

AN ASSESSMENT OF OSTEOARTHRITIS PREVALENCE IN THE UNIVERSITY OF BENIN TEACHING HOSPITAL

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Abstract

Background: Osteoarthritis (OA) is a degenerative joint disease that affects virtually all joints in the body. It is the most common form of arthritis and mainly affects the older population.

Objective: To assess the prevalence of osteoarthritis at the University of Benin Teaching Hospital.

Methods: This retrospective study was conducted at the University of Benin Teaching Hospital. Information was obtained from the case notes (between January 2013- December 2018) at the records department using a data collection sheet. Data were analysed using SPSS version 24.0 and expressed in frequencies and percentages. Inferential statistics were done using graph pad instat, and a P-Value ≤ 0.05 was interpreted to be statistically significant.

Results: OA cases accounted for 9.34% of patients who visited the Orthopedic and Rheumatology Departments within the period under review. Prevalence was higher in females (68.7%) and patients between 60-69 years (32.4%). Hypertension was the most comorbid disease (66.5%), followed by diabetes (15.4%) and peptic ulcer disease (14.3%). The lumbar joint (47.9%) was the most commonly affected. Pain was experienced by all the patients, while 98.5% experience limitation in the range of movement.

Conclusion: The prevalence of osteoarthritis at the orthopaedic and Rheumatology Department of the University of Benin Teaching Hospital is 9.34%. It was found to be most prevalent in the elderly and in the lumbar vertebra joints.

Keywords: Osteoarthritis, Prevalence, Joints, lumbar, knee, Hospital

Introduction

Osteoarthritis (OA) is the most common form of arthritis, which often affects the hands, hips, knees, feet, and spine and is also a leading cause of disability^[1]. Osteoarthritis is a long-term chronic disease characterised by the deterioration of articular cartilage, which results in bones rubbing together. Among adults 60 years of age or older, the prevalence of symptomatic knee OA is approximately 10% in men and 13% in women. OA was the second cause of disability around the globe in 2015, following mental and substance use disorder^[2] and the single most common cause of disability in older adults as 50% of adults older than 65 years are affected by the disease. This makes it the most prevalent disorder of articulating joints in humans^[4]. OA prevalence has varied across different studies^[5] depending on the definition used, with radiographic definition yielding a higher prevalence than those based on self-report or symptomatic definition^[6]. Although the radiographic definition is the most objective, it has some shortcomings in validity and reliability^[7:8] as a large proportion of these patients do not show any symptoms or disability^[9], and it is unclear whether such people should be considered as having OA.

OA is more prevalent in women than in men, especially OA of the hip, knee and hand, as women suffer from a more progressive decline in joint space and loss of cartilage with age^[10:11]. However, women are less likely to develop cervical spine OA^[5], while men have a higher prevalence of radiographic hip OA than women^[12]. OA prevalence is rising due to population ageing and related factors such as obesity and other lifestyle predisposing one to the disease. Although arthritis has not been associated with increased mortality, reduced physical activity and the use of NSAIDs for OA pain management has been significantly associated with increased mortality resulting from heart disease^[13].

Several factors have been associated with the pathogenesis of OA, which can be classified as modifiable and non-modifiable factors. The modifiable factors include BMI, infection ^[14], physical activities ^[15;16], injury and others, while the non-modifiable risk factors include: age, sex, family history, race ^[17]. The knee joint is the most commonly affected joint in the body ^[18;19], accounting for more than 80% of the disease's total burden ^[20]. This is because the knee bears the most body weight and is involved in many body movements. Other commonly affected joints are the cervical, hip, carpometacarpal, and other joints. The growing age of people in developed and developing countries occasioned by advancements in medicine and technology, as well as increased risk factors for OA, predominantly obesity and inactivity, are pointers that the number of people living with hip or knee OA will escalate in the coming years ^[21;22]. Hence the need to assess the prevalence of osteoarthritis.

Methods

Setting

This retrospective study was conducted at the records sections of the Orthopedic and Rheumatology Departments of the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. These departments have both in-patient and out-patient sections. UBTH is a Federal Government owned tertiary healthcare institution established on May 12th, 1973. It has a capacity of over 750 bed spaces.

Study Sample and Size

The study sample was drawn from all the patients (24,625) that visited the Orthopedic and Rheumatology Departments of the hospital between January 2013 and December 2018, as obtained from the Medical Records Department.

Sample Size and Sampling Technique

The sample size consists of all the patients diagnosed with OA within the period under review. A systematic sampling technique was used with a sampling interval of 5 case notes, i.e. for every 5 case notes, one case note was retrieved and used for the study.

Inclusion Criteria

All patients diagnosed with OA during the period under review were included in the study.

Exclusion Criteria

Patients who were not diagnosed with OA were excluded from the study.

Ethical Approval

Ethical approval was obtained from the Research and Ethics committee of the University of Benin Teaching Hospital with approval number ADM/E 22/A/VOL. VII/14783

Data Collection

The case notes of the patients diagnosed with OA within the review period were retrieved from the medical records department. Using a data collection sheet, relevant information about the patients was obtained from the case notes. The data collection sheet consists of two sections. Section A collected the socio-demographic data, e.g. sex, age, occupation, marital status, educational level, family history of osteoarthritis, smoking and alcohol consumption. Section B obtained information about the prevalence and pattern of osteoarthritis, such as the date of diagnosis, the number of joints affected, duration of pains, symptoms observed, comorbid conditions, previous history of injury and surgical procedure(s) undergone.

Data Analysis

Data collected were entered into a Microsoft excel spreadsheet and then imported into the statistical package for social science (SPSS) version 24.0 for analysis. Data were expressed in frequencies and percentages. The effect

of socio-demographic factors on prevalence patterns was assessed using cross-tabulation. P-values were obtained using graph pad instat, and values ≤ 0.05 were interpreted as statistically significant.

Results

From the number of cases sampled (4,925), OA cases accounted for 9.34% of patients that visited the Orthopedic and Rheumatology Departments within the period under review (2013-2018). Osteoarthritis percentage prevalence was highest in 2015 (13.21%) and lowest in 2016 (6.42%), as shown in Table 1.

Table 1: Yearly prevalence of osteoarthritis between 2013-2018.

Year	Total patient population	Number of samples	Osteoarthritis prevalence (%)
2013	2,985	597	49 (8.2)
2014	2,270	454	51 (11.23)
2015	2,385	477	63 (13.21)
2016	4,595	919	59 (6.42)
2017	6,125	1,225	101 (8.24)
2018	6,265	1,253	137(10.98)
Total	24,625	4,925	460 (9.34)

Table 2 shows the socio-demographic factors of patients with OA. There appears to be a female preponderance in prevalence (68.7%). Patients between ages 60-69 years accounted for the highest number of cases (32.4%), followed by patients between ages 50-59 years (21.3%). The younger individuals, i.e. those below 30 years, were the least affected as they accounted for only 4.8% of the cases. Most of the patients were married (327, 71.1%), while 88 (19.1%) were widowed. Smokers accounted for 5.7%, while 134 (29.1%) drank alcohol. The majority of the participants were self-employed (183, 39.8%). Hypertension was the most comorbid condition seen in the patients (66.5%). This was followed by diabetes (15.4%) and peptic ulcer disease (14.3%).

Table 2: Socio-demographic data of patients with OA

Socio-demographic data	Variables	Frequency	Percentage(%) Prevalence
Sex	Male	144	31.3
	Female	316	68.7
Age (Years)	<30	22	4.8
	30-39	27	5.9
	40-49	50	10.9
	50-59	98	21.3
	60-69	149	32.4
	70-79	90	19.6
	≥ 80	24	5.2
Smoking Status	Yes	26	5.7
	No	434	94.3
Alcohol consumption	Yes	134	29.1
	No	326	70.9
Comorbidity	Hypertension	181	66.5
	Diabetes	42	15.4
	Peptic ulcer	39	14.3
	Asthma	4	1.5
	Glaucoma	1	0.4
	Students	24	5.2
	Government job	69	15.0
Occupation	Self-employed	183	39.8
	Unemployed	90	19.6
	Private Sector	4	0.9
	Retired	90	19.6

About 88% of patients (403) were found to have osteoarthritis of one joint, while only 1(0.2%) patient had the disease at four different joints.

Table 3: Number of joints affected per patient.

Number of joints	Frequency	Percentage (%)
1	403	87.6
2	51	11.1
3	5	1.1
4	1	0.2
	460	100

Lumbar vertebrae joints were the most frequently affected joints of the body (47.9%). This was followed by the knee joints (28.6%) and the hip joints (8.8%). The thoracic and carpometal carpal joints were the least affected, accounting for 1% of each case. Female patients accounted for 70.04% of the total joint affection.

Table 4: Distribution of joints affected.

Joints affected	Total Number of joints	Percentage (%)
Lumbar vertebrae	251	47.9
Knee	150	28.63
Hip	46	8.78
Elbow	2	0.38
Shoulders	15	2.86
Ankle	11	2.1
Wrist	3	0.57
Cervical vertebrae	42	8.02
Thoracic vertebrae	1	0.19
Carpometal carpal	1	0.19
Proximal interphalangeal	2	0.38
Total	524	100

All the patients experienced pains, while 98.5% experienced limitation in the range of movement and the least reported symptom was crepitus (47, 10.2%).

Table 5: Distribution of most frequently affected joints based on demographic data

Variable	Frequency	Lumbar	Knee	Hip	Cervical	p-value
Age(years)						
0-39	40	13(32.5)	10(25)	11(27.5)	6(15)	0.0013
40-59	157	84(53.5)	45(28.66)	14(8.92)	14(8.92)	
≥60	292	154(52.74)	95(32.53)	21(7.19)	22(7.53)	
Sex						
Male	147	91(61.90)	23(15.65)	20(13.61)	13(8.84)	0.0001
Female	342	160(46.8)	127(37.13)	26(7.60)	29(8.48)	
Occupation						
Student	20	4(20)	7(35)	5(25)	4(20)	0.0025
Govt/Private worker	69	44(60.27)	12(16.43)	7(9.59)	10(13.70)	
Self-employed	195	97(49.74)	67(34.36)	20(10.26)	11(5.64)	
Unemployed	101	52(51.49)	38(37.62)	6(5.94)	5(4.95)	0.0198
Retired	100	54(54)	26(26)	8(8)	12(12)	
Alcohol						
Yes	140	82(58.57)	35(25)	17(12.14)	6(4.29)	0.0198
No	349	169(48.42)	115(32.95)	29(8.31)	36(10.32)	

While patients that were aged 60years and above had the highest prevalence of OA of the lumbar vertebrae (154, 52.74%), knee (95, 32.53%), cervical vertebrae (21, 7.19%), and hip (22, 7.53%), females outnumbered their male counterparts also in all the joints. Self-employed participants had a higher frequency for lumbar (97, 49.74%), knee (67, 34.36%) and hip (20, 10.26%) joints, whereas the retired had a higher frequency for the cervical joints (12, 12%). For participants who drink alcohol, the disease prevalence was higher in lumbar joints (82, 58.57%) and lowest in cervical joints (6, 4.29%), whereas it was lowest in the hip joint (29, 8.31%) for non-drinkers. The p-value was less than 0.05 for all the variables. The lumbar vertebra was the most affected joint for smokers (18,75%) and non-smokers (233, 50.11%). However, further inferential analysis based on the joints affected was impossible due to samples being too few.

Discussion

This study assesses the prevalence of osteoarthritis at the University of Benin Teaching Hospital, Benin City. Hospital-based prevalence may be helpful when information on community-based prevalence is not readily available. Osteoarthritis prevalence in this study was found to be 9.34% within the period under review. This is

slightly higher than the value (8.9%) observed from a similar study conducted in Ibadan and Lagos between September 1999 to August 2002 by Akinpelu et al.^[19]. However, the OA prevalence rate is mainly dependent on the specific population and the diagnostic method used^[23]. Differences in prevalence may also be due to the genetic makeup and lifestyle of the study participants^[24]. A higher prevalence for women (68.7%) is consistent with other studies^[10,11,19]. This shows that women are more predisposed to OA, especially at older age^[18;19]. More so, the fact that women have been reported to have a better healthcare-seeking behaviour than men may also be responsible for the higher preponderance^[25;26]. Participants aged between 60-69 years recorded a higher prevalence of OA.

This finding corroborates that of Woolf and Pfleger^[27;28] that OA is a disease of the elderly leading to a significant clinical problem. However, this is contrary to the outcome of a study by Akinpelu et al., which stated that the peak age of disease prevalence was 50-69 years^[19]. The current belief that osteoarthritis is associated with age is hinged on the fact that degradation of the musculoskeletal structures due to age increases the risk of OA, as age alone does not cause OA. This is strongly supported by the multifactorial nature of OA pathogenesis and the knowledge that not all older adults develop OA and all joints in the body are not affected^[29]. Ageing is associated with calcification and crystal formation^[30], a decline in the ability to compensate for stress, development of bone marrow lesions, etc^[31]. Also, ageing leads to the accumulation of advanced glycation end products, which have been found to alter the biochemical properties of the cartilage, thereby making it more brittle^[32]. A P-value of 0.0013 shows that the association between age and the prevalence of osteoarthritis in the different joints is statistically significant.

A notable percentage of the participants consumed alcohol. This helps to corroborate the finding that an association exists between serum uric acid level and osteoarthritis incidence and progression^[33;34;35]. Alcoholic beverages, especially beer, are found to be very rich in purine, broken down in the body to form uric acid. This association may be based on the hypothesis that micro-particles formed by monosodium urate (MSU) crystals could induce low-level inflammatory reactions, which can worsen cartilage degradation and lead to OA progression^[36]. More so, several studies have found alcohol to be one of the potential risk factors for osteoarthritis^[37;38;39]. However, some studies have shown contrary views regarding the association between alcohol consumption and osteoarthritis^[40;41]. Hypertension was the comorbid disease condition with the highest frequency (66.5%) among the study samples. This may be so as hypertension is also a known disease of the elderly, and most drugs (NSAIDs) used in the management of osteoarthritis are known to be associated with cardiovascular diseases^[42;43]. Thereby necessitating cautious use of NSAIDs in patients with an underlying cardiovascular disorder.

The majority of the participants in this study were self-employed (39.8%), and these may constitute the set of people engaged in arduous jobs that requires extreme physical bodily exertion like twisting, climbing, squatting, lifting and bending, thereby supporting the claim of association between occupation and osteoarthritis prevalence^[5]. This group appears to have a significantly higher prevalence of OA. There have been contrasting reports on the effects of smoking on OA, as some studies have revealed an inverse relationship between smoking and OA^[44], while some have reported smoking to be a significant cause of cartilage loss and pain^[45]. However, in this study, non-smokers (94.3%) were less likely to present with OA.

The lumbar vertebrae joint, which was the most affected joint in this study (47.9%), carries the upper body's weight. This is in contrast to several other studies that reported the knee as the most affected joint^[46,47]. This was followed by hand joints^[6]. However, this study reported the knee joint as the second most affected joint. In addition, cervical spine OA was more prevalent in women than in men. This is contrary to the postulation by Johnson et al.,^[5] that cervical OA is more prevalent in men than in women. Pain, as reported by all the patients, is common amongst all OA patients as OA typically presents as joint pain. This is accounted for by neuronal activities in the pain pathway, which generates and exacerbates the feeling of pains^[48]. Pain is typically related to activity and resolves with rest. As the disease progresses, the pain becomes intense and impacts patients' ability to carry out activities of daily living. Limitation in the range of movement, which was the second most common symptom is usually due in part to pain and stiffness. However, an association has been found between knee flexion and osteophyte size and location and between knee flexion and joint space narrowing (JSN) in the lateral tibiofemoral compartment^[49]. Reduced knee movement is part of the European League Against Rheumatism (EULAR) recommendations for diagnosing knee OA^[50]. Crepitus, a crackling and grating sound during joint movement, was the least reported symptom. Although crepitus does not necessarily call for great concern, it may signal the onset of osteoarthritis.

Conclusion

The prevalence of OA in our study sample was found to be 9.34%. Osteoarthritis is a highly prevalent disease condition among the elderly, and the lumbar vertebra joint was the most affected across all age groups.

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