

PalArch's Journal of Archaeology
of Egypt / Egyptology

RISK FACTORS OF KNEE PAIN; PREVALENCE IN ATHLETES

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Ishrat Ali Virk , Sobia Nazir , Risk Factors of Knee Pain; Prevalence In Athletes ,
PalArch's Journal Of Archaeology Of Egypt/Egyptology 18(2), 973-982. ISSN 1567-214x.**

Key words: Knee Pain, Athletes, Injury, Injury Factors, Warm-up, Risk factors.

Abstract

This study was conducted in capital city of Pakistan, Islamabad. In this survey 300 athletes, 233 male and 67 female participating in various sporting events at various levels were tested to find out the prevalence of knee pain and the associated risk factors in different games. Findings of the research have shown that 42% (300) of the athletes reported knee pain, which is a very high frequency among the athletes, whereas 58% (172) of the athletes were reported to have no knee

pain. Many contributing factors identified were obesity, improper warm-up, improper coaching, poor training, improper shoes, poor technique, bone weakness, improper cooldown, maximum participation level and injury. Total 27 games were made part of study, where the highest percentage of knee pain was reported in athletics, which was 13.0% and lowest was in Tennis 0.7%. The highest risk factors, which included improper shoes and poor technique was 23.4% whereas poor training was 14.1%. It is suggested that further studies may be conducted on the problem to find out different knee injuries i.e. Ligamentous injuries, Tendinitis injuries, muscular injuries which may cause knee injury or pain in athletes.

Introduction

Sports are considered to be an integral part of a healthy society. Participation in sports activities by athletes imposes a risk of injury. The knee is the most frequently injured joint in the body. A knee injury may occur due to continuous stress and physical activity. In sports ratio of knee pain is higher than any other joint in the body. Athletes often suffer from stress, pain, and injury on this joint because it is one of the important weight-bearing joints in the human body. The knee is the joint between the thigh and lower leg in humans. The upper and lower bones of the knee are separated by two discs (menisci). The upper leg bone (femur) and the lower leg bones (tibia and fibula) are connected by ligaments, tendons, and muscles. The surface of the bones inside the knee joint is covered by articular cartilage, which absorbs shock and provides a smooth, gliding surface for joint movement ⁽¹⁾. The knee joint joins the thigh with the leg and consists of two articulations: one between the femur and tibia, and one between the femur and patella. The mobile joint knee, which permits movement like flexion, extension, and internal and external rotation ⁽²⁾. The knee is one of the most important joints of our body. It plays an essential role in movement related to carrying the body weight in horizontal (running and walking) and vertical (jumps) directions. Bones give strength, stability, and flexibility to the knee. Four bones. Four bones make the knee. Tibia, Patella, Femur, and Fibula ⁽³⁾. Patella the kneecap is flat, triangular bone and the patella moves when the leg moves. It helps the bones and muscles when the knee is bent or straightened. The femur is called the thigh bone it's the largest, longest, and strongest bone in the body. The fibula is a long, thin bone in the lower leg on the lateral side, and runs alongside the tibia from the knee to the ankle ⁽⁴⁾. The main parts of the knee joint are ligaments, bones, cartilages, and tendons, and a joint capsule, which is made of collagen ⁽⁵⁾. Collagen is a fibrous tissue. With the passage of time collagen breaks down ⁽⁶⁾. The adult skeleton is made up of bone and cartilage. Bone and cartilage are connective tissues. The knee joint's main function is to bend, straighten, and bear the weight of the body along with the ankles and hips. The knee, more than just a simple hinged joint, however, also twists and rotates. To perform all of these actions and to support the entire body while doing so, the knee relies on several structures including bones, ligaments, tendons, and cartilage ⁽⁷⁾. The knee permits flexion and extension about a virtual transverse axis, as well as a slight medial and lateral rotation about the axis of the lower leg in the flexed position ⁽⁸⁾. The knee joint is called "mobile" because the femur and lateral meniscus move over the tibia during rotation, while the femur rolls and glides over both menisci during extension-flexion ⁽⁹⁾. Knee pain is a common problem that can originate in any of the bony structures compromising the knee joint (femur, tibia, and fibula), the kneecap (patella), or the ligaments and cartilage (meniscus) of the knee. Knee pain is caused by trauma, misalignment, and degeneration as well as by conditions like arthritis ⁽¹⁰⁾. The most common knee disorder is generally known as patellofemoral syndrome. One form of patellofemoral

syndrome involves a tissue-related problem that creates pressure and irritation in the knee between the patella and the trochlea (patellar compression syndrome), which causes pain. The second major class of knee disorder involves a tear, slippage, or dislocation that impairs the structural ability of the knee to balance the leg (patellofemoral instability syndrome). Patellofemoral instability syndrome may cause either pain, a sense of poor balance, or both ⁽¹¹⁾. Muhammad Manan Haider Khan, Waqar Ahmed Awan, and Muhammad Umar, (July – Dec 2015) studied the common sports injuries with relation to age, gender, and sports in Elite athletes of Pakistan. According to their study knee injury stands on number 3 and about 17% of the athletes suffer knee injuries ⁽¹²⁾. David C. Flanigan; Joshua D. Harris; Thai Q. Trinh; Robert A. Siston studied the prevalence of chondral defects in athlete's knee to determine the full-thickness focal chondral defects in the athlete's knee. According to their study, the overall prevalence of full-thickness focal chondral defects in athletes was 36%. Fourteen percent of athletes were asymptomatic at the time of diagnosis. Patellofemoral defects 37% were more common than femoral condyle 35% and tibial plateau defects 25%. Medial condyle defects were more common than lateral 68% vs 32%, and patella defects were more common than trochlea 64% vs 36%. Meniscal tear 47% was the most common concomitant knee pathological finding, followed by anterior cruciate ligament tear 30% and then medial collateral ligament or lateral collateral ligament tear 14% ⁽¹³⁾. Prof & principal, P.D.V.V.P.F.S College of Physiotherapy, Ahmednagar (M.S), India, and colleagues studied on Prevalence and identification of risk factors for knee osteoarthritis among elderly men and women. The study was conducted in Vikhe Hospital; Ahmednagar (M.S) and it was an observational study. Participation was poorer among men and there was a slightly higher prevalence of radiographic changes of OA in women than in men however, there was a significantly higher proportion of women with the symptomatic disease 11% of all women versus 7% of all men; $P=0.003$. The age-associated increase in OA was almost entirely the result of the marked age-associated increase in the incidence of OA in the women studied ⁽¹⁴⁾. Perugia and colleagues studied high and long jumpers' knees. According to the 65% cases of the patella due to the insertion of the patellar tendon into the patella, attachment of quadriceps tendon to the patella 25% and the attachment of the patellar tendon to the tibial tuberosity 10% ⁽¹⁵⁾. Williams and Wilkins studied the epidemiology of acute knee injuries. During a 1 year period, data on all acute injuries treated as emergency departments were entered into the registry; of these injuries, 6% involved knee joints. The rate of anterior cruciate ligament injuries and meniscus tears was, respectively 0.3 and 0.7 injuries 1,000 inhabitants per year ⁽¹⁶⁾. Osteen B. Lian, Lars Engebretsen, and Roald Bahr studied the prevalence of jumper's knees among Elite athletes from volleyball, Basketball, and jumping events. According to their research prevalence of current symptoms was highest in volleyball 44.6% and Basketball 31.9% ⁽¹⁷⁾. H. Miranda, E. Viikari –Juntura, R. Martikainen, and H. Riihimäki studied a prospective study on knee pain and its risk factors to evaluate the effects of work-related and individual factors as well as physical activity and sports on the incidence and persistence of knee pain among a working population. A total of 10% of workers developed knee pain during the follow-up. Significant predictors of incident knee pain in the multivariable model were higher age, overweight, smoking, and previous knee injuries. Also, working with the trunk forward flexed in a kneeling or standing position and physically strenuous work were non-significant predictors of incident knee pain. Of those 333 workers with severe knee pain at baseline, 220 (66%) still reported severe knee pain after one year. Higher age and job dissatisfaction increased the risk of persistent symptoms. General physical exercise and different sports activities did not predict the incidence or persistence of knee pain ⁽¹⁸⁾.

Methodology

A Cross-Sectional Survey was conducted in Islamabad. The duration of the study was 4 months. 300 athletes were surveyed in this study. Convenient (Non- probability) sampling technique used for sample collection. Athletes who visited the Pakistan Sports Complex, satisfying the inclusion criteria were recruited in the study. The data was collected through self-designed questionnaires. Data were analyzed by using SPSS and descriptive statistics were used to analyze data. In this study, there were 300 athletes from three different age categories. In the 1st category (16-20) there were 5% male athletes and 5% female athletes. In the 2nd Category (21-25) there were 49.7% male athletes and 15% female athletes. In the 3rd category (26-30) there were 23% male athletes and 2.3% female Athletes. The total number of male athletes were 77.7% and female athletes were 22.3%.

Objectives

To find out the prevalence and risk factors of knee pain among athletes.

Hypothesis

Ho. There is no significant prevalence of risk factors in athletes knee pain.

Table 1

		Gender		Total
		MALE	FEMALE	
AGE	16-20	15(5%)	15(5%)	30(10%)
	21-25	149(49.7%)	45(15%)	194(64.7%)
	26-30	69(23%)	7(2.3%)	76(25.3%)
	Total	233(77.7%)	67(22.3%)	300(100%)

Results

There were 300 Athletes in study and 42 % (300) athletes have knee pain and 58 % (300) have no pain. In boxing prevalence was 3.3% ,Hand Ball 3.3% , Base Ball 6.4% , Foot Ball 5.7% , Swimming 0.7%, Weight lifting 2.3% , Taekwondo 2.7% , Basket Ball 5.7% , Squash 1.3% , Rugby 1.0%, Discus Throw 1.3% , Wrestling 1.7% , Wusho 1.3% , Judo 2.3%, Tennis 0.7% , High Jump 2.3% , Long Jump 1.0% , Athletics 13.0% , Hurdler 1.0% , Cricket 3.7% , Volley Ball 6.0% , Badminton 5.4% , Table tennis 4.7% , Golf 4.7% , Archery 5.0% , Kabaddi 5.0% , Hockey 7.7%.

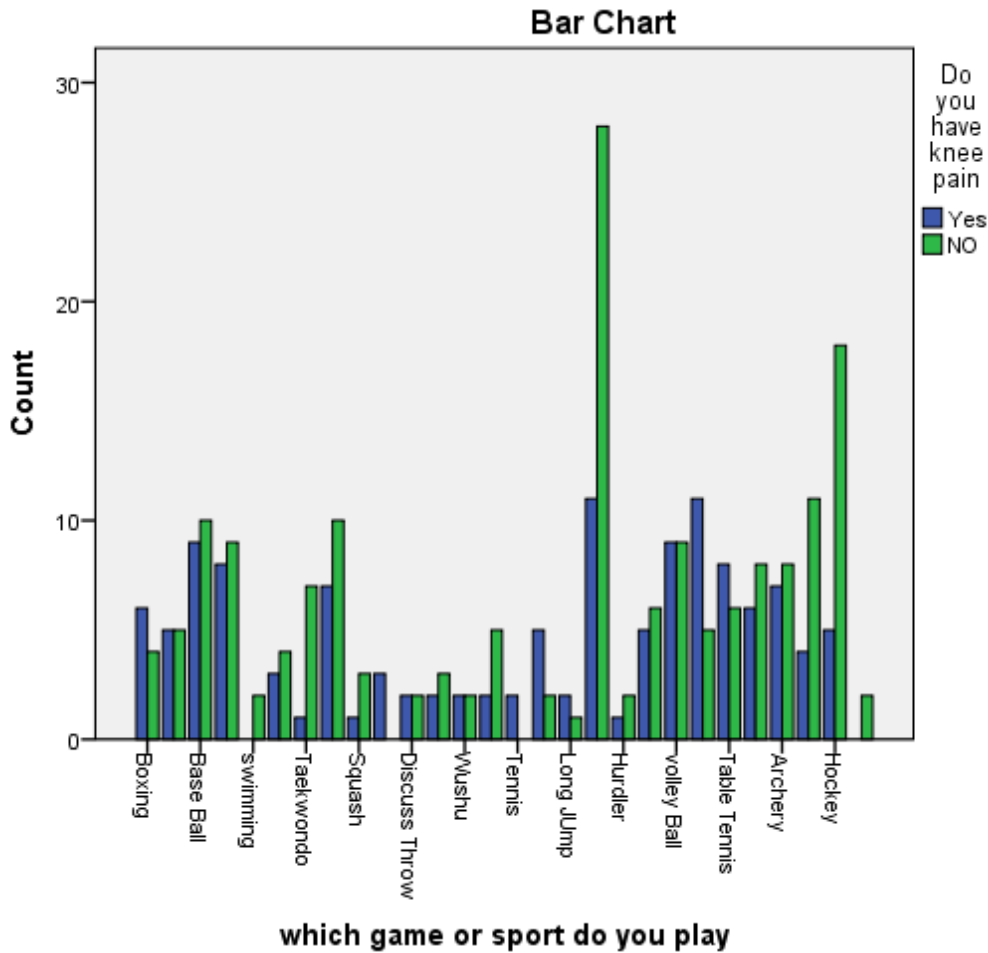
TABLE 2:

			Do you have knee pain		Total
			Yes	NO	
which game or sport do	Boxing	Count	6(2.0%)	4(1.3%)	10(3.3%)

you play	Hand Ball	Count	5(1.7%)	5(1.7%)	10(3.3%)
	Base Ball	Count	9(3.0%)	10(3.3%)	19(6.4%)
	FootBall	Count	8(2.7%)	9(3.0%)	17(5.7%)
	Swimming	Count	0(0.0%)	2(0.7%)	2(0.7%)
	weight lifting	Count	3(1.0%)	4(1.3%)	7(2.3%)
	Taekwondo	Count	1(0.3%)	7(2.3%)	8(2.7%)
	Basket Ball	Count	7(2.3%)	10(3.3%)	17(5.7%)
	Squash	Count	1(0.3%)	3(1.0%)	4(1.3%)
	Rugby	Count	3(1.0%)	0(0.0%)	3(1.0%)
	Discuss Throw	Count	2(0.7%)	2(0.7%)	4(1.3%)
	Wrestling	Count	2(0.7%)	3(1.0%)	5(1.7%)
	Wushu	Count	2(0.7%)	2(0.7%)	4(1.3%)
	Judo	Count	2(0.7%)	5(1.7%)	7(2.3%)
	Tennis	Count	2(0.7%)	0(0.0%)	2(0.7%)
	High Jump	Count	5(1.7%)	2(0.7%)	7(2.3%)
	Long Jump	Count	2(0.7%)	1(0.3%)	3(1.0%)
	Athletics	Count	11(3.7%)	28(9.4%)	39(13.0%)
	Hurdler	Count	1(0.3%)	2(0.7%)	3(1.0%)
	Cricket	Count	5(1.7%)	6(2.0%)	11(3.7%)
	volley Ball	Count	9(3.0%)	9(3.0%)	18(6.0%)
	Badminton	Count	11(3.7%)	5(1.7%)	16(5.4%)
	Table Tennis	Count	8(2.7%)	6(2.0%)	14(4.7%)
	Golf	Count	6(2.0%)	8(2.7%)	14(4.7%)
Archery	Count	7(2.3%)	8(2.7%)	15(5.0%)	

	Kabaddi	Count	4(1.3%)	11(3.7%)	15(5.0%)
	Hockey	Count	5(1.7%)	18(6.0%)	23(7.7%)
Total		Count	127(42%)	172(58%)	299(100.0%)

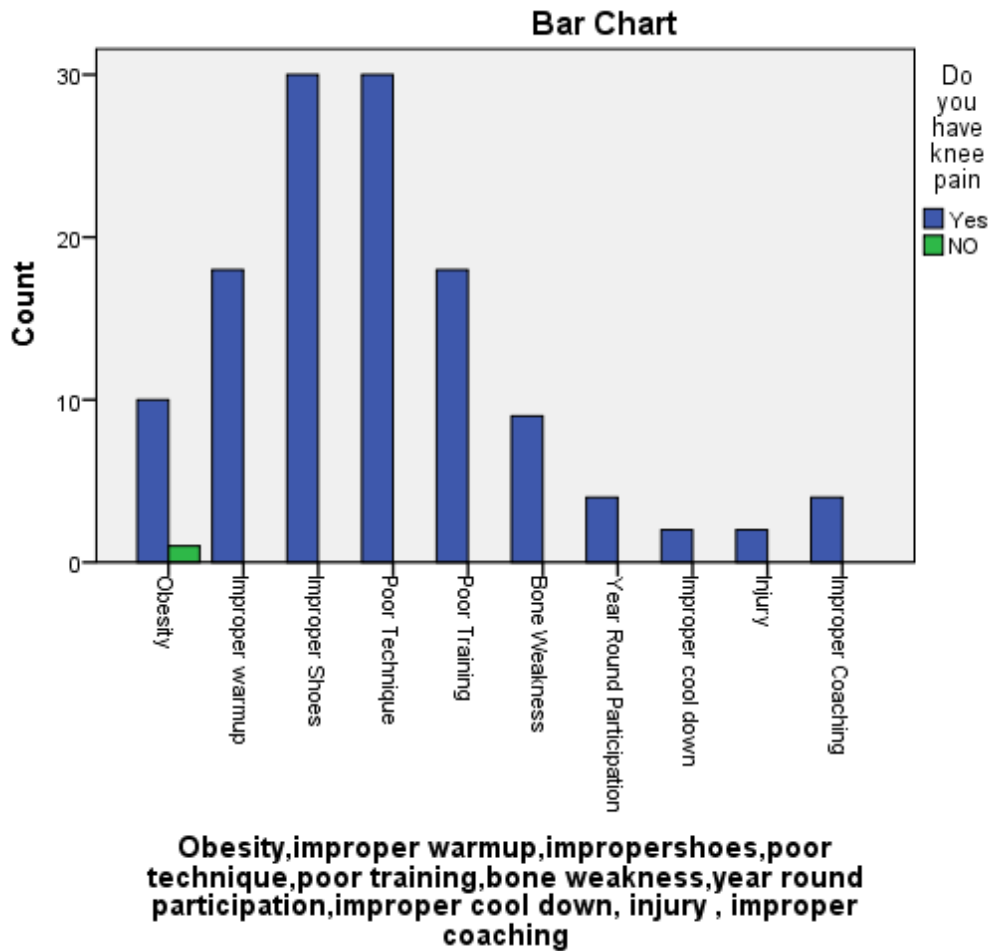
Prevalence of knee pain in different sport



In Athletes there are some risk factors for their knee pain obesity is one of them and the % of obesity in 128 Athletes (42.7%) was 8.6%, Improper warmup 14.1%, Improper Shoes 23.4%, Poor technique 23.4%, Poor Training 14.1%, Bone Weakness 7.0%, Year-round participation 3.1%, Improper cool down 1.6%, Injury 1.6%, Improper Coaching (3.1%).

TABLE 3: Risk Factors of Knee Pain

			Do you have knee pain		Total
			Yes	NO	
Obesity, improper warmup, improper shoes, poor technique, poor training, bone weakness, year-round participation, improper cooldown, injury, improper coaching	Obesity	Count	10(7.8%)	1(0.0%)	11(8.6%)
	Improper warmup	Count	18(14.1%)	0(0.0%)	18(14.1%)
	Improper Shoes	Count	30(23.4%)	0(0.0%)	30(23.4%)
	Poor Technique	Count	30(23.4%)	0(0.0%)	30(23.4%)
	Poor Training	Count	18(14.1%)	0(0.0%)	18(14.1%)
	Bone Weakness	Count	9(7.0%)	0(0.0%)	9(7.0%)
	Year-Round Participation	Count	4(3.1%)	0(0.0%)	4(3.1%)
	Improper cooldown	Count	2(1.6%)	0(0.0%)	2(1.6%)
	Injury	Count	2(1.6%)	0(0.0%)	2(1.6%)
	Improper Coaching	Count	4(3.1%)	0(0.0%)	4(3.1%)



Discussion

In this survey 300 athletes were studied to find out the prevalence of knee pain and the associated risk factors in different games which will help coaches and athletes in reducing those factors and minimizing knee pain. There were 233 male athletes and 67 female athletes from three different age categories and 42 % (127) of the athletes reported having knee pain whereas 58% (172) of the athletes had no knee pain. There were 27 games studied in this research in which the highest percentage of knee pain was reported in athletics, which was 13.0% and the lowest was in Tennis 0.7%.The highest risk factors, which included improper shoes and poor technique was 23.4% whereas poor training was 14.1%. A study was conducted by Muhammad Manan Haider, Waqar Ahmed Awan, and Muhammad Umar at the Pakistan Sports complex to find out the common sports injuries about age,gender, and sports in Elite athletes of Pakistan. According to their study knee injury stands on number 3 and about 17% of the athletes suffer knee injuries ⁽¹²⁾.M.Boling, D, Panda, and Marshall studied gender differences in the incidence and prevalence of patellofemoral pain syndrome. According to their research prevalence were 15% in females and 12% in male Athletes ⁽²¹⁾.Osteen B.Lian, Lars Engebretsen, and Roald Bahr studied the prevalence of jumper's knees among Elite athletes from volley Ball and Basket Ball.According to their research prevalence of current symptoms was highest in volley

Ball 44.6% and Basket Ball 31.9%⁽¹⁷⁾. Louise Murphy, Todd Schwartz, Charles G. Helmick, and Joanne Jordan studied the lifetime risk of symptomatic knee osteoarthritis. According to their research lifetime risk of symptomatic knee, OA was 44.7 %⁽²⁰⁾. Erik witvrouw, Johan Bellemans, Roeland lysens and Drikcambier studied on intrinsic risk factors for the development of patellar tendinitis in an athletic population. According to their research, the intrinsic risk factor was 14 %⁽²²⁾.

Conclusion

This study concluded that 42% (127) of the athletes reported knee pain when surveyed, which is a very high frequency in athletes. Many contributing factors identified were obesity, improper warmup, improper coaching, poor training, improper shoes, poor technique, bone weakness, improper cooldown, year-round participation, and injury. It is suggested that further studies can be conducted on the topic to find out different knee injuries i.e. Ligamentous injuries, Tendinitis injuries, muscular injuries that could contribute to knee pain in athletes.

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