

Prevalence, Burden of illness and injury in Indian male field hockey players: A prospective study

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Abstract

Field hockey is widely spread Olympic sports played as recreational and professional level. It is fastest team sports and that is more prone to injuries. The main objective of the study to find out prevalence and incidence of illness, acute and overuse injuries and the areas which will more vulnerable to injuries. A prospective cohort study on the 60 male field hockey players for the 6 week of time period. Prevalence and severity of the illness and injury was evaluated by the Oslo Sports Trauma Research Centre questionnaire on health problems on weekly basis with the time interval of 2 week. The study found that 92 cases of injury and illness were reported in 6th week. Total 15 cases of illness which includes respiratory and gastrointestinal. 42 and 35 cases of acute and overuse injury were reported. Hand/fingers(n=10) area was more prone to acute injuries. In overuse lower back pain(n=10) and hip/groin(n=10) was more susceptible. In both the injuries and illness, the players reduce their training volume. Only 2% of the population had severe loss in their training days. The study conclude that incidence and prevalence of acute injuries was more among players followed by overuse and illness. Training volume of the players were reduced at mild extent which further reduced the performance in the competition. Majority of the players loss the 1-day training on weekly basis.

Key words- field hockey, injury, illness, prevalence.

Introduction

The game of field hockey is played widely across the world. Field hockey is an Olympic sport played by men and women at both recreational and professional levels. ^(1,2) Hockey is a dynamic and competitive sport that frequently produces musculoskeletal injuries, which can be classified into acute and chronic. ^(5,6) Hockey players are exposed to various injuries during running, turning, twisting and stretching activities. ^(7,8) According to National Collegiate Athlete Association injury rate in field hockey is 6.3/1000 athlete exposures. Training in natural grass demonstrated more injuries (64.87%) as compared to artificial turf (35.13%). ⁽⁹⁾ The injury data which collected Up to 75% of field hockey players have sustained at least one acute injury during a game or practice. ⁽¹⁰⁾ When field hockey is compared with other team sports, such as basketball and soccer, the overall rate of injury is similar. ^(11,12,13) The lower limb is the most often injured site, and, like other sports, most of these injuries are ankle sprains. ^(14,15) This rate was lower than basketball players but not significantly different from soccer or lacrosse. ⁽¹⁶⁾

It was reported that the majority of injuries in elite players were to the lower limb and to the back. In lower extremities and include lateral ankle sprains, meniscal tears, tibiofemoral ligament sprains, tibia and fibula fractures, and hip flexor, adductor, quadriceps and hamstring strains. The predisposing mechanisms of acute hockey musculoskeletal injuries are physical trauma (collision with the ball, stick and other players) and rapid rotational movements. (6,17,18)

The abundance amount of the literature available on the injury profile of the hockey players which included the acute, overuse, extrinsic and intrinsic causes of injury. In Indian context there is dearth of literature. The major lacuna on the illness data profile among field hockey players. The current study design to collect the prevalence of illness, acute and overuse injuries. To also focus on the incidence of injuries and the loss of training time while the injury phase. This information will provide guidance to develop and implement the prevention strategies and burden of the injuries among players. Furthermore, it will reduce the injury cost.

Methodology

The prospective cohort study was conducted on 60 field hockey players of national and district level in the Guru Gobind Singh Stadium, Nanded. Purposive sampling techniques was used to collect the data. This study involved 17- and 25-year old male players. All the interested players recruited in the study. Players with the age above 25, lack of interested and having surgical history were excluded from the study. Before initiating the study, we held meetings with the players, through meeting the verbal and written information was given to the players and their parents about the purpose of the study, the importance of athlete commitment and the procedures of the study. The same information was given to their coaches during training sessions. The study was approved and reviewed by the MGM institute of Physiotherapy, Committee for Research Ethics. Informed consent was obtained from the athletes and from the parents of those under 18 yrs.

Protocol

The study consisted of two main parts: 1) A prospective cohort study conducted from November 2016 through December 2016. 2) Supplemental telephonic interviews after the completion of data collection.

Within a week of inclusion in the study, all participants completed a questionnaire which collected information on their anthropometrics, medical and sporting history, previous competition and training loads and performance level. The baseline questionnaire also included the Oslo Sports Trauma Research Centre questionnaire on health problems (OSTRC questionnaire) covering the previous week.

Supplemental telephonic interviews - To supplement missing data from the prospective weekly registration and verify the accuracy of the prospective data, we conducted telephonic interviews at the end of the study period. We interviewed all available participants still included in the study.

Instrumentation

All participants completed a general questionnaire which collected information on their anthropometrics, medical and sporting history, previous competition and training loads and performance level.

Oslo Sports Trauma Research Center Questionnaire on Health Problems (OSTRC-HP)

It is used to Registration of injury, illness, time loss, training and competition hours. The OSTRC questionnaire consisted of four graded key questions about sport participation, training volume, performance and health problems experienced during the previous 7 days⁽¹⁷⁾. Health problems were defined as all injuries and illnesses, regardless of severity and consequences. The responses to each of the four questions were allocated a numerical value from 0 to 25, were 0 represented no problems and 25 represented the maximum level for each question. The four response values were summed in order to calculate a severity score from 0 to 100 for each health problem. In sum, the OSTRC questionnaire records the consequences of the athlete`s health problems during the last week, as well as to what extent they had experienced symptoms. If the lowest score on each of the four key questions was recorded (no health problems or symptoms reported), the questionnaire was complete for that week. However, if any health problems were reported, athletes were asked to define whether the problem was an injury or an illness. In the case of an injury, they were asked to classify it as an acute injury (sudden event after for instance falling or a tackle) or an overuse injury (no particular injury situation) and thereafter to record the anatomical location of the injury. If illnesses were reported, athletes were asked to select the main symptoms they had experienced during the past week. Multiple predefined symptoms could be registered. For both injuries and illnesses, they reported the number of whole days of time loss to training or competition the past week (defined as total inability to train or compete). In cases of multiple health problems during the same week, the questionnaire repeated itself up to four times. Participants were instructed to report all health problems every 2nd week, regardless of whether or not the problem had been registered the previous week. The total number of training and competition hours per week (0-25). Health problems were classified as an injury if affecting the musculoskeletal system or concussions and as an illness if affecting other organ systems such as respiratory, gastrointestinal, cardiac, dermatological and psychological systems, as well as unspecified or generalized symptoms such as fever, dizziness or fatigue. Injuries were further categorized into acute and overuse as reported by the athlete. An acute injury was defined as one which onset could be linked to a specific injury event, such as falling or being tackled, whereas overuse injuries were those that could not be linked to a single clearly identifiable event. Illnesses were coded according to organ system affected.

Procedure

The Sample of 60 hockey players were selected according to inclusion and exclusion criteria. The data was collected during the month of November to December, 2016 from Shri Guru Gobind Singh Stadium, Nanded. It was ensured that the subjects were not undergone from any Surgery. The procedure, benefits, and potential risks of study were explained to the subjects before test starts and a fully signed informed consent form was taken. On the 1st week of data collection, the baseline data was collected by using general questionnaire which collected information on their age, height, weight, BMI, medical and sporting history, previous competition and training loads and performance level. The baseline questionnaire also included the Oslo Sports Trauma Research Centre questionnaire on health problems (OSTRC questionnaire) covering the previous week. On 2nd Sunday the data was collected by distributing the hardcopy of questionnaire and on the WhatsApp group and it used by the participants for weekly submission of the OSTRC questionnaire, training and competition hours and days of time-

loss from training and/or competition. The period of the data collection was from 16th November 2016 until 28th December 2016 (6 weeks). Reminders were sent to non-responders after 2, 4 and 6 days, manually through SMS by the researcher. During the data collection period, we had regular contact with athletes and their coaches. first data was collected on the 16th November, after the interval of 2 week the second data was collected on the 30th November which followed by the 14th December and the last OSTRC questionnaire distributed on the 28th December. Afterward supplemental telephonic interview conducted to verify the accuracy of the prospective data and supplement missing data.

Result

Statistical analysis & results

The data analysis with SPSS version 21. Results expressed in the frequency and percentage.

Demographic information -At the baseline, the general demographic data was collected from 60 players of district and national level that includes age (mean±SD, 20.67±2.06), height (mean±SD, 172.43±6.43), weight (mean±SD, 66.83±6.12), BMI (mean±SD, 22.57±2.33), experience in hockey (mean±SD, 4.52±1.57), duration of the training per day (mean±SD, 4.13±0.54), describe in table 1.

Table 1 Shows mean and SD of age, height, weight, BMI, Sporting history experience and training duration of all the players.

Variables	Mean±SD	N
Age	20.67±2.06	60
Height	172.43±6.43	60
Weight	66.83±6.12	60
BMI	22.57±2.33	60
Sporting History Experience	4.52±1.57	60
Training Duration	4.13±.54	60

Table 1 Describe the mean and SD of demographic variables that are age, height, weight, BMI, Sporting history experience and training duration of all 60 hockey players.

OSRTC Questionnaire response on weekly basis.

Effect of injury on the training volume of the players- On weekly basis, data of 2nd week revealed 40% of injury cases and had full participation in sports with injury. 4th and 6th week report shows 30% and 43% of injury and illness reports with full participation in sports. Mild sign and symptoms were noted by the players due to injury in practice, training and reduced training volume of 15%, 7%, and 13% in 2nd, 4th and 6th week respectively, only 2% of the moderate reduce in training volume was observes in 4th week.

Effect of injury on the performance of the players- Minor extent of effect was seen in 2nd week (10%), 4th week (8%) and 6th week (8%). Although the participations were nor reduced and in the 6th week of data, 3% of the players had moderate extent of effect on their performance.

Experience symptoms from last week- on average the minor extent of the symptoms was experienced by the players from last week that were 10% in both 2nd and 4th week and 20% were in 6th week. 3% of the players also had an experience of moderate extent in 4th week report.

Table 2 Shows loss of training time due to injury and illness

WEEKS>		0 week	2 week	4 week	6 week	0 week	2 week	4 week	6 week
Variables	Days loss	%	%	%	%	F	F	F	F
Time loss	1 Day	15%	22%	12%	13%	9	13	7	8
	2 Days	10%	5%	8%	7%	6	3	5	4
	3 Days	0%	8%	3%	12%	0	5	2	7
	4 Days	0%	2%	3%	2%	0	1	2	1
	5 Days	0%	2%	2%	2%	0	1	1	1

From the analysis of 6week data, the maximum loss of time was 5 days which was 2% and seen in all last three weeks. Minimum loss of training time was 1 day that was observed among 9 players at baseline time, 2nd week (13 players), 4th week (7 plays) and 6th week (8 players) as shown in table 2.

Table 3 Demonstrate the frequency and percentage of illness, acute and overuse injury.

WEEKS>		0 week	2 week	4 week	6 week
Variables	Present of symptoms	%	%	%	%
Illness	Yes	7%	7%	3%	8%
Acute injuries	Yes	17%	18%	17%	18%
Overuse injuries	Yes	10%	15%	12%	22%

Table 3 elicit the cases of illness and injury. Total 92 cases of injury and illness were reported in 60 players in 6th week. 15 cases of illness which includes respiratory and gastrointestinal. 42 and 35 cases of acute and overuse injury were reported. It includes various anatomical locations.

Table 4 Displays the acute and overuse in jury cases on the basis of anatomical locations.

Injury profile		
Body Part	Acute	Overuse
Head/face	1	0
Neck	0	0
Thoracic spine	0	0

Shoulder/clavicle	6	4
Elbow	0	0
Forearm	0	0
Wrist	0	0
Hand/fingers	10	3
Abdomen	0	0
Lumbar spine	8	10
Pelvis/buttocks	0	0
Hip/groin	6	10
Thigh	0	0
Knee	3	2
Ankle	7	6
Foot/toes	3	0

The total 42 and 35 cases of acute and overuse injuries were observed from the 6week data. Most prone area of acute injury was hand/fingers (n=10) followed by lumbar spine(n=8), ankle (n=7), hip/groin and shoulder with same number of cases (n=6) and knees and foot/toes (n=3), a single case of head was seen in acute injury also. In overuse injuries lumbar spine(n=10) and hip groin(n=10) were susceptible to injuries, afterward ankle (n=6) was more prone to overuse injuries, less than 5 cases were observed in shoulder(n=4), hand/finger(n=3) and knee(n=2).

Table 5 Illustrate the cases of illness.

Type of illness	Number of cases
Respiratory	5
Gastrointestinal	9
Neurological	0
Other illness	1

Table 5 explain the type of illness. Total 15 cases of illness were observed in period of 6 week. In which 9 cases of gastrointestinal symptoms, 5 cases were of respiratory symptoms and 1 was of other illness. All these cases were further referred to the consultant physician.

Discussion

The current prospective study conducted to find out the prevalence and incidence of injury in field hockey players. It also revealed the severity of injury and its effect on the performance and training by using the OSRTC question. The present literature explains the injury profile among the field hockey players by using the different position of the players in the field such as goalkeeper, midfielders, defenders and forward position ⁽¹⁹⁾.

OSRTC Questionnaire

The Oslo sports trauma research center formalized a questionnaire of health problems. It describes the prevalence of illness, acute and overuse injuries. It has 4 question with 4 options which based on the participation of the players with and without injury. According to the evaluation of the data, at baseline 28% of the players suffered from the injury and full participate in sports with injury, on weekly basis highest percentage of injured players were seen in 6th and 2nd week that was 43% and 40% respectively. In 4th week, the proportion of injury or illness was 30%. All the players participated in their game with the symptoms of injury or illness.

Data also analysis the Influence of injury on training volume and performance on weekly basis. The minor and major extent of training reduction was observed by the researcher. Majorly the minor extent of reduction in training volume was reported in all the week. Their percentage was higher in 2nd week (15%), followed by 6th week (13%), both baseline and 4th week having equally percentage of reduction that was 7%. A little up to 2% amount of moderate reduction of volume seen in 2nd week. The injury or illness also effect the performance of the players, 10% of the players in 2nd week shows minor extent decline in sports, 8% was assessed in 4th and 6th week, followed by 5% at baseline. Somewhat moderate reduction was observed in 2nd week.

Various studies were conducted on sports player by using OSRTC questionnaire. Anine Nordstrom et al, 2020 conducted A Prospective Study in the Norwegian Professional League to study the prevalence and Burden of Health Problems in Male Elite Ice Hockey Players. A total of 225 male ice hockey players in the GET League (the premier professional league) in Norway reported all health problems (acute injuries, overuse injuries, and illnesses) during the 2017-2018 competitive season by using the Oslo Sports Trauma Research Center Questionnaire on Health Problems for 31 weeks. ⁽²⁰⁾ Another study done by Clarsen et al, 2012 conducted prospective study on heterogeneous groups of athletes, particularly when overuse injuries and illnesses are of concern. total of 142 athletes were monitored over a 40-week period using a weekly OSRTC online questionnaire on health problems on Norwegian athletes preparing for the 2012 Olympic and Paralympic Games. ⁽¹⁷⁾

Illness

From the data evaluation, total 15 cases were reported of illness in time period of 6 week. The cases were majorly distributed into two type of illness that was respiratory and gastrointestinal. 9 players show the sign and symptoms of gastrointestinal that can be diarrhea. Pain and others, and 5 cases shows the respiratory sign and symptoms. 1 player shows other health issue. The similar study was done by the Clarsen et al, 2012 in heterogenous group of athletes which found 617 health problems by 132 athletes in 40 week of time period. 329 illness were reported from the 617 health problems. ⁽¹⁷⁾

Injury

Acute and overuse injuries were reported in the current study. 42 cases of acute injuries were analyzed from the 6-week data, it involves various anatomical locations. The hand/fingers was more susceptible part of the acute injury followed by the lumbar area. Sherker S and Cassell E, 2002 also found similar finding in their research, revealed that 50% of data for hockey injuries in emergency department of Victoria hospital was reported of upper

limb (mostly injuries to the hand and forearm).⁽³⁾ Another study conducted by the T J Ellapen et al, 2012 on high school players who belonged to the KwaZulu-Natal Hockey League via voluntary they found that 94 players sustained acute musculoskeletal injuries in the 12-month study period and the mechanism producing the acute injuries were rapid rotational movement (36%) and physical trauma (63%).⁽²¹⁾

In current study, 35 cases of the overuse injuries have been observed. Lumbar spine and hip/groin were most burdensome area of overuse. Similar finding was reported by Anine Nordstrom et al, 2020, karen murtaugh, 2001 and T J Ellapen et al, 2012 in their studies, lower back (18%) to be the most prevalent sites of injury and the hip/lower back was the most prevalent anatomical site of chronic musculoskeletal injury. The intrinsic factors predisposing players to chronic hip/lower-back injury were hip flexion contractures and posture. Another area which more prone to injury was ankle, it was reported by various research studies.^(12,20,22,5)

Both acute and overuse increase the burdensome on the training and performance of the players. To analysis the severity of any particular injury or illness on the players, the loss in training or practice time effectively enlighten it. Maximum loss of training days was 5 days which reported only 2% in last 2nd, 4th and 6th week. Majority of the players loss their 1-day training time at baseline, 2nd, 4th and 6th week. In 6th week, most of the players loss their training time due to injury and highest number of injuries were reported in this week.

Limitation-The sample size was small. To generalized the finding on the whole population required a large sample size. The duration of the study was small. Single male population and homogeneous (hockey) players were participated.

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