

Risk factors of osteoarthritis of knee among elderly persons

Shyam Ganvir^{1*}, B R Zambare²

{¹Dean/Principal, Department of Physiotherapy} {Professor and HOD, Department of Anatomy} Padmashri Dr Vitthalrao Vikhe Patil Foundation's Medical College and Hospital, Near Government Milk Dairy, Post MIDC, Vilad Ghat, Ahmednagar, Maharashtra, INDIA.

Email: shyam.ganvir@gmail.com

Abstract

Introduction: OA is often referred to as “wear and tear” of the joint and all sites for OA show a tendency for increased prevalence of the disease with age. Although it is more common in older people, it is not really accurate to say that the joints are just “wearing out.” **Aims and objectives:** To determine the Risk factors associated with Osteoarthritis knee and also to determine various signs in knee joint in patients with Osteoarthritis knee. **Material and Methods:** A longitudinal study undertaken to determine prevalence of osteoarthritis in the elderly patients. Sample size was calculated based on the Frahigham study, the prevalence of osteoarthritis was taken as 20% among elderly population. Sample size was estimated at 5% level of significance with an allowable error of 20%. Hence 400 elderly patients attending the OPD were included in the study population. **Results:** The overall prevalence of OA was found to be 21.50% in the population. The distribution of patients according to signs showed, crepitus was elicited in the right knee in 75 (18.75%) patients and in the left knee in 73 (18.25%) patients. Radiographic prevalence of osteoarthritis according to **K-L grades** showed that the overall prevalence of OA was found to be 32.25% in the population studied. The age specific prevalence was found to be highest in the age group 80 and above (58.82%). The risk of knee OA was significantly greater in patients with age ≥ 60 years and was not statistically significantly significant in females. Whereas the risk of knee OA was significantly greater in patients with BMI ≥ 25 . **Conclusion:** The risk of knee osteoarthritis was significantly greater in patients with age ≥ 60 years and in patients with BMI ≥ 25 . The risk of knee osteoarthritis was not statistically significantly in females, education and occupation.

Keywords: Risk factor, age, BMI, Osteoarthritis, knee, Elderly patients.

*Address for Correspondence:

Dr. Shyam Ganvir, Department of Physiotherapy, Padmashri Dr Vitthalrao Vikhe Patil Foundation's Medical College and Hospital, Near Government Milk Dairy, Post MIDC, Vilad Ghat, Ahmednagar, Maharashtra, INDIA.

Email: shyam.ganvir@gmail.com

Received Date: 19/07/2015 Revised Date: 22/08/2015 Accepted Date: 12/09/2015

Access this article online

Quick Response Code:



Website:

www.statperson.com

DOI: 14 September
2015

INTRODUCTION

Osteoarthritis refers to a clinical syndrome of joint pain accompanied by varying degrees of functional limitation and reduced quality of life. It is by far the most common form of arthritis and one of the leading causes of pain and disability worldwide. Any synovial joint can develop OA but knees, hips and small hand joints are the peripheral sites most commonly affected. ¹ OA is often referred to as

“wear and tear” of the joint and all sites for OA show a tendency for increased prevalence of the disease with age.² OA is a disease of the entire joint, involving the cartilage, joint lining, ligaments, and bone. Although it is more common in older people, it is not really accurate to say that the joints are just “wearing out.”³ A variety of traumas may trigger the need for a joint to repair itself. Osteoarthritis includes a slow but efficient repair process that often compensates for the initial trauma, resulting in a structurally altered but symptom-free joint. In some people, because of either overwhelming trauma or compromised repair, the process cannot compensate, resulting in eventual presentation with symptomatic osteoarthritis; this might be thought of as ‘joint failure’.⁴ Knee osteoarthritis is also a leading cause of chronic disability. Because the prevalence of knee osteoarthritis is expected to increase substantially with the aging of the baby boomers, it is important to understand the factors associated with KOA that may contribute to disability. Stiffness is a common complaint in individuals with

osteoarthritis. It is 1 of 6 criteria used in the clinical diagnosis of knee osteoarthritis and may contribute to the disability associated with knee osteoarthritis. The most common method of assessing this variable is through the self-report tool, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).⁵ The United States Centre of Disease Control (CDC) estimates that OA affects 13.9% of adults aged 25 and older, and 33.6% of those aged 65 and older. This means that, for the United States, 26.9 million people are estimated to suffer from OA.⁶ Injuries to joints sustained earlier in life can also increase the future risk of OA as they can result in initiation sites. A knee injury even as a child or young adult has been shown to significantly increase knee OA incidence in later life by around 8%.⁷ Obesity, measured using body-mass index (BMI), has previously been linked to OA prevalence.⁸ The Framingham study⁹ found that men whose jobs had medium or higher physical activity demands (e.g. labourers) has a higher risk of knee OA. Sports and other recreational activities have also been linked to OA incidence for the same reasons. Some sports may involve repetitive excessive loading of the joints and this can allow OA to initiate.¹⁰

AIMS AND OBJECTIVES

1. To determine the Risk factors associated with Osteoarthritis knee.
2. To determine various signs in knee joint in patients with Osteoarthritis knee.

MATERIAL AND METHOD

Study Design

The present study was a longitudinal study undertaken to determine prevalence of osteoarthritis and association between contributing risk factors and knee osteoarthritis in the elderly patients.

Study Period: The study period was 24 months.

Study Population: The study population were elderly patients attending the OPD.

Sample Size Estimation

Sample size was calculated with the following assumptions. Based on the Frahigham study, the prevalence of osteoarthritis was taken as 20% among elderly population. Sample size was estimated at 5% level of significance with an allowable error of 20%. Hence 400 elderly patients attending the OPD were included in the study population.

Inclusion Criteria

1. Patients with age >40 years.
2. Patients ready to participate in the study.

Exclusion Criteria

1. Patients with terminal illness, psychiatric illness, deceased and severe dementia.

2. Patients with hemiparasis, knee amputation in either lower limb.
3. Patients on medications for osteoarthritis.
4. Patients who could not be contacted for follow up.

Data collection

- The selected patients were visited and the questionnaire was administered after a written informed consent was obtained from the participants.
- The questionnaire consisted of two parts. The first part included socio-demographic details such as type of family, marital status, religion, education, socio-economic status (according to the standard of living index and BG Prasad's classification), and per capita income.
- The second part consisted of the possible risk factors for developing OA of the knee such as age, gender, occupation, history of injury to the knee, climbing stairs regularly, and a family history of OA. It included the tool used to diagnose OA namely the ACR criteria. The questionnaire was validated by translation into the local language and reviewed by a group of experts. It was subsequently piloted among a small group of individuals to test their comprehension and suitable changes were made accordingly

Data Analysis

For the purpose of analysis, few variables were made into two groups. For age association total number of patients was grouped as <60 and >60. This was done to see if there was any effect of age in elderly patients above 60 years. For education association with osteoarthritis total number of patients was grouped as primary and below and above primary. For association between occupation and osteoarthritis total number of patients was grouped as manual and non manual workers.

Statistical tests applied: Percentages, mean and Chi-square test was done with the help of SPSS (version 17) for windows

RESULTS

Table 1: Age-specific prevalence of osteoarthritis according to ACR criteria

Age group	No. of Patients	No. of Patients with OA	Prevalence of OA
41-50	33	03	09.09%
51-60	123	22	17.89%
61-70	178	43	24.16%
71-80	47	13	27.66%
>80	17	05	29.41%
Total	400	86	21.50%

The above table showed prevalence of osteoarthritis according to the modified ACR criteria. The overall prevalence of OA was found to be 21.50% in the population studied. The age specific prevalence was found to be highest in the age group 80 and above (29.41%) while, the age specific prevalence was lowest in the age group 41-50 years (9.09%).

Table 2: Distribution of Patients according to Signs in knee joint

Signs	Right knee joint (n=400)	Left knee joint (n=400)
Crepitus	75 (18.75)	73 (18.25)
Bony enlargement	34 (8.50)	40 (10.00)
Limited movement	15 (3.75)	15 (3.75)
Effusion	07 (1.75)	15 (3.75)
Joint laxity	03 (0.75)	06 (1.50)
Periarticular tenderness	22 (5.50)	11 (2.75)
Patello-femoral tenderness	08 (2.00)	07 (1.75)
Palpable warmth	08 (2.00)	03 (0.75)

The distribution of patients according to signs showed, crepitus was elicited in the right knee in 75 (18.75%) patients and in the left knee in 73 (18.25%) patients. The bony enlargement was observed in 40 (10%) left knee joint. The joint laxity, effusion etc. was also observed among 15 (3.75%) and 6 (1.5%) left knee joint. Deformities such as genu valgus and genu varus and fixed flexion deformity were not encountered.

Table 3: Age wise prevalence of osteoarthritis according to radiographic assessment (K-L grades)

Age group	Osteoarthritis by K-L grades		
	No. of Patients	No. of Patients with OA	Prevalence (%)
41-50	33	06	18.18%
51-60	123	27	21.95%
61-70	178	67	37.64%
71-80	47	19	40.42%
>80	17	10	58.82%
Total	400	129	32.25%

The above table showed radiographic prevalence of osteoarthritis according to K-L grades. The overall prevalence of OA was found to be 32.25% in the population studied. The age specific prevalence was found to be highest in the age group 80 and above (58.82%) while, the age specific prevalence was lowest in the age group 41-50 years (18.18%).

Table 4: Association of age with osteoarthritis of the knee

Age	Patients with OA (%)	P value	OR(CI)
≥60 (n=156)	60 (38.46)	<0.001*	5.24 (3.11 to 8.81)
<60 (n=244)	26 (10.65)		
Total (n=400)	86 (21.50)		

(P<0.05; statistically significant)

The above table showed the association between age and osteoarthritis. The risk of knee OA was significantly greater in patients with age ≥ 60 years. (OR=5.24; p<0.001)

Table 5: Association of sex with osteoarthritis of the knee

Sex	Patients with OA (%)	P value	OR(CI)
Female (n=230)	51 (22.17)	0.71*	1.09 (0.67 to 1.78)
Male (n=170)	35 (20.58)		
Total (n=400)	86 (21.50)		

(* P> 0.05 statistically not significant)

The above table showed the association between sex and osteoarthritis. The risk of knee OA was not statistically significantly significant in females. (OR=1.09; p=0.71)

Table 6: Association of Education with osteoarthritis of the knee

Education	Patients with OA (%)	P value	OR(CI)
Primary and Below (n=230)	56 (24.35)	0.19*	1.37 (0.84 to 2.24)
Above Primary (n=170)	30 (17.64)		
Total (400)	86 (21.50)		

(* P> 0.05; statistically not significant)

The above table showed the association between education and osteoarthritis. The risk of knee OA was not statistically significant among literate and illiterate. (OR=1.37; p=0.19)

Table 7: Association of Occupation with osteoarthritis of the knee

Occupation	Patients with OA (%)	P value	OR(CI)
Manual (n=352)	75 (21.30)	0.19*	0.92 (0.47 to 1.87)
Non manual (n=48)	11 (22.92)		
Total (n=400)	86 (21.50)		

(* P> 0.05 statistically not significant)

The above table showed the association between occupation and osteoarthritis. The risk of knee OA was not statistically significant among manual and non manual workers. (OR=0.92; p=0.19)

Table 8: Association of BMI with osteoarthritis of the knee

BMI	Patients with OA (%)	P value	OR(CI)
≥25 (n=151)	61 (40.40)	<0.0001*	4.89 (2.94 to 8.15)
<25 (n=249)	25 (10.04)		
Total (n=400)	86 (21.50)		

(P<0.05 Statistically significant)

The above table showed the association between BMI and osteoarthritis. The risk of knee OA was significantly greater in patients with BMI ≥ 25. (OR=4.89; p<0.0001)

DISCUSSION

The present prospective study was undertaken to determine the association between contributing risk factors, and knee osteoarthritis in the community dwelling elderly patients. The overall prevalence of OA was found to be 21.50% in the population. The age specific prevalence was found to be highest in the age group 80 and above (29.41%) while, the age specific prevalence was lowest in the age group 41-50 years (9.09%). The distribution of patients according to signs showed, crepitus was elicited in the right knee in 75 (18.75%) patients and in the left knee in 73 (18.25%) patients. The bony enlargement was observed in 40 (10%) left knee joint. The joint laxity, effusion etc. was also observed among 15 (3.75%) and 6 (1.5%) left knee joint. Deformities such as genu valgus and genu varus and fixed flexion deformity were not encountered. Radiographic prevalence of osteoarthritis according to K-L grades showed that the overall prevalence of OA was found to be 32.25% in the population studied. The age specific prevalence was found to be highest in the age group 80 and above (58.82%) while, the age specific prevalence was lowest in the age group 41-50 years (18.18%). The risk of knee OA was significantly greater in patients with age ≥ 60 years and was not statistically significant in females. The risk of knee OA was not statistically significant among literate and illiterate whereas the risk of knee OA was significantly greater in patients with BMI ≥ 25 . A study done by Felson DT *et al*¹¹ who conducted a study to determine the longitudinal risk factors for knee OA in an elderly population. Out of 598 patients without knee OA at baseline the mean age was 70.5 years. In study by Abraham AM *et al*¹² to measure the prevalence of features of osteoarthritis (OA), in the dominant hand, knees and hips using ultrasound the participants were aged 61-63 years with mean of 62 years. The finding was in relevance of our study. The mean age among elderly suggest that the life expectancy of the people had increase now a day hence there was increase in mean age among the participants. Similar findings were observed by Nisha Elizabeth Ajit *et al*¹³ in the study to measure the prevalence of knee osteoarthritis among adults in a rural area. Crepitus was elicited in the right knee in 75 (21.9%) subjects and in the left knee in 73 (21.3%) subjects. Deformities such as genu valgus and genu varus and fixed flexion deformity were not encountered. The study by Turkiewicz A *et al*¹⁴ estimated the prevalence of frequent knee pain in radiographic, symptomatic and clinically defined knee OA in middle-aged and elderly patients. The prevalence of symptomatic or clinically defined knee OA was 15.4%. In the study by French HP *et al*¹⁵ to investigate the prevalence of osteoarthritis (OA) in a population aged ≥ 50 years in Ireland found the overall

prevalence of OA was 12.9% (women-17.3%; men-9.4%). The findings of Cho HJ *et al*¹⁶ in a study to determine the prevalence and risk factors of radiographic OA in the spine, shoulder, hand, hip, and knee in Koreans older than age 65 years found the female sex was associated with knee OA. Holbrook TL *et al*¹⁷ in the study found the age-adjusted prevalence rate of self-reported arthritis was higher in women than men for osteoarthritis. The findings of our study were similar to Sudo A *et al*¹⁸ study to examine the prevalence and risk factors for knee osteoarthritis in elderly Japanese men and women. The prevalence of definite radiographic knee osteoarthritis was 30.0% overall: 17.7% in men and 36.5% in women. The study by Turkiewicz A *et al*¹⁴ estimated the prevalence of frequent knee pain in radiographic, symptomatic and clinically defined knee OA in middle-aged and elderly patients. The prevalence of radiographic knee OA was 25.4%. The findings of the present study where in contrast with study Nisha Elizabeth Ajit *et al*¹³ where they found significant association between education and osteoarthritis. Nisha Elizabeth Ajit *et al*¹³ found no association between knee OA and body mass index. This was in contradiction to our study. In other study, by Zhang Y *et al*¹⁹ found a significant association between occupation and osteoarthritis and also found a significant association between BMI and osteoarthritis. The obese patients were at high risk of developing osteoarthritis than normal or underweight persons.

CONCLUSION

The risk of knee osteoarthritis was significantly greater in patients with age ≥ 60 years and in patients with BMI ≥ 25 . The risk of knee osteoarthritis was not statistically significant in females, education and occupation.

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Source of Support: None Declared
Conflict of Interest: None Declared