

# Prevalence of knee osteoarthritis and its determinants in 30-60 years old women of Gurdaspur, Punjab

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## ABSTRACT

**Background:** Osteoarthritis (OA) is a major cause of enormous disability in both the developed and developing countries. The worldwide prevalence estimate for symptomatic OA is 9.6% among men and 18% among women. **Objectives:** The present study was undertaken with the following objectives: To estimate the prevalence of the knee OA (KOA) and to ascertain the determinants of KOA among women of 30–60 years of age in Gurdaspur. **Materials and Methods:** The community-based cross-sectional study was conducted in 422 women of Gurdaspur, Punjab, India. The data were collected in November 2016–April 2017. A semi-structured interview schedule was used to collect the data. Data analysis was done using SPSS version 21 and Epi info version 7.2. **Results:** The overall prevalence was found to be 21.6%. The prevalence of KOA was found high in 50–60 years of age group. The proportion of the cases was more in high socioeconomic class, body mass index (BMI)  $\geq 25$  category, and sedentary lifestyle group. **Conclusion:** The prevalence was found to be increased with age and was also significantly associated with higher socioeconomic status, menopause, greater BMI, and sedentary lifestyle.


**KEY WORDS:** Knee Osteoarthritis; Prevalence, Women, Gurdaspur, Punjab

## INTRODUCTION

Osteoarthritis (OA) is the most common type of arthritis. It is also known as degenerative arthritis or degenerative joint disease. OA is ranked as one of the leading causes of disability among the elders.<sup>[1-3]</sup> OA is a heterogeneous group of conditions that lead to joint symptoms and signs which are associated with defective integrity of articular cartilage and related changes in the underlying bone at the joint margins.<sup>[4]</sup> OA is a major cause of enormous disability in both

the developed and developing countries and is responsible for the loss of productivity.<sup>[1,5]</sup> The Global Burden of Disease Study revealed that OA of the knee and hip is now ranked as the 11<sup>th</sup> leading cause of years lived with disability and 38<sup>th</sup> highest in disability-adjusted life years among 291 health conditions analyzed.<sup>[6]</sup> Treatment cost is almost double for such long duration and progressive diseases.<sup>[7]</sup>

Worldwide estimation reported over 100 million people globally suffer from OA, which is one of the most common causes of disability.<sup>[8,9]</sup> As per the WHO report on disability (2011), the prevalence of moderate and severe disability (in millions) due to OA in high-income countries was 1.9 and 8.1 in the age group of 0–59 and above 60 years, respectively. In the low- and middle-income countries, these figures were 14.1 and 19.4.<sup>[10]</sup> The worldwide prevalence estimate for symptomatic OA is 9.6% among men and almost double (18%) among women.<sup>[11]</sup> The exact prevalence of

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OA is unknown, due to the uncertainties and variations in diagnostic mechanisms. Various studies reported discordance between symptomatic and radiographic OA. Many patients with radiographically apparent OA do not have symptoms. The prevalence of symptomatic knee OA (KOA) was less than radiographic KOA.<sup>[12,13]</sup> Symptomatic OA is most relevant for public health purposes because the symptoms such as pain, stiffness, and swelling cause nuisance to the affected individuals.<sup>[14]</sup> Almost every age group is affected by OA, but the prevalence increases dramatically after the age of 50 years in men and 40 years in women.<sup>[15,16]</sup> OA ranks fourth among medical problems in women.<sup>[17,18]</sup> Therefore, women are at greater risk of OA than men. In India, the prevalence of OA was found to be in the range of 17–60.6%.<sup>[19]</sup>

KOA is the most common form of OA.<sup>[20-22]</sup> KOA contributes more to the disability than other forms of arthritis as it restricts the mobility of the individuals and leads to dependence. Knee pain is the primary reason for which patients seek treatment. Other presenting signs and symptoms may include stiffness that generally improves after 30 min of activity, crepitus, swelling, bony tenderness, and limp. In advanced cases of KOA, patients may experience instability of the joint or valgum (knock knee) or varum (bow knee). KOA has a substantial impact on the quality of life of patients. KOA affects every aspect of an individual's daily life and their overall quality of life.<sup>[23]</sup> It negatively influences the quality of life. Disease burden of KOA is related to pain occurrence, frequently leading to functional disability ranging from slight limitation of movements to severe impairment of normal daily living activities. KOA negatively influences every aspect of the life of the patient.

There is currently no cure for KOA. Treatment is primarily aimed at symptom relief and improvement of joint mobility to ameliorate quality of life of the patients.<sup>[24]</sup> Patients generally seek treatment when the condition becomes worse. All patients are not benefitted by the consultation. In view of the chronic unbearable nature of symptoms, they keep trying different treatment agencies and regimens.

The present study was undertaken with the following objectives:

- To estimate the prevalence of the KOA in women of 30–60 years of age in Gurdaspur.
- To ascertain the determinants of KOA among women of 30–60 years in Gurdaspur.

## MATERIALS AND METHODS

The study was conducted in district Gurdaspur, Punjab, India. A sample size of 422 women in the age group of 30–60 years was decided. The technique of systematic random sampling was applied to collect a required number

of study subjects. Eligible subjects were selected from the five headquarter villages, which fall under 5 subcenters of selected health block. One headquarter village was selected from each subcenter. The subjects were chosen by selecting a household. The first household was randomly selected from area of any subcenter. Then, every 5<sup>th</sup> house was visited to collect data. A semi-structured interview schedule was used to interview the study subjects. OA was considered (ACR clinical diagnostic criteria) if a study subject was suffering from knee pain along with at least three of the following symptoms: Morning stiffness lasting 30 min or less, crepitus on motion, bony tenderness, bony enlargement, or no palpable warmth. The research work was duly approved by Panjab University Institute Ethics Committee (Vide No. PUIEC/2016/38//20/05). Informed written consent of the respondents was taken before involving them in research after telling them the purpose and procedures of the study. The identity of the participants was kept confidential and anonymous. After collection, data were compiled and reviewed. Data were coded and entered into SPSS version 21 and Epi info version 7.2. Percentages and Chi-square test were used to draw inferences.

## RESULTS

Most of the respondents (54.9%) were from the age group of 50–60 years. Majority of the respondents belonged to Sikh (48.3%) and Hindu (32.5%) religion. Most of the participants were homemakers (79.8%). Majority of the participants belonged to the lower middle socioeconomic status (42.9%), followed by upper middle socioeconomic status (33.2%). The prevalence of the knee pain was found to be 24.4%. 91 respondents among 103 fulfilled the clinical diagnostic criteria for KOA. The prevalence of KOA was reported to be 21.6%. Mild-to-moderate KOA cases were more prevalent than severe KOA cases. The prevalence was reported high in 50–60 years of age group. The prevalence was significantly associated with age, socioeconomic status, body mass index (BMI), menopause, and lifestyle [Tables 1 and 2]. On the other hand, variables such as religion, educational level, occupation, and marital status were not significantly associated with KOA.

## DISCUSSION

Approximately one-fourth of the study subjects were suffering from knee pain, of which 88% of individuals were diagnosed with KOA for the purpose of this study. The number of KOA cases was found to be increased with the age. The proportion of the cases was more in high socioeconomic status (31.3%), followed by upper middle socioeconomic (27.1%) and lower middle socioeconomic status (24.9%). The number of cases was found to be less in poor socioeconomic status. Although the patients were

**Table 1:** Relationship between demographic variables and KOA

| Demographic variables    | Suffering from KOA |           | Total n=422 (%) | Significance                 |
|--------------------------|--------------------|-----------|-----------------|------------------------------|
|                          | No (%)             | Yes (%)   |                 |                              |
| Age (years)              |                    |           |                 |                              |
| 30–40                    | 39 (9.2)           | 2 (0.4)   | 41 (9.7)        | $\chi^2=50.8$<br>$P=0.000^*$ |
| 40–50                    | 140 (33.2)         | 9 (2.1)   | 149 (35.3)      |                              |
| 50–60                    | 152 (36.0)         | 80 (18.9) | 232 (54.9)      |                              |
| Matriculation or less    | 148 (35.1)         | 46 (10.9) | 194 (45.9)      | $\chi^2=6.2$<br>$P=0.100$    |
| Senior secondary         | 76 (18.0)          | 13 (3.0)  | 89 (21)         |                              |
| Graduation               | 80 (18.9)          | 19 (4.5)  | 99 (23.4)       |                              |
| Postgraduation or more   | 27 (6.4)           | 13 (3.0)  | 40 (9.4)        |                              |
| Religion                 |                    |           |                 |                              |
| Hindu                    | 106 (25.1)         | 31 (7.3)  | 137 (32.5)      | $\chi^2=3.58$ $P=0.310$      |
| Sikh                     | 155 (36.8)         | 49 (11.6) | 204 (48.3)      |                              |
| Christian                | 59 (13.9)          | 9 (2.1)   | 68 (16.1)       |                              |
| Other                    | 10 (2.3)           | 3 (3.0)   | 13 (3.0)        |                              |
| Marital status           |                    |           |                 |                              |
| Single                   | 3 (0.7)            | 1 (0.2)   | 4 (0.9)         | $\chi^2=0.67$<br>$P=0.713$   |
| Married                  | 313 (74.2)         | 84 (19.9) | 397 (94)        |                              |
| Divorced/separated/widow | 15 (3.6)           | 6 (1.4)   | 21 (4.9)        |                              |
| Occupation               |                    |           |                 |                              |
| Housewives               | 259 (61.4)         | 78 (18.5) | 337 (79.8)      | $\chi^2=2.0$<br>$P=0.154$    |
| Working                  | 72 (17.1)          | 13 (3.0)  | 85 (20.1)       |                              |
| Socioeconomic status     |                    |           |                 |                              |
| High                     | 11 (2.6)           | 5 (1.2)   | 16 (3.8)        | $\chi^2=21$<br>$P=0.0003^*$  |
| Upper middle             | 102 (24.2)         | 38 (9.0)  | 140 (33.2)      |                              |
| Lower middle             | 136 (32.2)         | 45 (10.7) | 181 (42.9)      |                              |
| Poor                     | 62 (14.7)          | 2 (0.4)   | 64 (15.2)       |                              |
| Very poor                | 20 (4.7)           | 1 (0.2)   | 21 (4.9)        |                              |

\*Significantly associated with KOA, Chi-square ( $\chi^2$ ) test applied. KOA: Knee osteoarthritis, BMI: Body mass index

**Table 2:** Relationship between KOA and menopause, BMI, and lifestyle

| Characteristics  | Suffering from KOA |     | Total | Significance                  |
|------------------|--------------------|-----|-------|-------------------------------|
|                  | No                 | Yes |       |                               |
| Menopause status |                    |     |       |                               |
| Yes              | 177                | 82  | 259   | $\chi^2=38.88$<br>$P=0.000^*$ |
| No               | 154                | 9   | 163   |                               |
| BMI              |                    |     |       |                               |
| <18.5            | 7                  | 0   | 7     | $\chi^2=18.27$<br>$P=0.000^*$ |
| 18.5–24.9        | 118                | 13  | 131   |                               |
| 25 or more       | 206                | 78  | 284   |                               |
| Lifestyle        |                    |     |       |                               |
| Active           | 102                | 12  | 114   | $\chi^2=12.32$<br>$P=0.002^*$ |
| Moderate         | 116                | 35  | 151   |                               |
| Sedentary        | 113                | 44  | 157   |                               |

\*Significantly associated with KOA, Chi-square ( $\chi^2$ ) test applied. KOA: Knee osteoarthritis, BMI: Body mass index

more in the category of postgraduate educational level, it was not found to be statistically significant. The prevalence of KOA was reported to be high in individuals with BMI  $\geq 25$ . Menopause and sedentary lifestyle were also reported to be significantly associated with KOA.

The overall prevalence of KOA was 21.6% in this study. The prevalence was within the range of 17–60.6% reported in India and in other countries. The prevalence was found to be approximately similar (21.4%) for women in a study conducted in Nigeria.<sup>[25]</sup> However, this prevalence was lower than some previous studies conducted in India. Other studies showing higher prevalence in India for OA are from Jammu, South Delhi, and five states of India with prevalence of 42.4%, 47.3%, and 28.7%, respectively.<sup>[26–28]</sup> However, the prevalence observed in our study was higher than that found in Shanghai (China), North Carolina (US), and Hoshiarpur (Punjab) for symptomatic KOA (7.2%, 16%, and 19.5%, respectively).<sup>[12,29,30]</sup> In these studies, the age groups taken in the sample were above 40 years of age. However, in the

present study, the sample included women of the age group of 30–60 years only. This may be the reason for lower prevalence in the present study. Moreover, the prevalence was found to be statistically significant with age. In this study, it was observed that the percentage of the women with OA increased with the age. Maximum prevalence was found in the age group of 50–60 years (34.5%). Age was found to be significantly associated with KOA. This finding is similar to those of the studies conducted in South Delhi, Dharwad, and at other places.<sup>[19,25,27,31,32]</sup> The Framingham study represented one of the earliest studies to associate increasing age with worsening knee arthritis. The prevalence was also reported to be significantly associated with the sedentary lifestyle and greater BMI. Sedentary lifestyle may give rise to obesity, which in turn increases BMI and makes person more prone to KOA.<sup>[33-37]</sup> Sedentary lifestyle can be a risk factor for the development of KOA, or it can be its consequence. It may also give rise to sedentary lifestyle due to pain and decreased mobility, which furthermore restricts the activities or exercise. The restriction of the mobility may give rise to obesity which additionally contributes to the progression of the disease. On the contrary, a study suggests that more active individuals may see a greater reduction in the risk of KOA from avoiding a high BMI than those less active.<sup>[38]</sup> The prevalence of KOA was found to be more (31.7%) among women of menopausal age. The findings are similar to a study from South Delhi.<sup>[27]</sup> Many studies have shown that loss of estrogen at the time of menopause increases the women's risk of getting OA.<sup>[30,39,40]</sup> Some cohort studies have indicated that women taking estrogen have lower prevalence and incidence of radiographic OA.<sup>[41,42]</sup> Association was reported between higher socioeconomic status and KOA. This study contradicts the findings of Dunlop *et al.* (2001) and Dalstara *et al.* (2004) which have shown that the prevalence of KOA increased with poverty.<sup>[43,44]</sup> In the present study, the difference might be due to the sedentary lifestyle of women who belong to good socioeconomic background. Most of the women from good socioeconomic status were either homemakers or teachers. Most of the daily home chores such as cleaning and mopping of the house, washing of clothes, and cleaning of utensils were done by the part-time employed maids. This lifestyle may lead to obesity, a strong risk factor for KOA. In our study, educational status was not found to be statistically associated with the educational level of the participants. These findings are contrary to the studies stating the association between literacy level and KOA.<sup>[43,45]</sup>

The clinical diagnostic criterion was used to diagnose the cases of KOA. As this study was conducted in the community, we were unable to obtain X-rays to confirm KOA radiographically. Hence, only symptomatic cases were considered in the present study. The study presents the emerging trends of chronic musculoskeletal diseases in the study area, which affect the quality of life of the suffering women. There is a need of such studies to be done at broader level to address this health issue.

## CONCLUSION

The prevalence of KOA was 21.6% among women of 30–60 years age in Gurdaspur. The prevalence of KOA increased with the age. Prevalence was higher in menopausal women. Sedentary lifestyle and greater BMI also emerged as factors associated with KOA.

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