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Association of risk factors with early knee osteoarthritis in patients presented to tertiary care hospital: A cross-sectional study

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***Abstract*---**Aim: To determine the risk factors associated with early knee osteoarthritis in patients presented to tertiary care hospital. Methods: This cross sectional study was conducted on 120 patients presenting with early knee osteoarthritis at Sialkot Medical College Sialkot Pakistan from November, 2022 to April, 2023. We assessed the risk factors associated with early knee osteoarthritis. Results: Mean age recorded was 50.80±8.94 years. Majority of the patients were females. About 30% of the patients were house wives while 53.3% were office employees and 16.7% were laborers. About 20% patients had normal BMI while 35% overweight and 45% obese. About 60% patients were diabetic and 69.2% patients had vitamin D deficiency.

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Conclusion: Profession, obesity, diabetes and vitamin D deficiency are leading risk factors with early knee osteoarthritis in patients.

***Keywords*---**risk factors, obesity, early knee osteoarthritis.

Introduction

Degenerative joint disease, such as osteoarthritis of the knee, occurs when articular cartilage gradually deteriorates and wears away over time. The elderly are disproportionately affected [1]. There are two distinct categories of knee osteoarthritis: primary and secondary [1, 2]. Articular degeneration in primary osteoarthritis occurs for no apparent reason. Post-traumatic or articular cartilage abnormalities, such as those seen in rheumatoid arthritis (RA), are the root causes of secondary osteoarthritis [3, 4].

Osteoarthritis is a degenerative condition that can worsen over time and leave sufferers unable to perform daily tasks [5]. Clinical symptoms may present themselves in varying degrees of severity for different people. However, over time, they tend to worsen in intensity, frequency, and impact [6]. Each person develops at their own unique pace. Slow-onset, activity-aggravated knee pain, knee stiffness and swelling, knee discomfort after rest, and progressive knee pain are all common clinical signs. When non-surgical techniques of treating knee osteoarthritis are unsuccessful, surgical options are explored. Although there are disease-modifying medicines for the treatment of rheumatoid arthritis and other inflammatory disorders, there are currently none for the treatment of knee osteoarthritis [6].

Early-onset knee osteoarthritis is a worldwide problem, leaving no region untouched [7]. Clinical research investigating the role of inflammation in the development of osteoarthritis have increased in recent years [8]. Inflammatory mediators such chemokines and adipokines are released from skeletal mass, according to the literature, ultimately leading to articular degeneration [9]. Primary Osteoarthritis occurs when the underlying cause is unknown, while secondary Osteoarthritis has a known etiology. Changes in articular cartilage are pathological and can range from general softness to localized breakdown of the tissue [10, 11]. Patients typically complain of pain, especially while bearing weight, but stiffness is more commonly experienced after prolonged periods of inactivity. The prevalence and economic toll of OA in the elderly are well-documented facts. More and more evidence suggests that younger people also suffer from Osteoarthritis at a high rate [12].

Patients in Pakistan often delay until advanced stages of ailment or incapacity to seek medical advice due to cultural and economic factors that discourage early consultation. This is why, in both the West and the rest of the world, they take action before distortions and invalidity can be set up. The first step in preventing the debilitating effects of osteoarthritis is to identify and treat the risk factors for the condition. With the goal of enhancing our patients' functional prognosis, we set out to investigate the most significant risk factors related to knee osteoarthritis.

Material and Methods

We conducted this cross sectional study on 120 patients after taking ethical approval from our hospital. The study was conducted at Orthopedic Department Sialkot Medical College Sialkot Pakistan from November, 2022 to April, 2023. All the patients were informed about the study and written consent was obtained from them. Patients having early knee osteoarthritis diagnosed on radiographic examination having knee pain according to Kellgren and Lawrence grading, patients having grade 1 to 4 were selected for the study. Patients' age was between 35 to 65 years of either gender. All the demographic information along with risk factors such as profession, diabetes status, vitamin D deficiency and BMI were noted on a pro-forma.

All the data was analyzed using IBM SPSS 22. Frequencies and percentages were used for qualitative data and mean and standard deviation was used for quantitative data. Chi Square test was applied to assess the association between gender and KL grading keeping P value significant at less than 5%.

Results

We conducted this study on 120 patients presenting with early knee osteoarthritis. The mean age of the patients was 50.80±8.94 years. According to gender majority of the patients were female 58.3% as compared to male patients 41%. According to the KL classification of KOA majority of the patients were having grade 3 KOA 54.2% followed by grade 4 21.7%. Most of the patients were presented with bilateral KOA 63.3%. According to education majority of the patients had intermediate education 41.7% while 28.3% had primary education. We did not find any significant association between gender and KL classification. Regarding the risk factors we observed that 30% of the patients were house wives while 53.3% patients were office employees and 16.7% were laborers or having physical work as profession. About 20% patients had normal BMI while 35% were overweight and 45% were obese. Majority of the patients were diabetic 60%. Vitamin D deficiency was seen in 69.2% patients.

Table 1 Demographics

Demographics		Statistics
Age (Years)		50.80±8.94
Gender	Male	50 (41%)
	Female	70 (58.3%)
KL classification	Grade 1	18 (15%)
	Grade 2	11 (9.2%)
	Grade 3	65 (54.2%)
	Grade 4	26 (21.7%)
Pain location	Unilateral	44 (36.7%)
	Bilateral	76 (63.3%)

Graph 1 Education status

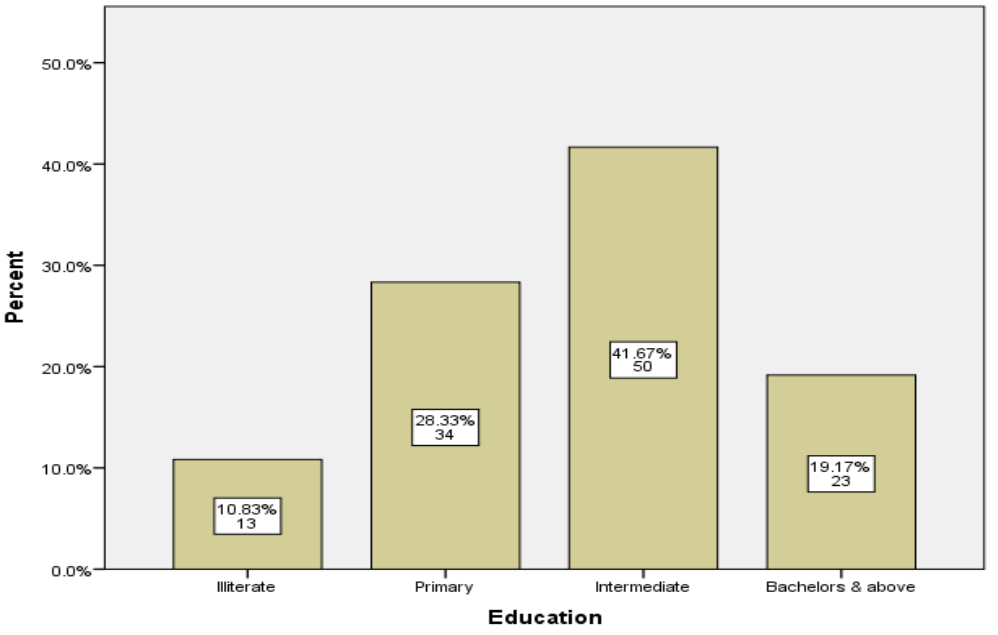

Table 2 Association between gender and KL classification

		KL classification				Total	P value
		Grade 1	Grade 2	Grade 3	Grade 4		
Gender	Male	8	4	30	8	50	0.57
		16.0%	8.0%	60.0%	16.0%	100.0%	
	Female	10	7	35	18	70	
		14.3%	10.0%	50.0%	25.7%	100.0%	
Total		18	11	65	26	120	
		15.0%	9.2%	54.2%	21.7%	100.0%	

Table 3 Risk factors of early knee osteoarthritis

Risk factors		Statistics
Profession	House wife	36 (30%)
	Office employee	64 (53.3%)
	Laborer/Physical worker	20 (16.7%)
BMI (kg/m^2)	Normal	24 (20%)
	Overweight	42 (35%)
	Obese	54 (45%)
Diabetes	Yes	72 (60%)
	No	48 (40%)
Vitamin D deficiency	Yes	83 (69.2%)
	No	37 (30.8%)

Discussion

The frequency of osteoarthritis has been studied throughout a wide range of nations and areas. Taking into account the considerable variations across various ethnic groups, social level, environmental conditions, and lifestyle practices. KOA was prevalent in a study at around 15.6 percent[13]. According to a different study, symptomatic KOA affects 10% of people over 65 and 6% of persons aged 30 and older. Comparatively, a research in Taiyuan revealed a prevalence of KOA of 10.9%, while the overall prevalence of the disease is roughly 9.6% in Beijing's suburbia, China.[14] The findings show that there are regional variances in the frequency of KOA, which may be due to racial or cultural diversity, environmental variables, geographic location, or lifestyle choices. The results may also be affected to some extent by potential biases brought on by variations in study methodologies and demography.[15]

According to our study, becoming older increases your chance of KOA. Age-related increases in KOA prevalence were more pronounced in women than in men. Similar findings from a research indicated that female sex is a separate risk factor for KOA and that the overall incidence of KOA rises with age.[16] Additionally, research from various regions has revealed that the incidence of KOA rises with aging, with women experiencing a larger prevalence. It is believed that abnormal gait mechanics contribute to the etiology of KOA. According to a study, knee kinematics alter with advancing years, which could be one of the factors contributing to KOA's growing prevalence.[17]

Kinematic measurements may be able to offer early indicators for determining the likelihood for developing KOA with aging, according to studies. A study that looked at the differences between men and women's gait mechanics found that women may have higher knee loads in the medial part of the knee.[18] Evidence also points to gender variations in gait mechanics as a factor in women's greater frequency of KOA and suggests that women's knee loads differ from men's. Additionally, it appears that one of the primary causes of the danger of KOA is sex disparities.[19] Another factor for KOA identified in our study was profession, we observed that majority of the female patients of KOA were females and they were mostly housewives while in male patients office workers and laborers were higher in number, these findings are in accordance to a study which reported similar findings[20]

Increased BMI is significantly associated with KOA, studies have shown that obesity is an important risk factor for KOA in patients of either age group.[20,21] In our study we observed that majority of our patients were either overweight or obese. Along with obesity diabetes is also an important factor contributing in development of KOA, we observed that most of our patients were diabetic having age more than 35 years, similar findings have been observed by a study, which stated that diabetes plays an important role in development of KOA[21].

In our study we also observed that the vitamin D deficiency was also indicator of KOA in our patients as majority of the patients had vitamin D deficiency, this has been reported by the aforementioned study conducted in Pakistan that vitamin D

deficiency or insufficiency plays an important role in development of KOA in patients.[20]

Conclusion

From our study we conclude that profession, obesity, diabetes and vitamin D deficiency are leading risk factors with early knee osteoarthritis in patients. We suggest early diagnosis of KOA along with lifestyle modification, diet control and sufficient intake of vitamin D to control the painful condition of KOA.

References

1. Hunt SA, Jazrawi LM, Sherman OH. Arthroscopic management of osteoarthritis of the knee. JAAOS-Journal of the American J Am Acad Orthop Surg. 2002;10(5):356-63.
2. Springer BD. Management of the Bariatric Patient. What Are the Implications of Obesity and Total Joint Arthroplasty: The Orthopedic Surgeon's Perspective? J Arthroplasty. 2019;34(7):30-32.
3. Workman J, Thambyah A, Broom N. The influence of early degenerative changes on the vulnerability of articular cartilage to impact-induced injury. Clin Biomech. 2017;43:40-9.
4. Elsiwy Y, Jovanovic I, Doma K, Hazratwala K, Letson H. Risk factors associated with cardiac complication after total joint arthroplasty of the hip and knee: a systematic review. J Orthop Surg Res. 2019;14(1):15-19.
5. Abramoff B, Caldera FE. Osteoarthritis: pathology, diagnosis, and treatment options. Med Clin. 2020;104(2):293-311.
6. Lundgren-Nilsson Å, Dencker A, Palstam A, Person G, Horton MC, Escorpizo R, et al. Patient-reported outcome measures in osteoarthritis: a systematic search and review of their use and psychometric properties. RMD Open. 2018;4(2):e000715.
7. Yeoh PS, Lai KW, Goh SL, Hasikin K, Hum YC, Tee YK, et al. Emergence of deep learning in knee osteoarthritis diagnosis. Neuroscience. 2021.
8. Wang X, Hunter DJ, Jin X, Ding C. The importance of synovial inflammation in osteoarthritis: current evidence from imaging assessments and clinical trials. Osteoarthr Cartil. 2018;26(2):165-74.
9. Morgenstern R, Denova TA, Ren R, Su EP. A comparative cohort study with a 20-year age gap: hip resurfacing in patients aged≤ 35 years and patients aged≥ 55 years. Arthroplasty Today. 2021;7(3):22-28.
10. Salman A, Shabana AI, El-Ghazouly DE, Maha E. Protective effect of glucosamine and risedronate (alone or in combination) against osteoarthritic changes in rat experimental model of immobilized knee. Anat Cell Biol. 2019;52(4):498-510.
11. Seitz AM, Osthaus F, Schwer J, Warnecke D, Faschingbauer M, Sgroi M, et al. Osteoarthritis-related degeneration alters the biomechanical properties of human menisci before the articular cartilage. Front Bioeng Biotechnol. 2021.
12. Ackerman IN, Kemp JL, Crossley KM, Culvenor AG, Hinman RS. Hip and knee osteoarthritis affects younger people, too. J Orthop Sports Phys Ther. 2017;47(2):67-79.
13. Akpabio A, Akintayo R, Yerima A, Olaosebikan H, Akpan-Ekpo E, Ekrikpo U, et al. Frequency, pattern, and associations of generalized osteoarthritis

among Nigerians with knee osteoarthritis. Clin Rheumatol. 2021;40(8):3135–41.
14. Felson DT, Zhang Y. An update on the epidemiology of knee and hip osteoarthritis with a view to prevention. Arthritis Rheum. 1998;41(8):1343–55.
15. Zeng QY, Zang CH, Li XF, Dong HY, Zhang AL, Lin L. Associated risk factors of knee osteoarthritis: a population survey in Taiyuan, China. Chin Med J. 2006;119(18):1522–7.
16. Sims EL, Carland JM, Keefe FJ, Kraus VB, Guilak F, Schmitt D. Sex differences in biomechanics associated with knee osteoarthritis. J Women Aging. 2009;21(3):159–70.
17. Garcia SA, Vakula MN, Holmes SC, Pamukoff DN. The influence of body mass index and sex on frontal and sagittal plane knee mechanics during walking in young adults. Gait Posture. 2021;83:217–22.
18. Ro DH, Lee DY, Moon G, Lee S, Seo SG, Kim SH, et al. Sex differences in knee joint loading: cross-sectional study in geriatric population. J Orthop Res. 2017;35(6):1283–9.
19. Seok H, Choi SJ, Yoon JH, Song GG, Won JU, Kim JH, et al. The association between osteoarthritis and occupational clusters in the Korean population: A Nationwide Study. PLoS ONE. 2017;12(1):e0170229.
20. Iqbal F, Khani GMK, Siddiqui A, Ali A. Risk Factors Associated with Development of Early Knee Osteoarthritis Mutlicenter Cross-Sectional Study. J Pak Orthop Assoc.2023;35(1):9-14.
21. Ji S, Liu L, Li J, Zhao G, Cai Y, Dong Y, Wang J, Wu S. Prevalence and factors associated with knee osteoarthritis among middle-aged and elderly individuals in rural Tianjin: a population-based cross-sectional study. J Orthop Surg Res. 2023;18(1):1-8.