Research Article

Clinical pattern of knee osteoarthritis in patients seen at rheumatology clinic of Aminu Kano Teaching Hospital, Northwestern Nigeria

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Abstract

Background: Although osteoarthritis is a frequent and important cause of pain and disability worldwide, its pattern of joint involvement varies from place to place.

Objective: To determine the clinical pattern of knee osteoarthritis in patients seen at the rheumatology clinic of Amino Kano Teaching Hospital.

Design: A prospective, cross sectional, descriptive, hospital-based study was carried out, from the 1st June to 30th November 2009.

Methods: Adults aged 18 years and above referred with knee pain were evaluated.

Results: One hundred and seventy four osteoarthritic knee involvements in 100 patients were evaluated. There were 27 males and 73 females, giving a F:M ratio of 2.7:1, with mean age of 56.92 ± 12.71 years. The mean BMI of the patients was 29.68 ± 4.87 Kg/M^2 and 18% reported previous trauma to the knee. Eleven per cent of the patients had features of benign joint hypermobility syndrome.

The median duration of knee pain before presentation was 30 months (range 3-180). Forty per cent of the patients had history of knee swelling, with a median duration of 24 months (range 1-120) before presentation. Majority of the patients (92%) had morning stiffness, with a median duration of 10 minutes (range 0-60).

There was knee tenderness (in all patients), knee swelling (44%), knee crepitus (95%), knee deformities (34%), decreased range of motion (64%) and decreased quadriceps strength (82%) were observed. Majority of the patients' radiographs showed KL grade 3 (44%) or 4 (38%) features. The Medial Tibio-Femoral (MTF) compartment was affected in 92% of the patients while the Lateral Tibio-Femoral (LTF) compartment was affected in 66% and the Patella-Femoral (PF) compartment in 80% of the patients. Associated hand OA was noted in 13% of the patients, while OA affecting other sites were observed in 32%. Majority of the patients were in functional class I or II.

Conclusion: The clinical pattern seen in our patients is similar to what was reported elsewhere in Africa and contrasts with reports in caucasians where associated generalized osteoarthritis and hip joint disease are more common.

Keywords: Clinical, Pattern, Knee, Osteoarthritis

Introduction

Osteoarthritis (OA) can be defined by either joint symptoms, or structural pathology (e.g. on X-ray), or by the combination of the two. The primary symptoms include joint pain, stiffness, and difficulty in walking. The joint pathology is diverse and includes focal damage and loss of articular cartilage, abnormal remodeling and attrition of subchondral bone, osteophytes, ligamentous laxity, weakening of periarticular muscles, and in some cases synovial distention and inflammation[1].

All tissues of the joint are involved, although the loss of articular cartilage and changes in adjacent bone remain the most striking features[1]. In this regard, OA represents failure of the joint as an organ,

analogous to renal or cardiac failure, and the pathological observations in advanced disease are as much a product of attempted repair as of the primary insult or damage which contributed to the initiation of the process[1]. The knee joint is the commonest site affected by OA in Nigerians,[2-5] as is the case globally[1].

As a result of its effect on ambulation and mobility, OA of the knee has significant functional impact and is associated with considerable medical costs from surgeries, accounting for most of the 478,000 total knee replacements for arthritis in 2004 in United States (US)[6].

Although adequate information exists on the pattern of the disease in the developed countries, [7, 8] there are few studies from tropical West Africa[2-5]. Apart from the above mentioned studies in another part of Nigeria, we were unable to find any previous reports on how the pattern of osteoarthritis of the knee in this region (Northwestern Nigeria) compared with the pattern of the disease elsewhere.

Materials and Methods

This was a prospective, cross-sectional, descriptive, hospital-based study carried on adults aged 18 years and above, referred with clinical and radiographic evidence of knee OA (as defined by the ACR Criteria)[9] to the Rheumatology Clinic of AKTH, Kano. A pre-tested questionnaire was administered to each patient after obtaining an informed consent, and relevant information on biodata, history of the knee OA, anthropometry as well as clinical and radiographic evaluation of the knees were performed. Standard radiographs as suggested by Ahlback[10] were done (i.e. standing semi-flexed and skyline views) where necessary. Kellgren and Lawrence Criteria[11] were used to grade the findings. Other symptomatic joints were also evaluated and recorded. Data obtained were analysed using the Statistical Package for Social Sciences (SPSS) version 16.0 and a p-value of < 0.05 was considered significant. The study was conducted from the 1st June, 2009 to the 30th November, 2009.

Results

One hundred and seventy four osteoarthritic knees from 100 patients were evaluated. There were 27 males and 73 females, giving a F:M ratio of 2.7:1. The mean age of the patients at presentation was 56.92 ± 12.71 years. The peak age group was 60-69 years (29%), with up to 29% of the patients below 50 years. Table 1 depicts the patient's characteristics.

Table 1: Patients characteristics

Variables	Males	Females	Total (%)
Sex	27	73	100
Age groups (years)			
10-19	0	0	0
20-29	0	1	1
30-39	5	5	10
40-49	2	16	18
50-59	8	20	28
60-69	7	22	29
70-79	5	9	14
≥80	0	0	0
Ethnicity			
Hausa	16	49	65
Fulani	3	8	11
Kanuri	3	5	8
Yoruba	3	4	7
Igbo	1	4	5
Idoma	1	3	4
Occupation			
Petty trading	5	19	24
Skilled/Professional	6	18	24
Teaching	2	15	17
Unskilled labour	6	1	7
Domestic servants	1	5	6
Subsistent farming	3	0	3
Others	4	15	19
Educational status			
University/Diploma graduates	9	28	37
Secondary graduates	4	17	21
Primary graduates	4	5	9
Qur'anic education	10	23	33

All (100%) patients reported with knee pain. Seventy eight (78%) had pain in both knees, 12 (12%) had pain in only the left knee while 10 (10%) had pain in only the right knee. The median duration of knee pain before presentation was 30 months (range 3-180). Forty (40%) patients reported history of knee swellings. Both knees were reported swollen in 18 (18%) patients. Eleven (11%) patients each reported swelling of either left or right knee alone. The median duration of knee swelling before presentation was 24 months (range 1-120). There were 92 (92%) patients that reported history of early morning and/or after rest stiffness in their knees. The median duration of stiffness was 10 minutes (range 0-60). Sixty four (64%) of the patients reported having difficulty going up and/or down the stairs. Eighteen (18%) patients had history of trauma to the knee (mostly home accident), 13 (13%) of which were females while 5 (5%) were males. There was no significant statistical difference between the sexes, $p = 0.935$.

Only 7 (7%) patients had previous medical and/or surgical procedure on the knee(s). Five patients had foreign body removed (mostly sewing needle), while the remaining two were closed arthrocentesis, all in known

sickle cell anaemia patients. Thirty six (36%) patients were using a walking aid at presentation; and the walking stick was used in 35 patients, while 1 patient was using a walking frame. Paracetamol was used by 57 (57%) patients, while 22 (22%) used various NSAID's and 9 (9%) had steroids injected into their knees. Twelve (12%) patients had used various traditional medications, which included bloodletting and herbal remedies.

The mean weight of the patients was 79.48kg ± 11.74. The mean weight for males was 79.07kg ± 11.95 while for females was 79.62kg ± 11.74. The patients had a mean height of 1.64meters ± 0.066. The mean height for males was 1.69meters ± 0.0462 while for females was 1.62meters ± 0.0608. The mean BMI of the patients was 29.68kg/m² ± 4.87. The males had a mean BMI of 27.55kg/m² ± 3.95 while the females had a mean BMI of 30.47kg/m² ± 4.96. Forty one (41%) of the patients were obese.

Knee tenderness was elicited in all (100%) patients, either along the medial and/or lateral knee joint lines or the patella. Eighty (80%) patients had tenderness of both knees, 12 (12%) were only tender on the left knee while 8 (8%) were only tender on the right knee. Knee swelling was demonstrated in 44 (44%) patients. Swelling was either bony, fluid, soft tissue or a combination. Of these 44 patients, 24 had both knees swollen, 13 had swollen left knee only while 7 had swollen right knee only. Table 2 shows the other knee clinical examination findings. Majority of the patients' radiographs showed KL grade 3 (44%) or 4 (38%) features. The medial Tibio-Femoral (MTF) compartment was affected in 92% of the patients while the Lateral Tibio-Femoral (LTF) compartment was affected in 66% and the Patella-Femoral (PF) compartment in 80% of the patients.

Among the study group, 13 (13%) patients were found to have evidence of hand osteoarthritis, mainly affecting the 2nd and 3rd DIP's. Ten were females while three were males. Thirty two (32%) patients showed clinical and/or radiographic evidence of osteoarthritis in other joints (excluding hand OA). Twenty six (26%) were females, with 6 (6%) males, (p = 0.202). Symptomatic Lumbar Spondylosis was present in 27 patients, hips were affected in 6 patients, shoulders in 4 patients, while the ankles in 11 patients. The 1st metatarsophalangeal joints were affected in 17 patients. Eleven (11%) patients showed evidence of Benign Joint Hypermobility Syndrome (BJHS)[12], 7 were females and 4 males, (p = 0.458). Majority of the patients were either in class I (45%) or class II (47%) functional disability state (as assessed using the Steinbrocker's Criteria)[5], with 8 (8%) patients in class III. None of the patients was in class IV, (p = 0.243).

Table 2: Knee examination findings in the patients

Variables	Males	Females	Total (%)	P value
Knee crepitus				0.019
None	2	3	5	
Left	9	7	16	
Right	6	16	22	
Both	10	47	57	
Knee deformity				0.013
(Varus)	22	57	79	
None	2	10	12	
Left	2	4	6	
Right	1	2	3	
Both				
Knee deformity	19	34	53	0.013
(Valgus)				
None	2	16	18	
Left	2	13	15	
Right	4	10	14	
Both				
Knee ROM				0.045
Normal	14	22	36	
Decreased	13	51	64	
Quadriceps strength				0.005
Normal	7	11	18	
Decreased	20	62	82	

Discussion

The preponderance of women with knee OA observed in this study is similar to observations earlier made in Ibadan,[2, 4, 5] South African blacks[13] and in studies of the white populations[1]. However; the female preponderance was less marked in our study, perhaps because some of our patients were relatively young, with features of Benign Hypermobility Syndrome. It is known that the female to male ratio in this disease increases with age[14]. The slightly earlier age of onset of the disease in our patients compares with what others from Nigeria found[2, 4, 5]. Twenty-nine per cent of the patients were 50 years and below, which may reflect the younger mean age of our study population when compared with subjects in Caucasian populations. The reason for this younger age of onset in our patients is unknown, and no obvious predisposing cause was found in most cases. A study by Ebong[2] suggested that the onset of symptoms in the disease at an early age was unfavourable with regard to the development of pain.

Although patients of all categories of educational background were seen in this study, however, more University/Diploma graduates attended our clinic which may be a result of more health awareness in them rather than a reflection of their social status.

Petty trading, domestic work and professional/ skilled work as well as teaching were the predominant occupations for females in this study, while most men

were unskilled labourers or subsistent farmers. Adelowo[3] has suggested association between knee OA and women traders who sit on low stools, about a foot off the ground with their knees in extreme flexion. This position may subject their knee joints to minor trauma and uneven wear. The same observation was made by Adebajo[5]. Our study also supported these observations. Apart from kneeling for prayers; women are required to kneel as a form of greeting to their elders.

Trauma was apparently a less significant factor in OA of the knee in Kano patients, as in Ibadan[2, 4, 5] than in Caucasians. In Caucasian males, trauma was found to be associated with OA of the knee in about half of the cases[8]. This is not apparent in this study, especially with poor recall of previous history of trauma as a possibility in our patients. It may also be that differences in occupational hazards partly accounted for this difference. For instance, most of the men in the Caucasian study by Kellgren and Lawrence[8] were coal miners, in whom knee injury was quite common.

The role of obesity in causation of knee OA has long been established[15]. It preceded its development by many years[16-18] and hastens the structural worsening of existing knee OA[19, 20]. About three-quarter of the patients in our study were either overweight (37%) or obese (41%). In another series from Ibadan[2], however, only a quarter of the females were overweight.

Hypermobility was seen in more than 10% of the patients, most of whom manifested this feature at a relatively young age. In a personal communication, Adelowo made a similar observation, though Adebajo[5] observed much less figures. Repeated minor trauma to the ligaments and tendons around the knee in patients with hyper mobile joints may explain the early onset of degenerative changes.

Assessment of the causal relationship of quadriceps weakness and knee OA is problematic in case of symptomatic knee OA, as is the case in our study. Most of the patients had decreased quadriceps strength, which was bilateral in two-thirds. Knees with existing OA are known to have weaker quadriceps than knees without OA, especially when symptoms are present (probably due to disuse atrophy). But weakness is also present in knees without pain or evidence of muscle atrophy, possibly due to arthrogenous inhibition of muscle contraction[21].

About a third of the patient's knees were found to have either varus and/or valgus deformities, and the deformities were bilateral in about a fifth. Knee deformities are very common in Nigerian children[2], and some adults are seen with neglected gross deformities starting from childhood. It is not possible to say categorically from our study whether the observed deformities were the cause or result of knee degeneration. We found more valgus deformity than varus, and this was even more so in women than in men ($p= 0.013$). Ebong[2] made a similar observation in Ibadan, with 22 knees having valgus compared to three knees with varus deformity. OA knees with a varus or valgus malalignment have 3-4 fold increased risk of further joint space narrowing in the medial or lateral compartment respectively[22].

Pain, the cardinal symptom of symptomatic knee OA, was present in all the cases, as it was in Ibadan patients[2]. By definition, symptomatic OA patients will have pain at involved sites, in addition to other clinical and radiological features. Majority (92%) of our patients also had stiffness, while only half of Ibadan patients had stiffness. However, history of knee swelling was similar to Ibadan patients[2] in our study.

Majority of the patients' knees were tender (180 of the 200 knees), signifying bilateral affectation of the knees with the disease. It is known that with the passage of time, unilateral knee OA tends to progress to bilateral knee OA due to excessive loading of the initially unaffected knee[23]. A third (34%) of the patients' knees were swollen, either with fluid or by bony osteophytic outgrowths. None of our patients had Baker's cyst or ruptured popliteal cyst. It is known that herniation or rupture of a bursa into the thigh or leg (herniated or ruptured popliteal cyst) may complicate knee OA, simulating thrombophlebitis (pseudothrombophlebitis syndrome)[24].

Crepitus of the knee is one of the ACR diagnostic criteria[9] for knee OA. This was present in (152) 76% knees of our study group. Its presence, especially on active movement, may limit patient's function and decrease quality of life.

With the progression of knee OA, the range of motion of the affected knee tends to decrease, subsequently leading to fixed flexion deformities with/without bony ankylosis. Majority of the patients in this study had some evidence of abnormal knee range of motion, signifying advanced stage of the disease at presentation. However, some of our patients presented relatively early (mean duration of symptoms before presentation was 43.21 ± 36.93 months), which compares with Caucasian studies. It may imply that their disease is rapidly progressing. This observation requires further evaluation in a study specifically designed to address rate of disease progression from onset. The radiographic appearances in our patients were similar with the recognized pattern[2, 4, 5, 13,25].

The paucity of Heberden's nodes in our study was striking, as well as metacarpophalangeal and carpometacarpophalangeal joints disease, in support of the view that such disease is usually linked to generalized OA. Adebajo[5] made similar observations. However, reports from Burkina Faso[26] reported a high prevalence of Heberden's nodes in their knee OA patients.

The hip joints, commonly involved in Caucasians, were affected in only six patients. A similar low frequency was reported in Nigeria[2, 4, 5] and among the Chinese[25]. The Nigerian ethnic groups assumes a squatting position most especially during defaecation and other religious and daily activities. This was postulated to be protective against the development of hip OA[25].

Polyarticular osteoarthritis affecting three or more joint sites was uncommon in our patients, and occurred in only six patients. In contrast, the incidence of multiple osteoarthritis in an English series was 24%[8]. The reason for this lower incidence of polyarticular OA in African

Blacks is not known, but this observation has been reported previously[2,13].

Osteoarthritis, especially of the weight bearing joints, is known to affect functional status. This depends on the severity and associated co-morbid conditions of the patients. Majority of the patients in our study were either in functional class I or II. A few (8%) were in functional class III.

Conclusion

The clinical pattern of knee OA seen in our patients is similar to what was reported elsewhere in Africa and contrasts with reports in caucasians where associated polyarticular (generalize) osteoarthritis and hip joint disease are more common.

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