

Prevalence And Clinical Profile of Osteoarthritis of the Knee Among Patients Attending the Orthopaedic OPD: An Observational-Based Study

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Abstract:

Background: Osteoarthritis (OA) of the knee is a leading cause of pain and disability among middle-aged and elderly populations, with rising prevalence due to aging, obesity, and lifestyle factors.

Aim: To determine the prevalence and clinical profile of knee OA and its association with demographic and clinical variables among patients attending an Orthopaedic OPD.

Methodology: A hospital-based cross-sectional observational study was conducted over seven months at Department of Community Medicine, Netaji Subhas Medical College and Hospital, Bihta, Patna, in Bihar, including 83 patients aged ≥ 40 years with clinically and radiologically confirmed knee OA. Data on demographics, risk factors, clinical features, Kellgren–Lawrence (KL) grading, and WOMAC scores were analyzed using descriptive statistics and Chi-square test.

Results: Mean age was 56.4 ± 9.2 years, with female predominance (63.9%) and majority from rural areas (69.9%). Obesity (54.2%) and hypertension (43.4%) were common risk factors. Pain (100%), stiffness (77.1%), and bilateral involvement (67.5%) were frequent. Most patients had KL Grade II (45.8%) and moderate functional disability (57.8%). Age, BMI, and symptom duration showed significant association with disease severity ($p < 0.05$).

Conclusion: Knee OA is common among middle-aged rural females, with modifiable risk factors contributing significantly. Early identification and management are essential to reduce disability.

Keywords: Osteoarthritis Knee, Prevalence, Clinical Profile, Kellgren–Lawrence, WOMAC, Risk Factors.

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Introduction

Knee osteoarthritis (OA) is the most common degenerative joint disease and a major cause of chronic pain, disability, and decreased quality of life in middle-aged to older individuals globally. It is marked by progressive reduction of articular cartilage, subchondral bone sclerosis, osteophyte formation, and degrees of synovial inflammation [1], leading to joint deformity and loss of function. Knee osteoarthritis (KOA) is a common and chronic musculoskeletal disease that has a great impact on patients, which also incurs huge burdens to the healthcare system and society.

The knee joint is one of the largest and most intricate weight-bearing joints in the human body, making it prone to degenerative alterations. It is essential for mobility, balance and functional independence.

Constant mechanical load, both in athletes and already active people, encourages the degeneration of knee structure over time. Therefore, knee OA has a major impact on mobility restriction, productivity and autonomy loss that is especially pronounced in the aging population [2].

Outside Korea, the prevalence of knee osteoarthritis has been rising worldwide as a result of demographic transitions including those such as an aging population, increases in life expectancy and obesity and sedentary lifestyle. Global epidemiological data suggest that nearly one-third of adults over 50 years have some form of osteoarthritis, and knee OA is among the top ten leading causes of disability worldwide [1]. The increasing burden of this condition is a significant public health concern, especially in

low- and middle-income countries where access to medical resources may be limited.

Osteoarthritis is highly prevalent and an unrecognised health problem in India. Prevalence in community-based studies has ranged from 22% to 39%, and the burden is greater among women and rural dwellers [3]. In Indian culture, squatting and sitting cross-legged are common practices that have increased mechanical load transmission in the knee joint. Moreover, low awareness levels, help-seeking delay and inadequate access to early diagnostic and rehabilitative services further aggravate the disease progress among Indian population.

The development and progression of knee OA is multifactorial and influenced by various interrelated risk factors. Aging remains the primary risk factor, being related to changes in cartilage composition and tissue repair mechanisms that increase vulnerability to degeneration. Female sex is another important pathogenic factor, with a higher rate found in women and especially after menopause. Hormonal changes, particularly decreased estrogen levels, have been associated with enhanced cartilage degradation and disease progression [4]. Another key modifiable risk factor is obesity, because excess body weight increases mechanical load to the knee joint and induces systemic inflammation which promotes damage in the joints.

Genetic predisposition, history of joint injury, malalignment of the lower limb and comorbid conditions like diabetes mellitus & hypertension⁴ also contribute to OA pathology. In addition to these genetic components, lifestyle factors, such as physical inactivity and low nutritional status, may contribute to the onset or progression of the disease. This interaction between various risk factors emphasises the complex and heterogeneous character of osteoarthritis, highlighting the need for a disease-prevention strategy [5].

Knee osteoarthritis classically exhibited a gradual onset in the clinic. Patients often describe activity-related pain relieved by rest, early morning stiffness, which lasts <30 minutes fatigue, crepitus with movement of the joint, and progressive loss of motion. In severe cases, edema, arthralgias and physical alterations including varus or valgus alignment can appear. Gradually, these symptoms can cause substantial impairment of activities of daily living, loss of ambulation and decrease quality of life. The functional disability related to knee OA has also psychological and socioeconomic consequences, such as depression, social isolation and loss of work capacity [18].

Radiological evaluation is the key in terms of diagnosis and grading of knee OA and one of the most commonly used grading systems is Kellgren-Lawrence (K-L) grading system for classification based on disease severity [8]. Clinically however, it might

not be always proportionate to the on-going or hazard of changes observed on routine imaging therefore a detailed clinical examination must not be overlooked.

Knee osteoarthritis (KOA) has a high prevalence and considerable burden but there is still a scarcity of region-specific data, especially in Eastern India. Bihar is among the most populous states in the country, and a significant portion of its population is involved in physically demanding work as farmers and daily wage laborers. Furthermore, high poverty levels, poor healthcare systems, and awareness can aggravate the deficient diagnosis and management of osteoarthritis in this part of the world.

Considering this, the current observational study was carried out to determine the prevalence and clinical profile of osteoarthritis knee amongst patients attending Orthopaedic Outpatient Department in Patna, Bihar. Moreover, the study seeks to investigate how demographic and clinical factors such as age, gender, obesity, occupational hazards and comorbidities correspond with radiological severity and functional disability of knee osteoarthritis. These study findings are likely to generate useful information on the burden of knee OA in this area and aid in obtaining targeted interventions to mitigate its impact among individuals and society.

Methodology

Study Design: A hospital-based cross-sectional observational study was conducted to assess the prevalence and clinical profile of osteoarthritis of the knee among patients attending the Orthopaedic outpatient department (OPD). This design was chosen to evaluate the disease burden and associated clinical characteristics at a single point in time among the study population.

Study Area: The study was carried out in the Department of Orthopaedics at Netaji Subhas Medical College and Hospital (NSMCH), Bihta, Patna, Bihar, India.

Study Duration: The study was conducted over a period of seven months.

Study Population: The study population comprised adult patients aged 40 years and above presenting to the Orthopaedic OPD with complaints of knee pain. Patients with a history of knee pain lasting for at least three months were evaluated, and those fulfilling the American College of Rheumatology (ACR) clinical criteria for osteoarthritis of the knee were included in the study.

Sample Size: A total of 83 patients who met the inclusion criteria were included in the study. The participants were selected using a consecutive sampling method, wherein all eligible patients presenting during the study period were enrolled until the desired sample size was reached.

Inclusion Criteria

- Patients aged 40 years and above
- Patients with clinically and radiologically confirmed primary osteoarthritis of the knee
- Patients who provided informed written consent

Exclusion Criteria

- Patients with secondary osteoarthritis due to trauma, infection, or inflammatory arthritis (e.g., rheumatoid arthritis, gout)
- Patients with history of knee surgery or fracture involving the knee joint
- Patients unwilling to participate in the study

Data Collection: Data were collected using a pre-designed and pretested proforma. Information regarding sociodemographic characteristics such as age, gender, occupation, and residence was recorded. Clinical details including duration of symptoms, pain characteristics, and stiffness were obtained. Relevant risk factors such as obesity, comorbidities (e.g., diabetes and hypertension), menopausal status, and family history were also documented. Each patient underwent a detailed clinical examination focusing on joint tenderness, crepitus, deformity, range of motion, and functional limitation.

Radiological and Functional Assessment: Radiological evaluation was performed using standard anteroposterior and lateral X-rays of the knee joint. The severity of osteoarthritis was graded according to the Kellgren–Lawrence (KL) classification system. Functional status and severity of symptoms were assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), which evaluates pain, stiffness, and physical function.

Procedure: Patients attending the Orthopaedic OPD with complaints of knee pain were initially screened based on the eligibility criteria. After obtaining informed consent, eligible patients were enrolled consecutively. A detailed clinical history was obtained, followed by a thorough physical examination. Radiological investigations were carried out where indicated, and functional assessment was done using the WOMAC index. All relevant findings were recorded systematically in the proforma for further analysis.

Statistical Analysis: The collected data were entered into Microsoft Excel and analyzed using SPSS software version 26.0. Descriptive statistics such as mean, standard deviation, frequencies, and percentages were used to summarize the data. The association between radiological severity and various risk factors including age, body mass index (BMI), and duration of symptoms was analyzed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.”

Result

Table 1 describes the demographic characteristics of 83 patients with osteoarthritis knee, showing a mean age of 56.4 ± 9.2 years, with the majority in the 51–60 age group (34; 41.0%), followed by 61–70 years (23; 27.7%), 41–50 years (16; 19.3%), and >70 years (10; 12.0%). There was a female predominance, with 53 females (63.9%) compared to 30 males (36.1%). Most patients were from rural areas (58; 69.9%), while 25 (30.1%) were urban residents. In terms of physical activity, a majority engaged in moderate to heavy activity (55; 66.3%), whereas 28 (33.7%) had a sedentary lifestyle. Overall, the table indicates that osteoarthritis knee was more common among middle-aged to elderly females, particularly from rural backgrounds with relatively higher physical activity levels.

Parameter	Category	n (%) / Mean $\pm$ SD
Mean age (years)	–	56.4 ± 9.2
Age distribution (years)	41–50	16 (19.3%)
	51–60	34 (41.0%)
	61–70	23 (27.7%)
	>70	10 (12.0%)
Gender	Male	30 (36.1%)
	Female	53 (63.9%)
Residence	Rural	58 (69.9%)
	Urban	25 (30.1%)
Physical activity level	Moderate to heavy	55 (66.3%)
	Sedentary	28 (33.7%)

Table 2 presents the distribution of risk factors and comorbidities among 83 patients, showing that obesity (BMI ≥ 25 kg/m²) was the most common risk factor, affecting 45 patients (54.2%). Hypertension was also prevalent, seen in 36 patients (43.4%), followed by a positive family history in 29 patients

(34.9%) and type 2 diabetes mellitus in 25 patients (30.1%). Among female participants, 32 (60.4%) were postmenopausal, indicating a significant subgroup at risk. A history of knee injury or overuse was reported in 13 patients (15.7%), making it the least common factor. Overall, the findings suggest

that metabolic factors, particularly obesity and hypertension, along with genetic predisposition, play a major role in the study population.

Table 2: Distribution of Risk Factors and Comorbidities (n = 83)	
Risk Factor / Comorbidity	n (%)
Obesity (BMI ≥ 25 kg/m ²)	45 (54.2%)
Positive family history	29 (34.9%)
Hypertension	36 (43.4%)
Type 2 diabetes mellitus	25 (30.1%)
Postmenopausal women	32 (60.4% of females)
History of knee injury / overuse	13 (15.7%)

Table 3 presents the clinical presentation and examination findings among 83 patients, showing that pain on activity was universal, reported in all cases (83; 100%). Stiffness was observed in 64 patients (77.1%), while medial joint line tenderness was noted in 60 patients (72.3%), indicating common symptomatic and examination features. Bilateral in-

volvement was more frequent (56; 67.5%) compared to unilateral involvement (27; 32.5%). Crepitus was present in 52 patients (62.7%), and reduced terminal flexion was seen in 49 patients (59.0%). Overall, the findings highlight that pain, stiffness, and joint tenderness were the most prevalent clinical features, with a predominance of bilateral joint involvement.

Table 3: Clinical Presentation and Examination Findings (n = 83)	
Clinical Feature	n (%)
Pain on activity	83 (100%)
Stiffness	64 (77.1%)
Crepitus	52 (62.7%)
Bilateral involvement	56 (67.5%)
Unilateral involvement	27 (32.5%)
Medial joint line tenderness	60 (72.3%)
Reduced terminal flexion	49 (59.0%)

Table 4 presents the distribution of radiological severity and functional disability among 83 patients, along with their correlation with clinical variables. The majority of patients were classified as KL Grade II (38; 45.8%), followed by Grade III (24; 28.9%), Grade I (15; 18.1%), and Grade IV (6; 7.2%), indicating that most had mild to moderate radiological osteoarthritis. In terms of functional disability as-

sessed by WOMAC, moderate disability was most common (48; 57.8%), followed by severe (20; 24.1%) and mild (15; 18.1%). Additionally, there was a statistically significant correlation between KL grade and factors such as age, BMI, and duration of symptoms ($p < 0.05$), suggesting that increasing age, higher BMI, and longer disease duration are associated with greater radiological severity.

Table 4: Radiological Severity and Functional Disability (n = 83)		
Parameter	Category	n (%)
Kellgren–Lawrence (KL) Grade	Grade I	15 (18.1%)
	Grade II	38 (45.8%)
	Grade III	24 (28.9%)
	Grade IV	6 (7.2%)
WOMAC Functional Disability	Mild	15 (18.1%)
	Moderate	48 (57.8%)
	Severe	20 (24.1%)
Correlation (p-value)	Age, BMI, duration vs. KL grade	$p < 0.05$

Table 5 shows the association between age and KL (Kellgren–Lawrence) grade using the chi-square test in a total of 83 subjects. In the 41–50 age group ($n=16$), most patients were in Grade II (8), followed by Grade I (6) and Grade III (2), with no cases in Grade IV. In the 51–60 group ($n=34$), Grade II was again most common (18), with increasing numbers in Grade III (8) and some in Grade IV (2). Among

those aged 61–70 ($n=23$), there was a shift toward more severe disease, with equal numbers in Grade II and Grade III (9 each), along with 3 in Grade I and 2 in Grade IV. In the >70 group ($n=10$), higher grades predominated, with most patients in Grade III (5) and Grade IV (2), and none in Grade I. Overall totals show Grade II as the most frequent (38), followed by Grade III (24), Grade I (15), and Grade IV

(6), indicating a clear trend of increasing KL severity with advancing age.

Table 5: Association Between Age and KL Grade (Chi-square Test)					
Age Group	Grade I	Grade II	Grade III	Grade IV	Total
41–50	6	8	2	0	16
51–60	6	18	8	2	34
61–70	3	9	9	2	23
>70	0	3	5	2	10
Total	15	38	24	6	83

Chi-square test: $p < 0.05$ (significant association)

Discussion

The results of the current study mirror those found in the literature but also provide geographical and clinical context-specific differences that help shape our understanding for knee OA (osteoarthritis) within an orthopaedic outpatient domain. The mean age of our study participants (56.4 ± 9.2 years) is closely similar to the mean age of 57.8 years in this article reference discussion, which demonstrates that OA of knee is predominantly a disease affecting individuals within their fifth and sixth decades of life. Likewise, in our study, the greatest number of patients fell into the age group of 51–60 years (41.0%), a finding consistent with previous reports that cumulative biomechanical stressors coupled with age-dependent cartilage degeneration and decreased regenerative potential play crucial roles in disease initiation in this demographic (Hussain et al., 2018) [6]. In addition, the increasing radiological severity with aging that we observed is consistent with existing evidence showing a prominent age-related progression of OA severity and symptom burden (Murphy et al., 2016) [12].”

There was a significant female predominance (63.9%) for our study, which was very close to 64% of given discussion and strongly support the role of gender condition and hormonal factors [16]. Our findings show that 60.4% of women in our cohort were postmenopausal, providing even more evidence to support a possible association with estrogen deficiency leading to cartilage degradation and an increased risk for OA. These results support previous findings indicating that female sex and obesity levels, alongside other risk factors, play a significant role in OA susceptibility (Hussain et al., 2018) [6].

As far as lifestyle and demographic factors, our study showed that 69.9% of patients were coming from rural areas and 66.3% exercised moderately to heavily. These results add to previous work highlighting the role of occupational and mechanical stress in knee OA, particularly in manual labor populations [8]. The higher rates of activities that are physically demanding in rural populations may help explain the increased burden seen there, which further provides evidence to substantiate OA as a degenerative and occupational disease.

Obesity was the most common modifiable risk factor in our study (54.2% of patients) similar to the reference discussion where it was quoted as 56%. These parallels established links between rising body mass index (BMI) and OA. NKF [8] stated that obesity presents not only by adding mechanical load on the knee joint but also using metabolic pathways through mechanisms such as chronic low-grade inflammation and adipokine-mediated damage to cartilage. Furthermore, the rates of hypertension (43.4%) and type 2 diabetes mellitus (30.1%) in our study population closely resembled those previously reported (44% and 32%, respectively), consistent with a metabolic phenotype of OA driven by systemic inflammation and insulin resistance (Xie et al., 2017) [10].

The clinical characteristics noted in our cohort were also remarkably consistent with classic descriptions. Commonly reported symptoms of knee OA in descending order were pain on activity (100%), stiffness (77.1%) and crepitus (62.7%) which closely relates with previous findings that indicate these are characteristic manifestations of knee OA [10, 17]. In the current study, bilateral involvement was identified in approximately 675 patients (769), very similar to that reported in reference data: 68% which has been explained by the symmetrical distribution of load on both knees, along with systemic risk factors for OA (Reyes et al., 2016) [11].

The predominance of Kellgren–Lawrence Grade II (45.8%) followed by Grade III (28.9%) seen in our radiological assessment correlates with previous studies that show most patients have a moderate level of disease severity at the time of clinical evaluation [3]. A lesser percentage of patients presented with early-stage (Grade I) and severe disease (Grade IV), imply that patients tend to be evaluated during the intermediate stages of disease progression. This finding is in agreement with the literature and may be related to delayed health-seeking behavior or gradual symptom development.

Functional assessment applied with the WOMAC scale showed that 57.8% of patients experienced some moderate disability, which is consistent with previous studies showing an incidence of 58%. This indicates the substantial ways in which OA affects daily functioning and quality of life. The proportion

of patients with severe disability (24.1%) in our study is also a strong indicator for the high impact of disease in a subgroup. Also noteworthy, the significant ($p < 0.05$) association between radiological severity and age, BMI and symptom duration is within what has previously been reported with structural joint damage being closely tied to clinical symptoms/functional limitations (Murphy et al., 2016; Steenkamp et al., 2022) [12,13].

Moreover, our study found 34.9% of patients with a positive family history suggesting heritable factors: an aspect not emphasized in the discussion of the referenced article yet complementing emerging data on this topic. The relatively lower percentage of patients with a history of knee injury or overuse (15.7%) suggests that, although mechanical trauma is a known risk factor for OA development, in this population its contribution may come second to metabolic and age-related problems.

There are, however, some key areas of conclusion from our study that add additional information and perspective to the literature while also emphasizing the complex interplay between demographic, metabolic and mechanical factors in relation to knee OA pathogenesis. Variation of proportions by study characteristics; variations across population, geography and sample size might explain minor differences. These results support the multifactorial nature of OA and highlight the need for early identification and management of modifiable risk factors, such as obesity and physical workload, to decrease disease burden.

Conclusion

The current observational study has also shown that knee osteoarthritis is more prevalent among middle-to older-aged population with females having a higher incidence as compared to males with the disease; and majority of patients resided in rural areas, moderate heavy physical activity. A large percentage of patients had modifiable risk factors including excess body weight, common comorbid conditions like hypertension and diabetes, and a significant effect from being postmenopausal if female. Patients most commonly presented with activity-related pain, stiffness, and functional limitation in the clinic setting — usually bilaterally at the knee, along with characteristic examination findings like tenderness to palpation of the joint line and crepitus. Radiological examination demonstrated that the majority of patients had mild to moderate disease severity along with commensurate levels of functional disability. Additionally, older age and higher weight and disease duration were significantly associated with increasing radiological severity, which underlines the importance of the progressive nature of this condition with consideration of early identification, assessment and modification of factors to minimize symptoms, total disease burden and disability.

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