

A MUSCULOSKELETAL INJURY PROFILE OF ATHLETES AT A NATIONAL INTER-UNIVERSITY ATHLETIC MEET IN MANIPAL, KARNATAKA, INDIA

Parachi Shah, Abraham Samuel Babu, Vaibhavi Satam, H.S. Ballal, Fiddy Davis and Arun G. Maiya

ABSTRACT

Background: Sports physical therapists form a part of the team in all major sporting events. However, their presence at the university or recreational level is not commonly seen. The profile of injuries during an athletic event varies on whether the person is a recreational athlete or an elite athlete. As there is no data available from India on athletic injuries, we describe the profile of injuries at a national inter-university health sciences athletic meet. **Methodology:** During the inter university athletic meet, an analysis of the profile of injuries was done and the injured were classified according to the National Athletic Reporting System. **Results:** A total of 200 athletes took part in this competition. 32 (16%) athletes sustained injuries, of which musculoskeletal injuries were most common and accounted for 71.87% (23/32) of the total injuries. Most injuries were managed on the field without any loss of time except for four (viz., dislocated shoulder, heat exhaustion, injury of medial collateral ligament of knee and ankle lateral collateral ligament tear with avulsion injury) who required further attention in the hospital. **Conclusion:** We observed a high rate of injuries amongst the athletes, out of which musculoskeletal injuries, especially ankle injuries, were common during track and field events. Heat - related illnesses of varying degrees of severity were also seen.

Keywords: Sports injury, Sports physical therapy, National athletic reporting system, Heat related illness

INTRODUCTION

Sport participation is no more just a leisure activity but rather an integral part of keeping oneself fit. Along with academic work, sport participation has been given importance since early schooling. Track and field events, a major aspect of athletics involving various distances of running, jumps and throws, are the earliest sport activities (Pendergraph, 2005).

Athletic events are challenging with respect to the various fitness parameters like speed, agility and power.

Competitive sports range from participation at high-school to the university level. In India, the presence of a medical team at an inter university or lower level of competition is not commonly seen. Studies have shown that 80% of the injuries occurring on the field are

musculoskeletal in nature (Patel, 2006). This highlights the importance of having a sports physical therapist on the field so as to decide on athletes' sport fitness and help treat as well as to facilitate a faster return to the game (Rehberg, 2007). Studies that have reported injuries have been from major athletic events like the Olympics, wherein only elite athletes participate (Junge, 2009). However, injuries among the recreational athletic population or at junior levels, in which most college students participate, have hardly been studied in our country. As this group may not have adequate training like elite athletes, it is possible that they maybe at a greater risk of sustaining injuries during competitive events. Furthermore, there is a paucity of information regarding the profile of sports injuries in India. It was therefore decided that the reporting of injuries from such an event would help physical educators, sports organizers, physical therapists and athletes deal with injuries and prevent them during training and competition. We describe the profile of injuries among athletes who participated at a national inter-health university athletic meet at Manipal University, Manipal in 2009.

METHODOLOGY

An all India inter - health university athletic meet was held at Manipal University, Manipal, Karnataka, India for three days, i.e. 5th – 7th of December, 2009. A total of 13 universities and 200

athletes from all over India participated in this event. The list of events on the three days has been provided in Table 1. A medical stall was setup at the ground which was easily accessible to the athletes. It also gave the medical team a good view of all the events and thereby aided in analysis of the mechanism of injury. All the athletes were informed of the medical stall to which they were to report any injury. In events where a higher rate of injury was expected a physical therapist (PT) was present at the event site.

An analysis of the profile of injuries was done for the duration of the athletic meet for all the injuries that were reported to the medical team. All the injuries were classified using the national athletic reporting system (NARS) (Patel, 2006). This included the following categories, viz., no time lost, minor (1-7 days lost), moderate (8-21 days lost), major (> 21 days) and severe (permanent disability).

All injuries were attended to on the field by one of the physical therapists. Injured athletes were evaluated and diagnosed from a thorough clinical examination. Injured athletes were managed using the 'PRICE' protocol i.e., prevention, rest, ice, compression and elevation. In cases of ankle injuries, supportive taping was utilized to help in early return to the event. Taping to prevent secondary injury was also given to those athletes who approached the physiotherapists with a history of

chronic ankle injury. Taping for toes were done for athletes who preferred running barefoot. Stretching and icing were used to manage muscle cramps. This was also supplemented by giving them adequate hydration with oral rehydration solution and glucose. Cuts and bruises were cleaned and dressed using a sterile procedure. Return to the event was decided by the treating physical therapist based on the type and severity of the injury and also the athlete's willingness and recovery stage.

RESULTS

A total of 200 athletes (83 women and 117 men) from 13 health universities all over India participated in the athletic meet (Table 2). The distribution of athletes with injuries as per the NARS is given in Table 3. There were 32 injured athletes out of which 3 had multiple injuries. Musculoskeletal injuries were a common occurrence (23/32) followed by abrasions and bruises (7/32) and systemic involvement, like heat-related illnesses (2/32). The ankle and foot were the most commonly affected part observed with eight being acute injuries and six recurrent injuries. Events like long jump and triple jump had the most injuries (Table 4). Twelve athletes (6%) reported having muscle cramps of which two had recurrent episodes on all three days. Cramps were seen in most of the running events except the 10,000m race.

It was seen that 28 injured athletes were able to return to their event without losing time. However, four athletes (with heat exhaustion, anterior dislocation of shoulder, injury of the medial collateral ligament of knee and a lateral collateral ligament avulsion injury of the ankle) required hospitalization for further medical management.

DISCUSSION

Our study showed that 32/200 (16%) were injured during the athletic meet. A report by Junge et al., (2009) described a rate of injuries of 11.3% among 2,132 elite athletes during athletic events. The higher rate seen here could be attributed to the level of conditioning of the athletes. Most athletes here were amateurs with only a few being elite.

A high rate of return to participation, i.e., 28/35 (80%), seen in this athletic meet is indeed credible. These high rates show that a multi-disciplinary medical team is to be present at all sporting events irrespective of their competitive level to help maintain a high rate of return to sporting event. Despite this high level of return to event, few cases still required further medical attention. Seven out of the 35 injured (20%) could not return to their event. This rate was higher than those found by Junge et al., (2009) wherein only 7.3% lost time due to injuries.

Three of the cases, who had a major type of injury with >21days lost as per the NARS classification (Table 3) are described here. The first was a case of an anterior shoulder dislocation following a fall by a 23-year old male in a 5000m run. The fall was on the elbow, 100m from the start line. The shoulder was relocated on the field by the physical therapist using the modified Kocher's technique, and he was then transported to hospital for an orthopaedic evaluation and radiographs. He was managed with immobilization and analgesics as prescribed by the orthopaedic surgeon. The second case was a 24-year old male injured during the long jump. He had a history of left ankle instability and bilateral quadriceps strain for which adequate secondary injury prevention precautions were taken before the event. He sustained an inversion and plantar flexion injury with a popping sound. Examination of the ankle by the physical therapist revealed tenderness over the lateral collateral ligament insertion with swelling. A diagnosis of a complete lateral collateral ligament tear with the possibility of an avulsion fracture of the fibula was made. After appropriate first aid using the PRICE protocol, he was referred to a hospital for further evaluation and management. The x-ray of his ankle showed a fracture of

distal fibula. He was put on a posterior slab and was advised to engage in non-weight bearing walking with crutches for four weeks. The third athlete suddenly complained of medial knee pain after running 4,800m of 10,000m, forcing her to discontinue the race. On examination she had a localized swelling on the medial aspect of the knee with instability. Her knee was immobilized by using a Jones compression bandage and she was then shifted to the hospital with a diagnosis of medial collateral ligament injury for further investigation and management. As she was from another state, she was asked to rest and continue the bandaging. Symptomatic treatments with analgesics were given.

We had two cases of heat exhaustion which are described here. The first, being a 23- year old male who presented with confusion, drowsiness and nausea at the end of the second day. He had a systolic blood pressure of 80mmHg. He had tachycardia and tachypnea. A history of no oral fluid intake during the day was given. The athlete had participated in two events (800m and 4x400m relay) earlier in the day and had not taken adequate rest or hydration. A working diagnosis of heat exhaustion and dehydration was made. Ice was applied to his body to cool him

down, as there was no facility for ice water immersion, and he was made to drink sips of water. When he showed no improvement, he was transported to hospital for further management. There he had a blood work up done and re-hydrated with fluid intravenously. There was another case of heat exhaustion to a 19 - year old female who was managed on field. As she was stable as she did not require any form of advanced medical care. She was monitored regularly by the medical team to ensure adequate hydration and rest. She recovered completely with proper hydration. It was noted that athletes had their own views regarding hydration. Among those requiring medical attention, it was found that they believed water should not be taken prior to the event resulting in poor hydration status. Other factors that could have also contributed to the heat related illness are harsh environmental conditions, conditioning status of the athlete and prolonged participation in sports with continuous exposure to extreme heat.

Muscle cramps were another common occurrence seen among athletes participating in running events. The heat and loss of body water could have predisposed them to cramps. Most of them were reported after 12:00 noon. Surprisingly, those who participated in the 10,000m run did not report any

cramps. This could be attributed to the timing of the events. The 10,000m run was held at 6:30am while the other running events were held between 9am and 4pm. Also the athletes were participating in various events on consecutive days. Therefore emphasizing the role of replenishment of macronutrients, fluid and electrolyte imbalances that would have occurred after the event is very important to reduce the occurrence of cramps during subsequent events. However, these aspects seem to be neglected by many athletes and their coaches.

Most participants who received medical help for musculoskeletal conditions reported the lack of a structured, regular training protocol. To the best of our knowledge, there were only three cases who had received a supervised training programme by a physical therapist prior to their participation in this athletic event. This shows that small number of athletes participate in post- injury rehabilitation. Therefore, awareness among the athletes regarding the importance of post- injury rehabilitation will have to be stressed.

It was also observed that a few of them had inappropriate techniques in various running events (hurdles and sprints) which could have potentially contributed to their injury. Another contributing factor could also be the type of athletic footwear used for

these events. It was noted that athletes wore spikes and running shoes for their events whilst some of them preferred running barefooted. Even though these factors need to be considered they beyond the scope of this study.

Our medical team consisted of four physical therapists, two doctors and one nurse with first aid kits and emergency equipment for advanced airway and cardiac life support. The physical therapists and doctors were trained in both basic as well as advanced cardiac life support. Subjective feelings of comfort were also reported by the athletes with the presence of an on field medical team.

From the above findings, the authors wish to make the following recommendations:

- Athletes and coaches need to be educated on the importance of adequate hydration and nutrition as well as their roles in health and sport performance.
- Proper training techniques need to be emphasized with regard to long and triple jumps, and hurdles.
- Athletes with recurrent injuries must seek proper rehabilitation from sports physical therapists
- The presence of a medical team on site is imperative to manage acute injuries and heat related ailments.

CONCLUSION

In this study, it was observed a high rate of injuries (16%), with majority being musculoskeletal in nature. Events in which most injuries occurred were the long jump, triple jump and hurdles. A good rate of return to participation was seen following acute management on field by the medical team and hence, their presence is of tremendous value to athletes. It is recommended that they be present for future events at various levels of competition.

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Table-1: Demographic details of athletes

Total number of athletes, n	200
Males, n (%)	117 (58.5)
Females, n (%)	83 (41.5)
Total number of athletes injured, n (%)	32 (16)
Musculoskeletal injuries, n (%)	23 (71.87)
Abrasions and bruises, n (%)	7 (21.87)
Systemic involvement, n (%)	2 (6.25)

Table-2: Daily list of events

Day 1	Day 2	Day 3
1500 m ^{£‡}	200 m ^{£‡}	10,000 m ^{£‡}
100 m ^{£‡}	800 m ^{£‡}	Long jump ^{£‡}
Javelin Throw ^{£‡}	High Jump ^{£‡}	Hammer throw ^{£‡}
Triple Jump ^{£‡}	Shot-put [‡]	400 m ^{£‡}
Shot-put [£]	4 x 400 m relay ^{£‡}	4 x 100 m ^{£‡}
5000 m ^{£‡}	100 m hurdles [‡]	Discus throw [‡]
	110 m hurdles [£]	
	400 m hurdles ^{£‡}	
	Discus Throw [£]	

£ Men, ‡ Women

Table-3: Classification of injuries according to National Athletic Reporting System (NARS)

Type of injury	Number of injuries
No time lost	28
Minor (1 – 7 days lost)	3
Moderate (8 – 21 days lost)	1
Major (> 21 days lost)	3
Severe (Permanent Disability)	0
TOTAL	35

Table-4: Musculoskeletal injuries and the events in which they occurred

EVENT	INJURY	NUMBER	%
Hammer throw	Supraspinatus strain	1	2.86
	Partial biceps rupture	1	2.86
Long Jump and triple jump	Patellofemoral pain syndrome	2	5.71
	Quadriceps strain	1	2.86
	Achilles tendinopathy	2	5.71
	Lateral ligament avulsion fracture of ankle	1	2.86
5000m	Shoulder dislocation	1	2.86
	Peroneus tendinopathy	1	2.86
10,000m	Medial collateral ligament strain of knee	1	2.86
800 m	Tibialis posterior tendinopathy	1	2.86
400m	Acute ankle sprains	2	5.71
100m hurdle	Ankle soft tissue contusion	1	2.86
110m hurdle	Groin injury	3	8.57
	Shin splint	1	2.86
4x100m relay	Shin splint	1	2.86
	Chronic ankle sprain	6	17.14