

The Most Prevalent Injuries of Senior Level Baseball Players in Sri Lanka

H. P. P. G. S. Pathirana¹, E. G. D. D. Bandara¹, C. A. Edirisinghe²

¹(Department of Sports Sciences and Physical Education,
Faculty of Applied Sciences/ Sabaragamuwa University of Sri Lanka)

²(Institute of Sports Medicine, Colombo, Sri Lanka)

*Corresponding Author: H. P. P. G. S. Pathirana

ABSTRACT: This field of study based on identifies the main injuries that occurred in the baseball players in Sri Lanka. The intention of this review study is to provide knowledge to coaches, sports doctors and instructors in order to aware suitable training, coaching patens and treatments for preventing the injuries among baseball players. The data was collected from the sixty-two subjects of baseball players (age- 26.1 ± 4.7 years; weight- 70.05 ± 11.1 ; height- 170.09 ± 6.5) by distributing a questionnaire. Pitchers are the most commonly injured player position, with upper body injuries being the most common (11.76%). When compared to other injuries, upper body injuries are the most prevalent injury site (64.2%), and muscular injuries are common (35.71%). The majority of injuries occur in non-game situations (81.48%), while the main maneuver when playing the game is throwing (50%). The majority of Sri Lankan baseball players seek treatments from western doctors (sport doctors, general practitioners, and other specialists) (56%) as well as ayurveda doctors (20%). This is significant to understand the frequency, kind, and origin of these injuries can help reduce their recurrence by informing Sri Lankan players, healthcare teams, and coaching staff about the risk.

Keywords – Maneuver, Player position, Pitcher, Throwing

I. INTRODUCTION

Baseball is a prominent team sport in the United States, South Korea, Japan, and Taiwan, and it has spread to Cuba, the Philippines, and Indonesia as well, but it is gaining popularity among young and high school players in Sri Lanka. Although the baseball is a bat and ball sport in which two teams of nine players each alternate batting and fielding facing injuries intentionally or unintentionally[1].

For the sake of convenience, baseball injuries may be split into numerous distinct types. Therefore can be divided as payer position, game vs. non-game injuries, overuse vs. non-overuse injuries, injury location and training season [1][2][3][4]. The most of injuries has their specific injury risk factor. Those injury factors can be divided in to two categories as intrinsic and extrinsic factors. Intrinsic risk variables (e.g., age, race, and gender) are often not changeable, making them of limited value when seeking to intervene to avoid harm. The extrinsic risk factors are mostly connected to the game's environment as the hardness of the baseball, the stiffness of the bases, and the protective equipment utilized when batting, fielding, and base-running [4].

Baseball is becoming increasingly popular in Sri Lanka, with both youth and senior sportsmen participating. Unfortunately, there is less study direction regarding baseball player growth and performance. As a result, Sri Lanka should concentrate on current methods or researches of developing baseball athletes' performance by offering opportunities to compete in international competitions.

As a result, it is critical to identify study areas of baseball performance growth since it has a significant impact on Sri Lanka's reputation. As a result, this study focuses on identifying prevalent injuries among baseball players in Sri Lanka in order to aid players, coaches, instructors, and medical professionals in being aware of and guiding players toward injury readiness.

Therefore, this study will identify the most prevalent injuries that occur in game situations vs. practices, overuse vs. non-overuse, and player roles such as pitcher, catcher, infielder, and outfielder. Not only that, this study will identify the in which situation most injuries are happened and rate of injuries happen for senior level baseball players in Sri Lanka.

II. METHOD

The study is based on qualitative research to assess the most frequent injuries sustained by baseball players. There are three main categories in the questionnaire that pertain to their recent and past injuries. The questionnaire was used as the modification of injuries in elite Gaelic footballers questionnaire [5]. Questions were organized into the three sections as part A, B, and C which are relevant to General questions, Player specific injuries questions, and injury-specific questions is shown in the figure 1. General questions were consisted as player characteristics such as age, weight, height and any other sports they participated.

The part B was consisted with player specific questions and at the first of this section about their player position. Moreover, other questions in part B were examining exposure to training in terms of the frequency and length of training sessions. Then prediction will be provided after comparing the results with variables. This final question in Part B was constructed as a filter-type approach, which meant that no more information from the subject were necessary if the response to the preceding question was no. If the participant answered yes, he was instructed to complete part C of the questionnaire (Fig. 1)

Then the part C requested responders to provide information regarding the location, time, cause, and nature of the injury. More information was needed on whether the injury occurred during training or competitive matches, as well as if the ground condition contributed to the injury. It was also determined whether the damage was recurrent. Finally, the effects of the injury were evaluated in terms of absence from training or competition, medical professionals engaged in treating the injury, and if the injury necessitated hospitalization. Each injury experienced since January 2019 requires the subjects to complete a separate part C.

To assure involvement, the investigators established first phone contact with the team management. Following approval, an introduction cover letter and the appropriate number of questionnaires were distributed to the team managers, clearly describing the aims of the research and directions for questionnaire completion. Each questionnaire was made up of one part A and two-part Bs. Extra copies of Part B were provided for patients who were injured more than three years period. All individuals were requested to sign a consent form to ensure the anonymity and confidentiality of the questionnaire findings. Questionnaires were distributed for ten teams and among them for this research sixty-two baseball players were used to gather the information regarding on their injuries. Then categorized their results as total injuries in body location, player position vs injury, game situation vs non-game situation, cause of injury, nature of injury and practitioners treating for injury.

<p>Part A: General Question</p> <p>1. Name of the team : _____</p> <p>2. District : _____</p> <p>3. Age : _____</p> <p>4. Weight : _____</p> <p>5. Height : _____</p> <p>6. Training age : _____</p> <p>7. Other sports that participate : _____ except baseball</p> <hr/> <p>Part B: Player Specific Questions</p> <p>NOTE: FOR MULTIPLE CHOICE QUESTIONS PLEASE TICK CORRECT BOX</p> <p>1. What is your player position?</p> <p>2. How many times do you train per week?</p> <p style="padding-left: 20px;">a) Season b) Off-Season</p> <p>3. How long does each training session last? (on average)</p> <p style="padding-left: 20px;">a) Season b) Off-Season</p> <p>4. Does each session/competition involve a warm-up?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>5. If yes, please specify the average duration of warm-up</p> <p>6. What protective equipment do you wear presently? (Knee brace, ankle support, gum shield, etc.)</p> <p>.....</p> <p>7. Which hand do you tend to throw the ball with?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Right <input type="checkbox"/> Left <input type="checkbox"/> Both</p> <p>8. Which side do you tend to batting?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Right <input type="checkbox"/> Left</p> <p>9. Have you sustained an injury/ injuries due to baseball?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>IF YES, PLEASE FILL OUT ACCOMPANYING FORM/ FORMS PLEASE FILL OUT A SEPARATE FORM FOR EACH INJURY</p>	<p>Part C: Injury Specific Questions</p> <p>PLEASE FILL OUT A SEPARATE SHEET FOR EACH INJURY</p> <p>NOTE: FOR MULTIPLE CHOICE QUESTIONS PLEASE TICK CORRECT BOX</p> <p>1. Where was the injury located?</p> <p>2. Which side was the injury located?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Right <input type="checkbox"/> Left</p> <p>3. Where was the injury sustained? <input type="checkbox"/> During practices <input type="checkbox"/> During competition</p> <p>4. When did it happen? Year Month</p> <p>5. What was the nature of the injury?</p> <p>6. What caused the injury?</p> <p>7. Did you continue to play with injury?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>8. If you continued, was your play affected by this injury?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>9. Were you absent from training/competition due to your injury?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>10. If yes, lost participation time?</p> <p>11. Did you require treatment for your injury?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>12. If yes, who treated you? (Tick more than one box if appropriate)</p> <p style="padding-left: 20px;">Physiotherapist <input type="checkbox"/> Doctor <input type="checkbox"/> Sports masseur <input type="checkbox"/> Other.....</p> <p>13. Was this the recurrence of an old injury?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>14. Is it fully recovered?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>15. If yes, how long did it take to recover?</p> <p>16. Do you still get treatments for the injury?</p> <p style="padding-left: 20px;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
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Fig. 1: Questionnaire on baseball injuries

III. RESULTS

A total of 100 questionnaires were distributed, and 76 were returned, yielding an overall response rate of 76%. Fourteen subjects were removed from this study because they did not have any injuries or had injuries prior to the time range under consideration. The mean age (SD) of subjects were 26.1(4.7) years, the mean weight (SD) was 70.05(11.1) and the mean height (SD) was 170.09(6.5). Some 91% of players threw with their right hand, while the remaining 9% threw with their left hand. Furthermore, 82.1% of players batted on the right side, while 17.9% batted on the left. The players have average 11.01 years of training age and they trained for an average of 3.5 hours each session for 4.5 days per week. All the players had worn the suitable playing equipment and safety gears as helmet and gloves rather than the knee guard and chest guard. It was discovered that 3.5% of injuries happened in the head and neck, 64.2% occurred in the upper body, and 32.3% occurred in the lower body of the participants (Fig. 2). For this consideration, head to neck body parts were treated as the head and neck, neck to hip region comprising both upper limbs as the upper body, and hip to toe body parts as the lower body.

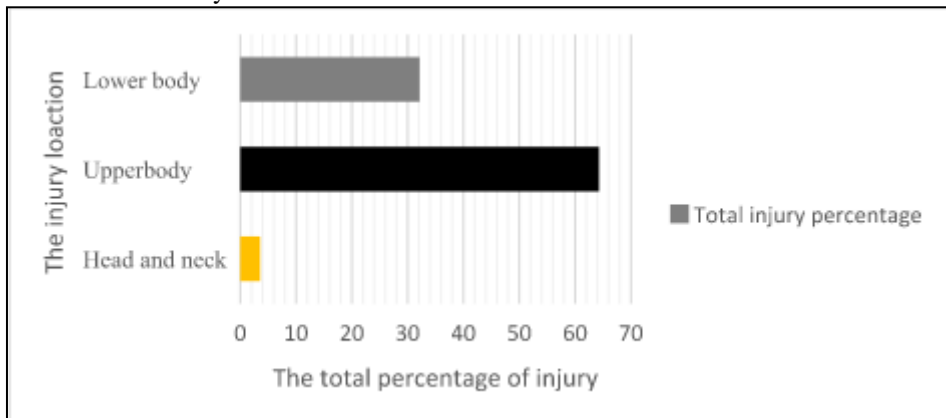


Fig. 2: The total injury percentage with injury location

Furthermore, this study discovered that pitchers, catchers, first basemen, shortstops, left field, right field, and center field had zero head and neck injuries. Pitchers had 11.76% upper body injury and 5.88% lower body injury. Catchers suffered 2.94% upper body injury and 2.94% lower body injury. The first baseman was injured in 5.88% of his upper body and 1.47% of his lower body. The second baseman had 1.47% head and neck injuries, 8.82% upper body injuries, and 5.88% lower body injuries. The third baseman had 1.47% head and neck injuries, 7.35% upper body injuries, and 4.41% lower body injuries. The short stop had 7.35% upper body injury and 1.47% lower body injury. The left and right fielders had 8.82% upper body injuries and 1.47% lower body injuries. The center fielder had 5.8% upper body injury and 4.4% lower body injury (Fig. 3).

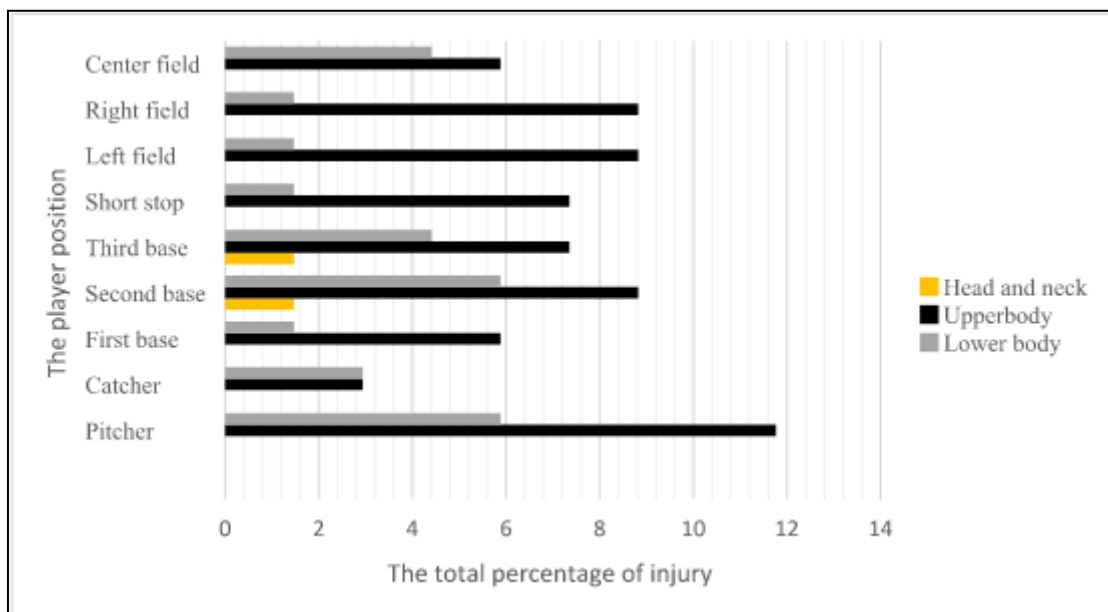


Fig. 3: Player position vs injury type

According to these results, 17.65% of injuries has occurred for pitchers, 5.88% for catchers, and 7.35% for first basemen. The second baseman has received 16.18% of the injuries, the third baseman has received 13.24% of the injuries, the shortstop has received 8.83% of the injuries, and the left, ride, and center fielders have received 10.3% of the injuries (Fig. 4).

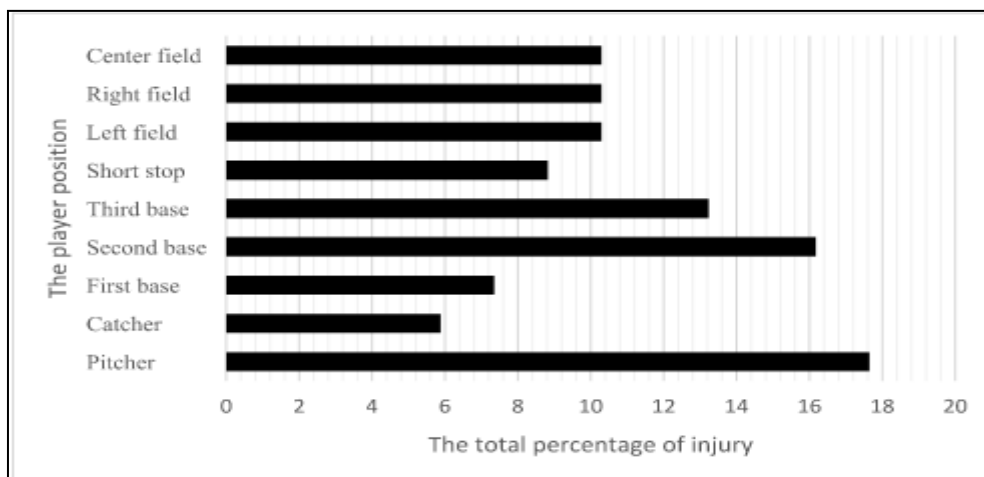


Fig. 4: Player position vs total injury

The Fig. 5 depicts the findings of injuries, whether they happened during game or non-game situation. According to the findings, 18.51% of injuries happened during a game, while 81.48% occurred during a non-game situation. For this study non- game situation was considered as injuries that happened in the practice time and game situation was considered as the competitive scenario.

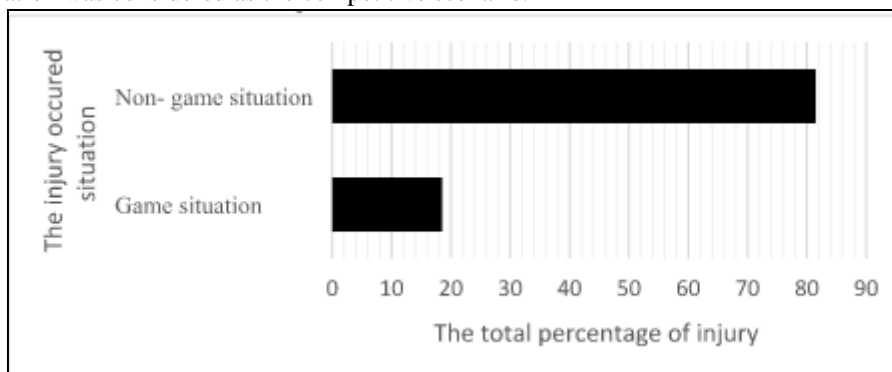


Fig. 5: The injuries occurred in game vs non-game situation

The Fig. 6 represents the types of injuries sustained while playing baseball. According to the findings, 26.79% injuries were bone injuries, 8.93% were ligament injuries, 3.58% were cartilage injuries, 35.71% were muscle injuries, 1.79% were wound injuries, and 12.5% were other injuries.

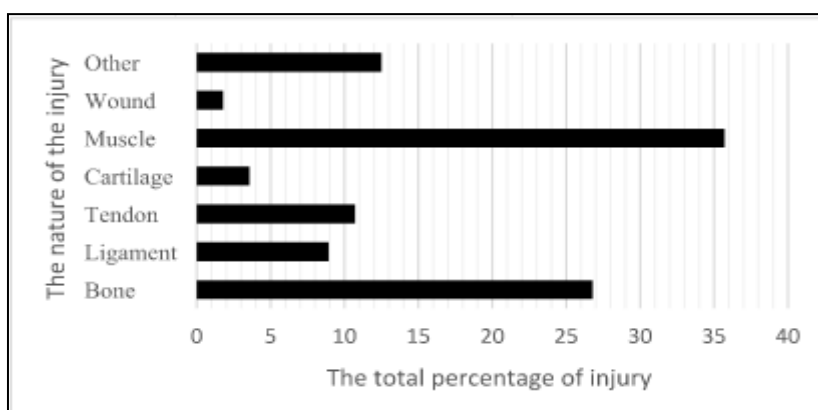


Fig. 6: Nature of injury

The majority of the injuries in the research were caused by throwing the balls, and the analytic data showed that the injury occurrence was around 50% higher than other injuries. Running between the bases was another component in the majority of injuries, accounting for 10.71% of all injuries. The third type of injury incidence was ball contact during catching and falling while running or catching. Thus, both types of ball contact and falling were reported to be 7.14% more common than other injuries. Some injuries occurred as a result of collision with an item or surface, overuse of muscle groups, and while hitting. When compared to other injuries, those other injury categories accounted for 16.07% (Fig. 7).

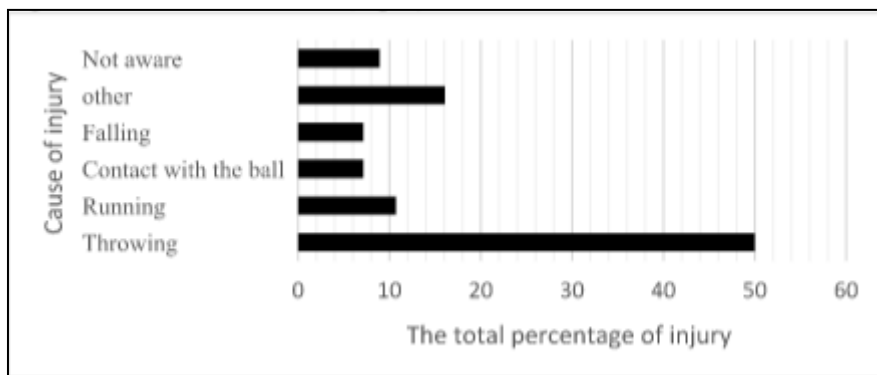


Fig. 7: Causes of injury

According to this study, all most all the players were selected for practitioners for their treatments as physiotherapists, sport masseur, western doctors (sport doctors, general practitioners and other specialist doctors) and ayurvedic doctors. Most of the players were taken their treatments from the western doctors which was about 56% when comparing with other practitioners. Some of players (20%) were tend to get treatments from ayurvedic doctors. The other group of players were taken their treatments from the physiotherapists and sports masseurs and it was about 14% and 10% of study data (Fig. 8).

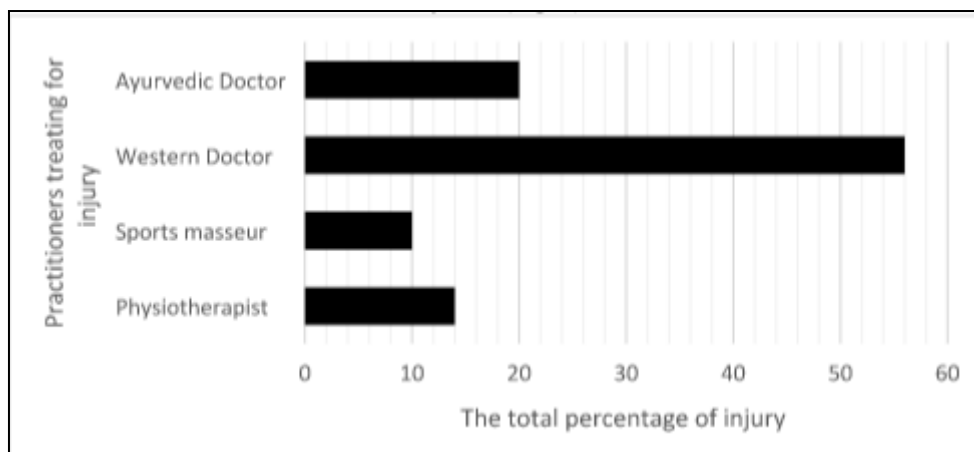


Fig. 8: The practitioners treating for injury

IV. DISCUSSION

This study was found out that, the most prevalent injury site was the upper body (64.2%) comparing with other injury sites. Among those injuries, pitchers had 11.76% of upper body injuries comparing with other player positions. The epidemiologic study of the [6] highly agree this research study findings. According to the [6], the upper limb injuries accounted for 58% of all injuries, with the shoulder being the most often injured body area, resulting in an average of a week of lost participation time. Two studies of [7] [8] were agreed with this study that self-reported elbow pain affected more than 25% of pitchers and self-reported shoulder soreness affected more than 30% of pitchers.

Pitchers and second baseman had received the higher percentage of lower body injuries (5.88%). The second and third basemen had received the majority of head injuries (1.47%) comparing with the other player positions. Therefore, the most prevalent injury player position was pitchers (17.65%), second basemen (16.18%), third basemen (13.24%), and out fielders (10.3%). The findings of the [9] slightly agree with this

study because defensive players were the most likely to have knee injuries (56.5%), including pitchers (17.3%), infielders (14.7%), outfielders (14.7%), and catchers (9.8%).

In contrast of the study, [10] shows that, Lower extremity injuries are infrequent in young baseball players but at older ages, ankle and knee injuries are common as a result of sliding [11].

Moreover, comparing game and non-game injuries with the study results, the most of the injuries were occurred during the non-game situation (81.48%). The findings of [12][3] shows that similar findings of this study as the most of game injuries were caused by contact, but 63.9% of practice injuries were non-game. Base running, base sliding, ball contact, bat contact, and player-player contact have all been identified as potential causes of baseball contact injuries. Moreover, throwing was the most prevalent non-game injury activity (27%) including batting and pitching (15%) and other (17%) and [2].

According to the findings, the majority of the injuries had occurred as muscle injuries (35.71%) and bone injuries (26.79%). The less percentage of injuries had occurred as the ligament injuries (8.93%), cartilage injuries (3.58%), and (1.79%) wound injuries. Another recent study found that many shoulder injuries in high school softball and baseball players were caused by muscular tendon strains [13]. In contrast that, the study of [14] found that sprains were the most prevalent injury of high school baseball players, followed by strains. Furthermore, based on the findings, the main reason of injuries while playing the baseball is throwing (50%).

Averagely the running, contact with ball, falling and other factors had cause for the less percentage of the injuries. Unfortunately, several athletes were unaware of the cause of their injury or how it occurred, but they typically experienced pain at the site of their injury. These injuries are thought to be caused by overuse of the afflicted joints. Furthermore, it is considered that chronic overuse will eventually result in major damage or arm-related impairment in certain pitchers [15].

Research findings show that, the most of the players were prone to take treatments from the western doctors (56%) including sport doctors, general practitioners and other specialist doctors. Other majority of players were tended to get treatments from the ayurvedic doctors (20%). Other group of players were taken their treatments specially from the physiotherapists and the sports masseurs. Therefore, the majority of players seek the professional advices for their treatments in the Sri Lankan context.

V. CONCLUSION

This purpose of this study is to identify the major injuries in the baseball, major reasons and the player positions of the injuries while playing the baseball. This study findings shows that pitchers are the most prevalent injury player position and received especially upper body injuries. As a common upper body injuries are the most common injury site and muscle injuries are common when comparing with other injuries. The most of the injuries are happened in the non-game situation and the main maneuver is throwing when playing the game. The most of the Sri Lankan baseball players tend to take treatments from the western doctors (sport doctors, general practitioners and other specialist doctors) and ayurvedic doctors. Therefore, these findings are critical because understanding the incidence, kind, and causation of these injuries can help minimize their recurrence by teaching Sri Lankan players, medical personnel, and coaching staff about the risks.

REFERENCES

- [1]. E. Bandara, H. Pathirana, and C. A. Edirisinghe, "The major aspects determining the most prevalent injuries in baseball: A review," *Int. J. Phys. Educ. Sport. Heal.*, 10(1), 2023, 83–88, doi: <https://doi.org/10.22271/kheljournal.2023.v10.i1b.2757>.
- [2]. A. Esquivel *et al.*, "Analysis of Non-Game Injuries in Major League Baseball," *Orthop. J. Sport. Med.*, 7(12), 2019, 1–6, doi: 10.1177/2325967119888499.
- [3]. H. P. Melugin, N. D. Leafblad, C. L. Camp, and S. Conte, "Injury Prevention in Baseball: from Youth to the Pros," *Curr. Rev. Musculoskelet. Med.*, 11(1), 2018, 26–34, doi: 10.1007/s12178-018-9456-5.
- [4]. L. Micheli, "Baseball, Injuries in," *Encycl. Sport. Med.*, 49, 2014, 9–30, doi: 10.4135/9781412961165.n57.
- [5]. F. Cromwell, J. Walsh, J. Gormley, J. Hospital, and J. Street, "A pilot study examining injuries in elite gaelic footballers," 2000, 104–108.
- [6]. McFarland, "Epidemiology of collegiate baseball injuries," *Clin. J. Sport Med.*, 8(1), 1998, 10–13.
- [7]. S. Lyman *et al.*, "Longitudinal study of elbow and shoulder pain in youth baseball pitchers," *Med. Sci. Sports Exerc.*, 33(11), 2001, 1803–1810, doi: 10.1097/00005768-200111000-00002.
- [8]. S. Lyman, G. S. Fleisg, J. R. Andrews, and E. D. Osinski, "Effect of pitch type, pitch count, and pitching mechanics on risk of elbow and shoulder pain in youth baseball pitchers," *Am. J. Sports Med.*, 30(4), 2002, 463–468, doi: 10.1177/03635465020300040201.
- [9]. D. L. Dahm *et al.*, "Epidemiology and Impact of Knee Injuries in Major and Minor League Baseball Players," *Am. J. Orthop. (Belle Mead. NJ)*, 45(3), 2016, E54–E62.

- [10]. K. L. Yen and J. D. Metzl, "Sports-specific concerns in the young athlete: Baseball," *Pediatr. Emerg. Care*, 16(3), 2000, 215–220, doi: 10.1097/00006565-200006000-00021.
- [11]. D. H. Janda, "Softball Sliding Injuries," *Jama*, 259(12), 1988, 1848-1850, doi: 10.1001/jama.1988.03720120052035.
- [12]. R. L. Nicholls, B. C. Elliott, and K. Miller, "Impact Injuries in Baseball: Prevalence, Aetiology and the Role of Equipment Performance," *Sport. Med.*, 34(1), 2004, 17–25, doi: 10.2165/00007256-200434010-00003.
- [13]. S. Krajnik, K. J. Fogarty, E. E. Yard, and R. D. Comstock, "Shoulder injuries in US high school baseball and softball athletes, 2005-2008," *Pediatrics*, 125(3), 2010, 497–501, doi: 10.1542/peds.2009-0961.
- [14]. C. L. Collins and R. D. Comstock, "Epidemiological features of high school baseball injuries in the United States, 2005-2007," *Pediatrics*, 121(6), 2008, 1181–1187, doi: 10.1542/peds.2007-2572.
- [15]. R. Francis, T. Bunch, and B. Chandler, "Little League Elbow: A Decade Later," *Phys. Sportsmed.*, 6(4), 1978, 88–94, doi: 10.1080/00913847.1978.11710701.

***Corresponding Author: H. P. P. G. S. Pathirana**
¹(Department of Sports Sciences and Physical Education,
Faculty of Applied Sciences/ Sabaragamuwa University of Sri Lanka)