

Prevalence and Pattern of Osteoarthritis of the Knee in Elderly Females

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Abstract

Background: Osteoarthritis (OA) is a long-term degenerative joint disorder that causes pain, stiffness, and loss of mobility, imposing a considerable medical and economic burden on society. Among all affected joints, the knee is the most frequently involved, accounting for nearly 83% of the total OA burden. Therefore, the purpose of the study was to determine the prevalence and pattern of knee osteoarthritis among elderly female individuals.

Aim of the study: The aim of the study was to determine the prevalence and pattern of knee osteoarthritis among elderly female individuals.

Methods: A cross-sectional study of 350 elderly females (≥ 60 years) was conducted at the Department of Orthopaedics, Upazilla Health Complex, Pangsha, Rajbari, Bangladesh (March 2021–February 2022); participants' socio-demographics, BMI, knee OA (clinical and radiographic, Kellgren–Lawrence grade, laterality), and risk factors were recorded, with data analyzed using SPSS 26.0 and chi-square tests ($p < 0.05$).

Results: Among 350 elderly females, 213 (60.9%) had knee OA, increasing with age: 78/198 (39.4%) in 60–69 y, 98/125 (78.4%) in 70–79 y, and 37/27 (85.2%) in ≥ 80 y. Bilateral OA was seen in 148 (69.5%), mostly Grade II (96, 45.1%). Key risk factors included BMI ≥ 30 kg/m² (98, 46.0%), prior knee injury (45, 21.1%), and prolonged squatting (125, 58.7%).

Conclusion: Knee osteoarthritis is common among elderly females, predominantly bilateral and moderate in severity, with obesity, prior knee injury, and prolonged squatting as key risk factors.

Keywords: Osteoarthritis, Knee, Elderly Females.

1. INTRODUCTION

Osteoarthritis (OA) is a long-term degenerative joint disorder commonly associated with aging. It involves the deterioration and loss of articular cartilage along with inflammation of the synovial membrane, resulting in joint stiffness, swelling, and impaired mobility [1]. OA can also produce significant localized pain, compromise joint function, and ultimately lead to disability. This condition imposes a considerable medical and economic burden on society, particularly due to

the increasing proportion of elderly individuals. The prevalence of OA is projected to rise by approximately 40%, making it the fourth leading cause of disability worldwide by 2020 [2, 3]. OA primarily affects the knees, hips, hands, facet joints, and feet.

Among these, the knee is particularly susceptible to both direct and indirect injuries as well as the high mechanical load it bears, which makes it the most commonly affected joint. Data indicate that knee osteoarthritis (KOA) represents about 83%

of the total OA burden [4]. OA, being the most prevalent joint disorder, carries substantial social and financial implications in addition to causing pain and functional limitations, ranking among the leading musculoskeletal causes of disability globally.

The prevalence of OA differs greatly across regions, ranging from 3.8% to 70%, depending on study designs, such as clinical evaluation, radiographic assessment, self-reporting, or physician diagnosis [5]. As both incidence and prevalence rise with advancing age, increasing life expectancy will contribute to a larger population affected by the condition. In the United Kingdom, 20% to 30% of individuals over 60 years present with symptomatic OA [6]. Among people older than 65 years, the female-to-male ratio of knee OA prevalence ranges from 2:1 to 3:1 [7]. Evidence suggests that KOA prevalence rises in women during the premenopausal period and continues to increase throughout menopause, likely due to estrogen deficiency, which heightens the risk of developing osteoarthritis [8]. The prevalence of knee OA remains particularly high among elderly women during and after menopause [9]. However, differences in ethnicity, socioeconomic status, environmental exposures, and lifestyle behaviors mean that these findings may not be directly applicable to rural populations.

Identifying risk factors for KOA is essential for managing health in adults, particularly the elderly [10]. OA development is influenced by age, sex, genetic susceptibility, prior joint injury, and abnormal mechanical forces, predominantly resulting from obesity [11].

Knee OA is especially prevalent in women, affecting around 25.7% of females aged 40 to 80 years. Beyond causing pain, it is linked to reduced physical activity, loss of independence, decreased quality of life, and lower productivity [8, 12]. Numerous studies have examined KOA risk factors in developed countries [13, 14], with findings consistently indicating that female patients are at higher risk, supporting the rationale for focusing clinical studies on elderly women [15].

Despite the growing global burden of knee osteoarthritis, most existing research has been conducted in developed or urban settings, with limited data available from rural or community-based populations in low- and middle-income countries. In Bangladesh, where lifestyle factors such as squatting, floor-based activities, and limited access to preventive care are common,

studies focusing specifically on elderly women remain scarce. Furthermore, there is a lack of detailed information regarding the clinical patterns, laterality, and severity grading of OA in this population. Addressing this gap is essential to guide early diagnosis, effective management, and targeted health interventions for at-risk groups. Therefore, the purpose of the study is to determine the prevalence and pattern of knee osteoarthritis among elderly female individuals.

2. OBJECTIVE

- To determine the prevalence and pattern of knee osteoarthritis among elderly female individuals.

3. METHODOLOGY & MATERIALS

This cross-sectional observational study was conducted at the Department of Orthopaedics, Upazilla Health Complex, Pangsha, Rajbari, Bangladesh, from March 2021 to February 2022. A total of 350 elderly female participants aged 60 years and above were included, selected based on specific inclusion and exclusion criteria. Data were collected to assess the prevalence, pattern, and associated risk factors of knee osteoarthritis among this population.

3.1. Inclusion Criteria

- Female participants aged 60 years and above
- Attending the Orthopaedics outpatient department at Upazilla Health Complex during the study period
- Willing to participate and provide informed consent

3.2. Exclusion Criteria

- Diagnosed with inflammatory arthritis (e.g., rheumatoid arthritis)
- History of malignancy affecting the musculoskeletal system
- Severe systemic illness preventing clinical assessment
- Previous knee replacement surgery or major knee trauma that could confound OA assessment

Socio-demographic data including age, residence, and occupation were recorded, and anthropometric measurements were taken to calculate body mass index (BMI), categorized as normal (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²), or obese (≥ 30 kg/m²). Participants underwent clinical and radiographic evaluation for knee osteoarthritis, with severity graded using the Kellgren–Lawrence classification system

(Grade I–IV) and laterality (unilateral or bilateral) noted. History of knee injury, prolonged squatting, and postural stress was obtained through structured interviews. Data were entered and analyzed using SPSS version

26.0. Descriptive statistics were used to present frequencies and percentages, and associations between risk factors and knee OA were assessed using chi-square tests, with p-values <0.05 considered statistically significant.

4. RESULTS

Table 1. Socio-demographic and Anthropometric Characteristics of the Study Participants (n = 350)

Variable	Frequency (n)	Percentage (%)	
Age group (years)	60–69	198	56.6
	70–79	125	35.7
	≥ 80	27	7.7
Residence	Urban	210	60.0
	Rural	140	40.0
Occupation	Housewife	269	76.9
	Other	81	23.1
Body Mass Index (BMI)	Normal (18.5–24.9)	85	24.3
	Overweight (25–29.9)	155	44.3
	Obese (≥ 30)	110	31.4

The majority of participants were aged 60–69 years (n = 198, 56.6%), followed by 70–79 years (n = 125, 35.7%) and ≥80 years (n = 27, 7.7%). Most participants resided in urban areas (n = 210, 60.0%) compared to rural areas (n = 140, 40.0%). Regarding occupation, 269 participants (76.9%)

were housewives, while 81 participants (23.1%) had other occupations.

In terms of BMI, 85 participants (24.3%) had normal BMI, 155 (44.3%) were overweight, and 110 (31.4%) were obese.

Table 2. Age-wise Prevalence of Knee Osteoarthritis among Study Participants (n = 350)

Age Group (years)	Number Examined	OA Positive (n)	Prevalence (%)
60–69	198	78	39.4
70–79	125	98	78.4
≥80	27	37	85.2
Total	350	213	60.9

Table 2 presents the age-wise prevalence of knee osteoarthritis among the study participants.

70–79 years, reaching 85.2% among participants aged ≥80 years.

The prevalence increased progressively with age, from 39.4% in the 60–69 years group to 78.4% in

Overall, 213 participants (60.9%) were diagnosed with knee OA.

Table 3. Pattern of Knee Osteoarthritis among Study Participants (n = 213)

Type/Severity	Frequency (n)	Percentage (%)	
Laterality	Unilateral	65	30.5
	Bilateral	148	69.5
Kellgren–Lawrence Grade	Grade I	39	18.3
	Grade II	96	45.1
	Grade III	66	31.0
	Grade IV	12	5.6

Table 3 presents the pattern of knee involvement and radiographic severity among participants diagnosed with knee osteoarthritis. Bilateral involvement was observed in the majority of cases (n = 148, 69.5%), while unilateral OA was less common (n = 65, 30.5%). Radiographic

assessment using the Kellgren–Lawrence grading system revealed that most participants had moderate OA (Grade II: n = 96, 45.1%) followed by Grade III (n = 66, 31.0%), Grade I (n = 39, 18.3%), and a smaller proportion with severe disease (Grade IV: n = 12, 5.6%).

Table 4. Association of Key Risk Factors with Knee Osteoarthritis among Study Participants (n = 350)

Risk Factor	OA Present (n = 213)	OA Absent (n = 137)	p-value
BMI ≥ 30 kg/m ²	98 (46.0%)	12 (8.8%)	<0.001
History of Knee Injury	45 (21.1%)	10 (7.3%)	0.0005
Prolonged Squatting/Postural Stress	125 (58.7%)	48 (35.0%)	<0.001

Table 4 shows the association of selected risk factors with knee osteoarthritis among study participants. Obesity (BMI ≥ 30 kg/m²) was significantly more prevalent among participants with OA (46.0%) compared to those without OA (8.8%) ($p < 0.001$). A history of knee injury was reported by 21.1% of OA participants versus 7.3% of non-OA participants ($p = 0.0005$), indicating prior trauma as an important contributing factor. Prolonged squatting or postural stress was observed in 58.7% of participants with OA compared to 35.0% of those without OA ($p < 0.001$).

5. DISCUSSION

Knee osteoarthritis (KOA) is a leading cause of pain and disability among elderly individuals, particularly women, due to its progressive degenerative nature and impact on joint function. It adversely affects mobility, independence, and overall quality of life, posing a growing public health concern with increasing life expectancy. The present study assessed the prevalence and pattern of KOA among elderly females attending the Department of Orthopaedics, Upazilla Health Complex, Pangsha, Rajbari, Bangladesh. The findings reveal a high prevalence of KOA with predominance of bilateral and moderate-grade involvement, emphasizing the significant burden of this condition and the need for targeted preventive and rehabilitative strategies in this population.

In the present study, the majority of participants were aged 60–69 years ($n = 198$, 56.6%), followed by 70–79 years ($n = 125$, 35.7%) and ≥ 80 years ($n = 27$, 7.7%), indicating a higher representation of the younger elderly group. This age distribution aligns with findings by Tondare et al.[16], who observed higher prevalence of knee osteoarthritis (OA) in older age categories among urban females, particularly in those aged 50–60 years compared with 40–50 years.

Regarding residence, most participants were from urban areas ($n = 210$, 60.0%) compared to rural areas ($n = 140$, 40.0%), consistent with Sharma et al. [17], who reported significantly higher OA prevalence among urban elderly (60.3%) than rural counterparts (32.6%). In contrast, Li et al. [18] observed slightly higher

prevalence in rural populations in a Chinese cohort, highlighting regional differences in OA distribution. A large proportion of participants were housewives ($n = 269$, 76.9%), reflecting a predominantly sedentary lifestyle that may contribute to OA risk. Analysis of body mass index (BMI) showed that 44.3% were overweight and 31.4% were obese, while only 24.3% had normal BMI, supporting previous reports by both Tondare et al.[16] and Sharma et al.[17], which identified higher BMI as a significant risk factor for knee OA. Overall, the socio-demographic and anthropometric profile of participants in terms of age, residence, occupation, and BMI is broadly consistent with patterns reported in prior studies, reinforcing the role of these variables as important determinants of knee osteoarthritis in elderly females.

The age-wise analysis of knee osteoarthritis demonstrates a clear increase in prevalence with advancing age. Among participants aged 60–69 years, 39.4% ($n = 78$) were affected, rising sharply to 78.4% ($n = 98$) in the 70–79 years group, and reaching 85.2% ($n = 37$) among those aged ≥ 80 years. Overall, 60.9% of the study population ($n = 213$) had knee OA. These findings are consistent with previous research highlighting the strong association between age and osteoarthritis. Felson et al.[19], in the Framingham Study, reported that radiographic knee OA prevalence increased from 27% in subjects younger than 70 years to 44% in those aged 80 years and older, illustrating a similar age-related trend. Similarly, Jaiswal et al.[20] observed that individuals over 70 years had a higher prevalence of knee OA (~54.1%) in an Indian cohort. The progressive rise in OA prevalence across successive age groups underscores the influence of aging on joint degeneration, reinforcing age as a major risk factor for knee osteoarthritis in elderly females.

Bilateral knee osteoarthritis was substantially more common than unilateral involvement, with 69.5% ($n = 148$) of participants affected bilaterally compared to 30.5% ($n = 65$) with unilateral OA. This pattern is consistent with findings from Komatsu et al.[21], who reported that bilateral disease occurred far more frequently than unilateral in their cohort, and

Shinde et al.[22], where 86.2% of patients exhibited bilateral OA compared to only 13.8% with unilateral involvement. Radiographic assessment using the Kellgren–Lawrence grading system revealed that moderate OA (Grade II) was most prevalent (n = 96, 45.1%), followed by Grade III (n = 66, 31.0%), Grade I (n = 39, 18.3%), and a smaller proportion with severe disease (Grade IV: n = 12, 5.6%). These findings align with Dhaon et al.[23], who reported Grade II as the most common severity among their knee OA patients (36.5%). Overall, the results highlight that bilateral and moderate-severity knee OA predominates among elderly females, reflecting both the progressive nature of the disease and patterns observed in previous studies.

This study also identified obesity (BMI ≥ 30 kg/m²), history of knee injury, and prolonged squatting or postural stress as significant risk factors for knee osteoarthritis. Nearly half of the participants with OA (46.0%) were obese compared to only 8.8% of those without OA (p < 0.001), highlighting the strong association between high BMI and disease presence. Similarly, 21.1% of OA participants reported a prior knee injury versus 7.3% of non-OA participants (p = 0.0005), and prolonged squatting or postural stress was more common in the OA group (58.7% vs 35.0%, p < 0.001). These findings are consistent with previous literature: Heidari et al. [24] emphasized prolonged squatting as a major risk factor for tibiofemoral OA in the elderly, alongside obesity and prior joint trauma. Klussmann et al. [25] reported obesity (OR ~17.65 in women) and knee injuries as strong predictors of knee OA, noting occupational knee bending and squatting as additional contributors. Furthermore, Blagojevic et al.[26], in a meta-analysis of older adults, found significantly increased KOA risk in individuals with higher BMI and prior knee trauma, as well as exposure to repetitive knee loading. Collectively, these studies corroborate the present results, reinforcing the role of modifiable factors such as obesity, knee injury, and postural stress in the development of knee osteoarthritis in elderly females.

6. LIMITATIONS OF THE STUDY

This study had some limitations:

- The sample was not randomly selected.
- The study's limited geographic scope may introduce sample bias, potentially affecting the broader applicability of the findings.

7. CONCLUSION

Knee osteoarthritis is highly prevalent among elderly females, with increasing frequency in older age groups. Bilateral involvement and moderate radiographic severity were the most common patterns observed. Obesity, prior knee injury, and prolonged squatting or postural stress were significant risk factors, highlighting the impact of both physiological and lifestyle factors and the need for targeted preventive strategies.

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