

Frequency of factors associated with knee osteoarthritis

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Abstract

Objective: To determine the frequency of factors associated with knee osteoarthritis.

Method: A cross sectional study was conducted in the department of medicine at Liaquat National Hospital Karachi from September 2007- March 2008 on patients diagnosed with osteoarthritis of knee. One hundred patients of age more than 18 years, and of either gender were consecutively included. Those patients with family history, occupations like farmers, mill workers and jack hammer operators, females with hormonal replacement therapy, patients with hyperparathyroidism, haemochromatosis and systemic lupus erythematosus were excluded. The patients were then graded on the basis of knee joint X-ray findings into four grades. The main outcome variables of the study were factors associated with osteoarthritis which included obesity, age, gender, smoking and anaemia.

Results: The mean age was 56.28 ±8.786 years. The mean BMI was 29.434 ±7.849 years and mean Haemoglobin was 11.77±1.670 mg/dl. The frequency of factors associated with osteoarthritis was age ≥ 55 years in 60 (60%) patients. Gender included 74 (74%) females and 26 (26%) males. Smokers were 25 (25%), obesity was present in 33 (33%) and anaemia was present in 7 (50%) women and 16 (61.5%) males.

Conclusion: The study found that females of age greater than 55 years mostly noted to visit a tertiary care hospital due to knee osteoarthritis.

Keywords: Knee osteoarthritis, Obesity, Old age, Females. (JPMA 61:786; 2011).

Introduction

Osteoarthritis is a common chronic disease that leads to joint symptoms and signs which are associated with defective integrity of articular cartilage, related changes in the underlying bones, joint margins and pain.^{1,2} The development of osteoarthritis is dependent on age, sex, genetic predisposition and previous trauma to the joint and abnormal mechanical forces caused primarily by obesity. Biochemically, there is an imbalance in the enzyme of cartilage degradation and cartilage regeneration that is involved in pathogenesis of osteoarthritis.³

Osteoarthritis of the knee and non-specific low back pain (NSLBP) are among the most common rheumatic disorders in the Asia-Pacific region. Studies have shown the

prevalence of knee osteoarthritis (KOA) to be 7.50%, 10.9% and 13.6% in China.⁴ In India and Bangladesh it is reported to be 5.78% and 10.20% respectively.^{5,6} A study in Pakistan has shown that 28.00% of the urban and 25.00% of the rural population have knee osteoarthritis (KOA).⁷

Osteoarthritis of the knee is very common in the elderly and is a major contributor of pain.⁸ Besides pain it is also associated with decreasing physical activity, and may lead to limitation of one's independence and affect health related quality of life.⁹ Several studies have found that increasing age and Body Mass Index (BMI) have positive correlation with the development of knee osteoarthritis.⁸

A study conducted in China found that geography, age, sex, and BMI may be associated with KOA, but climbing

stairs, time length of occupation service, education level, smoking history and religious belief are not correlated with KOA.¹⁰ Study conducted by Sudo reported that high BMI, female sex, older age, and high BMD were significantly associated with an increased risk for radiographic knee osteoarthritis.¹¹ Another study conducted in Germany on 1250 consecutive primary care patients has shown that factors associated with OA were physical limitation of lower limb, social network, BMI and duration of disease.¹² Study conducted by Ouedraogao showed that the most common associated risk factors for development of osteoarthritis of the knee were obesity (42.4%), menopause in women (66.7%), history of OA (43.2%), and previous knee injury (19.5%).¹³

Study by Al Afraj in 2003 found an association between knee OA, generalized OA and the serum uric acid [AOR 2.03].¹⁴ Study by Sun et al also suggested a possible role of elevated serum uric acid in the multifactorial etiology of generalized OA.¹⁵ However, the study by Bagge,¹⁶ and Hart¹⁷ found that serum uric acid levels do not vary at different categories of knee osteoarthritis.

Although ample studies have been conducted on knee osteoarthritis worldwide, but scanty data is available in Pakistan. The extensive literature search did not show any local study exploring frequency of factors associated with knee osteoarthritis. The results of this study would definitely make a foreground for future studies to be conducted on developing preventive strategies and ultimately reducing the morbidities and mortalities associated with knee osteoarthritis.

Patients and Methods

This cross sectional study was conducted in Liaquat National Hospital department of medicine from September 2007- March 2008. This is a tertiary care center, located in the centre of Karachi. The study was limited to urban population only and not to Pakistan in general. The ethical approval was obtained from the ethical committee of Liaquat National Hospital. Similarly, informed consent was obtained from the participants or attendants before including patients in the current study project. All patients age > 18 years, either gender, diagnosed as osteoarthritis of knee on knee X-ray, giving informed consent were consecutively included. Patients with a family history, farmers, mill workers, jack-hammer operators, females with hormonal replacement therapy, hyperparathyroidism, haemochromatosis and Systemic Lupus Erythematosus (SLE) were excluded. The sample size of the study was 100 patients.

The justification of selection of age > 18 years was, because, OA is common in adults as shown by the data collected by Summary Health Statistics for US Adults, 2002 (NCHS, CDC).¹⁸ The prevalence of institutionalized adult

patients with arthritic symptoms in US was 20.8%. As our study was based on adults we preferred to include all age groups of adults (above 18 years of age). Further factors such as age and smoking are common in this age group.

Review of literature, showed that, factors such as smoking cigars, cigarillas and pipes did not have a strong association with OA as compared to factors such as tobacco cigarettes, age, gender and BMI.

Hence, for our sample size to have sufficient statistical power, osteoarthritis factor's such as smoking cigars, cigarettes and pipes were excluded and diagnosis was based on the clinical and radiological criteria,¹ as knee pain for most days of prior month, osteophytes at joint margins on X-ray, synovial fluid typical of osteoarthritis (laboratory), age > 40 years, morning stiffness about 30 minutes and crepitus on active joint motion.

Osteoarthritis was considered if items 1, 2 or 1, 3, 5, 6 or 1, 4, 5, 6 were present.

OA was graded on the basis of X ray findings.³ Grade 1 included doubtful narrowing of joint space and possible osteophytic lipping. Grade 2 included definite osteophytes and possible narrowing of joint space. Grade 3 included moderate multiple osteophytes, definite narrowing of joint space, and some sclerosis and possible deformity of bone ends. Grade 4 was large osteophytes, marked narrowing of joint space, severe sclerosis, and definite deformity of bone ends.

The main outcome variables were factors associated with osteoarthritis that include obesity, age, gender, smoking and anaemia. Obesity was labeled when BMI (Body Mass Index) ≥ 30 , whereas overweight was labeled with BMI between 25-29. Patient's age was stratified into <45, 45-50, 51-55, 56-60, 61-65, 66-70, >70 years. Smoking was defined as the active smoking of one or more manufactured or hand rolled tobacco cigarettes (or parts there-of) per day. This did not include the smoking of tobacco in cigars, pipes and cigarillos. Anaemia was labeled as Haemoglobin level < 13mg/dl in males and <12 mg/dl in females. All the eligible patients were then interviewed by principal investigator and performa was filled for variables such as age, gender, height, weight, BMI, diabetes mellitus (DM), hypertension (HTN), dyslipidaemia, ischaemic heart disease (IHD), smoking, grades of osteoarthritis and anaemia.

Data was entered and analyzed in SPSS version 14. Mean and standard deviations were reported for continuous variables like age, height, weight, BMI and anaemia. Categorical variables like gender, obesity, diabetes mellitus (DM), hypertension (HTN), ischaemic heart disease (IHD), dyslipidaemia and clinical and radiological criteria and severity of osteoarthritis were reported in percentages and proportions.

Results

The mean age of the sample was 56.28 ± 8.786 years with range of 43-75 years. The patients were stratified into different age groups (Table-1). The mean body weight was 70.30 ± 13.341 Kg, mean BMI was 29.434 ± 7.849 , mean Hb was 11.77 ± 1.670 g/dl, other patient characteristics are shown in Table-2. The co morbidities in the sample included 64(64%) hypertensive, 43(43%) diabetic, 27 (27%) dyslipidaemic and

distribution of six different clinical and radiological criteria's present. The results also showed grades of osteoarthritis with three (3%) patients with grade 1, sixteen (16%) with grade 2, thirty three (33%) with grade 3 and forty eight (48%) were found to be of grade 4.

Discussion

The most frequent co-morbidities in our sample were

Table-1: Characteristics of patients with OA (Osteoarthritis).

Variables	n	Minimum	Maximum	Mean	Std. Deviation
Age	100	43	75	56.28	8.786
Weight (kg)	100	45	94	70.30	13.341
Height (cm)	100	1.23	1.99	1.5591	.13132
BMI	100	19.5	58.2	29.434	7.8497
HB (g/dl)	100	8	15	11.77	1.670
TLC	100	3	18	7.60	3.191
PLT	100	135	405	246.37	71.423
RBS	100	80	261	143.10	43.611
CHOL (mg/dl)	100	90	240	148.29	42.902
TG (mg/dl)	100	70	170	109.04	22.574
LDL(mg/dl)	100	40	170	113.50	24.869
HDL(mg/dl)	100	30	60	41.14	8.799

Table-2: Clinical Radiological criteria (CRC) of patients with OA (Osteoarthritis).

Variable	Frequency (Yes)	(%)
CRC1	100	100
CRC2	100	100
CRC3	74	74
CRC4	94	94
CRC5	69	69
CRC6	91	91

Table-3: Age distribution of patients with Osteoarthritis.

Age (Years)	Frequency	Percent
<= 43	6	6.0
44 - 48	10	10.0
49 - 54	24	24.0
55 - 59	28	28.0
60 - 64	18	18.0
71+	14	14.0
Total	100	100.0

38 (38%) with ischaemic heart disease.

The results showed the factors associated with osteoarthritis were: old age ≥ 55 years in 60 (60%) patients, gender which includes 74 (74%) females and 26 (26%) males and 25 (25%) were smokers. Among which 18 were males and 8 were females. In addition, around 39 (39%) participants were overweight among which 9 were males and 30 were females. Some 37 (50%) women and 16 (61.5%) males were anaemic. Table-3 show the frequency and percentage

64(64%) HTN, 43(43%) DM, 27 (27%) dyslipidaemia, 38 (38%) IHD and 33 (33%) obese patients. The study by Cimmino in 2005 also showed that co-morbidities associated with knee osteoarthritis were hypertension in (53%), obesity (22%), osteoporosis (21%), type II diabetes mellitus (15%), and chronic obstructive pulmonary disease (13%).¹⁹

Obesity, gender, leisure time behaviour, genetic disposition, metabolic syndrome, smoking behaviour and regular practice of extreme sports were found to be associated with KOA.¹⁰⁻¹² Other, studies have also shown that smoking seems to increase the risk of osteoarthritis.²⁰⁻²² However, the mechanism remains unexplored. Similarly, our study also revealed that obesity, gender, smoking and old age were associated with KOA.

Our study shows that Osteoarthritis was more common in females than males, as 74 out of 100 patients were female (74%) and 26 patients were male (26%). This difference may be explained by the lack of physical activity, mobility, social issues especially in our region and higher prevalence of obesity among women in general, which is consistent with the data from other studies.²³ The study by Abdurhuman S et al in Saudi Arabia found strong association between excess weight and knee Osteoarthritis in females (AOR 3.28, 95% CI 2.07-5.36) than the males (AOR 1.88, 95% CI, 1.24-2.92).²³ The prevalence of osteoarthritis in our sample was more common in the age group 55-59 years (28%) and then decreased. However, study in China has showed that KOA increases with age, from 1.3% in the 40-

49-year-old age group to 13.2% in the 70 plus age group.²⁴ This difference may be due to socio demographic differences between the two settings.

The main limitation of the study was that our sample was selected from patients visiting tertiary care centers. Thus it can only represent the severe cases of knee osteoarthritis seeking either treatment or follow up and not to mild ones. Second, the study design selected was unable to comment on the biologic plausibility and temporal relationship. However, our objective was only to determine the current frequency of associated factors. Moreover, the strict selection criteria and use of consecutive sampling, best among the non probability ones overcame most of the limitations of our study. The other limitation of our study was that the results of a single center study could not be generalizable to the other tertiary care centers of Pakistan. For this we need to have a large multicenter trial with large sample size, however, due to unavailability of resources we were unable to perform it.

Conclusions

The study found that females of age greater than 55 years visit tertiary care hospitals due to knee osteoarthritis. Factors like smoking, obesity and anaemia were also associated but are less prevalent in the population studied.

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