

Knee Osteoarthritis among patients attending a Rheumatology Clinic

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Abstract

Background: Osteoarthritis (OA) is the most common joint disorder in the world. It is a multifactorial disease associated with pain, loss of function, and disability. Weight bearing joints like knee and hip are more commonly affected.

Objective: To describe the pattern of OA in a population of rheumatology clinic attendees.

Methods: The study was prospectively carried out over three years (January 2011- December 2013) in a Nigerian teaching hospital. Patients who met both the clinical and radiological diagnosis of OA were included in the study.

Results: A total of 136 patients were studied. Females constituted 64.7% while men formed 35.3% of the study population. The age ranged between 40 and 84 years with the mean age of 63 years (SD ± 7.91). People aged between 61 and 70 years were predominantly affected. Some of the factors identified among the patients with OA included advanced age (58.1%), obesity (17.6%), sport injuries (8.1%), joint hypermobility (7.4%) and professional dancing (2.9%).

Conclusion: Recognition and modification of the factors which may affect the weight bearing joints may reduce the risk of OA and prevent subsequent morbidities.

Key words: Knee joint, Obesity, Osteoarthritis, Rheumatic diseases

Introduction

Osteoarthritis (OA) is a common disease and a leading cause of disability among the elderly but it may affect all ages.^[1]

The aetiology of OA is multifactorial. Common attributable risk factors for OA of the knee include age, sex, weight and trauma to the joint due to repetitive movements, in particular, squatting and kneeling.^[2] These risk factors may occur singly or in combination.^[2]

OA is characterized clinically by joint pain, tenderness, limitation of movement, crepitus and occasional joint stiffness.^[3] It is a major cause of

mobility impairment, particularly among females, with profound effect on both physical and psychological functions of the affected individuals.^[4]

Knee OA is more important not only for its high prevalence rate compared with other types of OA but also for its presentation in earlier age groups particularly in younger age group of obese women. The incidence of OA increases with age and Body Mass Index (BMI).^[5] Obesity is associated with the onset and progression of osteoarthritis, thus weight modification represents an important preventive strategy.^[5]

This study aimed to describe the pattern of OA of the knee in a population of rheumatology clinic attendees.

Methods

A descriptive cross-sectional study was carried out over three years (January 2011- December 2103) among patients attending the Out-Patient

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Rheumatology Clinic of Olabisi Onabanjo University Teaching Hospital, Sagamu, southwest Nigeria. Included in the study were all males and females presenting with first time diagnosis of osteoarthritis (OA) made by the Rheumatologist. The other criteria included symptoms of pain in the knee joint with or without disability and with clinical and radiological diagnosis of knee OA. Excluded from the study were patients with systemic inflammatory disorders and patients with inconclusive radiological findings.

The socio-demographic characteristics of the patients, detailed medical history including the occupational history as well as detailed physical examination was carried out to exclude systemic inflammatory disorders. Plain radiographs of the knees were requested and the findings were interpreted by the Radiologist. Laboratory investigations including the markers of inflammation, erythrocyte sedimentation rate and others were requested where required to exclude inflammatory arthropathies.

The subjects were commenced on simple analgesics alongside non-steroidal anti-inflammatory drugs (NSAID) whilst intra-articular steroid was administered to subjects who did not make good clinical response with the oral agents.

Case definition

Osteoarthritis of the knee was defined using the American College of Rheumatology (ACR) criteria. An individual was labelled as having knee pains suggestive of OA in the presence of affirmative response to (a) "have you had pain on either knee for most of the time in the previous month"? in addition to four or more of the following criteria: (a) age over 50 years (b) morning stiffness shorter than 30 minutes (c) knee crepitus on active joint motion (d) pain when exerting pressure at the bony margins of the joint (e) bony joint enlargement and (f) absence of clear signs of inflammation.

Radiological definition

Radiological knee OA was defined as the presence of osteophytes with any other radiological features of (a) narrow joint space (b) sub-chondral cyst and (c) sub-chondral sclerosis.

Body Mass Index (BMI)

BMI was derived from the weight in kilogram divided by height in meter squared ($Wt (kg)/Ht (m^2)$). Using the BMI, the subjects were classified as

normal (BMI 18.5-24.9 kg/m^2), overweight (25.0-29.9 kg/m^2) or obese (BMI $> 30kg/m^2$).

Results

A total of 136 subjects were included in the study. There were 88 (64.7%) females and 48 (35.3%) males. The female to male ratio was 1.8:1. The age range of the subjects was 40 - 84 years with the mean of 63 (SD 7.9) years. Subjects in the age range of 61-70 years were predominantly affected (32.4%). Females were more frequently affected than males (63.3% Vs 36.4%). Subjects aged 40 years to 50 years were the least affected. Table I shows the age and gender distribution of the study population.

Table I. Demographic characteristics of study population

Age Group (Year)	Male <i>n</i> = 48 (%)	Female <i>n</i> = 88 (%)	Total <i>n</i> = 136 (%)
40-50	4 (8.3)	8 (9.1)	12 (8.8)
51-60	7 (14.6)	16 (18.2)	23 (16.9)
61-70	16 (33.3)	23 (31.8)	44 (32.4)
71-80	13 (27.1)	21 (25.0)	34 (25.0)
81-90	08 (16.7)	15 (17.0)	23 (16.9)

Out of the 136 subjects, 79 people aged ≥ 40 years had OA (58.1%). The leading predisposing factors in OA of the knee in this study was advanced age (58.1%), followed by obesity (17.6%): out of the 24 obese subjects, 18 (75%) were females. Sport injury (football injury) was recorded among 8.1% of the affected subjects. Hypermobility was found in 7.4% of cases and all were females. Four female traditional dancers (2.9%) had osteoarthritis of the knee as shown in Table II.

Overweight patients constituted 30.9% of the study population while 17.6% were obese. Obesity was three times commoner among women compared with men, while overweight was twice common among women than men (Table III). In addition, knee OA occurred more frequently among muslims compared to christians [57.9% (51/88) among females and 52.1% (25/48) among males].

Table II. Predisposing factors in knee osteoarthritis among study group

Predisposing Factors	Male n = 48 (%)	Female n = 88 (%)	Total n = 136 (%)
Previous sport injury	8 (16.7)	3 (3.4)	11 (8.1)
Other knee injury	2 (4.2)	6 (6.8)	8 (5.9)
Obesity	6 (12.5)	18 (20.5)	24 (17.6)
Age	30 (62.5)	49 (55.7)	79 (58.1)
Professional Dancing	--	4 (4.5)	4 (2.9)
Hyper-mobility	2 (4.2)	8 (9.1)	10 (7.4)

Table III. Body Mass Index (BMI) of the study population

BMI kg/m ²	Male n (%)	Female n (%)	Total n (%)
Normal (18.5-24.9)	28 (58.3)	42 (47.7)	70 (51.5)
Overweight (25-29.9)	14 (29.2)	28 (31.8)	42 (30.9)
Obese (30+)	6 (12.5)	18 (20.5)	24 (17.6)

Clinical findings

All the patients presented with knee joint pain. On gender basis, thirty men (62.5%) presented with unilateral knee pain while 18 men (37.5%) presented with bilateral knee pain. Sixty (68.2%) women presented with unilateral knee pain while 28 (31.8%) presented with bilateral knee pain. There was joint swelling among 63 (46.3%) subjects, comprising 42 women (66.7%) and 21 men (33.3%). The joint swelling was due to bony enlargement in 6 (9.5%) women and 7 men (11.1%), while synovial fluid accumulation was responsible for the joint swelling in 36 (57.1%) women and 14 (22.2%) men. Seventy-one (52.2%) subjects, comprising 53 (74.6%) women and 18 (25.4%) men, observed early

morning joint stiffness. Overall, early morning joint stiffness was present for less than 30 minutes. Joint tenderness was found among 45 (33.1%) subjects, comprising 31 (68.9%) women and 14 (33.1%) men. Tenderness was in the medial compartment of the knee among 27(60%) subjects, lateral compartment in 12 (26.7%) patients, and 6 (13.3%) had tenderness at the quadriceps insertion on the patella. The range of knee joint motion was reduced in 23 (16.9%) subjects comprising 18 (78.3%) women and 5 (21.7%) men. Joint deformity was found in 43 (31.6%) subjects made up of 38 (88.4%) women and 5 (11.6%) men. Unilateral genu valgus was found among 27 (71.1%) women and bilateral genu valgus among 8(21.1 %) women, only 3 (7.8%) women had genu valrum on one knee. All the 5 men with knee deformity had unilateral genu valgus

Radiographic findings

All the subjects had presence of osteophytes on the plain radiographs of the knee. Narrow joint space was present among 127(93.4%) subjects. The medial compartment was predominantly affected in 101 (79.5 %) cases while the lateral compartment was involved in 26 (20.5%) cases. Sub-chondral cyst and sclerosis were present among 23(16.9%) subjects.

Laboratory results

Erythrocyte Sedimentation Rate (ESR) as a marker of inflammation was generally within normal range in all the subjects. Other laboratory investigations (serum uric acid, full blood count and rheumatoid factor) where requested were essentially normal.

Treatment modalities

The response to simple analgesics and NSAID was generally good but 61(44.9%) patients comprising 43 (70.5%) women and 18 (29.5%) men had intra-articular steroid injection because of poor response to oral medications.

Discussion

Women were almost twice affected by knee OA than men in this study. However, literature^s have documented that women are not only more likely to have OA of the knee than men, they are also more likely to have severe OA. ^[6] The observed increase in the incidence of OA in women around the time of menopause led researchers to

hypothesize that hormonal factors may play a role in the development of OA. However, results on effect of estrogen, either endogenous or exogenous, on OA from observational studies have been conflicting.^[7, 8] In a randomized clinical trial (the Heart and Estrogen/Progestin Replacement Study) in a group of older postmenopausal women with heart disease, no significant difference was found in the prevalence of knee pain or its associated disability between those taking estrogen plus progestin therapy or those taking placebo.^[9]

People in the age range of 61-70 years formed the bulk of cases in this study. It is expected that more elderly people should be affected than this age group. The authors were of the opinion that more elderly people may find it difficult to get to the teaching hospital for the reason of poor mobility and the fear of the hospital protocols. Age is one of the leading factors predisposing to OA of the knee.^[10, 11] The increase in the prevalence of OA of the knee with age probably arose from cumulative exposure to various risk factors and structural changes that are associated with aging. These factors may make a joint less able to cope with adversity, such as cartilage thinning, weak muscle strength, poor proprioception, and oxidative damage. While adults of any age may develop knee OA, the prevalence of symptomatic knee OA increases rapidly starting at age of 45 years and continues to rise thereafter.^[12]

Previous knee injury, both sport related and other forms of injury was recorded among 14% of the subjects in this study. Increased risk of OA has been found among athletes active in different kinds of sports. Knee injury, in particular, has been found to be an established risk factor for knee OA. Thelin *et al*, in a population based case-control study of 825 cases found that sports-related increased risk for knee OA was explained by knee injury.^[13] In the literature, few studies investigated the correlation between sports history and the development of knee OA. In a review by Gross and Marti, the evidence of the correlation between OA and sports was described as moderate and it was concluded that very intensive sports exercise can lead to a low grade increase in the risk for hip and knee OA (ball and strength sports in particular).^[14]

In very active sprinters, the risk of OA also increases. The risk of OA at the weight-bearing joints (knee and hip) might be increased by extremely intensive and long term sports activity,

but might not be predominant in the majority of the population engaging in sports, since the intensity of sporting activity is lower. Some studies have reported an association between physical activity and a risk for knee OA^[15], while other studies have shown no effect of physical activity on the risk of OA^[16] or may even protect the knee joint from degenerative changes.^[17]

Obesity was the second common factor predisposing to OA of the knee following age and women were thrice as obese as men. This may account for the high prevalence of OA of the knee among women compared with men. Obesity is the main preventable risk factor that has been identified in large joint OA. Therefore, the role of obesity in OA can be minimized by conservative treatment such as weight loss.^[18]

Longitudinal data have shown that obesity is a major risk factor for the development of knee OA.^[19] One twin study found a 9-13% increased risk for the onset of the disease with every kilogram increase in body weight.^[20] It has also been found to be a risk factor for the progression of radiological osteoarthritis.^[21] However, the mechanism by which the excess weight influences disease onset and progression is unclear. Biomechanical load across articular cartilage has been postulated as a possible mechanism of disease induction.^[22] The Framingham study had shown that weight control significantly affected the risk of developing knee osteoarthritis.^[23]

Hypermobility as a predisposing factor for knee OA was found in 7.4% of this study. Oguntona *et al* in a study of 124 young females reported that 6.5% of the subjects with knee pain had hypermobility syndrome.^[24] Lewkonja *et al* also suggested that the additional stresses imposed upon a joint by ligamentous laxity predispose to premature articular degeneration. These stresses are likely to result from biomechanically disadvantageous loading conditions being adopted, resulting in microtrauma. The proprioceptive deficit is a possible mechanism for such a situation to arise, and could explain the increased incidence of osteoarthritis reported clinically.^[25]

Knee OA, in the present study, was found to be more common among muslims compared to christians. This observation may be attributed to frequent kneeling by Muslims for prayers. The literatures have also suggested that occupations involving squatting or kneeling more than two

hours daily were associated with two-fold significantly increased risk of moderate to severe radiographic knee OA.^[26, 27] It was also found that the risk of developing knee OA was more than two times greater for men whose jobs require both carrying and kneeling or squatting in mid-life than for those whose jobs did not require these physical activities.^[28] The risks of knee OA associated with kneeling and squatting were much higher among subjects who were overweight or whose job also involved lifting.^[29]

Four traditional dancers had OA of the knee in this study. Though no local research has been conducted on the relationship between dancing and osteoarthritis, it is known that dancing predisposes to osteoarthritis of different joints. In the study conducted by Angio *et al* on professional ballet dancers, early signs of OA were recorded in different joints.^[30] Further research is however needed in the local setting.

The limitations of this study included the small number of patients as well as the site of the study in a tertiary health facility. This may limit the number of patients encountered since they are mainly referred to that centre. A community study would have been more appropriate, and this is the future goal.

Conclusion

Both occupational and non-occupational factors predisposed to symptomatic knee OA. These predisposing factors are either synergistic or additive, and each has a graded relationship to OA risk. Consistent results implicating overweight and obesity as major risk factor for knee OA underline the importance of the early prevention and reduction of obesity.

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