Research Report

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Prevalence and Anatomical Distribution of Non-Contact Musculoskeletal Pain among Elite Adolescent Cricket Fast Bowlers in Sri Lanka

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Background Even though the nature of the cricket game is gaining with time, there is a considerable increase in the incidence of injuries ranging from mild to severe.

Purpose This study aims to examine the prevalence and anatomical distribution of non-contact musculoskeletal pain among adolescent elite cricket bowlers in Sri Lanka (n=102) over the competition period of the 2019 cricket season.

Study design Secondary data collected from Division 1 boys' schools in Colombo were used for the study. Subjects' participation was dependent on both parental informed and voluntary consent. Participants were required to answer interviewer-administered questions regarding the presence of non-contact musculoskeletal pain during the competition period of the 2019 cricket season. The data were analyzed using descriptive statistics through the statistical package for the social sciences software.

Methods Secondary data collected from Division 1 boys' schools in Colombo were used for the study. Subjects' participation was dependent on both parental informed and voluntary consent. Participants were required to answer interviewer-administered questions regarding the presence of non-contact musculoskeletal pain during the competition period of the 2019 cricket season. The data were analyzed using descriptive statistics through the statistical package for the social sciences software.

Results Among the total sample, 53% of the subjects experienced non-contact musculoskeletal pain. The prevalence of musculoskeletal pain specific to the anatomical site is mostly experienced in the lower back (36.3%), knee (6.9%), and ankle (5.9%) followed by shoulder (2.9%) and groin (1%). 47% of the subjects remained pain-free for the duration of the season.

Conclusions Adolescent elite cricket bowlers reported a high prevalence of non-contact musculoskeletal pain. The lower back was the most common anatomical site to occur non-contact musculoskeletal pain. Each person in the multidisciplinary sports medicine team should consider about the conditioning of players to address the nature and the anatomical site of pain.

Key words Adolescent, Fast bowlers, Musculoskeletal pain, Non-contact.

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INTRODUCTION

Cricket is a dynamic team sport that involves many skill and health-related fitness components.[1] To ensure the optimum level of each component, cricketers have to assure on avoid from being injured.[1,2] Mainly there are three roles of a cricket game; batting, bowling, and fielding which are always linked with the risk of injury throughout the game.[1] Not like past days, in the present, cricket games are being played throughout the whole calendar as it has missed its seasonal routine. As a result of these longer-continuous seasons, cricketers have to spend more time on training too.[3] Even though the nature of the cricket game is gaining with time, there is a considerable increase in the incidence

of injuries ranging from mild to severe.[4]

Australia, England, New Zealand, and South Africa are considered as the leading cricket-playing countries that research the incidence and nature of injuries in first-class cricket.[5] In 2005, a previous study was published introducing a standardized method for investigating cricket injuries, which had been lacking in international cricket until then.[4] It has been helpful to compare the cricket injury profiles between different countries. According to a study conducted on elite Australian cricketers, 16.3 average seasonal injury incidence was reported over a decade of time.[6] Similarly, in a longitudinal study conducted on elite South African cricketers throughout the six-season period between 1998 to 2003, there were 1.9, 1.6, 2.1, 2.4, 1.8, 2.9, and 2.1 seasonal injury incidents, respectively.[7] So as it express, the comparison between injury incidence or profile of respective countries become more difficult might be due to executing different standardized ways.

Several researchers agree that the high physical workload on fast bowlers may contribute to the rise in the incidence of injuries.[3,8,9] Strong school-level cricketers are the substructures to possess such a stable national side.[9] Younger cricketers were recognized to be more vulnerable to encounters with injuries and its recurrences compared to the adult cricketers.[7,10] Musculoskeletal pain can occur at any time in any role of cricket; batting, bowling, and fielding.[9,11,12,13] It is important to teach players that prevention is always better than cure.[14] Some cricketers do not have the mental or physical concentration required to face a cricket match due to a lack of physical training.[15] Because of this, their health and skill-related fitness components on the cricket field are often inadequate.[1]

This study aimed to identify the prevalence and anatomical distribution of non-contact musculoskeletal pain sustained by elite school-level adolescent Sri Lankan fast bowlers. It will help to ensure the next generation of national-level fast bowlers remain in possible injury-free careers and future researchers can use these findings to develop appropriate training programs on an individual basis.

METHODS

The information sheet which was in multi-language (English, Tamil, Sinhala) was given to each subject and their parents/guardian before obtaining the informed consent which was available in all three languages. The written informed consent was only obtained from the subjects' parents/guardians after ensuring adequate knowledge and understanding of the research study. The research was conducted in accordance with the declaration of Helsinki.

The current study was designed as a descriptive cross-sectional study. A convenience sampling method was used. The study was conducted in division 1 boys' schools in Colombo during the period of the 2019-2020 cricket season, including all the fast bowlers aged between 12–19 years in the following settings. As Colombo division 1 school cricket is considered as the most competitive level of school cricket design in Sri Lanka, the term 'elite' has been used to describe these adolescent fast bowlers. Already existing data (secondary data) were acquired and documented during the data collection for a final year undergraduate research project that has ethical approval obtained from the Ethics Review Committee, Faculty of Medicine, General Sir John Kotelawala Defence University. Data analysis was done using the statistical package for the social science Software (SPSS Software). Descriptive statistics were used to analyze the data.

Inclusion criteria

- All the fast bowlers in Division 1 boys' schools in Colombo
- Age group between 12 - 19 years
- The subjects who grant the consent following receiving the information about the research

Exclusion criteria

- The subjects with a history of any neurological disorders, or cardio-vascular diseases.
- If they are on medical advice not to participate in any format temporary.
- The subjects who didn't grant consent.

RESULTS

The prevalence of non-contact musculoskeletal pain was 53% in the study population while 47% was assessed as not having any non-contact musculoskeletal pain (Figure 1).

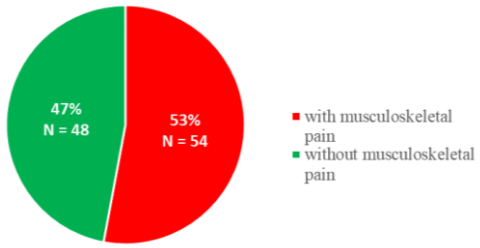

Figure 1. Prevalence of non-contact musculoskeletal pain.

The mean age of the study population was 16.71±1.03 years. The mean values of height, weight, and BMI were obtained as 1.72±0.07 m, 61.95±10.48 kg, and 20.98±3.04 kg/m^2 respectively for this study population. The distribution of non-contact musculoskeletal pain specific to the anatomical site was evaluated in Table 1.

According to the analysis, shoulder, hip/groin, knee, ankle, and lower back regions were susceptible to occur non-contact musculoskeletal pain. The lower back was the most common anatomical site to occur non-contact musculoskeletal pain. However, there was no evidence of non-contact musculoskeletal pain in the elbow and wrist regions in the study population.

DISCUSSION

The principal objective of this study was to investigate the prevalence of non-contact musculoskeletal pain sustained by Sri Lankan adolescent elite cricket bowlers. Among the 102 adolescent fast bowlers, 54 (53%) experienced non-contact musculoskeletal pain within the period of the 2019-2020 cricket season. This finding is similar to other international injury surveys which recorded the prevalence of male adolescent non-contact musculoskeletal pain and injury.[4,16,17]

Similar to the present study, a study was done in Australia to compile an injury profile of elite, junior-level fast bowlers aged between 11–18 years and to identify their associated risk factors. 85% of bowlers were uninjured during the season. The most common injuries occurred at the knee (41%) and lower back (37%). They have concluded that the lower back & knee were identified as the most vulnerable sites to get injuries in adolescent fast bowlers.[17]

Moreover, a study has been conducted among adolescent male players ages ranged from 14 to 17 years residing in Durban over a year, to determine the prevalence and nature of cricket-related musculoskeletal pain. Data was collected from 234 participants and among them, 188 subjects experienced cricket-related musculoskeletal pain. According to the results, they found that the most common sites were the lower extremities (39%) followed by upper extremities (36%) and 18% from lower back injuries in adolescent cricketers.[16]

Table 1. Distribution of non-contact musculoskeletal pain among adolescent fast bowlers

Anatomical site	Frequency	Percentage
Shoulder	3	2.9%
Elbow	0	0.0%
Wrist	0	0.0%
Hip/Groin	1	1.0%
Knee	7	6.9%
Ankle	6	5.9%
Lower back	37	36.3%
Total	54	53%

According to Dube et al.,[18] lower back, knee, and shoulder are the three most vulnerable anatomical regions of musculoskeletal pain and injuries in cricket players, especially fast bowlers. Biomechanically, the bowling action consists of a large amount of forces that act not only on the spine but also on the lower and upper extremities which can cause an adverse effect in those structures that leads to pain and injury.[11] In addition to that, a high incidence of low back pain and injuries occur as a result of repetitive hyperextension of the trunk during the action of fast bowling. Similar findings suggest that there is a high prevalence of non-contact musculoskeletal pain among adolescent fast bowlers and the lower back and limbs being the most commonly injured sites.[19]

Compared to other play positions like batting, fielding, and spin bowling, non-contact pain is more common among fast bowlers due to the factors such as higher bowling workloads,[20] biomechanical deviations in the bowling action[21], and higher ground reaction forces in the bowling action.[22] According to a study by Difiori,[23] it was identified that among all the age groups, adolescent bowlers are at greater risk for non-contact pain as they are susceptible to overuse injuries that occur entering adulthood which is also their period of bone growth.

This study has some limitations. One limiting factor is the study covers only the school-level cricketers in Colombo, Sri Lanka. Therefore, covering all regions of Sri Lanka, including not only schools ranked in Division 1, but also Division 2 and 3 ranked schools which also helps in increasing the sample size of the study. In Sri Lanka, cricket is also played by the female population, but since this study was limited to the male population, a comparison between both genders regarding non-contact musculoskeletal pain is also recommended.

CONCLUSIONS

It was noted that the prevalence of non-contact musculoskeletal pain in Sri Lankan elite adolescent cricket fast bowlers is higher than in the other play positions. The lower back was the most common anatomical site to occur non-contact musculoskeletal pain. Each person in the multidisciplinary sports medicine team including coaches and ath-

letes should consider about the conditioning of players such as warm-up and stretching activities should address the nature and the anatomical site of pain.

Accordingly, health and skill-related fitness testing needs to be addressed in training programs to minimize injury rates. A more in-depth investigation of pain or injuries of this specific age group needs to be attempted to determine the underline causes for the increased incidence of non-contact musculoskeletal pain or injuries.

Key Points

Question What is the prevalence and anatomical distribution of non-contact musculoskeletal pain sustained by elite adolescent cricket fast bowlers in Sri Lanka?

Findings Prevalence of non-contact musculoskeletal pain was 53% in the study population while 47% was assessed with not having any non-contact musculoskeletal pain. The lower back was the most common anatomical site to occur non-contact musculoskeletal pain.

Meaning The prevalence of non-contact musculoskeletal pain in Sri Lankan elite adolescent cricket fast bowlers is higher than the other play positions and further studies are needed to determine the true causes underlying the high prevalence of non-contact musculoskeletal pain or injuries among fast bowlers.

Article information

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Author contributions

Conceptualization: HWUSJ.
Data acquisition: HWUSJ.
Design of the work: HWUSJ.
Data analysis: HWUSJ.
Project administration: HWUSJ.
Interpretation of data: HWUSJ.
Writing – original draft: HWUSJ.
Writing–review&editing: HWUSJ.

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