CORRELATES OF RADIOGRAPHIC CHANGES IN NIGERIAN PATIENTS WITH OSTEOARTHRITIS OF THE KNEE

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ABSTRACT

BACKGROUND: To determine the relationship between age, gender, and duration of Knee Osteoarthritis and radiographic changes using the Kellgren – Lawrence (K – L) grading.

METHODS: The study was retrospective and cross-sectional. We reviewed the case notes of patients with knee osteoarthritis attending a rheumatology clinic in Lagos over a ten year period, looking at their ages, gender, disease duration, K-L grading and deformities from radiological reports.

RESULTS: Three hundred and eighteen patients were studied, of which 261(82.08%) were females. Their ages range between 31 and 91 years, with a mean of 60.92±10.96. The least duration of complaints at the time of presentation was 1.5 months, the longest 348 months, with a median of 48 months. Right knee joint alone was affected in 31 (9.84%), left knee in 21(6.67%), and both in 263 (83.49%) patients. The right knee joint alone was affected in 31 (9.75%) patients, left knee in 21(6.60%) patients, and both knees in 266 (83.65%) patients. Six patients (1.89%) had K-L grade 0, 12 had 1 (3.77%), 168 had 2 (52.83 %), 107 had 3 (33.65%), and 25 (7.86%) had K-L grade 4. Deformities noted in 32 patients, among which Genu valgus seen in 18 (56.25%), Genu Varus in 11 (34.38%), and fixed flexion deformities in 1 patient (3.13%); both Valgus and Varus in 1 patient (3.13), and both Varus and Fixed flexion deformities in 1 patient(3.13%). Among patients who were 44yrs and below, 19 (79%) had K-L grade II; while in those 65yrs and above, 57 (44%) had grade III, with a p value of 0.00. But there were no statistically significant differences in K-L grading between males and females, and between K-L grading with deformities, or with the duration of knee OA at the time of presentation (p> 0.05). Conclusion: This study, as in previous ones, showed that the age of the patient with knee OA is directly proportional to the likely severity of the K-L radiographic grading, but not with disease duration.

KEYWORDS: Knee Osteoarthritis, Relationships, Kellgren – Lawrence (K – L) grading

INTRODUCTION

Osteoarthritis (OA) of the knee is the third most prevalent rheumatic disease in the world[1]. Similar prevalence has been reported across Africa[2], and in Nigerian studies[3-6]. This has significant health and economic burden[7]. Age [8], female sex[9], obesity[10], occupation[11], lifestyle[12], and associated diseases[13] are among the risk factors that determine its presentation, management and outcome. Clinical diagnosis of knee osteoarthritis can be supported by radiographic and imaging findings. The Kellgren - Lawrence (K-L) classification of knee OA and the Osteoarthritis Research Society International (OARSI) atlas[14] grading are among the best known radiographic methods of grading Knee OA. These grading may determine the severity and management options of

Knee Osteoarthritis.

The Kellgren - Lawrence (K-L) radiographic classification of knee OA has been widely used to grade knee osteoarthritis. The overall grades of severity are measurable from 0-4 and are related to the presumed sequential appearance of osteophytes, joint space loss, sclerosis and cysts[15]. The grades are as follows: 0 = normal radiograph; 1 = doubtful pathology; 2 = minimal osteophytes, possible narrowing, cysts, and sclerosis; 3 = moderate, as in definite osteophytes with moderate joint space narrowing; 4 = severe, with large osteophytes and definite joint space narrowing. It has been correlated with patients' clinical and demographic characteristics with varying outcomes over the years [16-21]. Among these there are reports of severe radiographic changes affecting 1% of people with Knee OA aged 25 – 34 years, increasing to nearly 50% in those 75 years and above[7].

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Although studies have been done on the relationships between Knee OA and its radiographic findings in other parts of the world[16-21], no such have been carried out yet in Nigeria. This study is aimed at reviewing the relationships of radiographic K-L grading to age, gender and disease duration among patients with knee OA attending a Rheumatology clinic in Lagos, Nigeria.

Methods

All the case notes of patients' with diagnoses of knee OA from 2005 to 2015, at Arthrimed Specialist clinic, a specialty Rheumatology clinic in Lagos, were reviewed. The results included age, gender, disease duration, knee joint (s) affected, and K-L radiographic grading with or without deformity. The interpretations of the radiographs were as reported by radiologists from different centres. Radiological reports of the K-L grading of all the knee radiographs were noted, as accepted by the World Health Organisation[15,22]. Statistical analyses were performed using SPSS version 12 for Windows. In all analyses, P values <0.05 were considered statistically significant. These patients were placed on treatment with Non-steroidal Anti-inflammatory Drugs (NSAIDS); codeine based analgesics, intra-articular steroids and Hyaluronate as deemed necessary, available or affordable. They had, also, been referred to Physiotherapists for appropriate physical therapy.

Results

A total of three hundred and eighteen patient case notes were reviewed, of which 261 (82.08%) were females and 57 (17.92%) were males. The ages of the patients were between 31 to 91 years (mean 60.93 ± 10.91). The range of disease duration was 2 months to 348 months, median 48 months. Eighty-three percent had bilateral knee OA, 9.75% had only right knee affected, while 6.60% had only left knee affected.

Of the radiographic assessment, 6 patients (1.89 %) were grade 0 on the Kellgren-Lawrence index, 12 (3.77%) were grade 1, 168 (52.83%) were grade 2, 107 (33.65%) had grade 3, and 25 (7.86%) had grade 4. Thus the subjects were mostly categorized as mild to moderate for radiographic features. Deformities noted in 32 patients, among which Genu valgus seen in 18 (56.25%), Genu Varus in 11 (34.38%), and fixed flexion deformities in 1 patient (3.13%); both Valgus and Varus in 1 patient (3.13), and both Varus and Fixed flexion deformities in 1 patient (3.13%). The demographic, clinical, and radiological data of the patients are presented in Table 1 below. Kellgren-Lawrence grading scale and age were directly associated (P < 0.05), as seen in Table 2 below. But there was no statistically significant difference between gender and K-L grading (P = 0.966), nor between the K-L grading and disease duration (P = 0.144), or with the deformities (0.515) as shown in Table 3 and 4 below

respectively.

DISCUSSION

This retrospective study looked at the correlations between age, gender, deformities and duration of Knee Osteoarthritis of the patients with the radiographic Kellgren – Lawrence grading scale. Positive correlation of radiographic severity, as in increasing K-L grading, with advancing age of the patients was obtained, as in a previous studies[7,23]; but no significant relationship between the K-L grading with either male or female gender, or with the duration of the knee OA[31].

Secondary changes occurring in the joint with increasing age cause OA to be one of the major health problems in the elderly. Increased prevalence of OA with advanced age may be due to changes in cartilage with aging, muscle weakness, the loss of chondrocytes, the loss of flexibility of subchondral bone, and inadequate neuromuscular response facilitating joint damage[24]. In previous epidemiological studies, the direct relationship between age and OA was found to be the most striking finding[8,25]. Recently, a study showed that radiographic findings were found to be related with age and disease duration which shows the progressive nature of OA[23]. We also found a positive association between age and radiographic findings; but not with disease duration, which is similar to previous studies outcomes[31,32]. And radiographic grades may even stagnate, or decrease over time[32].

In our study, female patients with knee OA far outnumber men. Symptomatic knee osteoarthritis in women has been reported more frequently than that in men[9, 17, 26, and 27]. This condition could be partly explained in aging women with the differentiation of the hormonal status and the imbalance in the formation and destruction of bone[28,29]. In postmenopausal women as the level of estrogen decreases interleukin-1 levels can increase which leads to OA[30]. Furthermore, the effects of gender on the relationship between symptoms and radiographic grades of knee OA have been found more in women than men[29]. We, however, found no direct association between gender and radiographic progression in knee OA. This discordance between clinical and radiographic knee osteoarthritis has been previously shown in some studies[31,32]. Deformities seen in this study were mainly genu valgus, but an increasing degree of varus alignment is associated not only with progression of knee OA but also with development of knee OA. However, this association seems particularly applicable to overweight and obese persons[10,33]. But we found no significant association between the deformities and the K-L grading.

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Limitations of our study are its retrospective cross-sectional design rather than longitudinal follow-up. We looked at the patients' age, gender, and disease duration in relation to the radiographic K-L grading, but were not able to assess the separate contribution of possible confounders that have been associated with knee OA radiographic grading such as Body Mass Index (BMI), disability, and comorbidities. Further community based studies are needed.

CONCLUSION

Despite the varying outcomes of studies related to knee OA, this study, as in previous ones, has shown that the age of the patient with knee OA is directly proportional to the likely severity of the K-L radiographic grading, but not with gender, deformity and disease duration.

Table 1. Demographic features, Clinical, and Radiological characteristics of the patients with knee OA

Attributes	Frequency
Age (years), mean ± SD	60.93 ± 10.91
Gender	
Female no. (%)	261 (82.08)
Male no. (%)	57 (17.92)
Disease duration (months) median	48
Knees affected	
Both Right and Left Knees no. (%)	266 (83.65)
Right Knee only no. (%)	31 (9.75)
Left Knee only no. (%)	21 (6.60)
Kellgren-Lawrence scale	
Grade 0 no. (%)	6 (1.89)
Grade I no. (%)	12 (3.77)
Grade II no. (%)	168 (52.83)
Grade III no. (%)	107 (33.65)
Grade IV no. (%)	25 (7.86)
Deformity	
Genu Valgus no. (%)	18 (56.25)
Genu Varus no. (%)	11 (34.38)
Fixed Flexion no. (%)	1 (3.13)
Both Valgus and Varus no. (%)	1 (3.13)
Both Varus and Fixed Flexion no. (%)	1 (3.13)

Table 2. Comparison of age and radiographic grades using chi squared test

Age (years)   K-L grading

Age groups (years)	K-L grade 0	K-L grade I	K-L grade II	K-L grade III	K-L grade IV
≤44	1	4	19	1	0
45 – 64	2	6	99	49	6
> 65	3	2	50	57	19

P <0.05

Table3. Comparison of gender and duration of Knee OA with the K-L radiographic grading using chi squared test

	K-L grade 0	K-L grade I	K-L grade II	K-L grade III	K-L grade IV
Gender					
Female no.	5	9	139	87	21
Male no.	1	3	29	20	4
Duration groups (months)					
≤100	3	1	57	38	8
100 – 200	0	0	9	16	1
201 – 300	0	0	0	6	2
>300	0	0	0	1	0

P >0.05

Table 4. Comparison of deformity with the K-L radiographic grading using chi squared test

Deformity	K-L Grade			
	I	II	III	IV
Genu Valgus	1	5	7	5
Genu Valgus and Varus	0	0	0	1
Genu Varus	0	0	9	2
Genu Varus and Fixed Flexion	0	0	1	0
Fixed Flexion	0	0	1	0

P > 0.05

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