Original Article

# Osteoarthritis in women reporting to tertiary care hospital in Eastern India: Associated factors determining management

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## Abstract

**Introduction:** Osteoarthritis (OA) is a painful joint condition that is left heavily underdiagnosed, as it is also related to advancing age. Hence, those affected, tend to live with it, until the condition becomes excruciating or disabling. The women in our society are a section, who have very poor health seeking behavior. However, in today's era, tertiary care hospitals offer definitive management for OA in the form of Joint Replacement Surgery (JRS). This again is taken up often as a last resort and is heavily dependent on the socioeconomic condition of the family. The surgery offers proven better quality of life. **Objectives:** This study discusses a public health hypothesis regarding the disease presentations of OA in women visiting a tertiary care hospital and endeavors to develop a model based on some predictors that increase the predilection of recommendation of surgery among these women, These studies have been done for general populations, but here we chose to study women, as the society in eastern part of the country is male dominated and the decision to go for a surgery in case of the women is dependent on several issues. This model perhaps will bring to light the need of surgery in the women with OA and help take some policy decisions to offer some subsidized care to this section of the society. The results were derived from 350 women coming to an orthopedic tertiary care center during a 6-month study period with joint pain in any of the big joints and then finally given a definitive diagnosis of OA based on radiological KL score and clinical presentations. **Results:** Women above age 40 years were taken up; mean age in study being 55.94 SD 6.648 (maximum 83, minimum 43). A semi structured questionnaire was used to compare the sociodemographic parameters like type of residence, type of family, attained menopause, occupation, duration of OA, etc., In the sample, which gave multiple responses, right and left knee were maximally inflicted by OA i.e. 59.1% and 57.1% of cases, followed by hip (28.9%) and lower back (26.1%). 75% were offered conservative treatment, only 24.6% were on physiotherapy. **Conclusion:** Menopause, increased age, comorbidities, and preobese were seen to be significantly associated with recommendations of JRS. This can help develop a screening method for women and encourage them to undergo assessment for OA as a targeted intervention and address this growing burden of disease at the earliest.

**Keywords:** Joint replacement surgery, osteoarthritis, women above 40 years

## Introduction

Osteoarthritis (OA) is a chronic degenerative disorder of multifactorial aetiology characterized by the loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis, and range of biochemicaland morphological alterations of the synovial membraneand joint capsule.[1] OA is now one of the most frequent joint disease encountered in the clinical practice in India and Asian populations.[1,2] Several studies have already indicated that the disease is common in women and age related.[1,3,4]

In the current context, of changing lifestyle, diet and hence shifting patterns of disease, wherein the Non communicable diseases are gaining ground than the Communicable diseases, it becomes essential for each community to track its

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susceptibility to these diseases, which cause more morbidity with advancing age.

The most critical part of OA is its compounding on the nonfatal burden[3,5] and the only treatment modality available is total joint replacement therapy, a procedure, which is now available in almost all tertiary care hospitals in the country, but its utility is unexplored by many because of the myth that pain in joints is an acceptable and tolerable problem and especially for women, who continue to live with it as long as possible.

Hence, the study was a part of an internal assessment of women complaining with joint pain, seeking treatment in a tertiary care set up and who are having OA and who are amenable to treatment. The idea was to devise a counseling and awareness program to such women that advanced and affordable therapies are available and also to see the factors that might be attributing to joint replacement therapy in these women.

## Objectives

i. To know the pattern of Osteoarthritis and presenting complaints among women visiting tertiary care in Bhubaneswar
ii. To determine the probable associated factors in the same population for a recommendation of Joint Replacement Surgery.

## Materials and Methods

### Study design

Cross-sectional observational hospital-based study

### Study universe

Women patients attending Orthopaedics Department of KIMS with joint pain from June-Dec 2017. It is a short-term rapid assessment, which was conceived as a prelude to an awareness campaign for women to safeguard against OA.

### Study population and sampling

Consecutive women in the age group of 40 years and above, having joint pain coming to the Ortho OPD clinic either for first time or as a follow up case, within the study period, comprised the sample population. Prevalence of OA in India is reported varying from 15% to as high as 40%.[6,7] The study being limited to women and assuming prevalence at 20% at 95% CI interval with an absolute precision of 5%, the estimated sample size was calculated as 256. Taking a 20% nonresponse rate, the optimal final size was calculated as 307. The final sample interviewed within the study period was 350.

### Inclusion criteria

- 40 and above, coming with joint pain especially in big joints like hip, back and the knees or more than one site
- Not very seriously ill and ambulatory.
- Patient with co-morbid disease like DM, DM, and Hypertension, Hypertension and Hypothyroid. Any other common reported condition would be clubbed as others.
- Willing to participate.

### Exclusion criteria

- Very seriously ill and unambulatory
- Not willing to participate.

**Study period:** From June-Dec 2017. It is a short-term study to ascertain the burden of surgery requirement in the study group and devise a package of pre-surgery counseling and affordable treatment for women as a whole.

**Study Tool:** Pre-designed, pre-tested questionnaire containing

A) Socio demographic, occupation of subject and dietary profile of the respondents
B) history of disease complaints specific to big joints; hx of trauma, drugs, etc.
C) current Signs and symptoms of OA
D) Wear pattern according to Kellgren and Lawrence system and joint stability
E) Joints affected - primarily big joints
F) Weight and BMI
G) Treatment recommendation for Joint Replacement Therapy.

### Operational definition of OA

The modified ACR clinical criteria that includes (i) persistent knee pain, (ii) crepitus on active joint motion, (iii) morning stiffness <30 min. in duration, (iv) age ≥38 years, and (v) bony enlargement of the knee on examination would be used to include the women into the study on the presumption of having OA. OA is considered to be present, if (i-iv) or (i, ii, v) or (i, iv, v) are present.[8,9]

The final diagnosis would be made by the Ortho specialist subject to radiological confirmation wherein Kellgren and Lawrence (KL) system[10] will be used for classifying the severity of knee osteoarthritis (OA) using five grades namely;

Grade 0: No radiographic features of OA are present,
Grade 1: Doubtful joint space narrowing (JSN) and possible osteophytic lipping,
Grade 2: Definite osteophytes and possible JSN on anteroposterior weight-bearing radiograph,
Grade 3: Multiple osteophytes, definite JSN, sclerosis, possible bony deformity,
Grade 4: Large osteophytes, marked JSN, severe sclerosis and definite bony deformity

The approval from ethics committee obtained. Date of approval 27-11-2017. The data were collated after due ethical clearance of the study, by conducting a face to face interview between the subjects, in the language they can understand by the study team, comprising of postgraduate student and interns and the

final data were entered in SPSS version 16 package for detailed analysis. Descriptive statistics were taken for continuous variables like age in years, duration of disease, number of living children, and BMI. A binary logistic goodness of fit regression model was used wherein the dependent variable was recommendation for surgery coded as "no" and "yes". The covariates were selected as increased age, menopause, a comorbid condition, type of family, residence, and BMI from epidemiological studies to determine the significant predictors and odds for getting a surgery recommended.

## Results

A total of 350 women aged 40 and above, abiding by the inclusion and exclusion criteria, after due informed consent participated in the study.

The women attending the tertiary care with any of the joint complaints were of mean age nearly 55 years; the mean age of menopause in this group was 39 years and the duration of complaints were of an average 2.6 years and as high as 9 years and the highest number of living children was 4. The average BMI of the study sample was 25.229 (SD 3.97) which is indicative that the eastern women population is mostly thin built [Table 1].

The sample was predominantly rural and belonged to nuclear family (60.9%), 84% were married, mostly in age group 50–59 years (75.4%), nearly 80% having attained menopause; 68.5% being educated till primary or secondary and 79.7% being housewives. Low socioeconomic status (as per BG Prasad classification) was seen in 42.6% of the women [Table 2].

**Classification Table**

| Observed | | Predicted | | |
|---|---|---|---|---|
| | | recc joint surgery | | Percentage Correct |
| | | no | yes | |
| Recommended | No | 248 | 11 | 95.8 |
| | Yes | 25 | 66 | 72.5 |
| Overall Percentage | | | | 89.7 |

a. The cut value is 0.500

The binary logistic regression model, gave the omnibus test as highly significant (LR chi square value being 135.745; $P = 0.000$), with the Hosmer Lemeshow test showing no significance at $P > 0.05$, proving a goodness of fit model for this sample. Urban residence is protective while belonging to joint family has 2.3 odds of being recommended for surgery (0.015; 2.339 (1.182-4.627)). Attainment of menopause ($P = 0.002$; 7.850 wide CI); advancing age of above 60 years ($P = 0.000$; 13.432, wide CI); being a housewife ($P = 0.026$; 18.470); having hypertension ($P = 0.000$; 0.031, is protective for surgery) and finally being preobese ($P = 0.019$; 3.004); those in middle income age group were 4.7 times prone to be recommended for surgery [Tables 3 and 4]. The final classification table of binary logistic regression shows that no surgery was correctly predicted in 95.8% while 72.5% times surgery was recommended in this study group which is a high percentage and warrants concern.

## Discussion

With a sizeable increase in aging populations in most countries in west, information on the epidemiology of OA comes from population-based radiographic surveys. A study from the Netherlands[11] included 6585 inhabitants done in late 1980s; randomly selected from the population of a Dutch village; 75% of women aged 60-70 years had OA of their DIP joints, and even by 40 years of age 10-20% of subjects had evidence of severe radiographic disease of their hands or feet. Recently, in 2016 an ICMR study done in five cities of India among a sample of nearly

**Table 1: Sociodemographic details of the study participants (*n*=350)**

| Parameter | Mean | SD | Maximum | Minimum |
|---|---|---|---|---|
| Age in years | 55.94 | 6.648 | 83 | 42 |
| Age of menopause (*n*=245) | 39.24 | 19.338 | 51 | 37 |
| Duration OA (years) | 2.60 | 1.217 | 9 | 1 |
| No. of living children | 1.31 | 1.094 | 4 | 0 |
| BMI | 25.22 | 3.97 | 36.40 | 18.73 |

**Table 2: Sociodemographic profile of the women in the study (*n*=350)**

| Parameters | Frequency | Percentage |
|---|---|---|
| residence | | |
| urban | 137 | 31.9 |
| rural | 213 | 60.9 |
| Type of family | | |
| Joint | 137 | 39.1 |
| Nuclear | 213 | 60.9 |
| Marital status | | |
| Married | 294 | 84.0 |
| Unmarried | 26 | 7.4 |
| Divorced | 30 | 8.6 |
| Age category | | |
| 40 to 49 years | 54 | 15.4 |
| 50 to 59 years | 264 | 75.4 |
| 60 to 69 years | 15 | 4.3 |
| 70 years and above | 17 | 4.9 |
| Menopause (age attained) | | |
| Not attained menopause | 68 | 19.4 |
| <50 years | 182 | 52.0 |
| >50 years | 100 | 28.6 |
| Education | | |
| illiterate | 30 | 8.6 |
| primary | 115 | 32.9 |
| secondary | 125 | 35.7 |
| degree and higher | 80 | 22.9 |
| Occupation | | |
| Agriculture | 22 | 6.3 |
| labourer | 28 | 8.0 |
| Housewife | 279 | 79.7 |
| Others (Government and Private jobs) | 21 | 6.0 |
| Per capita income | | |
| Low (<949) | 149 | 42.6 |
| middle (949 to 6260) | 107 | 30.6 |
| high | 94 | 26.9 |

**Table 3: OA as seen in the sample of women, *n*=350**

| Dynamics of OA | Frequency (%) | Dynamics of OA | Frequency (%) |
|---|---|---|---|
| Duration of OA (in years) | | Comorbid condition | |
| 1-2 years | 177 (46.6) | None | 173 (49.4) |
| 3-4 years | 182 (52) | DM | **71 (20.3)** |
| >4 yrs | 5 (1.4) | HTN | 37 (10.6) |
| Joints affected | | Hypothyroid | 17 (4.9) |
| Hip joint affected | 101 (28.9) | HTN and DM | **52 (14.9)** |
| Left knee affected | **200 (57.1)** | | |
| Right knee affected | **207 (59.1)** | Those on conservative treatment | 263 (75.1) |
| Lower Back | 92 (26.3) | No sustained relief from pain | 174 (49.7) |
| On Physiotherapy | 86 (24.6) | Recommended Joint surgery | **091 (26)** |

**Table 4: Factors associated with Joint surgery in sample**

| Factors | Surgery recommendations | | *P* | OR; 95% CI interval |
|---|---|---|---|---|
| | No | Yes | | |
| Residence | | | | |
| Rural | 165 (77.1%) | 49 (22.9%) | | |
| Urban | 94 (69.1%) | 42 (30.9%) | 0.826 | 0.929 (.482-1.791) |
| Type of family | | | | |
| Nuclear | 164 (77.4%) | 48 (22.6%) | | |
| Joint | 95 (68.8%) | 43 (31.2%) | **0.015** | **2.339 (1.182-4.627)** |
| Menopause | | | | |
| No | 63 (92.6%) | 5 (7.4%) | | |
| Yes | 196 (69.5%) | 86 (30.5%) | **0.002** | **7.850 (2.076-29.682)** |
| Age of women (in years) | | | | |
| 40-59 years | 251 (77.7%) | 72 (22.3%) | | |
| Above 60 years | 8 (29.6%) | 19 (70.4%) | **0.0.000** | 13.428 (4.293 to 42.001) |
| Occupation | | | | |
| Agriculture & labourer | 37 | 13 | | |
| Housewife | 202 (72.4%) | 77 (27.6%) | **0.026** | 18.470 (1.411-241.821) |
| Working person | 20 (95.2%) | 1 (4.8%) | | |
| Comorbid condition | | | | |
| No condition | 130 (75.1%) | 43 (24.9%) | 0.042 | |
| DM | 14 (37.8%) | 23 (62.2%) | 0.398 | 1.871 (0.438 to 7.983) |
| HTN | 62 (87.3) | 09 (12.7%) | 0.000 | 0.031 (0.007 to 0.133) |
| Both HTN & DM | 39 (75%) | 13 (25%) | | |
| Hypothyroid | 14 (82.4%) | 3 (17.6%) | | |
| BMI | | | | |
| normal | 140 (76.5%) | 43 (23.5%) | 0.01 | |
| Pre obese | 88 (77.5%) | 25 (22.5%) | 0.019 | 8.741 (2.195 to 17.545) |
| Obesity and above | 33 (58.9%) | 23 (41.1%) | | |
| Per capita monthly income | | | | |
| Low | 121 (81.2%) | 28 (18.8%) | | |
| Middle | 56 (52.3%) | 51 (47.7%) | **0.000** | **4.375 (2.145-8.923)** |
| High | 82 (87.2%) | 12 (12.8%) | | |

5000 individuals, which was a population based study taking up one individual from a household as per the last birthday method; wherein only OA knee was considered and thus the prevalence was low i.e. 28.7%, wherein females prevalence was noted as 31.6%.[6] In our study, this was women with self-reporting pain in any big joint, OA right and left knee both were around 59%. Akin to this study, OA was seen in higher age group, >60 years and in women who have attained menopause. In this study, due to financial limitations we could not assess the women for their hormonal imbalances or the level of osteoporosis, which are other common attributing causes for the disease. Our model shows protective effect for women urbanites (0.929 with 95% CI 0.482-1.791; *P* = 0.826), while COPCORD study showed a higher prevalence in urban as compared to the rural prevalence of OA in Bangladesh, and a study in China, rural prevalence was higher.[12-15]

Studies from Chinese, Japanese and Korean populations in 2016 and 2017[16-18] have reiterated the increasing incidence of OA in women folk and expressed concern over the more

severe and painful OA in them, demanding research and timely treatment interventions. The rising concern is also the use of opoid analegics for pain,[19] which reduced quality-adjusted life expectancy and increased costs. In all these studies the OA incidence was associated with rural and low socio-economic conditions, thus increasing the economic burden of this disease.

Given the vast Indian population and our poor resource settings, we may see in coming years, a huge burden of this disease and our women who as seen in this study, are showing increased susceptibility to OA, may need fast and cost-effective treatment options. Prompt primary care and screening of the risk population like pre obese women with early menopause and from rural background, may defer the disease by few years. Choice of surgery for women is always a last option for Indian women, so we have to create a rising awareness and safe and easy availability of this need in our secondary and tertiary care settings.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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