PREVALENCE AND PATTERN OF KNEE OSTEOARTHRITIS IN A NORTH EASTERN NIGERIAN RURAL COMMUNITY

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ABSTRACT

Objectives: **To investigate the prevalence and pattern of symptomatic knee osteoarthritis (OA) in a rural Northeastern community in Nigeria and to determine the rural dwellers' beliefs about the causes of knee OA and their health-care seeking behaviour.**
Design: **Cross sectional descriptive survey.**
Setting: **A rural Northeastern community in Nigeria.**
Subjects: **One thousand four hundred and three adults aged ≥30 years.**
Results: **Two hundred and twenty nine (170 males, 59 females) participants aged ≥30 years were diagnosed as having knee OA, giving a point prevalence of 16.3%. The prevalence of symptomatic knee OA was 40.1% for females and 13.5% for male participants. For participants aged ≥40 years, the prevalence was 20.6%. Knee OA severity was significantly higher in participants aged ≤50years than those aged ≥60 years (P<001). Female participants had significantly more severe knee OA than males (p=0.000). Obese participants by BMI classification (p<0.001) and percent body fat classification (p< 0.001) had significantly more severe knee OA than participants who were overweight or with normal weight. The beliefs of participants about the causes of knee OA are old age (37%), evil spirits (22.2%) and heredity (19.2%). Traditional medicine was the most common health care services utilized by participants and doctor's consultation was the least.**
Conclusion: **The prevalence of symptomatic knee OA in this Northeastern Nigerian rural community is 16.3% for adults aged ≥30 years and 20.6% for those aged ≥40 years. Prevalence is higher in females, increases with age and increasing body adiposity. Healthcare seeking behaviour of adults in this community is poor.**

INTRODUCTION

Osteoarthritis (OA) is one of the most chronic and degenerative joint diseases and a major cause of pain in the elderly (1). It is a leading cause of disability, affecting 60-70% of the population older than 60 years. The worldwide prevalence estimate for symptomatic OA is 9.6% among men and 18% among women (2). Although OA occurs all over the world, the pattern and prevalence of the disease vary among populations (2).

Many hospital-based studies have shown that OA is common in Nigeria (3-7). A female preponderance (ratio 3.5-5:1) has been reported (4,7) and the knee has been found to be the most commonly affected joint among Nigerians, accounting for 65%-78% of cases (6-7). It has also been reported that multiple joint affectations and involvement of joints of the extremities are uncommon among Nigerian patients (3,4,6). Neither the prevalence nor the real burden of OA in Nigeria is truly reflected by these studies because they were hospital-based. According to Dawson *et al* (8), majority of individuals with OA resign to fate, seeking no medical care at all based on their belief that OA is an unavoidable disorder of old age for which nothing or little could be done. Therefore, people with OA in this category may elude hospital-based data. Community-based studies on the prevalence and pattern of OA in Nigeria are few. A study by Akinpelu *et al.* (9) reported the point prevalence of symptomatic knee OA to be 19.6% and a female preponderance in the ratio of 1.2:1 for a rural community in South Western Nigeria. The present study investigated the prevalence and pattern of knee OA in a rural community located in another geographical zone in Nigeria, the North East. The study also sought to determine the participants' beliefs about the causes of knee OA and their health-care seeking behaviour. We hypothesized that gender, age, adiposity indices, occupation and education would have no significant difference on the knee OA severity scores of individuals with knee OA.

MATERIALS AND METHODS

The study protocol was approved by the Research and Ethical Committee of the University of Maiduguri Teaching Hospital. The study was conducted in Konduga Local Government Area (LGA) because it is a plain, making it easily accessible, unlike many other LGAs in the state. The LGA is made up of four towns (Konduga, Auno, Dalori and Popomari) and 24 villages (NPC, 1991), giving a town to village ratio of 1:6. Based on this ratio, the study was conducted in one town and six villages selected using simple random sampling. The selected town was Konduga and villages were Njimtilo, Jakana, Kawuri, Mandalari, Moronti and Shuwari. Permission to conduct the study was obtained from the Chairman of Konduga LGA and the heads of the selected villages. Prior to the study, the sample size was estimated to be 1525, using the standard equation by the World Health Organization (10) and prevalence rate of 19.6% reported of a Southwestern Nigerian community by Akinpelu *et al* (9). A chief administrative officer with the Konduga Local Government, a Kanuri by tribe and an indigene of Konduga, who is also proficient in Hausa language assisted in locating the wards in Konduga town and the selected villages. He helped initiate social interaction with the locals of these communities. A standard equation recommended by the WHO (10) was used to estimate the sample size. The average household size and the proportion of Konduga LGA populace that was aged ≥30 years was extracted from the 1991 census results. In Konduga town, 12 out of 23 wards were randomly selected and all households in each selected ward were visited. In each selected village, all households were also visited. In each household where permission was given to collect data, all adults aged ≥30 years were interviewed and assessed. A previous study from Nigeria has shown that only 2% of patients with OA were aged below 30 years (6). In addition, previous studies on the prevalence of rheumatic diseases from other parts of the world involved adults aged ≥30 years (10-11).

The procedure of the study was explained to each participant in both Kanuri and Hausa languages (predominant languages in the local government area) and his/her informed consent was obtained. Participants were interviewed to collect socio-demographic data and health-seeking behaviours, using a pre-validated, structured questionnaire which was available in both Hausa and Kanuri languages (the two common indigenous languages of North-eastern Nigeria). The translations were by language experts; each was taken through one round of back-translation and pre-testing (12).

Participants' body weight and height were measured using a portable weighing scale (Seca 762, Vogel and Haike, Germany) and height metre (Invicta Plastic Limited, England) respectively. Their percent body fat was also measured using an electronic fat monitor (Omron HBF 306C). Participants were asked if they had knee pain. Those who reported knee pain, persisting for most days of the previous month and rated it ≥2 out of 10 on the Box Numerical Scale, were physically examined using the clinical criteria of the American College of Rheumatology (ACR) for the diagnosis of knee OA. The physical examination was performed by one of the authors (MSM) and it included assessment of bony enlargement, joint crepitus (patello-femoral or tibio-femoral), joint line tenderness, effusion, superficial joint tenderness, local warmth and patello-femoral joint compression (13). Participants who fulfilled the ACR clinical criteria for knee OA were interviewed to collect information on clinical history of knee OA, using a pre-tested questionnaire. The Lequesne Algofunctional Index of Knee was then administered through interview to assess severity of knee OA. Participants with bilateral knee OA were asked to base their responses on the more severely affected knee.

Data were summarized using mean, standard deviation and estimated prevalence of knee OA was calculated as percentage of the total number of adults surveyed. Mann-Whitney U test statistic was used to analyze the influence of sex on mean knee OA severity scores. Kruskal-Wallis test statistic was used to analyze the influences of age, occupation, education and adiposity indices on mean knee OA severity scores. Least Significance Difference (LSD) was used for post hoc analysis. The Statistical Package for Social Sciences 13.0 for windows (SPSS Inc, Chicago) was used for analyses.

RESULTS

A total of 1403 (1256 males, 147 females) adults, aged 43.9±121.8 years participated in this study. Most participants were farmers (62.8%) and non smokers (98.8%), with no formal education (86%). Majority (97.4%) were married and most (97.4%) practiced Islamic religion (Table 1). Participants' mean weight was 63.0±11.2kg and their mean height was 1.7±0.1m. Their mean body mass index was 22.0±3.6 and the mean percent body fat was 22.3±6.4.

Two hundred and twenty nine out of the 1403 participants were diagnosed with knee OA, giving a prevalence of 16.3%. The prevalence of symptomatic knee OA was 40.1% for females and 13.5% for males, giving a female to male ratio of 3:1. All the 229 participants with knee OA experienced knee pain and over 90% presented with joint line tenderness, joint stiffness and absence of palpable warmth. Only 51% were aged 50 years and above, joint crepitus was present in 72% while palpable bony enlargement was found in only 38% of participants with knee OA. Seventy two percent of participants with knee OA had single joint affectation. Symptomatic knee OA prevalence increased with age, peaking at age group 60-69 years (38.6%). In the occupational group, the highest prevalence was recorded among the home makers (38.3%) and by educational status; secondary school leavers had the highest prevalence of knee OA (22.2%). All the few smokers had knee OA (Table 2).

Table 1

Frequency distribution of participants by socio-demographic variables

Variable	Category	Frequency (n=1403)	%Total
Sex	Male	1256	89.5
	Female	147	10.5
Age group	30-39	584	41.6
	40-49	368	26.2
	50-59	210	15.0
	60-69	166	11.8
	≥70	75	5.4
Marital status	Single	21	1.5
	Married	1366	97.4
	Widowed	13	0.9
	Divorced	3	0.2
Religion	Islam	1366	97.4
	Christianity	35	2.5
	Traditional religion	2	0.1
Occupation	Farmers	882	62.9
	Civil servants	150	10.7
	Traders & Artisans	145	10.3
	Homemakers	141	10.0
Education	None	1207	86
	Primary	28	2.0
	Secondary	90	6.4
	Tertiary	78	5.6
Smoking	Smokers	1386	98.8
	Non smokers	17	1.2

Table 2

Socio-demographic distribution of total sample and group of individuals with prevalence of knee OA

Category	Frequency in total sample (n=1403)	Participants with knee OA (within category)	Prevalence of knee OA within each category	% of total number of participants with knee OA (n=229)
Sex				
Male	1256	170	13.5	74.2
Female	147	59	40.1	25.8
Age group				
30-39	584	60	10.3	26.2
40-49	368	52	14.1	22.7
50-59	210	29	13.8	12.7
60-69	166	64	38.6	27.9
≥70	75	24	32.0	10.5
Occupation				
Farmers	882	113	12.8	49.3
Civil servants	150	29	19.3	12.7
Traders & Artisans	141	54	38.3	23.6
Homemakers	145	25	17.2	10.9
Others	85	8	9.4	3.5
Education				
None	1207	196	16.7	85.6
Primary	28	3	10.7	1.3
Secondary	90	20	22.2	8.7
Tertiary	78	10	12.8	4.4
Smoking				
Smokers	1386	212	15.3	92.6
Non smokers	17	17	100	7.4

Table 3
Prevalence of knee OA by adiposity indices

Category	Frequency in total sample (n=1403)	Participants with knee OA (within category)	Prevalence of knee OA within category	% of total number of participants with knee OA (n=229)
Body Mass Index				
<18.5	152	11	7.2	4.8
18.5-24.9	1034	151	14.6	66.0
25-29.9	167	45	26.9	19.7
30-34.9	35	12	34.3	5.2
35-39.9	11	6	54.5	2.6
40 and above	4	4	100	1.7
Percent Body Fat				
Low	13	0	0	0
Normal	100	6	6.3	2.6
Over fat	535	55	10.3	14.0
Obese	755	168	22.3	73.4

Table 3 depicts that the prevalence of knee OA increases as adiposity indices (BMI and percent body fat) rises. Most (76.4%) participants with symptomatic knee OA reported no family history of knee OA and 42.8% reported history of previous injury. The beliefs of participants about the causes of knee OA are old age (37%), evil spirits (22.2%), heredity (19.2%), infection (7.4%), trauma (5.7%). Eighteen participants had no idea on the cause of their disease. The most common health care service utilized by the participants with knee OA was traditional/herbal medicine (48%) and only one of those who sought orthodox medicine had drugs prescribed by a medical doctor. Only four participants with knee OA were using walking sticks (Table 4).

sex, age, occupational category, body mass index, percent body fat had significant influence on knee OA severity (Table 5). Severity of knee OA was higher in females than in males and in older adults than younger ones. Educational attainment had no significant influence on the severity of knee OA. Least Significance Difference (LSD) revealed the following: home makers had significantly higher severity of knee OA than farmers ($p = 0.014$) and the category of traders, fishermen and artisans ($p = 0.006$); the obese by BMI classification had significantly more severe knee OA than other categories of the participants with the disease; also the obese by percent body fat classification had significantly higher severity of knee OA than other categories.

Table 4
Frequency distribution of health seeking behaviours of participants with knee OA

Types of treatment	Frequency	% of total (n=229)
Types of treatment (n=229)	66	28.8
None	110	48.0
Traditional medicine	53	23.2
Orthodox medicine (n=53)		
Oral drugs	41	77.4
Drugs by injection	5	9.4
Topical cream	7	13.2
Drug prescription (n=53)		
Doctor	1	1.9
Friends	15	28.3
Relatives	4	7.5
Self	3	5.7
Patent medicine sellers	30	56.6
Use of assistive devices		
No	225	98.3
Yes	4	1.7

Table 5
Influence of socio-demographic variables on knee OA severity

Variable	No. (n =229)	LAKIS †††	Test Statistic	P-value
Sex				
Male	170	6.44±3.11	-4.049†	0.000*
Female	59	8.42±3.58		
Age group				
30 – 39	60	5.37±3.06		
40 – 49	52	6.41±3.32	9.776††	0.000*
50 – 59	29	6.71±2.91		
60 – 69	64	8.10±3.00		
70 and above	24	9.25±3.29		
Occupation				
Farmers	113	6.66±3.35		
Civil servants	29	6.72±3.79		
Homemakers	54	8.01±3.11	2.750††	0.029*
Traders & Artisans	25	5.78±2.38		
Others	8	8.25±4.21		
BMI				
<18.5	11	6.82±1.83		
18.5 – 24.9	151	6.54±3.06		
25 – 29.9	45	7.42±3.56	4.822 ††	0.000*
30 – 34.9	12	7.29±3.52		
35 – 39.9	6	8.42±3.75		
40+	4	14.00±5.60		
%Body fat				
Normal	6	5.83±1.33		
Over fat	55	5.25±2.02		
Obese	168	7.54±3.54	10.996 ††	0.000
Educational level				
None	196	6.88±3.25		
Primary	3	6.83±3.33	0.238††	0.870
Secondary	20	7.53±3.64		
Tertiary	10	7.15±4.88		

Keys: * = significant at p<0.05; † = Mann-Whitney U test; †† = Kruskal-Wallis test.
LAKIS ††† = Lequesne Algofunctional Knee Index Score (Knee OA Severity Scores)

DISCUSSION

The majority (89.5%) of the participants were males. The reason for this, which was the major limitation we experienced, was restricted access to women in confinement or purdah. In the Northeastern part of Nigeria, Islam is the most widely practiced religion and for this reason, most women in this part of the country are in purdah and are not allowed to go out of the house. In addition, participation in the study was refused in some households for fear of being screened for Human Immuno-deficiency Virus (HIV). These individuals claimed they would rather die than know their HIV status. This was despite detailed explanation of the purpose of the study. Most participants (86%) in this study had no formal education. This implies a high level of illiteracy in this part of Nigeria. In addition the majority are farmers, traders and artisans, indicating the rural nature of Konduga LGA.

The prevalence of symptomatic knee OA in this study (16.3%) is slightly lower than the 19.6% reported in a similar study from South Western Nigeria (9). The difference in prevalence between these two studies may be explained by the fact participants were aged ≥30 years in this study, while they were aged ≥40 years in the study from Southwestern Nigeria. Furthermore, 169 out of 819 participants who were aged ≥40 years had symptomatic knee

OA in the present study, giving a prevalence of knee OA for this group of participants as 20.6%, which is fairly close to that reported by Akinpelu *et al* (9). The prevalence of knee OA increased with age, peaking at 60-69 years age group. This finding is similar to that of Akinpelu *et al* (9), who also reported peak prevalence of symptomatic knee OA for 60-69 years age group. This finding supports the fact that OA is age related and is more common in older population (1,14,15). The finding that the prevalence of symptomatic knee OA is 38.6% for age group 60-69 years and 10.3% for age group 30-39 years corroborates the findings of Lawrence *et al* (16) that clinical OA in persons aged 60 years or older is approximately four times that of persons aged 30 years and below. Seventy two percent of the participants with knee OA had unilateral affectation. This is in conformity with many previous hospital-based studies in Nigeria (3,4,6,7). The finding that all the 17 smokers in this study had symptoms related to knee OA supports previous observation that smoking is significantly associated with symptomatic knee OA (8,17).

Several studies (4,6,7,18-21) have demonstrated that OA occurs more frequently in women than in men. The female to male ratio deduced in this study is similar to those reported by previous hospital-based studies on OA in Nigeria (4,6,7). However, the female to male ratio of 3:1 reported in this study is much higher than that of 1.2:1 documented by Akinpelu *et al,* (9) in the study from Southwestern part of Nigeria. This higher ratio may be due to the fact that fewer females participated in this study. It is not surprising that OA is more prevalent among homemakers than other occupational groups because homemakers are generally women.

Almost 25% of the participants with symptomatic knee OA reported family history of the disease. This supports the fact that OA has some genetic dispositions. Spector *et al* (22) reported that genetic factors account for at least 50% of cases of hand and hip OA, and a smaller percentage in the knee. The finding that 43% reported history of injury and infection gives credence to the assertion by Adebajo (4) that many OA in the tropics are secondary to infections or injuries.

The most common health seeking behaviour of these rural dwellers was traditional medicine. In addition, only one participant with knee OA reported to have received drug prescription from a medical doctor among the few who used orthodox medicine. Most received their prescription from the patent medicine store owners who are not qualified to prescribe drugs. This implies wrong use and possibly abuse of drugs. Akinpelu *et al* (9) also reported similar poor healthcare seeking behaviours among rural dwellers in Igbo-Ora, Southwestern Nigeria. This poor healthcare seeking behaviour may be explained by the fact that in Nigeria, accessibility to healthcare in hospitals is generally poor particularly in rural areas (23,24). It may also be explained by the fact that majority of them had no formal education. Only four (1.7%) of the participants with knee OA were using walking sticks. Those who do not use any assistive device said they would never use them. The same attitude to the use of assistive devices was reported by Akinpelu *et al* (9) among residents of Igbo-Ora in South Western Nigeria. The Nigerian society probably views the use of assistive devices as a sign of incapacitation and/or old age.

The findings of this present study differed from that of Akinpelu *et al* (9) in that females had significantly higher severity score than males. The study by Akinpelu *et al* (9) showed no significant difference between the severities of the disease in both sexes.

Results indicated that severity of knee OA increased with increasing body adiposity. This finding corroborated those of many previous studies (6-8, 20). Toda *et al* (25) reported that reduction in percent body fat resulted to a decrease in mean knee OA severity scores of the disease. The implication of these findings is that weight reduction combined with well programmed moderate exercises may be a panacea for reducing the symptoms of knee OA and improving functions in an established disease. This study found no significant difference between educational group and mean knee OA severity scores of participants with knee OA. This is in tandem with the observation that perception of musculoskeletal pain had no association with educational level (26).

CONCLUSION

The prevalence of symptomatic knee OA in this Northeastern Nigerian rural community is 16.3% for adults aged ≥30 years and 20.6% for those ≥40 years. Prevalence is higher in females, increases with age and increasing body adiposity. Healthcare seeking behaviour of adults in this community is poor and their major belief about the cause of knee OA is old age.

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