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RISK FACTORS ASSOCIATED WITH OSTEOARTHRITIS AMONG THE PATIENTS VISITING TERTIARY CARE HOSPITALS OF PESHAWAR, PAKISTAN

Komal Khan[1], Fayzhan[1], Sara Khan[1], Adeela Mustafa[2], Nasreen Khan[1], Rabia Noor[1]

1. MBBS students, Khyber Medical College Peshawar, Pakistan

2.Department of Community Medicine, Khyber Medical College Peshawar, Pakistan

Corresponding Email: adeela.mustafa@kmc.edu.pk

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ABSTRACT

BACKGROUND: Osteoarthritis (OA) is a degenerative joint disorder that significantly impairs daily functioning, in all age groups. Different factors contribute to the development of Osteoarthritis including genetics, age, physical activity, Joint injury and occupation.

OBJECTIVE: The primary objective of this study was to identify and analyze the modifiable and non-modifiable risk factors associated with osteoarthritis (OA). Additionally, the study aimed to examine the strength of association between various risk factors and the development or progression of OA in affected individuals.

METHODOLOGY: :A descriptive cross-sectional study was conducted from 1st February to 30th April 2025, involving 358 diagnosed OA patients from Khyber Teaching Hospital (KTH) and Hayatabad Medical Complex (HMC). Non-probability sampling was used, and data was collected via a self-administered questionnaire. Statistical analysis was performed using SPSS, with results presented in tables and percentages.

RESULTS: : This cross-sectional study of 358 OA patients in Peshawar identified significant associations between modifiable (BMI, physical activity, joint injury) and non-modifiable (age, gender,) risk factors. Mean age of the patients was 55.39 years, a higher prevalence of knee OA (71.5%), and a higher BMI was statistically significant ($p<0.001$). Laborers (15.9%) and agricultural workers (9.8%) who engaged in vigorous activities exhibited significantly higher occupational injury rates (63.2% and 60.0%) as compared to the rest. Hypertension (23.7%, $p=0.004$) and diabetes (7.5%, $p=0.001$) showed a significant association with Osteoarthritis, while family history (34.4%, $p=0.734$) was non-significant.

CONCLUSION; This study showed that osteoarthritis is substantially related to age, gender, elevated body mass index, history of joint injury, occupational exposure, and physical activity. The results underscore the need for targeted interventions, such as weight management programs, occupational health initiatives, and genetic screening to explore familial predispositions.

KEYWORDS Osteoarthritis, Risk Factors, Tertiary care hospitals, occupation, BMI, Trauma

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INTRODUCTION

Inflammation of the joint's bone and cartilage, primarily due to articular disc erosion, is the hallmark of OA. It primarily affects the hands, feet, hips, knees, and spine.[1] It can lead to feelings of loneliness and annoyance by erecting obstacles in the areas of relationships, work, and education.[2] Between 1990 and 2019, the overall burden of OA increased globally, with the first decade of the twenty-first century seeing the fastest growth, primarily as a result of ageing and population growth. By 2050, the World Health Organization predicts that nearly 130 million people worldwide will have OA, 40 million of whom will be severely disabled. The disease's prevalence has been continuously increasing.[3] The knee is the most commonly affected joint, with a prevalence of 365 million, followed by the hip and hand[4]. The 2017 Global Burden of Disease (GBD) report lists hip and knee osteoarthritis as the eleventh most common cause of disability worldwide.[5]

According to a Cisternas study, 30.8 million adults in the US—or 13.4% of the total population have OA. OA-related medical costs total $373 ($460) billion.[3] Another South Asian report states that 35.7% of Indians suffer from OA.[6] Osteoarthritis is more common in North Pakistan, where it affects 37% of people. Of those patients, the proportion of females is 4:1.[7] Age, gender, life style and obesity are known risk factors for OA, but males doing heavy manual Labour like farmers and athletes are more vulnerable. Work-place modifications and protective measures can benefit these individuals.[8] According to research, women are more prone to be affected by OA presenting with severe pain and functional disability.[9] Another risk factor for OA that affects both weight-bearing and non-weight-bearing joints is obesity.[10] Due to which obese people due to their functional limitations are more at risk of developing OA.[11]

There is significant rise about the future burden of OA in South Asia, particularly in Pakistan, due to the rising rates of obesity, sedentary lifestyles, and longer life expectancies.[12]

Since there is no long-term medical cure for OA, pain

management and disability prevention are the primary objectives of treatment. When these patients reach the crippling stage, joint replacement surgery becomes the preferred course of treatment. Weight loss, exercise, and lifestyle modifications are examples of effective preventive strategies that help slow the progression of OA, preventing disability and enhancing quality of life.[13]The aim of current study is to find the risk factors of OA and association between different risk factors. By analyzing both modifiable and non-modifiable determinants this study supports evidence-based preventive strategies and direct early intervention in high-risk populations.

METHODOLOGY:

This analytical cross-sectional study was conducted from 1st February to 30th April 2025, in the outpatient departments of Khyber Teaching Hospital and Hayatabad Medical Complex. Diagnosed cases of Osteoarthritis made up the study population and those who had inflammatory joint conditions like rheumatoid arthritis or gout were excluded. The WHO sample size calculator was used to determine the sample size. Using a 95% confidence interval and a 0.05 margin of error, the sample size was 358 based on the prevalence (0.57) from a study done in tertiary care facility of Pakistan.[14] Convenient sampling was employed. Based on a review of the literature and conversations with subject-matter experts, a self-structured questionnaire was employed. Data collection started after taking ethical approval. Before initiating comprehensive data collection, a pilot study was conducted to evaluate the reliability of the questionnaire, yielding a Cronbach's alpha of 0.82. Statistical analyses were performed using SPSS software, with results presented in tables and percentages, and associations were assessed using the chi-square test.

Ethical approval with reference n .491 was obtained from institutional Review Board of Khyber Medical College on 12/06/2024.

RESULTS

This cross-sectional study assessed 358 individuals diagnosed with osteoarthritis (OA) from tertiary care hospitals in Peshawar, Pakistan, focusing on modifiable and non-modifiable risk factors. The mean age of participants was 55.39 years (SD ±10.77), indicating a higher OA frequency in middle-aged individuals. Baseline characteristics are shown in Table1.

Females constituted the majority of cases (n = 225, 62.8%), compared to males (n = 133, 37.2%), with the difference being statistically significant (p = 0.005), suggesting a higher disease burden among women.The most commonly affected joint was the knee (71.5%) , followed by other joints (18.4%) and hip (10.1%) indicating knee OA as predominant presentation.A family history of OA was reported by 34.4% of participants but the association was not statistically significant (p=0.167), indicating no clear link between family history and OA. Joint injuries were present in 44.1% of the sample, significant association with OA (p<0.01), highlighting joint injury as a modifiable risk factor, as shown in Figure 1.

Physical activity levels also showed significant association with OA(p<0.001). Comorbid conditions were prevalent in 64.5% of participants. Occupation also showed significant association (p=0.003) with OA.

Table 1: Frequencies and association of categorical variables with Osteoarthritis (n=358)

Categorical variables	Categories	Percentages (n)	p-value
Gender	Female	225 (62.8%)	0.005
	Male	133 (37.2 %)	
Occupation	Construction Workers	164 (45.8%)	0.003
	Laborers	57 (15.9%)	
	Agricultural worker	35 (9.8 %)	
Family History	1 or more relatives with OA	123 (34.4%)	0.734
	No Family History	235 (65.6%)	
Past Joint Injury	No	200 (55.9 %)	< 0.01
	Yes	158 (44.1 %)	
Physical activity	Vigorous	96 (26.8%)	< 0.001
	Moderate	227 (63.4%)	
	Sedentary	35 (9.8 %)	
Co-morbidities	Yes	231 (64.5 %)	< 0.001
	No	127 (35.5%)	

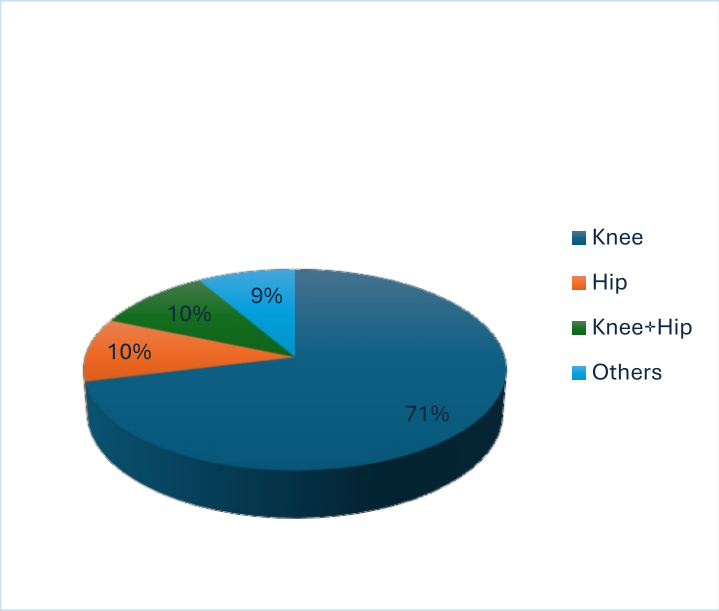

Figure 1: Percentage Distribution of Joint Types Affected by Osteoarthritis

Table 2: Association of BMI Categories by Gender and Age Group among OA Patients(n=358)

BMI Categories by Gender and Age Group among OA Patients (n=358)				
BMI Category	**Age Group**	**Female (%)**	**Male (%)**	**Total (%)**
Underweight (<18.5)	<50 yrs	5 (3.5%)	8(6.0%)	13(6.1%)
	>50 yrs	6(3.9%)	5 (3.8%)	11 (5.2%)
Normal (18.5-24.9)	<50 yrs	45(31.7%)	35(26.3%)	70(32.7%)
	>50 yrs	40(26.1%)	25(18.8%)	58(27.4%)
Overweight (25-29.9)	<50 yrs	35(24.6%)	18(13.5%)	53(24.9%)
	>50 yrs	50(32.7%)	32(24.1%)	72(33.6%)
Obese >30	<50 yrs	17(12.0%)	4(3.0%)	21(9.9%)
	>50 yrs	27(17.6%)	6(4.5%)	33(15.4%)
p-value (Age)		**p-value (Gender)**		
0.043		**0.004**		
Total		225(100%)	133(100%)	358(100%)

The findings indicated that higher BMI is more commonly observed in females and in older individuals, reinforcing the role of metabolic and hormonal influences in the development and progression of osteoarthritis as shown in Table 2. Further results suggest that joint trauma may be a more prominent contributor to OA development in men, possibly due to higher exposure to physical activities. Similarly, lifestyle patterns and Co-morbidities showed a higher burden of associated chronic conditions (such as hypertension or diabetes) among women with OA, as shown in Table 3.

Table 3: Gender-wise Comparison of Risk Factors among Patients with OA(n=358)

Risk Factors	Category	Female %	Male %	p-value
Past Joint Injury	Yes	80 (35.6%)	78(58.6%)	<0.001
	No	145 (64.4%)	55(41.4%)	
Physical Activity	Vigorous	30(13.3%)	66(49.6%)	<0.001
	Moderate	165(73.3%)	62(46.6%)	
	Sedentary	30(13.4%)	5 (3.8%)	
Co-morbidities	Yes	158(70.2%)	73(54.9%)	<0.003
	No	67(29.8%)	60(45.1%)	

DISCUSSION

Our study revealed a high prevalence of knee osteoarthritis (OA) at 71.5% among the sampled population. This underscores the significant burden of OA in this region, aligning with global trends of increasing OA prevalence in aging populations. It identified distinct gender-specific risk profiles, with obesity being a predominant risk factor for women and prior joint injuries more frequently associated with men. Additionally, occupational factors were noted to influence OA presentation, suggesting a role for biomechanical stress in disease progression.

The demographic profile of the study population, characterized by a mean age of 55.39 years and a gender distribution of 62% female and 37% male, is consistent with patterns observed in similar studies.A study by the Tehran Rheumatology Research group reported a comparable mean age of 52 ± 15 years and a female predominance (60%).[15] The similarity in age and gender distribution between these studies suggests that OA predominantly affects middle-aged and older populations, with a higher prevalence among females, most probably due to hormonal, biomechanical, or lifestyle factors such as obesity. In contrast, a multicenter, cross-sectional, questionnaire-based study conducted in Karachi's tertiary care hospitals reported a significantly younger mean age of 28.3 ± 2.2 years, with 60.3% female and 39.6% male patients .[16]

A study in Bangladesh identified family history (19.86%) and diabetes (18.49%) as risk factors associated with osteoarthritis (OA).[17] In contrast, our study, found a higher prevalence of family history for isolated knee joint OA (71.5%), though no significant association was established. Comorbidities were notably more prevalent among women (70.2%, n=158/225) compared to men (54.9%, n=73/133). However, a Canadian survey reported significant associations between family history and OA, particularly among females and those with multiple comorbidities[18], suggesting potential regional or methodological differences in the role of genetic and systemic factors.

Similar results were found in a study done in Sialkot, where the majority of patients were female, 20% had a normal BMI, 35% were overweight, and 45% were obese. Approximately 60% of patients had diabetes.[19]

In this study, women were more likely than men to be overweight or obese. In particular, 17.6% of older females (≥50 years) and 12.0% of younger females (<50 years) were reported to be obese (BMI ≥30), whereas the corresponding rates for males were 7.5% and 5.0%, respectively. A study conducted in India found that 25% of people were overweight, that a family history of OA was significantly linked to OA (20.1%), and that over 40% of Indians aged 70 and older have OA. Occupational risk factors accounted for 25.9% of study participants. There was a significant correlation between osteoarthritis 20 and a history of trauma (6.7%) and fracture (2.8%).[20]

A review study showed that heavy physical work load was the most common occupational risk factor for OA in several anatomical locations. Other factors include kneeling and regular stair climbing, bending and repetitive movements[21] similar to our study which also showed significant association of physical activity and occupation with OA.

Recruitment from Peshawar's tertiary care hospitals, a suitable sample size, and guaranteed representation from both urban and rural diversity are all advantages of this study. Limitations include the cross-sectional design, which precludes the inference of causality, the possibility of recall bias in self-reported injury history and the under-representation of extreme BMI categories.

CONCLUSION

This study showed that osteoarthritis is related with age, gender, elevated body mass index, history of joint injury, occupational exposure, and physical activity. Family history did not significantly relate with osteoarthritis.

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Key Contributions of the Authors	
Author Names	**Author Contributions**
Komal Khan	A, B, C, D
Fayzhan	A, B, C, D
Sara Khan	A, B, C, D
Adeela Mustafa	A, B, C, D
Nasreen Khan	A, B, D
Rabia Noor	A, B, D

Key for Author Contributions:

A.Conception or Design
B.Acquisition, Analysis, or Interpretation of Data
C.Manuscript writing
D.Critical Review and approval

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved