Original Article

Prevalence of Symptoms of Self-reported Knee Osteoarthritis in Odo-Ogbe Community, Ile-Ife

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ABSTRACT

Background: Osteoarthritis, (OA) the most common of all the types of arthritis, is a significant public health problem which contributes greatly to disability in the elderly. Community-based prevalence studies of OA in South-Western Nigeria were scanty for referencing.
Objective: This study investigated the prevalence of symptoms of self-reported knee OA (KOA) in a heterogeneous community of Odo-Ogbe in Ile-Ife, South-Western Nigeria.
Methods: All houses in Odo-Ogbe community were numbered, and all odd numbered houses were selected for the study. Every adult individual of aged 35 years and above living in the selected houses were recruited for the study. The total number of participants was 119 individuals and all of them participated in the study by completing Western Ontario and McMaster Universities Osteoarthritis Index Questionnaire. Their anthropometric variables were also measured. Data were analyzed using descriptive and inferential statistics.
Results: There were 99 females and 20 males respondents that participated in the study. Forty-seven (39.5%) had knee pain and other KOA symptoms. Among those with KOA symptoms, six of them were males while 41 (87.2%) of them were females. There was a significant negative relationship ($P < 0.001$) between academic qualification and pain intensity (−0.292), stiffness (−0.336), and difficulty (−0.267) of participants with KOA. Age was also found to be significantly related ($P < 0.001$) with all symptom of KOA.
Conclusion: The prevalence of symptomatic KOA at Odo-Ogbe community is high, more female were affected, and many of those affected had family history of arthritis.

Key words: Knee osteoarthritis, Odo-Ogbe community, pain intensity, Western Ontario and McMaster Universities Osteoarthritis Index

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INTRODUCTION

Osteoarthritis (OA) is a significant public health problem due to its major impact on disability and associated morbidities in the elderly. With growing incidence of obesity and other predisposing factors, incidence of OA is expected to increase worldwide. The economic impact of OA has also been estimated to be as high as 3% of the gross domestic product because of work-days missed due to joint pain.[1] Apart from intrinsic joint changes, other symptoms of OA include decreased joint flexibility, pain and joint effusion, crepitus, deformities of joint components and loss of function.[2] It is said to be a chronic disease characterized by subchondral bone sclerosis which can lead to the formation of bone cysts and marginal osteophytes. Being a leading musculoskeletal cause of disability in elderly persons all over the world and a major cause of physical limitations and reduced quality of life, OA, among other types of arthritis, is the most common type of joint disease in adults worldwide.[2,3]

Arthritis, in the first place, refers to inflammation of joint components which could be due to various causes, thus being of different types, and affecting any joint, it is a disease that could affect both men and women. Murphy *et al*. estimated the lifetime risk of developing symptomatic knee OA (KOA) to be about 40% in men and 47% in women.[4] Felson *et al*., however, reported a slightly higher prevalence of radiographic changes of OA in women (34%) than in men (31%).[5] OA is a heterogeneous disorder, characterized by both degenerative and reactive changes in the joints; it is also thought to be driven by a spectrum of environmental and genetic factors.[5-7] OA, however, can affect any joint in the body, but weight-bearing

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joints have a higher likelihood of affectation, due to continual and extensive usage over time, in which several micro traumas culminates in eventual wearing away of joint cartilages. OA has a multifactorial etiology and can be considered as interplay between systemic and local factors such as old age, female gender, obesity, previous joint injury, repetitive overuse of joints, bone density, muscle weakness, and joint laxity among others, which contribute to the onset of OA, especially in weight-bearing joints.[8]

The knee joint is a large weight-bearing joint in the body.[9] Its components, the tibia and the femur, are the largest bone components together, that make up a joint in the human body together with the patella, which is the largest sesamoid.[9] These bony components articulate and are held in place by the contrasting actions of the two antagonist group of muscles and ligaments which strengthen the joint capsule. They receive and transfer the weight of the body from the hip to the ankle joints, respectively. The knee joint is exposed to a lot of traumas and is particularly susceptible to injury in active individuals. This factor predisposes such individuals to OA later in life.[9]

KOA contributes greatly to disability in the elderly.[10]

Symptomatic KOA occurs in 10% of men and 13% of women aged 60 years or older, which could increase due to aging in the population and the obesity epidemic.[11] The prevalence of KOA increases with age because of repetitive microtraumas, previous surgeries on the knee, metabolic or endocrinological factors, heredity, obesity as well as, joint overload.[2] Pain, as well as stiffness, reduced range of motion, and swelling; are principal features of KOA, but it is well-recognized that severity of pain equates poorly with radiographic or structural change in joint components.[8] In OA, pain could be present at rest or on active or passive movement. Pain is generally considered to be subjective. It is said to be whatever the experiencing person says it is and that is existing wherever he says it is.[12] Pain could be present early in the morning, after patient wakes which suggest the presences of inflammatory arthritis. Pain is said to be usually worse after activity, especially overuse of the affected knee. Overall, pain could be mild, moderate or severe. The study area, Odo-ogbe community, is a settlement area around Odo-Ogbe Market in Ile-Ife, a town in Osun State, Nigeria. The community is a small one, with dwellers whose means of livelihood is mainly trading in the nearby market, bearing the same name. This study looked out for how prevalent KOA is, among this very industrious people.

MATERIALS AND METHODS

Participants

Participant in the study were inhabitants of Odo-Ogbe community (both tenants and landlords) who are more than or of 30 years of age according to Akintomide *et al*.;[13] Odo-Ogbe is a heterogeneous community and semi-urban area in which people of different ethnic groups that have come for trading at Ile Ife are residing.[14]

Instrument

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) Questionnaire was used to collect information on the KOA, the symptom and the severity of the symptom of KOA.

The questionnaire was in three sections, but a section was added to assess the biodata of the participants.

The first section of the questionnaire assessed the age, sex, academic qualification, occupation, length of stay in the neighborhood, history of knee pain in the family, and anthropometric measurements of the participant. The second section examined the pain intensity of participants while carrying out some specific actions. The third section evaluated the stiffness of the knee while the fourth section assessed the extent of functionality of the knee joint.

WOMAC is an outcome measure questionnaire, which assesses the pain, joint stiffness, and physical function in an osteoarthritic knee and hip joint.[14] There were 3 sections in the questionnaire, consist of 24 questions in total, 5 questions addressed pain intensity, 2 examined joint stiffness and 17 assessed functions of the hip/knee joint.[14] The questionnaire was developed by Bellamy, of the Centre for Research on Disability and Rehabilitation Medicine, University of Queensland, Australia.[15]

In scoring WOMAC, there are descriptors for all items named as none, mild, moderate, severe, and extreme, which are numbered 0–4, respectively. Thus, each of the three sections has a possible value range of 0–20 for the pain section, 0–8 for the joint stiffness section and 0–68 for the level of physical function section. Accordingly, the total score available in this questionnaire is 96 and the probable range of scores for the questionnaire is 0–96. It has been tested and found to be highly reliable and can be taken in approximately 12 min.[14]

A bathroom weighing scale (Hanson, Ireland) was used to measure weight, and a calibrated wooden stadiometer was used to measure the height of participants.

A tape measure (Butterfly, China) was used to measure the body circumferences of participants.

Procedure

Ethical clearance with Number IPH/OAU/12/142 was obtained from the Health Research Ethics Committee, Institute of Public Health, Obafemi Awolowo University, Ile-Ife and the consent of each participant was also obtained. Permission was obtained from the Chairman, Land Lord Association and the Baale, community leader of the community before the commencement of the study. All houses in Odo-Ogbe community were numbered, and all odd numbered houses were selected for the study. Every adult individual of aged 35 years and above living in the selected houses were recruited for the study.

Participants were visited in their different residences, and WOMAC Questionnaire was administered to each participant.

The following anthropometric parameters were also measured: Height, weight, wrist circumference, waist circumference, and hip circumference.

Body mass index (BMI) (weight/height^2) in kg/m^2, waist to hip ratio (waist circumference/hip circumference), and frame size (height [cm]/wrist circumference [cm]) were calculated.

Data analysis

The data were analyzed using the Statistical Packages for Social Sciences (SPSS) version 17 (Illinois, Chicago).

Descriptive and Inferential statistics were used to summarize the data. Spearman correlation was used to examine the relationship between academic qualification and each of pain intensity, joint stiffness and physical functioning of knee joint function. Spearman product correlation was also used to assess the association between the occupations of the inhabitants of the study area and each of pain intensity, joint stiffness, and physical functioning. Pearson moment correlation was used to assess the relationship between the anthropometric parameters and each of pain intensity, joint stiffness, and level of physical functioning of participants with KOA.

RESULTS

Table I shows the physical characteristics of the respondents. The mean age was 54.11 ± 13.93 years. The minimum BMI was 17.36 kg/m^2. The mean height, weight, and BMI of the respondents were 1.58 ± 0.09 m, 71.83 ± 20.13 kg, and 28.60 ± 6.83 kg/m^2, respectively.

Table I: Physical characteristics of respondents (n=119)

Variables	Minimum	Maximum	Mean±SD
Age (years)	35.00	100.00	54.11±13.93
Height (m)	1.33	1.78	1.58±0.09
Weight (kg)	45.00	131.00	71.83±20.13
Wrist circumference/cm	10.5	20.00	16.23±1.56
Waist circumference/cm	53.00	139	96.78±18.27
Hip circumference/cm	57.00	154	101.82±17.60
Body mass index/kg/m^2	17.36	48.71	28.60±6.83
Waist to hip ratio	0.19	1.35	0.95±0.09
Frame size	8.10	14.70	9.79±0.95

SD: Standard deviation

Occupation and educational level of respondents

Presented in Table II is the assessment of occupation and educational level of respondents. There were 20 males, 78 traders, and 17 artisans among the respondents. Fifty-one (42.9%) had no formal education while 4.2% had first-degree education.

Table II: Occupation and educational level of respondents (n=119)

Variables	Number	Percentage
Sex		
Male	20	16.8
Female	99	83.2
Occupation		
Artisans	17	14.3
Civil servants	7	5.9
Retirees	6	5.0
Teachers	7	5.9
Traders	78	65.5
Others	4	3.3
Total	119	100.0
Academic qualification		
No education	51	42.9
Primary school	27	22.7
Secondary school	25	21.0
OND	4	3.4
NCE	5	4.2
First degree	5	4.2
Master's degree	2	1.6

OND: Ordinary National Diploma, NCE: National Certificate of Education

Incidence of knee osteoarthritis, and history of knee pain in the family

Table III reveals the incidence of KOA and history of knee pain in the family. Forty-seven among the respondent reported knee pain, stiffness and difficulty, 41 of them were female and 32 including male and female had a family history of knee pain.

Relationship between academic qualification, occupation, and each of pain intensity, joint stiffness and level of difficulty in the last 48 h

Shown in Table IV is the summary of the correlation matrix between the academic qualification, occupation of the respondents, and each of pain intensity, joint stiffness, and level of difficulty. Pain in the 48 h preceding the questionnaire administration has a significant but indirect correlation with academic qualification (r = −0.292, P < 0.001). Stiffness in 48 h preceding the questionnaire administration also has a significant but indirect correlation with academic qualification (r = −0.336, P < 0.000). Level of difficulty in 48 h also has a significant but indirect correlation with academic qualification (r = −0.267, P < 0.004).

Relationship between Anthropometric indices and pain intensity, joint stiffness, and level of difficulty

Table V shows the summary of the correlation matrix between age, height, weight, waist circumference, hip circumference, BMI, waist to hip ratio and frame size, and each of pain intensity, joint stiffness, and level of difficulty. Pain at 48 h that preceded the response to the questionnaire (P48) has a direct and significant correlation with age (r = 0.442, P < 0.00).

DISCUSSION

The main objective of this study was to survey the prevalence of the symptoms of knee OA among adults and older adults in Odo-Ogbe community in Ile Ife, Nigeria. The study observed that 39.5% of respondents reported KOA symptoms. Our finding was higher than that of Northeast China reported by Jiang *et al*. where they found a prevalence of 16.05%.[16] More so, Akinpelu *et al*. found a point prevalence of 19.6% in a

study of Igbo-Ora, a countryside at South-Western Nigeria.[17] The result of our study agreed with studies of Ogunlade *et al*. and Akinpelu *et al*. in their separate studies though hospital based, they affirmed that OA, commoner among women with knee mostly affected is widely seen in Nigeria.[18,19] Murphy *et al*. predicted a 44.7% risk of developing symptomatic KOA in North Carolina and Felson *et al*. documented 32.5% mean prevalence of KOA.[4,5] These were relatively similar with the findings of our study. The high preponderance of KOA among Odo-Ogbe dwellers may be due to certain reasons which may include overweight, high preponderance of women, and black race. Anthropometric data of our study population revealed that average dwellers of Odo-Ogbe community were overweight by body fat indices such as BMI (28.60 ± 6.83 kg/m^2), waist circumference (98.78 ± 18.27 cm), and waist to hip ratio (0.95 ± 0.09). Jiang *et al*. in their study asserted that among the risk factors for developing KOA were sex and increase in BMI.[16] In addition, Toivanen *et al*. in their study found a strong connection between occurrence of KOA and higher values of BMI.[20] Dillon *et al*., a study in the USA submitted that there is higher preponderance of KOA in Africa- Americans than in Caucasians pointing to the effect of race as one of the risk factors in the occurrence of KOA.[21]

Another reason for high prevalence of KOA in our study was that the study population was majorly traders with large percentage been female. Studies have shown that frequent bending which characterized some occupation including trading is a major risk factor for developing KOA.[22,23] With respect to female gender, research on KOA from Framingham submitted that occurrence of KOA women is as high as double than of men. Most of these women with KOA were at their postmenopause age which is a pointer that hormone especially estrogen may be implicated as a pivotal in the development of OA.[24] Our study observed further that majority of our respondents had family history of knee pain. Researches have shown a strong link between genetics and chances of development of KOA which is supported by our findings.[5-7,25,26]

There was higher prevalence of KOA among female in our study. Similar finding was reported in Igbo-Ora South-Western Nigeria, by Akinpelu *et al*.[17] Also, the study by Lawrence *et al*. reported that OA prevalence increased with age and affected the hands and knees of women more frequently than men.[27] Felson *et al*. and Zhang and Jordan also buttressed the point that the condition is basically more common in women than men.[5,8] It may be inferred that large percentage of the dwellers in the study community were female. The community is very close to the market which is known for trading, and there is a strong association between female gender and trading especially among the Yoruba race, this may be one of the reasons for higher prevalence of KOA in this community.

The study observed an inverse relationship between academic qualification and pain intensity, joint stiffness and difficulty experienced by the respondents 2 days before the study. It implied that as academic qualification increases, expression of symptoms of KOA decrease. This is because as academic qualification increases the higher the tendency of individual to be abreast of information which may increase the knowledge of prevention and management of KOA. Increase in knowledge especially in KOA will assist individual to take preventive measures to alleviate pain better than individual with less education.

Age has a moderate and direct correlation with each of pain, stiffness and difficulty of respondents, which shows that as age increased, a self-report of the presence of KOA may increase. Researches have reported that increased age has positive influence in occurrence of KOA.[28,29] Increase in age has been assumed to have a negative effect on the self-protecting ability of a joint to protect itself from biomechanical stress. Possibly due to thinning

Table III: Incidence of knee osteoarthritis and history of knee pain in the family of respondents

Variables	Frequency *n* (%)
Incidence of knee osteoarthritis	
Knee pain, stiffness and difficulty	47 (39.5)
No pain, stiffness and difficulty	72 (60.5)
Knee pain of each sex	
Male with knee pain	6 (30)
Female with knee pain	41 (41.4)
Family history of knee pain	
Yes	79 (66.4)
No	40 (33.6)
Yes to family history of knee pain (with pain)	32 (40.5)
Yes to family history of knee pain (with no pain)	47 (59.5)

Table IV: Spearman Rho correlations showing the relationship between academic qualification, occupation, and P48, S48, D48 (*n*=119)

Variables	P48		S48		D48		Ac qual		Occup	
	R	*P*	*R*	*P*	*R*	*P*	*R*	*P*	*R*	*P*
P48	1.000	0.000								
S48	0.818	0.000	1	0.000						
D48	0.973	0.000	−0.816**	0.001	1	0.000				
Ac qual	−0.292**	0.001	−0.336**	0.001	−0.267**	0.001	1	0.000		
Occup	0.122	0.188	0.011	0.238	0.142	0.135	−0.284	0.002	1	0.000

** Significant at $P < 0.001$. *R*: Correlation coefficient, *P*: Alpha level i.e level of Significant. P48: Pain in the last 48 h preceding the response to the questionnaire, S48: Muscle stiffness in the last 48 h preceding the response to the questionnaire, D48: The level of difficulty in the last 48 h preceding the response to the questionnaire

Table V: Spearman Rho correlations showing the relationship between anthropometric indices and each of P48, S48, and D48 (n=119)

Variables	P48		S48		D48	
	R	*P*	*R*	*P*	*R*	*P*
Age/years	0.442**	0.000	0.345**	0.000	0.421**	0.000
Height/m	−0.022	0.816	−0.058	0.530	−0.024	0.796
Weight/Kg	−0.027	0.768	0.069	0.457	0.013	0.893
Waist Circumference/cm	−0.031	0.736	0.053	0.568	−0.012	0.894
Hip Circumference/cm	0.024	0.793	0.112	0.229	0.005	0.953
BMI/Kg/m2	0.087	0.346	0.166	0.072	0.131	0.158
Waist to hip ratio	0.107	0.250	0.102	0.272	0.124	0.179
Frame size	0.140	0.131	−0.056	0.547	0.075	0.422

**Significant at $P < 0.001$. *R*: Correlation coefficient, *P*: Alpha level i.e., level of significant. P48: Pain in the last 48 h preceding the response to the questionnaire, S48: Muscle stiffness in the last 48 h preceding the response to the questionnaire, D48: The level of difficulty in the last 48 h preceding the response to the questionnaire

of the noncalcified cartilage or an increased joint laxity, which can predispose to injury through aberrant joint loading, past injury with resultant biomechanics, or other age-related factors.[27,28] This precludes that OA is more prevalent among older adults, as stated in the works of Dillon *et al*. that adults above age 60 years have this condition.[21] This, however, does not nullify the fact that younger adults do have KOA, and it just shows that the condition is usually not widespread among the younger adults.

CONCLUSION

From this study, it can be concluded that there is a high prevalence of KOA among Odo-Ogbe inhabitants. Females were more affected than males, and the level of education was inversely related to the report of KOA.

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Conflicts of interest

There are no conflicts of interest.

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