Prevalence of knee injury among football players in Dharan, a sub-metropolitan city in eastern Nepal

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ABSTRACT

Introduction: Most injuries in football occur to the lower extremities. The knee possesses the highest risk. Knee injuries in football are of great concern because they result in substantial physical disability, financial cost, lost playing hours, and may even end a career. Most football clubs in Nepal do not have their own football ground. Players have to practice on the field or public grounds, which are poorly maintained. Nepali football players are thus at higher risk for injuries. This study aimed to determine the prevalence of knee injury among professional football players of the Dharan sub-metropolitan city, Nepal. **Methods:** A cross-sectional study was conducted in five wards of Dharan, randomly selected from 20 wards. All the players in the wards were enrolled in the study. It was a face-to-face interview based on a questionnaire followed by a knee examination performed by an Orthopaedic surgeon between March 2021 to May 2021. The Tegner-Lysholm Score was used to assess the current status of the participant's knee. **Results:** A total of 93 players participated in the study. The most common age group was 16 to 25 years. The mean BMI of the players was 22.4±3.4 kg/m^2, 8.6% of players were underweight, 16.1% were overweight, and 4.3% were obese. Twenty-nine (39%) participants had a knee injury. The mean Tegner-Lysolm Score of the participants with injured knees was 89±12. Only 13.7% had consulted health professionals after the injury and received some treatment. **Conclusions:** There was a high prevalence of knee injury among football players.

Keywords: Football, knee injury, prevalence.

INTRODUCTION

Football is one of the most popular sports in the world. Around one-fourth of the world's population plays football. It is estimated that more than half of the world's population considers themselves football fans.[1,2] Nepalese are not an exception to this. Dharan, a small city in the eastern part of Nepal in Koshi province, is known as mini–Brazil because of its passion for football. There are more than 20 registered football clubs in Dharan. They participate in different matches held in the country and nearby cities in India.

Injury is a constant threat in football, whether played for recreation or professional matches. The risk of injuries in a professional football match is about a thousand times higher than in industrial workers.[3] The risk factors may be intrinsic or extrinsic. Uneven ground surfaces, ill-fitting shoes, incorrect landing, and collision between the players are important risk factors.[4,5] Most injuries in football occur to the lower extremities, with the knee possessing the highest risk.[6] Knee injuries in football are of great concern because they result in substantial physical disability, financial cost, lost playing hours, and may even end a career. Knee injuries are the most common reason for surgery in footballers.

Most of the football clubs in Nepal do not have their football ground,

so players have to practice on the field or public grounds which are poorly maintained. Similarly, because of their low socio-economic status, they have to use poor-quality gadgets. Also, there is no scientific tradition of training sessions based on warm-up duration, time played during games, proper rest, or any treatment strategy after injury. Most of the professional football clubs in Nepal do not have a medical team that looks after players' health. They are often taken care by team-mates or paramedics available at the field who are unaware of the symptoms and signs of common ligament injuries of the knee. So, ligament injuries are often missed. Because of suboptimal health care delivery system and ignorance many of the players play football matches even when they are not fit to play. This may lead to further damage to their injured knee consequently some of the player has to switch the profession. There is little work on the pattern of knee injuries in Nepal. It is not widely appreciated that ligament damage to the knee is more common than any other type of knee injury pathology. Knowing the type of injury and its anatomical location is important not only to prevent injuries but also for selecting appropriate treatment. Thus, the study aimed to determine the prevalence of knee injury among professional football players in Dharan sub-metropolitan city.

METHODS

It was a cross-sectional study conducted among football players of Dharan sub-metropolitan City, Koshi Province 1 of Nepal. Ethical approval was obtained from the Institutional Review Committee, B. P. Koirala Institute of Health Sciences. The study was conducted between March 2021 and May 2021. Out of 20 wards in Dharan, five wards were randomly selected by a lottery method. A ward is the smallest unit of local government in Nepal. A complete enumeration method was used to enroll football players playing football from the selected wards by face-to-face interview and clinical examination. The questionnaire included: personal demographic information, knee injury in detail, and current functional status of the knee. A knee examination was done after an interview by an orthopedic surgeon. Anterior drawer test and Lachman test were done for Anterior cruciate ligament (ACL) assessment, Posterior drawer test for posterior cruciate ligament (PCL), Mc Murray test for medial and lateral menisci, varus and valgus stress test for lateral and medial collateral ligament, respectively. Based on the history and clinical examination findings, a clinical diagnosis was made. The functional status of the injured knee was assessed by the Tegner-Lysolm Score, which was freely accessed via the internet. If any abnormal finding was noticed during

data collection, the player was referred to the hospital for further management. Collected data were entered in Microsoft Excel 2010 and summarized and presented in charts and tables using Statistical Package for the Social Sciences (SPSS) software version 11.5.

RESULTS

Out of the 20 wards of Dharan sub-metropolitan city, ward numbers 8, 12, 16, 18, and 19 were selected by lottery method. Ninety-three participants were included in this study (17 from Ward 8, 18 from Ward 12, 17 from Ward 16, 21 from Ward 18, and 20 from Ward 19).

Of all the players, 77.5% were in the age group between 16-25 years, and 51.6% were studying at a higher secondary level. It has been observed that around one-third (29%) of players were malnourished, of which 8.6% were undernourished, 16.1% were overweight, and 4.3% were obese. (Table 1)

Table 1: Sociodemographic characteristics and nutritional status of participants (N=93)

Characteristics	Categories	No. of Participants	Percentage (%)
Age in years	≤15	3	3.2%
	16-20	38	40.9%
	21-25	34	36.6%
	26-30	11	11.8%
	31-35	5	5.4%
	>35	2	2.2%
Education level	Secondary	27	29%
	Higher Secondary	48	51.6%
	Bachelor and above	18	19.4%
BMI (kg/ht in m²)	<18.5	8	8.6%
	18.5-24.9	66	71%
	25.0-29.9	15	16.1%
	≥30.0	4	4.3%
Total		93	100%

Thirty-two players evaluated (34.4%) were playing forward, 36(38.7%) were midfield, 19(20.4%) were back, and 6(6.5%) were goalkeepers. Sixty-three players (67.8%) were playing football for more than five years. Most had training sessions once a day, played more than five days a week, and played for 1 to 2 hours in one session. Only 13 players (14%) played throughout the year; for the remaining, the training months in a year were found to be variable. (Table 2)

All the players had a warm-up session before they played football. The majority of them (73.1%) had 15 to 30 minutes of the warm-up session, and around 50.7% of them had sport-specialized training, running, and stretching.

Table 2: Sports information of the participants (N=93)

Sport information	Categories	No. of participants	Percentage (%)
Playing position	Forward	32	34.4%
	Midfield	36	38.7%
	Back	19	20.4%
	Goalkeeper	6	6.5%
Duration in sports (in years)	<1	5	5.4%
	1-5	25	26.9%
	6-10	30	32.3%
	>10	33	35.5%
No. of training sessions per day	1	86	92.5%
	2	6	6.5%
	≥3	1	1.1%
Training days per week	1	7	7.5%
	2-3	3	3.2%
	4-5	8	8.6%
	>5	75	80.6%
Length of training (hour) per session	<1	7	7.5%
	1-2	69	74.2%
	>2	17	18.3%
Training duration (months per year)	1-3	43	46.2%
	4-6	10	10.8%
	7-9	27	29%
	>9	13	14%
Length of warm-up per session in minutes	≤15	18	19.4%
	15-30	68	73.1%
	≥30	7	7.5%

It was found that 73 players (78%) had suffered some form of injury during their sports life. Of the total injuries, 80.2% had lower extremity injuries. The ankle joint was the most commonly injured body part (47.9%), followed by the knee (39.7%). Most injuries occurred during the match (65.8%).

Table 3: Injury patterns among participants (n=73)

Injury	Categories	No. of Participants	Percentage (%)
Knee injury	Knee only	20	27.4%
	Knee and other	9	12.3%
Other anatomical location of injury	Ankle	35	47.9%
	Low back	5	6.8%
	Thigh	5	6.8%
	Leg	4	5.5%
	Shoulder	1	1.4%
	Elbow	1	1.4%
	Forearm and wrist	1	1.4%
Time of injury occurrence	Training	25	34.2%
	Match	48	65.8%
Time away from sport	<1 Week	36	49.3%
	<1 Month	11	15.1%
	≥1 Month	26	35.6%

Of the 73 football players with injury, 29 had knee injuries. Out of them 20 had isolated knee injury and 9 had knee injury combined with some other injury. Bowling (24.1%), falling (24.1%), pivoting (24.1%), landing (17.2%), and sudden stops (10.3%) were the common mechanism of injury in order of frequency. Of the total knee injuries, 62.1% had severe injuries and were away from sports for more than one month.

Of the various clinical findings on the knee, the test for meniscus injury was positive for 10 participants, and the test for ACL insufficiency was positive for four participants. The tests for collateral ligament injury and cartilage injury

were also positive in some players. Two participants had no history of injury to the knee but they had palpable thud on Mc Murray test for lateral meniscus on their bilateral knee. Various clinical diagnoses were made based on the clinical examination findings (Table 4). The participants were counseled for the probable injury and advised to go to the hospital for further investigations and management. Two participants with knee injuries had poor knee status according to Tegner Lysolm Scale who were referred to the hospital for further evaluation and treatment.

Table 4: Knee injury detail of the participants (n=29)

Knee Injury	Categories	No. of participants	Percentage (%)
Side	Dominant	21	72.4%
	Non-Dominant	8	27.6%
Mechanism	Bowling	7	24.1%
	Falling	7	24.1%
	Landing	5	17.2%
	Pivoting	7	24.1%
	Sudden Stop	3	10.3%
Clinical finding	Anterior drawer/Lachman test	4	13.8%
	Dial test	1	3.4%
	Effusion	1	3.4%
	McMurray test	8	27.6%
	McMurray test + Valgus stress test	1	3.4%
	McMurray test + Lachman test	1	3.4%
	Palpable thud	1	3.4%
	Prominent B/L tibial tuberosity	1	3.4%
	Tender Tibial tuberosity Left side	1	3.4%
	Tenderness on the lateral facet of patella	2	6.9%
	Tight Hamstring	1	3.4%
	Valgus Stress	1	3.4%
Clinical Diagnosis	ACL tear	4	13.8%
	ACL tear + Medial Meniscus tear	1	3.4%
	Chondromalacia patellae	1	3.4%
	Hamstring Strain	1	3.4%
	Lateral Meniscus tear	1	3.4%
	Lateral meniscus tear/discoid lateral meniscus	5	17.2%
	Medial Collateral Ligament tear	1	3.4%
	Medial Meniscus tear	4	13.8%
	Medial Meniscus tear + Medial Collateral Ligament tear	1	3.4%
	OCD patella	1	3.4%
	Posterolateral corner injury	1	3.4%
Time away from sport after injury	<1 Week	10	34.5%
	<1 Month	1	3.4%
	≥1 Month	18	62.1%
%Treatment received from	Doctor	3	10.3%
	Physiotherapy	1	3.4%
	Self-treatment	7	24.1%
	No treatment	19	65.5%
Current Functional Status (Tegner Lysolm Scale)	Poor	2	6.9%
	Fair	4	13.8%
	Good	9	31%
	Excellent	14	48.3%

DISCUSSION

In this study, we evaluated the prevalence of knee injury among football players in the sub-metropolitan city of Dharan. We assessed the players individually and collected details under four broad headings: 1. Personal demographic information, 2. Sports information, 3. Football injuries, and

4. Knee injury details and Functional status of the knee. The age of the players ranged from 14 to 38 years, with the majority lying between 16 and 25. It is seen that players started their professional football at an early age.

The injury prevalence was 78%, and 80.2% of the total injuries were lower extremities. The knee was the second most common joint injury, accounting for 39.7% in this study. Similar reports were found in the following studies. Gurau et al. in their studies found that lower extremities injuries were the most frequent in football players, representing on average 83.32±4.85% of all injuries, with a range of variation between 64.2% and 94%. Among the lower extremities' injuries, the thigh showed the highest percentage of 26.07±5.53%, followed by the ankle at 15.84±3.93%, the knee at 14.7±2.84%, and the hip/groin region at 12.96 ± 2.15%.[7] Shalaj et al. in their study found that traumatic injuries account for 71% of Kosovarian football players. The body parts most frequently affected by moderate injuries were the knee, followed by the thigh and then the ankle.[8] Ayub et al. in their study of five sports clubs in Peshawar found that the overall prevalence of injuries was 53.3%. The ankle was the most commonly injured lower extremity at 56.3%, followed by the knee at 28.9%, hip at 10.9%, and shin at 3.9%.[9] Forsythe et al. in their study of the incidence of injury for professional soccer players in the United States found that the most commonly injured region was the thigh (30.8% of all injuries), followed by the knee (13.5%) and ankle (12.5%).[10]

Conde-Pipo et al. in their study to assess the description, comparison, and correlation of the body composition profile of Latin American professional football players playing in European leagues found BMI of the players was in the range between 22.2 to 24.5 kg/m^2. However, in our study, 71% of players had a BMI of 18.5 to 24.9kg/m^2. But 8.6% of total players had a BMI less than 18.5kg/m^2, and 4.3% had more than 30kg/m^2.[11]

Dahlstrom et al. in their study explored if disparity about parents' educational level, player body mass index (BMI), and self-reported health are determinants of football injury in community-based football programs, separately or in interaction with age or gender found that based on gender and age-standardized values youths reporting injuries had on average 0.19 standard deviations higher BMI compared with youths not reporting injuries.[12] Also, Dane et al. looked at physical education students and found BMI was higher in injured athletes than in non-injured ones.[13]

In a study by Bakshi et al., the mean time to Return To play (RTP) for all 50 athletes was 388.71±198.52 days.

The mean time to RTP for athletes with ACL/MCL injuries was 305.1±58.9 days, compared with 459.2±245.1 days (p=0.004) and 609.3±183.1 days (p<0.0001) for those with combined ACL and PCL/LCL injuries.[14] Our study also showed that most players had more than one month away from sports activities after trauma because most players had mild to moderate ligamentous injuries, and only a few had severe injuries.

High Tegner level athletes are more likely to return to their previous sport and to the previous level, similar to our study, with most players having excellent Tegner scores post injury and thus having good functional outcomes.[15] Playing without assessment and proper treatment can lead to further severe injury and permanent disability to the players in Dharan.

The limitations of this study was a small sample size. The diagnosis was made clinically. There was no imaging modality to confirm the clinical diagnosis.

CONCLUSIONS

There was a high prevalence of knee injuries in football players of Dharan sub-metropolitan city. Poor nutritional status and poor health-seeking behavior were also prevalent, increasing the risk of injury.

AUTHORS' CONTRIBUTIONS

BP designed the research, performed statistical analysis, and prepared the first draft of the manuscript. BP and ABS collected data, and contributed to prepare the first draft, AA, DT, and SS explained and interpreted the data and contributed to prepare the draft of the manuscript. All authors read and approved the manuscript.

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