

## NODAL OSTEOARTHRITIS IS UNCOMMON AMONG NIGERIANS

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### ABSTRACT

**Background-**Osteoarthritis of the hands is a musculoskeletal disease with a considerable effect on patients' lives. The disease leads to pain in the affected joints with associated swelling, stiffness, deformity and gradual loss of function. Contrary to common belief, it is not necessarily a disease of older people, but also occur relatively early in life, impairing the patient's capacity to work. Knowledge and research results in the field of hand osteoarthritis are however limited.

**Methods-** Osteoarthritis cases seen at the rheumatology outpatient clinic of Olabisi Onabanjo University Teaching Hospital (OOUTH) from July 2012 to June 2016 were retrospectively reviewed. Cases that satisfied the American College of Rheumatology (ACR) criteria for the classification of hand osteoarthritis were retrieved for further study. Patients with idiopathic osteoarthritis of the hand and those who met the ACR criteria were included, while patients with hand symptoms secondary to other rheumatological conditions were excluded.

**Results-** A total of 176 patients were seen during the study period. Twenty-nine patients presented with hand pain, while 10 of them were excluded from the study because they failed

to meet the criteria for the diagnosis of hand osteoarthritis. Nineteen patients were eventually included in the study. Females constituted 63.2% with a female to male ratio of 1.7:1. The age range was 45-76 years, with a mean age of 59 ±4.2 years. Artisans and farmers were predominantly affected. Distal interphalangeal joint was predominantly affected with 73.7%. Both proximal and distal interphalangeal joint were involved in 11 patients. Digital nodes were commonly found in people above 50 years, while 9 people had both hands been affected. Pain was the principal complaint in most people, while early morning joint stiffness was not significant generally. Marker of inflammation was within normal range and the predominant radiographic finding was osteophyte.

**Conclusion:** The pattern of hand osteoarthritis in males and females were indistinguishable, and the proximal and distal interphalangeal joints were affected in both sexes. Women were however predominantly affected, possibly confirming the genetic influence suggested by earlier studies.

**Keywords:** Hand Osteoarthritis, Distribution, Elderly, Hormonal Influence Osteophyte.

## INTRODUCTION

Osteoarthritis (OA) is a degenerative disease characterized by progressive loss of joint articular cartilage that results in pain and deformity. Epidemiologic data on OA varies depending on the

source but the general consensus is that it is the most common joint disease<sup>1</sup>. It is most prevalent in the older population, with 65% of individuals over 65 years old having radiographic evidence of the disease in at least one

joint<sup>2</sup>. Most studies to date have used a system for grading radiographic severity that was developed by Kellgren and Lawrence<sup>3</sup>. However, the Diagnostic and Therapeutic Criteria Committee of the American College of Rheumatology (ACR) concluded that radiography was of less value than clinical examination for classifying symptomatic OA of the hand<sup>4</sup>. Symptomatic hand osteoarthritis (OA) is a component of generalized osteoarthritis. Generalized osteoarthritis (GOA) is a term that is widely used in the literature in an attempt to describe the often polyarticular nature of osteoarthritis (OA). Polyarticular involvement in OA was described in the mid-1800s<sup>5</sup> and the first clearly recognizable description of GOA in 1952<sup>6</sup>. Hand osteoarthritis usually begins in middle age, with increased prevalence in the elderly. It is found in about 13% of males and 26% of females above the age of 70, thus implying a

hormonal influence on the prevalence of hand OA<sup>7</sup>. Other known risk factors include obesity<sup>8</sup> despite the fact that the hand joints are not weight bearing, a positive family history<sup>9</sup>, previous digital fractures and hyperglycemia<sup>10</sup>. The details of genetics of OA are unknown. There is, however, a significant genetic component. Spector et al. showed in 1996 in a classic female twin study that there was higher incidence of radiographic OA of hands and knees in identical twins than non-identical twins<sup>11</sup>. Overall genetic influence on radiographic OA of hands and knees in women was estimated at 39- 65%<sup>11</sup>. Characteristically, it affects the distal interphalangeal joints (DIPJ) of the fingers with bony outgrowth at the dorsal surface of the involved joints known as Heberden's nodes, and proximal interphalangeal joints (Bouchard's nodes) of the fingers. These nodes can be painful at their onset, but non-tender thereafter<sup>12</sup>. Other

frequently involved joints are carpometacarpal, metacarpophalangeal and interphalangeal joints of the thumbs<sup>12</sup>. Usual symptoms of hand OA are pain on usage and only mild stiffness in the morning or after a period of inactivity<sup>12</sup>. The pain is usually of a gradual onset with decreased function of the affected joint(s)<sup>12</sup>. Plain radiographs are the current gold standard for morphological assessment of hand OA, whereby classical features such as osteophytes, joint space narrowing, subchondral bone sclerosis and cysts are regularly seen<sup>13</sup>. Blood tests are not necessary for the diagnosis of hand OA, but can be useful to exclude other inflammatory arthropathies. Management of hand OA has been classically directed towards improving symptomatology and functionality of affected patients. However, no disease-modifying agent has been identified.

## **METHODOLOGY**

### **Patients and Methods**

One hundred and seventy-six cases of osteoarthritis seen at the medical outpatient clinic of Olabisi Onabanjo University Teaching Hospital (OOUTH) from July 2012 to June 2016 were retrospectively reviewed. Cases that Satisfied the American College of Rheumatology (ACR) criteria for the classification of hand osteoarthritis were retrieved for further study. Patients with symptomatic and idiopathic osteoarthritis of the hand (primary osteoarthritis-defined as osteoarthritis without any discernable cause) were included in the study, and only patients who met the ACR criteria were included, while patients with hand symptoms secondary to other rheumatological conditions were excluded. The socio-demographic parameters were obtained from the case notes. The following clinical features were also obtained; the duration of pain, the joints affected, presence of joint swelling, presence of early

morning joint stiffness, family history of hand osteoarthritis, impairment of activities of daily living, and presence of hard nodes on selected hand joints.

### **Disease Definition**

Disease was defined according to the classification criteria of the American College of Rheumatology. Patient was classified as having clinical osteoarthritis if there is presence of hand pain, aching or stiffness for most days of the prior month plus 3 of the following 4 criteria:

- Presence of hard tissue enlargement involving at least 2 of 10 selected joints
- Hard tissue enlargement of at least 2 distal interphalangeal (DIP) joints
- Swelling of fewer than 3 metacarpophalangeal joints
- If the patient had fewer than 2 enlarged DIP joints, then deformity of at least 1 of 10 selected joints was necessary in order to classify the symptoms as being due to osteoarthritis.

The 10 selected joints are the;

- Second and third distal interphalangeal joint of both hands
- Second and third proximal interphalangeal joint of both hands
- Base of the thumb of both hands

### **Laboratory and Radiological Investigations**

Laboratory and radiologic reports were documented. Radiologic features of Kellgren and Lawrence was used for the purpose of radiological diagnosis of hand osteoarthritis, however, the ACR clinical criteria were used for the inclusion of patients in the study.

### **RESULTS**

One hundred and seventy-six case notes were retrieved for study. The case notes of twenty-nine patients that presented with hand pain were further reviewed. Ten patients were excluded from the study because they did not meet the ACR criteria for hand OA. Nineteen patients were

eventually included in the study. There were twelve females (63.2%) and seven males (36.8%). The age range was 45-76 years, with a mean age of  $59 \pm 4.2$  years. Artisans and farmers were more affected (table 2). The age and sex characteristics of the patients are presented in table 1. The distribution of the hand nodes is as shown in table 3. Distal interphalangeal joint involvement was the leading joint (73.7%), while no nodes were found in the metacarpophalangeal joint of the thumb (base of the thumb). Eleven people had both proximal and distal interphalangeal joint involvement. Digital nodes were found in people above 50 years. Both hands were involved in nine people. Table 4 shows the clinical features and laboratory results of the patients with hand osteoarthritis. The primary complaint of all the patients was pain, while 5 patients also complained of reduced hand function, therefore limiting the activities of daily living. Hand deformity was however not a

common presenting feature in these patients. Range of motion was not significantly impaired in the patients. Pain was severe in 9 people and all the patients complained of early morning joint stiffness with a mean duration of 16 minutes.

Family history of hand osteoarthritis was difficult to ascertain and most patients were unable to tell categorically if any of their family members had hand osteoarthritis. The few that volunteered were only sure that their parents used to complain of pain in the fingers. The ESR was generally within normal range while the rheumatoid factor was negative in all the patients. Radiologic changes seen were osteophytes formation and reduced joint space. Osteophytes were the regular findings seen. Joint erosion was not seen in any patient.

## **DISCUSSION**

Nodal osteoarthritis is a component of generalized osteoarthritis. In the year

1952, Kellgren and Moore first proposed the term generalized osteoarthritis as a disease in which 3 joint groups or 5 joint sites are involved<sup>6</sup>. The hand is a common site of peripheral joint involvement in osteoarthritis (OA) and although often underestimated as a cause of disability, the effect on quality of life from limitations in performing activities of daily living is considerable. In 1990, the diagnostic and therapeutic criteria committee of the American College of Rheumatology suggested that radiography is of less value than clinical examination for classifying symptomatic osteoarthritis of the hand<sup>4</sup>. Population based studies however disputed this suggestion but agreed that where radiography is not available, clinical examination might be an acceptable option<sup>14</sup>. The ACR traditional classification was used in this study. This involved the use of only clinical findings to diagnose osteoarthritis of the hand. Radiographic diagnosis

was not used for the diagnosis of osteoarthritis in this study for two reasons; one reason is the high prevalence of erosion in osteoarthritis of the hand, a feature that makes it difficult to radiologically distinguish osteoarthritis from inflammatory arthritis. Second is the absence of radiologic results in the case note of some of the patients, possibly because of their inability to afford the cost of the investigation.

There were 176 cases of osteoarthritis, while nineteen patients were diagnosed with osteoarthritis of the hand. The prevalence of hand osteoarthritis in this study was 10.8%. Females were more affected with a percentage of 63.2%. Distalinterphalangeal joints were predominantly affected. The study by Seen et al estimated the prevalence of osteoarthritis of the hand in women over the age of 66 years to be 38%, while it was 24.5% in men<sup>15</sup>. In the Baltimore longitudinal study of aging, which studied the

incidence of hand osteoarthritis in 177 men, the incidence was highest at the distal interphalangeal joint and increased with age<sup>16</sup>. The prevalence of radiological osteoarthritis of the hand in a study by Lawrence et al found distal interphalangeal joint to be 19% in males and 22% in females and proximal interphalangeal joint to be 6% in males and 11% in females<sup>17</sup>. The risk factor for osteoarthritis found in our patients was age. It was predominantly found in people above 60 years. Many literatures have also found age to be the factor most closely associated with the development of osteoarthritis. The study by Zhang et al however found hand osteoarthritis to usually begin in middle age, with increased prevalence in the elderly<sup>7</sup>. Osteoarthritis of the hand is also strongly linked with genetic inheritance, particularly in women. Genetic studies were however not carried out in our patients because of the unavailability of

such study in our environment. In 1940s, studies by Stecher found Heberden's nodes were three times as common in sisters of affected women as in the general population<sup>18</sup>. Epidemiological studies in 1950s and 1960s found that the rate of generalized osteoarthritis were roughly twice as common in first-degree relatives of probands with osteoarthritis as in the general population<sup>17</sup>. The limitation of these early studies included case selection methods, poor case definition and lack of age matching with relatives. Many family studies for hand osteoarthritis and generalized osteoarthritis have used families selected on the basis of one affected individual.

The earlier studies however were supported by two other studies including Baltimore longitudinal study of aging<sup>19</sup>, and the Framingham offspring study<sup>20</sup>, both showing significant familiar clustering for hand and knee osteoarthritis. Framingham has



a strong strength because all the subjects were assessed at adult ages. Adult twin registry data from the St. Thomas hospital UK, found a greater association of radiological features of hand osteoarthritis among monozygotic twins when compared with dizygotic twins, further confirming a genetic influence for hand osteoarthritis<sup>11</sup>. Artisans and farmers were more affected. Osteoarthritis of the hand seems to be related to people involved in hard labours. Stecher and Karnosh<sup>21</sup> observed that neither radiological osteoarthritis nor Heberden's nodes form in paralyzed hands. This finding suggested the possibility that for nodes to develop required the wear and tear that accompanies regular use of joints<sup>21</sup>. Further studies by the same authors suggested a role for trauma in the development of hand osteoarthritis and that the distal interphalangeal joints of both sexes are the most commonly affected hand joints<sup>21</sup>. Osteoarthritis is found to be more severe in the distal

interphalangeal joints than the proximal interphalangeal joints<sup>22</sup> and that all the joints on the right hand of the right-handed people are more affected than the left hands<sup>23</sup>. We have studied the distribution of hand joints involvement of osteoarthritis in a group of patient that presented with osteoarthritis to the rheumatology clinic of a teaching hospital. Joint involvement in this subset tends primarily to affect the proximal and distal interphalangeal joints. The pattern of this joint involvement among men is almost indistinguishable from that among women, though women were predominantly affected, possibly confirming the genetic influence suggested by earlier studies. Further studies in Blacks will be needed to determine this genetic predisposition in hand osteoarthritis.

## CONCLUSION

Research activities in osteoarthritis have concentrated on the knee and

hip. Knowledge and research results for hand osteoarthritis are limited. The available research results are old and therefore it is time for re-appraisal of the knowledge of hand osteoarthritis. A prospective study of hand osteoarthritis in our environment would have been the ideal study, but for the lack of such facilities to carry out the study bearing in mind the genetic predisposition of the hand osteoarthritis. This retrospective study may therefore serve as a baseline and a study to build on in the future study of hand osteoarthritis in our environment.

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**Table 1. Age and Sex Characteristics of Patients with Hand Osteoarthritis**

| Age range | Female (%) | Male (%)  | Total number |
|-----------|------------|-----------|--------------|
| 40-49     | 16 (61.5)  | 10 (38.5) | 26           |
| 50-59     | 21 (60)    | 14 (40)   | 35           |
| 60-69     | 44 (57.9)  | 32 (42.1) | 76           |
| Above 70  | 27 (69.2)  | 12 (30.8) | 39           |
|           |            |           |              |

**Table 2. Occupations among People with Hand Osteoarthritis**

| Occupation      | Number (%) |
|-----------------|------------|
| Artisans        | 7 (36.8)   |
| Teachers        | 3 (15.8)   |
| Office workers  | 2 (10.5)   |
| Farmers         | 5 (26.3)   |
| Business people | 2 (10.5)   |

**Table 3. Site of Pain Distribution in Patients with Hand Osteoarthritis**

| Joint                                    | Female | Male | Total |
|------------------------------------------|--------|------|-------|
| Total affected                           | 12     | 7    | 19    |
| Distal interphalangeal                   | 9      | 5    | 14    |
| Proximal interphalangeal                 | 3      | 2    | 5     |
| Both proximal and distal interphalangeal | 7      | 4    | 11    |
| Metacarpophalangeal                      | 0      | 0    | 0     |

**Table 4. Clinical Features and Laboratory Results of Patients with Hand Osteoarthritis**

| Features                                                                                                                                                                 | Result                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Primary complaint <ul style="list-style-type: none"> <li>• Pain</li> <li>• Reduced hand function (5 people)</li> </ul>                                                   | 100%<br>26.3%                        |
| Severity of pain <ul style="list-style-type: none"> <li>• Very severe (5 people)</li> <li>• Moderately severe (4 people)</li> <li>• Mildly severe (10 people)</li> </ul> | 26.3%<br>21.1%<br>52.6%              |
| Joint morning stiffness                                                                                                                                                  | Average of 16 minutes                |
| Impaired activities of daily living (6 people)                                                                                                                           | 31.6%                                |
| Family history of hand osteoarthritis                                                                                                                                    | Not known                            |
| ESR                                                                                                                                                                      | Generally below 20mm/hr (Westergren) |
| Rheumatoid factor                                                                                                                                                        | Negative in all                      |

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