparisons with other cricket injury epidemiology studies (Orchard et al., 2023). The calculations for injury incidence rates and prevalence proportions is displayed in Table 1 (Goggins et al., 2020; Orchard et al., 2016; Warren et al., 2019).

Table 1
Equations for incidence and prevalence.

Player match days =	daily squad size x number of match days
Player training days =	daily squad size x number of training days
Injury incidence rate =	$\frac{\text{time - loss / non - time - loss injuries x 1000}}{\text{player match days}}$
Match time-loss prevalence =	$\frac{\text{players unavailable for matches x 1000}}{\text{player match days}}$
Match time-loss (per 1000 exposure hours) =	$\frac{\text{match time - loss injuries x 1000}}{\text{match exposure hours}}$
Training time-loss (per 1000 exposure hours) =	$\frac{\text{training time - loss injuries x 1000}}{\text{training exposure hours}}$

2.1. Statistical analyses

The incidence and prevalence rates were analysed using the formulas above as descriptive statistics in Microsoft Excel (Microsoft 365, Microsoft Corporation, Washington, USA).

3. Results

A total of 44 participants with a mean age of 20.86 ± 1.60 years participated in the study. A total of 75 injuries (14 time-loss and 61 non-time-loss) (46 new injuries, 29 recurrent injuries) were recorded over one cricket season (extra descriptive data, including conversions for exposure hours, are available in the supplementary document, Tables S1–S12). Training sessions were 2 hours per session, and matches per team for ODI was 43.3 hours per match per team, and T20 14.7 hours per match per team. Players were exposed to a total of 6336 training hours (3168 player training days) compared to 1740 h in 20 matches (880 player match days). Most injuries occurred during matches (46.67%) and training (49.33%). Time-loss injuries occurred almost equally in training and matches. Illness complaints were initially recorded in this study but only occurred twice during the season and did not result in any time-loss; hence illness is deliberately excluded from this study.

3.1. Injury incidence

The injury incidence of all injuries was 85.23 per 1000 player match days. Time-loss injuries were 15.91 per 1000 player match days and 69.32 for non-time-loss injuries. Match injury incidence in 20 overs was 21.59 per 1000 player match days compared to 50 overs injury incidence of 17.05 per 1000 player match days (Table 2). Injuries resulted in a total 17.11 hours missed for matches and 123.97 hours missed in training. Overall, match time-loss prevalence was 2.95% of players unavailable for selection on any given match day and 29.55 matches missed per 1000 player match days. Training time-loss prevalence was 5.87% of players unavailable to participate in training on any given day. The injury incidence rate for missed training days was 24.62 per 1000 player training days. For time missed due to injury, player match days were converted to exposure hours to compare match and training time-loss. The match time-loss injury incidence rate was 8.05 per 1000 exposure hours, and the training time-loss injury incidence rate of 4.42 per 1000 exposure hours. Wrist/hand injuries caused the most time missed in matches, followed by lower leg and shoulder.

Table 2
Incidence of injuries in sub-elite women's cricket by cricket format and player role (per 1000 player match days).

	Time-loss incidence rate (per 1000 player match days)	Non-time-loss incidence rate (per 1000 player match days)	Injury incidence rate (per 1000 player match days)
All	15.91	69.32	85.23
Per format of cricket:			
All matches	6.82	32.95	39.77
- *T20 match*	*4.55*	17.05	*21.59*
- *ODI match*	*2.27*	14.77	*17.05*
Training	n/a	n/a	38.64
Other	n/a	n/a	6.82
Per player role:			
All-rounders	6.82	23.86	30.68
Batters *(including wicketkeepers)*	3.41	22.73	26.14
Bowlers *(all)*	5.68	22.73	28.41
Per player role (sub-analysis):			
Fast bowlers	7.95	34.09	42.05
Slow bowlers	4.55	12.50	17.05
Wicketkeepers	0.00	6.82	6.82
Batters	3.41	15.91	19.32

3.2. Injuries per body region and player role

Injury incidence (time-loss and non-time loss) per body region can be seen in Table 3. The highest injury incidence occurred in the wrist/hand, knee, and lower leg. The highest time-loss injuries occurred in the lower leg, ankle, and wrist/hand. Fast bowlers had the most match time-loss injuries, followed by slow bowlers. All-rounders had the highest injury incidence compared to bowlers and batters. Further sub-analysis indicated that fast bowlers are more frequently injured when compared to batters, slow bowlers, and wicketkeepers (Table 3).

3.3. Activity, onset and nature of the injury

The nature of injuries per activity of injury is reported in Table 4. Players sustained the most injuries during fielding (46.67%) compared to bowling (25.33%), strength and conditioning (8%), batting (6.67%) and keeping (5.33%). Injuries were more common on the dominant (54.67%) compared to the non-dominant side (32%). The incidence of new injuries (52.27 per 1000 player match days) was higher than that of recurrent injuries in the same season (7.95).

Most new injuries occurred in the wrist/hand and during fielding. The most recurrent injuries occurred in the lower leg, knee and ankle and sustained during fielding and bowling. The most match time-loss injuries occurred during fielding. The incidence of direct contact injuries (61.33%) was higher than non-contact injuries (38.67%). Most recurrent injuries were non-contact injuries (75.86%). Recurrent injuries were linked to injuries sustained in previous seasons (47.83%) rather than the current season (15.22%). Direct contact with the ball had higher incidences (20%) than contact with the ground (12%). Sudden onset injuries (64%) had higher incidences than gradual onset injuries (36%). Medical attention injury incidence was 30.68 injuries per 1000 player match days, including a time-loss of 15.91 injuries per 1000 player match days. All time-loss injuries were medical attention injuries. The highest muscle-related injuries were in the lower leg and shoulder and sustained mainly by fast bowlers. The most joint-related injuries occurred in the wrist/hand and were more prevalent in slower bowlers.

4. Discussion

This study fills a vital research gap regarding injury epidemiology in sub-elite women's cricket. To the authors' knowledge, this is the first study to provide a detailed profile of the incidence rate and prevalence of injuries among the sub-elite female cricket population. The injury incidence rate in 20 over matches was higher (21.59 per 1000 player match days) than in 50 over matches (17.05 per 1000 player match days). The intensity of cricket played during 20 overs is higher than in longer game formats and could be the reason for increased injury incidence, despite the reduced exposure hours compared to 50 overs. In our study, the injury incidence rate for sub-elite women's cricket was 85.23 per 1000 player match days, 15.91 for time-loss and 69.32 for non-time-loss. The injury incidence rate was higher among UK international pathway women's cricket (182.5 per 100 players per year) and UK elite women's cricket (143 injuries per 1000 match days) (Goggins et al., 2020; Warren et al., 2019). Match time-loss was lower for the sub-elite level cricketers in this study compared to elite level women's cricket. Match time-loss in elite Australian women's cricket was 101 injuries per 1000 match days (Orchard et al., 2023) and 2.1 time-loss injuries per 100 match days in elite UK women's cricket (Warren et al., 2019). However, the incidence of match time-loss injuries in this study was higher (15.91 per 1000 players per year) than in UK international pathway women's cricket (7.0 per 1000 player match days) (Goggins et al., 2020). Further, 2.95% prevalence of time-loss injury reported in this study was lower compared to other women's cricket studies; 6.5% in elite Australian women's cricket, 4.6% in UK elite cricket and 4.1% in UK international pathway cricket (Goggins et al., 2020; Orchard et al., 2023; Warren et al., 2019).

Table 3
Incidence of body region injured per player role in sub-elite women's cricket (per 1000 player match days).

	Ankle	Elbow	Head/neck	Hip/groin	Knee	Lower back	Lower leg	Shoulder	Thigh	Wrist/hand
All	9.09	3.41	4.55	6.82	13.64	3.41	12.50	9.09	6.82	17.05
Time-loss	3.41	1.14	0.00	0.00	1.14	1.14	3.41	1.14	1.14	2.27
Non-time-loss	5.68	2.27	4.55	6.82	12.50	2.27	9.09	7.95	5.68	14.77
Per player role:										
Batters	1.14	2.27	2.27	1.14	1.14	0.00	2.27	1.14	2.27	5.68
All bowlers	7.96	1.14	1.14	5.69	9.09	3.41	10.23	6.82	3.41	10.23
- *Fast bowlers*	6.82	1.14	1.14	4.55	5.68	2.27	6.82	5.68	3.41	4.55
- *Slow bowlers*	1.14	0.00	0.00	1.14	3.41	1.14	3.41	1.14	0.00	5.68
Wicketkeepers	0.00	0.00	0.00	0.00	3.41	0.00	0.00	1.14	1.14	1.14

Table 4
Incidence of the nature of injuries per activity of injury in sub-elite women's cricket (per 1000 player match days).

Nature of injury	Fielding	Bowling	Batting	Strength and Conditioning	Wicketkeeping
Muscle	13.64	14.77	4.55	5.68	3.41
Bone/ ligament/ joint	20.45	6.82	0.00	0.00	1.14
Concussion	1.14	0.00	0.00	0.00	0.00
Superficial tissue/ skin	4.55	0.00	1.14	0.00	0.00
All	39.77	21.59	5.68	5.68	4.55

The lower prevalence and incidence of time-loss injuries among sub-elite women's cricket in our study, as opposed to the higher rates reported in the pathway and elite levels, may be attributed to several factors. Firstly, some studies, such as the UK international pathway cricket, (Goggins et al., 2020) report illness in addition to injury, which could be the reason for the higher rates compared to this study. Illness was intentionally excluded from this injury epidemiology study, as in several other cricket studies (Orchard et al., 2010, 2023), as it was not associated with missed match or training time. Another factor could be related to the reduced professionalism at the sub-elite level compared to the elite levels. Only five players per franchise team in this study had formal contracts compared to international pathway cricket, where all players have part-time contracts (Goggins et al., 2020) and elite level, where all players have full-time contracts (Orchard et al., 2023). Without professional contracts and financial support, sub-elite players participate in cricket training and matches based on their work and personal schedules, reducing their commitment to invest in their own and the team's skill development and performance. Less training time and reduced intensity and frequency will lower the risk of injury. The female participants in this study are younger than other women's cricket studies (Orchard et al., 2023; Perera et al., 2019; Warren et al., 2019), and have reduced experience and exposure to skills development as elite cricket players. It's known in different non-elite levels of the sport that these players have limited skill development, match exposure, and physical capacity compared to elite levels of sports (Kelly et al., 2019). Future research in cricket should investigate factors such as bowling speed, training load, match schedule, access to equipment and specialised coaching and the risk of injury at the sub-elite level.

An interesting finding of this study was the higher training time-loss prevalence compared to match time-loss prevalence. There were also more training injury incidences compared to matches. International women's pathway cricket in the UK also reported that the highest medical complaint injuries occurred during training rather than matches (Goggins et al., 2020). The technical demands of traditional net-training sessions exceed that of a typical match for each playing position, specifically for bowlers (Vickery et al., 2018). Training also exposes players to direct contact and non-contact risks. Contact injuries could be more frequent because players are exposed to different dangers during training. The increased contact risk, for example, can be multiple balls in play during training compared to matches as more than one stimulated play is happening during net sessions or more than one ball during fielding sessions. The high incidence of training-related injury could be a reason for the frequency of catching compared to in a match. Players are exposed to different conditions during training, such as other surfaces during fielding and inside and outdoor nets, different playing conditions and intensity, and increased frequency of batting, bowling and fielding that could contribute to non-contact injuries. Besides the higher training injury incidence, match-related injuries caused the most missed time due to an injury. The increased missed time for match-related injuries could be linked to the higher intensity of match play than training. Players are likely to resume earlier to training than matches. A staggered return to matches is expected, as the intensity of cricket is higher in matches than in training, and the risk of injury is higher. Players might go to extremes in matches to take catches, dive to reduce runs, bowl quicker or run faster compared to training.

The highest time-loss injuries occurred in the lower leg and ankle and were sustained mainly by fast bowlers. Also, most non-contact muscle-related injuries occurred in the ankle and lower leg. The high incidence of lower limb injuries reported in this study is similar to other women's cricket studies (Orchard et al., 2023; Perera et al., 2019; Warren et al., 2019). Joint and muscle-related injuries are concerning as these injuries can cause long-term health effects in retired cricket players (Cai et al., 2019; Jones et al., 2018). Female athletes are predisposed to ankle ligament laxity and poor dynamic postural control, increasing the risk of injury (Ericksen & Gribble, 2012). Future research should investigate female health and the effect of these factors on lower limb injury rates specifically at the sub-elite levels.

Fast bowlers had the highest injury incidence (time-loss and non-time-loss), muscle-related injuries and most missed time due to an injury compared to slow bowlers and batters in our study. The kinetic and kinematic risk factors for female fast bowlers could be linked to the high injury rates. Fast bowlers were also the player role with the most injuries in elite women's cricket in Australia (Perera et al., 2019), and the UK(Warren et al., 2019). Evidence suggests that female fast bowlers are exposed to kinematic and kinetic injury risks compared to slower bowlers and other player roles (Stuelcken et al., 2010a, 2010b; Stuelcken & Sinclair, 2009). Female fast bowlers with back pain have increased left lateral flexion relative to the pelvis during the delivery stride compared to bowlers with no lower back pain history (Stuelcken, Ferdinands, & Sinclair, 2010). The distraction force in the shoulder could also contribute to a shoulder injury in female fast bowlers (Stuelcken, Ferdinands, Ginn, & Sinclair, 2010). Kinetic risks are linked with ground reaction forces on the back foot and front foot contact during the bowling action (Stuelcken & Sinclair, 2009). Fast bowlers also have increased training and match volumes compared to other player roles (Petersen et al., 2010; Vickery et al., 2018). Injuries in all-rounders (players with a batting and bowling role in a team) were investigated to determine if this population had a higher incidence rate than only batters or bowlers. As expected, the incidence rate of all-rounders was higher when compared to bowlers and batters.

Almost 50% of injuries during the season were fielding-related

injuries. Fielding was also the activity that caused the most injuries in elite and pathway cricket in the UK (Warren et al., 2019). Catching-related injuries caused the most time-loss injuries in elite T20 women's cricket (Goggins et al., 2020; Warren et al., 2019). Fielding injuries are overrepresented in the female cricket population compared to males. Related to fielding injuries, this study reported that 61.33% of all injuries were direct contact injuries. Contact with the ball resulted in 32.61% of all contact injuries and contact with the ground 19.57%. Other women's cricket epidemiological studies also report a high incidence of contact injuries (Basu et al., 2021; Perera et al., 2019; Warren et al., 2019). Future research should investigate the intensity of fielding activities and compare this to math intensity. For example, fielders need to be exposed to catching and fielding balls that are hit at high speed towards them and need to stop boundary balls by diving. Furthermore, research should investigsate the implementation strategies of ground fielding and diving techniques as several fielding injuries are related to ground impact in this study. This study reports that 8% of all injuries were sustained during strength and conditioning, more than batting-related injuries. Future studies must explore the nature of training modalities specifically at the sub-elite level to explore whether strength and conditioning pertain to a risk of injury in sub-elite women's cricket.

The high incidence of wrist/hand injuries compared to other body regions.among this sub-elite cohort is concerning. The highest direct contact and joint-related injuries also occurred in the wrist/hand. Most of these injuries were sustained during fielding. Other women's cricket studies also reported a high incidence of wrist/hand injuries compared to other body regions (Goggins et al., 2020; Perera et al., 2019; Warren et al., 2019). There was also more acute onset than gradual injuries and more new injuries than recurrent injuries among this sub-elite women's cricket population. The high incidence of acute onset and new injuries can be linked to the high incidence of direct contact injuries. Most direct contact injuries occurred with the ball or the ground during fielding. Female cricket players could have developed catching and ground fielding techniques predisposing them to injury. Cricket players face several risks during fielding; contact with the ball, falls, boundary rope, and contact with the ground. Research is needed to identify fielding related factors such as hand-eye coordination and visual reaction time to reduce the risk of contact injury at the sub-elite level. Research has indicated long-term osteoarthritis and other health outcomes in past elite cricket players (Jones et al., 2018). Osteoarthritis, total hip and knee replacements are more prevalent in former cricket players compared to the general population (Cai et al., 2019). Reducing the number of direct contact injuries in women's cricket is vital for better long-term health outcomes after a cricket career and an indication for future research.

A limitation of this study is the small population size and potential consequences on external validity. Another limitation is the lack of detailed information regarding the cohort's playing history, age of commencement in cricket, number of seasons played at the sub-elite level, and involvement in additional sports, which could potentially impact injury rates and limit the generalisability of the findings. A strength of this study is the rigorous methodology, including three data sources to verify the data collection and reporting. All self-reported injuries were confirmed with medical team members. Another strength of this study is that all injuries sustained during matches and training and time missed for these were reported for an objective overview of all injuries sustained in sub-elite women's cricket. This study is the first to examine injury profiles in sub-elite women's cricket in South Africa. This study provided a comprehensive profile of injuries in this population by examining the injury's nature, onset, activity, player roles, body region, and time missed due to injury.

5. Conclusion

This study provides evidence-based injury rates in sub-elite women's cricket that can be used as the first step to guide injury prevention programs, specifically in South African women's and other sub-elite women's cricket populations. Injury incidence for sub-elite women's cricket (including time-loss) is lower than at elite levels. Fast bowlers had the highest injury incidence. Fielding was the activity that caused the most injuries. Wrist/hand had the highest incidence and caused the most missed time due to injury. Future research should focus on reducing the incidence of direct contact injuries, particularly during fielding. Research is needed to investigate catching techniques and ground movements during fielding to identify possible injury risk factors.

Disclosure statement

The authors have no conflicts of interest.

Financial support

JJ received funding from the University of the Witwatersrand's Post Graduate Merit Award to conduct this study as part of her PhD scholarship.

CRediT authorship contribution statement

Jolandi Jacobs: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing. **Benita Olivier:** Conceptualization, Methodology, Supervision, Visualization, Writing – original draft, Writing – review & editing. **Corlia Brandt:** Conceptualization, Methodology, Supervision, Visualization, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The authors would like to thank the medical staff of the respective cricket unions for their assistance in this study.

Appendix A. Supplementary data

Supplementary data for this article can be found in Appendix A.

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