Abstract

Introduction: Traumatic orofacial injuries are frequent among hockey players, often causing aesthetic, functional, psychological, and economic problems. This study was conducted to assess the prevalence and distribution of orofacial injuries and to assess the knowledge, attitude, and practices toward the use of protective wear as perceived among hockey players of Coorg district.

Methods: A cross-sectional descriptive study was conducted among 281 field hockey players of Coorg district, Karnataka, India. Data were collected using a specially designed self-administered, pretested questionnaire containing a set of 19 statements. Chi-square test was performed to assess statistical significance among the variables studied. P value <0.05 was considered statistically significant. Results: The mean age of the study sample was 32.7 ± 4.3 years, and majority of them were semi-professional hockey players (46.6%) with an experience of 5–10 years (41.3%) of playing hockey and having at least a graduate qualification (65.5%). A total of 79% of the players reported to have been injured at least once in the past 1 year, of which orofacial injuries accounted for 33.8% of the injuries. Majority of the players had a fair Knowledge, Attitude and Practice (KAP) score toward the use of protective wear (63.7%). Although 37.7% of the players had good knowledge, it translated to a favorable attitude among 24.1% of the players and favorable practice among 11.7% players. Professional hockey players had a positive association with KAP scores (P < 0.00), whereas experience was found to be negatively associated with KAP scores (P < 0.03). Conclusion: The majority of players had moderate knowledge about the importance of protective wear in preventing orofacial injuries, but their attitude and practices toward the same were relatively poor.

Keywords: Attitude, field hockey players, knowledge, orofacial trauma, practice, prevalence, protective wear

Introduction

Hockey is an ancient game thought to be the forerunner of all “stick and ball” games. Hockey was introduced in India during the British rule. It is one of the earliest games played in India and is considered as the national game of India. Although all team sports carry a particular risk of injury, players who participate in stick sports, such as ice hockey, field hockey, and lacrosse, face an increased risk of trauma because of high-speed stick movement required to hit a puck or a ball. The most common sites of injury in field hockey are lower limbs (47%–51%), followed by head and face (27%–34%), upper limbs (14%–20%), and torso injuries (1%–9%).1-5

Rules state that the hockey stick should not be raised above shoulder height and the ball must be played along the ground, in a non-dangerous manner, unless it is a shot at goal.6 Despite this, both stick and ball are capable of inflicting significant accidental damage and about 25% of the injuries in hockey occur due to trauma by the stick, that too most of the time due to “high-sticking.”7 According to the international field hockey rules, protective equipment, such as shin, ankle, and mouth protectors, are not mandatory, except for goalkeepers. However, the international field hockey rulebook states that players are advised to wear a mouthguard at all times while participating the sport.8 The Indian Hockey Association a.k.a. Hockey India also follows the same rules.

Field hockey players have higher proportion of facial injuries compared with ice hockey and lacrosse often causing aesthetic, functional, psychological, and economic problems as evidenced in published literature.8 Studies on prevalence,
knowledge, attitude, and practices toward protective wear among field hockey players are lacking in India and are limited to profiling of injuries related to player positions or assessing knowledge and attitudes of coaches toward orofacial injuries among hockey players. This study was thus undertaken to assess the prevalence of orofacial injuries and the use of protective wear among hockey players of Coorg district.

Materials and Methods

This cross-sectional descriptive study was conducted among field hockey players of Coorg district, Karnataka, during the Annual Kodava Hockey Tournament 2016 held in May at Mercara, Coorg. Ethical clearance was obtained by the institutional Ethics Committee, KVGDC. Prior permission to conduct the study was obtained from the concerned authorities (Kodava Hockey Academy and Department of Youth Services and Sports, Karnataka).

A pilot study was conducted on 30 players prior to the main study to assess the feasibility. The reliability of the questionnaire was assessed through Cronbach’s alpha coefficient which showed a high reliability of 0.966. Five percent of the estimated sample size (276) was added to compensate for expected sampling loss, and thus the final sample size was 290. A list of all participating teams (299 teams) was obtained from the organizers; 30 teams were randomly selected. In all, 290 willing players satisfying the inclusion/exclusion criteria were included in the survey. Willing participants playing hockey for at least a year present during the period (5 days) of the survey were included in the study. Participants who were injured on the day of survey and those needing emergency treatment were excluded.

Data were collected using a specially designed self-administered, pretested 19 items questionnaire consisting of three parts. Part A recorded the basic demography of the hockey players, Part B contained 10 questions for assessing prevalence and distribution of orofacial injuries, and Part C consisted of 3 questions with dichotomized responses each for assessing knowledge, attitude, and practice toward the use of protective wear. Responses to knowledge, attitude, and practice questions were divided into good, fair, and poor for ease in analysis and interpretation.

Content validation of the questionnaire was performed by mailing the questionnaire to five experts and their opinion was sought on a 5-point Likert scale. Each statement was analyzed on the basis of Aikin’s index and a content validity ratio (CVR) value of more than 0.6 was included in the questionnaire.

The investigator herself visited the site during the tournament with a prior permission and appointment and collected the necessary data from the players till the sample size was achieved. Statistical analysis was performed through SPSS version 21. Descriptive data were recorded; percentage distribution and Chi-square were conducted to test significance of the findings. P value was set ≤0.05.

Results

A total of 312 participants were approached for data collection to obtain a sample size of 290; 22 refused to participate in the study citing lack of time and interest as the main reasons for non-participation, thus yielding a response rate of 94%. Nine forms were discarded as they were incomplete, and thus a total of 281 forms were amenable for statistical analysis.

Analysis of the collected demographic parameters revealed that the majority of the players (34.16) were in the age group of 20–29 years with a mean age of 32 ± 4.3 years. About 65.5% of the players were college graduates having more than 5–10 years of experience (41.3%) playing hockey as semi-professionals (46.6%) with a majority playing at forward position (38.4%) [Table 1].

A total of 79% of players reported to have sustained injury at least once in the past 1 year, of which 33.8% of the players suffered injury to the orofacial region and 12.5% of them reported to have succumbed to three or more orofacial injuries in the past year [Figure 1].

Adequate use of protective wear was reported by 12% of the players. Analysis of knowledge, attitude and

| Parameters | Number | Percentage |
|------------|--------|------------|
| **Age (years)** | | |
| <19 | 82 | 29.1 |
| 20-29 | 96 | 34.1 |
| 30-39 | 60 | 21.3 |
| 40-49 | 25 | 8.8 |
| >50 | 18 | 6.4 |
| **Education** | | |
| Undergraduate | 61 | 21.7 |
| Graduate | 184 | 65.48 |
| Postgraduate | 36 | 12.8 |
| **Profession** | | |
| Professional | 95 | 33.8 |
| Semi-professional | 131 | 46.61 |
| Amateur | 55 | 19.57 |
| **Experience (years)** | | |
| 1-2 | 33 | 11.7 |
| 2-5 | 55 | 19.5 |
| 5-10 | 116 | 41.28 |
| >10 | 80 | 28.46 |
| **Player position** | | |
| Forward | 108 | 38.43 |
| Midfielder | 71 | 25.26 |
| Defender | 74 | 26.3 |
| Goalie | 14 | 4.9 |
| Inconsistent | 14 | 4.9 |
practice scores of the players revealed 37.7% had “good” knowledge while 24.1% had favorable attitude, whereas a mere 11.7% was translated into practice. Analysis of knowledge scores in relation to variables studied revealed a directly proportional statistically significant association to education ($P = 0.01$) and experience ($P = 0.00$) and professional players demonstrated better knowledge than their counterparts ($P = 0.00$) [Table 2].

In terms of attitude, age groups of 20–29 years and 30–39 years were found to have more favorable attitude compared with their younger (<19 years) and older counterparts (>40 years) ($P = 0.00$); however, professional players were found to have favorable attitude compared with their counterparts ($P = 0.00$). Players with higher educational level were directly proportional to favorable attitude ($P = 0.00$), while highly experienced players showed a negative attitude toward the use of protective wear ($P = 0.00$) [Table 2].

Professional players practiced adequate protective wear compared with their counterparts which was statistically significant ($P = 0.00$) while more experienced players had a comparatively negative attitude toward protective wear which was statistically significant ($P = 0.03$) [Table 2]. The most common reported limitation of protective wear was discomfort (34.5%).

**Discussion**

The modern game of hockey is now played in 132 countries around the world and is second in popularity to soccer as a team sport. Injuries are a part of this sport as any. There has been gradual change in the pattern of sporting injuries with change in the game and rules. Injuries reported were acute, traumatic such as fracture, dislocation, ligament sprains, and muscle tears, of which the majority of the injuries reported were minor ankle sprains and contusion.$^{[4,7,13]}$ Torn knee ligaments, concussions, and eye

![Figure 1: Prevalence and distribution of orofacial trauma among hockey player](image_url)

**Table 2: Knowledge, attitude and practice of protective wear among field hockey players in relation to the variables studied**

| Parameter          | Knowledge | Attitude | Practice |
|--------------------|-----------|----------|----------|
| Age (years)        | Good | Fair | Poor | $P$ | Favorable | Fair | Unfavorable | $P$ | Good | Adequate | Inadequate | $P$ |
| <19                | 34   | 24   | 24   | 0.62 | 21      | 34   | 46         |     | 11    | 38      | 33         |     |
| 20-29              | 33   | 36   | 27   |     | 30      | 37   | 1          |     | 13    | 51      | 32         |     |
| 30-39              | 26   | 20   | 14   |     | 11      | 26   | 2          |     | 7     | 27      | 26         |     |
| 40-49              | 8    | 12   | 5    |     | 4       | 11   | 47         |     | 2     | 13      | 10         |     |
| >50                | 6    | 9    | 3    |     | 1       | 9    | 1          | <0.00| 1     | 12      | 5          | 0.53 |
| Education          |        |       |      |       |         |       |            |      |       |         |      |     |
| Undergraduate      | 14   | 27   | 20   |     | 12      | 26   | 2          |     | 7     | 29      | 25         |     |
| Graduate           | 72   | 65   | 47   |     | 47      | 77   | 93         |     | 21    | 96      | 67         |     |
| Postgraduate       | 21   | 9    | 6    | 0.01| 8       | 13   | 3          | <0.00| 5     | 17      | 14         | 0.94 |
| Profession         |        |       |      |       |         |       |            |      |       |         |      |     |
| Professional       | 48   | 32   | 15   |     | 28      | 37   | 1          |     | 24    | 36      | 35         |     |
| Semi-professional  | 39   | 46   | 46   |     | 29      | 59   | 46         |     | 9     | 76      | 46         |     |
| Amateur            | 20   | 23   | 12   | 0.00| 10      | 24   | 47         | <0.00| 2     | 28      | 25         | <0.00|
| Experience         |        |       |      |       |         |       |            |      |       |         |      |     |
| <2                 | 10   | 5    | 18   |     | 4       | 15   | 1          |     | 7     | 9       | 17         |     |
| 2-5                | 14   | 21   | 17   |     | 8       | 22   | 3          |     | 3     | 27      | 22         |     |
| 5-10               | 50   | 39   | 27   |     | 33      | 47   | 47         |     | 11    | 60      | 45         |     |
| >10                | 33   | 36   | 11   | 0.00| 22      | 33   | 46         | <0.00| 12    | 46      | 22         | 0.03 |

*Overall KAP score: poor, 2.8%; fair, 63.7%; good, 33.5%
trauma leading to blindness were the more serious injuries reported.\(^{[13]}\) Hockey players are exposed to various injuries during running, turning, twisting, and stretching activities. The occurrence of extrinsic injuries is due to external forces and can result from being struck by a ball or stick, by colliding with another player, a goal post, or the ground. Several studies reported a high incidence of extrinsic injuries in hockey ranging from 60% to 80% of all reported injuries.\(^{[13,14]}\) The most common reasons for wearing protective gear are for prevention of injury and safety. Even though FIH and hockey India do not mandate wearing of protective equipment among hockey players, individual associations like National Collegiate Athletic Association in the United States and English Hockey Association mandate that all field players wear protective gear such as shin and ankle guards in addition to mouth guards at all times.\(^{[15]}\) In 2007, the FIH rules were modified to allow all players to use a face or head protector during short corners. It can be worn during regular field play if there are documented medical concerns.\(^{[6]}\) Although international studies on protective wear practice among hockey players have been reported, there are little data about the situation in India. As previous studies have emphasized, there are large variations between the different sports concerning the acceptance of wearing protective wear for prevention of injuries.\(^{[16,17]}\) This study revealed that even though about 24% of all players approved the use of adequate protective wear, only 11.7% actually practice them. In ice hockey, in which orofacial and cerebral injuries were most often reported (59%), the acceptance of mouthguards was the highest (48%). In handball and basketball, there was no need to use a mouthguard according to interviewed players, despite high injury rates (45%–48%). Similar results have been noted in other studies.\(^{[18‑21]}\) Despite the sport’s apparent popularity, data on injury rates among field hockey players in India are limited. Hence, this study was conducted to assess the prevalence and distribution of orofacial injuries and understand the knowledge, attitudes of the players, and their implementation/effects on protective wear usage for prevention of traumatic injury among hockey players.

In this study, of 281 players, 12.5% had sustained three or more orofacial injuries in the past year and about 79% of the respondents had sustained at least one injury during hockey. Of these injuries, 33.8% is to the orofacial region, similar to findings reported in other studies,\(^{[22‑24]}\) while a much higher prevalence was reported by Hendrick et al.\(^{[25]}\) and Hendrickson et al.\(^{[17]}\) maybe due to the fact that both these studies were conducted among female players, hence injury reported might be higher than those among male players. The most common injury (44%) was soft tissue damage, similar to studies reported by Hendrickson et al. (32%) and Robert et al. (65%).\(^{[26]}\)

This study revealed that the most common reported cause of injury was contact with the stick (35.1%) similar to Mukherjee (33.3%)\(^{[27]}\) and in contrast to contact with ball (56%) reported by Hendrickson et al.\(^{[17]}\)

Analysis of injuries with respect to player position as presented in Table 3 revealed that the majority of overall injuries were reported by forward players (83%) in contrast to the study by Murtaugh\(^{[23]}\) which reported that goalkeepers had highest injury (58%); this contrast might be due to the changes in the rules regarding hits above the backboard in the goal post being considered as “not goal,” hence reducing raised hits.\(^{[9]}\)

This study revealed that defenders (25%) and forwards (24%) reported highest orofacial injuries, while the least amount of injuries were reported by goalies, as wearing protective equipments was mandatory for the goalies and were strictly followed. Similar finding were reported by Sharma et al. and Murtaugh et al.\(^{[9,23]}\) in contrast to Dick et al., Fox, and Moore, who reported highest orofacial injuries among midfielders (27%)\(^{[7,28,29]}\) as these studies were conducted before the changes in hockey rules. The most common reported limitation for wearing protective equipment in this study was discomfort (34.5%) which concurs with the findings of Braham et al.,\(^{[30]}\) while Hendrick et al.\(^{[25]}\) reported speech problems (55%) to be the major limitation.

| Table 3: Type and site of traumatic injuries among hockey players in relation to player position |
|-----------------------------------------------|
| **Area of injury** | **Forward** | **Midfielder** | **Defender** | **Goalie** | **Inconsistent** | **P** |
|---------------------|-------------|----------------|-------------|-----------|----------------|------|
| Teeth               | 14          | 4              | 4           | 1         | 11             |      |
| Lips                | 3           | 2              | 3           | 2         | 4              |      |
| Cheeks              | 9           | 2              | 11          | 1         | 4              |      |
| Eyes                | 2           | 1              | 2           | 1         | 1              |      |
| Others              | 64          | 26             | 30          | 9         | 12             | <0.05|
| Orofacial injury    |             |                |             |           |                |      |
| Fracture            | 7           | 13             | 5           | 2         | 6              |      |
| Tissue injury       | 39          | 20             | 3           | 5         | 25             |      |
| Dental fracture     | 8           | 2              | 6           | 1         | 4              |      |
| Extrusion           | 2           | 2              | 1           | 1         | 1              |      |
| Others              | 34          | 12             | 8           | 5         | 6              | 0.00 |
The studied population showed 37.7% had satisfactory knowledge in relation to use of protective equipment for preventing injuries, while the study by Ferrari and Ferreria de Medeiros[20] showed that 57.3% had sufficient knowledge. A favorable attitude toward protective wear was seen among only 24.1% of the respondents, while a much higher percentage showed favorable attitude in the studies reported by Onyeaso and Adegbesan[21] (88.1%) and Hendrick et al.[25] (54%). These differences in attitudes might be due to the fact that those studies were conducted in developed countries where players have a greater awareness about traumatic injuries and their prevention. This study revealed that only 11.7% of players have implemented their knowledge similar to that reported by Neeraja et al. (15.9%),[12] while Hendrick et al. reported that 69% of the players implemented it in practice in their study.[25] Overall, knowledge, attitude, and practice of protective equipment among field hockey players of Coorg district were poor and there was a relatively large gap between what is stated and done; this gap between knowledge and implementation is reported in literature.[12,25] The reasons for this trend in the study population have to be elucidated. Authorities should develop awareness programs, including broad dissemination of information on the risks of traumatic orofacial injuries and methods for protection from injuries to sports personnel.

Limitation
Limitation of this study includes the use of self-reported data, which can lead to inaccurate information due to individual perceptions of the questions and the time frame of the study.

Conclusion
Knowledge, attitudes, and use of protective equipment among field hockey players of Coorg district were poor. Despite many players acknowledging the importance of using protective equipment, there was a relatively large gap between what is currently understood and what is practiced.

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Conflicts of interest
There are no conflicts of interest.

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