Section: Community Medicine

Original Research Article

A STUDY ON THE PREVALENCE OF KNEE OSTEOARTHRITIS AND ITS EFFECTS AMONG ADULTS AGED 50YEARS AND ABOVE IN A RURAL BLOCK IN SOUTH INDIA

Nalam Middleton A[1], Anu Mary Oommen[2], Alfred Job Daniel[3], Kuryan George[2]

[1]*Assistant Professor, Department of Community Medicine, Somervell Memorial CSI Medical College, Karakonam, India.*
[2]*Professor, Department of Community Medicine Health, Christian Medical College, Vellore, India.*
[3]*Professor, Department of Orthopedics, Christian Medical College, Vellore, India.*

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Corresponding Author:
Dr. Nalam Middleton A
Assistant Professor, Department of Community Medicine, Somervell Memorial CSI Medical College, Karakonam, India
Email: nalam_middleton@yahoo.com

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ABSTRACT

Background: Osteoarthritis (OA) is a major cause of global disability, especially in India, with symptomatic knee OA projected to rise due to aging and obesity. In areas lacking health facilities, there's a need for community-based diagnostic approach to enable early treatment. This study estimated the prevalence of knee OA among adults aged 50 years and above in villages of Tamil Nadu, India and also assessed quality of life and prevalence of depression among the affected.

Material and Methods: This community-based cross-sectional study was done among 300 adults aged 50 years and above. Ten villages with thirty subjects being selected from each village by simple random sampling. The American College of Rheumatology (ACR) clinical criteria questionnaire was used to diagnose knee OA. Among the participants with knee OA, severity, side of involvement, duration of knee pain, use of aids and history of treatment were assessed. Other tools included Likert pain scales, Patient Health Questionnaire (PHQ)-9 for depressive symptoms and Quality of life Questionnaire-Arthritis Impact Measurement Scale-2- (AIMS 2 SF).

Results: The prevalence of knee OA was 27% (95% CI 21.9% - 32.0%). knee OA was found to be more common in females (adjusted OR 2.21; 95% CI 1.21 to 4.03). Quality of life was worse among those above 60years with OA (adjusted OR 4.21, 95% CI 1.4 – 12.0) compared to younger ages. After adjusting for confounders, BMI ≥25 kg/m2 (adjusted OR 6.67, 95% CI 3.6-12.3) and depression (adjusted OR 3.26, 95% CI 1.4–7.2) were significantly associated with knee OA.

Conclusion: Knee OA is a common problem among older adults and is associated with poor mental health and obesity. Early diagnosis in the community is needed to provide treatment measures at the earliest to improve quality of life, especially among the ageing population.

Key Words: Knee osteoarthritis, quality of life, depression, obesity.

INTRODUCTION

The 2019 Global Burden of Disease (GBD) data revealed that approximately 1.71 billion individuals worldwide were affected by musculoskeletal disorders, encompassing issues such as low back pain, neck pain, fractures, injuries, OA, amputation, and rheumatoid arthritis.[1] The Disability-Adjusted Life Years (DALYs) for musculo-skeletal conditions increased by 61.6% between the year 1990 and 2016, with an increase of 19.6% between the year 2006 and 2016.[2] OA is the most common joint disorder in both developed and lower middle-income countries and a leading cause of disability in India and worldwide. OA, also called degenerative joint disease or osteoarthrosis is a disease of the joints characterized by a progressive deterioration of articular cartilage or the entire joint, including ligaments, articular

cartilage, synovium (joint lining) and the subchondral bone (bone beneath the cartilage).[3] Although OA was traditionally regarded as a disease of the elderly, now it is believed that its development starts earlier than originally thought.[4] Knee OA affects the three compartments of the knee joint (patellofemoral, medial and lateral joints) and usually develops slowly over 10 to 20 years, interfering with daily life activities. It was earlier interpreted as "wear-and-tear" of the articular cartilage due to aging and not related to inflammation, but now, it is accepted widely to be multifactorial in origin, although the disease pathophysiology is still poorly understood. Knee OA resulted in 12 million global YLDs in 2021 and was responsible for 1.3% of total global YLDs. knee OA makes up 56.4% of the burden of all OA.[5] The number of people affected with symptomatic knee OA is likely to rise because of the aging of the population and the obesity epidemic.[6] Data from Community Oriented Program for Control of Rheumatic Disorders (COPCORD) studies in Asian region on clinically-diagnosed knee OA showed that prevalence ranged from 1.4% in urban Philippines to 19.3% in rural communities in Iran.[7] In India, a study done in five states found overall prevalence of knee OA to be 28.7%.[8]

The diagnosis of knee OA relies on history taking and physical examination findings and is usually confirmed with x-rays. Laboratory investigations are usually reserved to rule out other diagnosis.[9] This study, aimed to estimate the prevalence of knee OA among rural adults 50 years and above in Vellore district Tamil Nadu, South India. Secondary objectives included assessing factors associated with knee OA such as obesity and depression, as well as, assessment of quality of life among those with knee OA.

MATERIALS AND METHODS

A community-based cross-sectional study was conducted in 2021, in Kaniyambadi block of Vellore District, Tamil Nadu, (population of 1,17,412 2020 local census). The study included individuals aged 50 years and above who had lived at their present address for more than six months. Exclusion criteria were: bilateral knee joint replacement, history of rheumatoid arthritis or SLE, previous history of fracture in and around the knee, or any other surgical or medical condition that severely limits functional ability.

Following written informed consent, an interviewer administered semi-structured, pilot-tested questionnaire was used to collect socio-demographic details, height, weight and depression status using the PHQ-9 scale (10). Diagnosis of knee OA was done using the ACR clinical criteria-Annexure attached (11). Once knee OA was diagnosed, severity, unilaterality or bilaterality, duration of knee pain, types of treatment accessed, use of aids or tools required, and any help required for household work were assessed. Quality of life was evaluated using the Arthritis Impact Measurement Scale-2-Short form (AIMS 2 SF). The QOL scores which range from 21 to 105 were divided in to 4 categories with higher scores indicating better quality of life and lower score indicating poor quality of life.[12]

Assuming a prevalence of 27% with absolute precision of 6%, sample size was calculated as 257, applying a design effect of 1.2.[13] Ten villages (clusters) were chosen from the list of villages in the block by simple random sampling. From each village, 30 subjects were chosen by simple random sampling (computer generated) from a line list of individuals 50 years and above (Figure 1). Data was entered in Epidata v3.1, analysis was carried out in SPSS trial version 28. Continuous variables were presented as means, medians and standard deviations while categorical data was summarized as percentages with 95% confidence intervals. To study the association between knee OA and associated factors, chi square test and logistic regression were utilized.

RESULTS

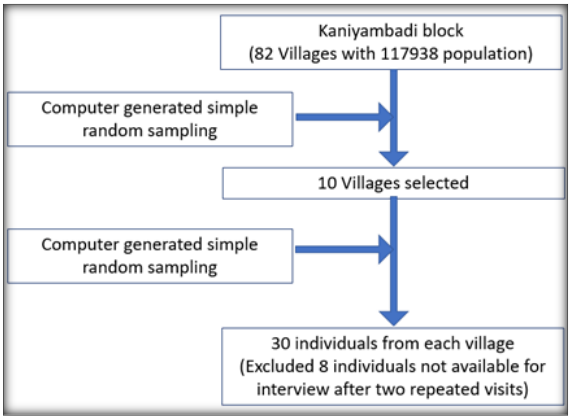

Figure 1: Sampling method

The results of 300 individuals were available for the study and their sociodemographic profile is described in table 1. Prevalence of knee pain among study population was 33.7% (101, 95% CI: 27 to 39.3) ie, in 101 participants. Morning stiffness was the most common symptom (61.4%) followed by bony tenderness in 55.4% of the study participants as per the ACR Clinical criteria. [Table 2]

The prevalence of knee OA among study population was 27% (81, 95% CI: 21.98 to 32.02). The prevalence of knee OA among males was 20.8% and females was 31.4% with 73 (90%) having bilateral knee OA. Among participants with knee OA, 67 (60%) had moderate intensity pain, followed by 20 (24.7%) with mild, 10 (12.3%) with severe and 3 (3.7%) with very severe pain. 67 (82.7%) of those with knee OA sought medical care while 14 (17.3%) did not. Among those seeking treatment, 65 (80.2%) of them were on allopathy treatment, 14 (17.3%) did not seek any treatment and 2 (2.5%) were taking Ayurveda treatment.

Among those with knee OA, 11 (13.5%) used cane to walk, 13 (16%) used western toilet commode and one individual used wheel chair. Some of the individuals with knee OA felt that they have started to be dependent on others for daily errands (9, 11.1%), maintaining their hygiene (59, 74%) and for raising from the bed (5, 6%). The distribution of Quality of life (QOL) Scores in patients with knee OA is given in Table 3. [Table 3]

Female sex (OR: 2.21, 95% CI: 1.21 to 4.03) and BMI of ≥ 25kg/m2 (OR: 6.67, 95% CI: 3.62 to 12.30) were found to be significant risk factors for knee OA respectively (Table 4). Knee OA was highest (71.9%) among those with obesity (BMI ≥30 kg/m2), compared to 35.8% in overweight individuals (BMI 25 to 29.9 kg/m2), 12.7% in those with normal BMI (25 to 29.9 kg/m2) and none among those who were underweight (BMI <18.5 kg/m2). Among those with knee OA, Quality of life was worse in individuals age above 60 years (OR 3.9, 95% CI 1.6 to 9.9). [Table 5]

Table 1: Sociodemographic profile of the participants

		n	%
Sex	Males	125	42
	Females	175	58
Age in years	50 to 60	161	53.7
	61 to 70	93	31
	71 to 80	32	10.7
	81 to 90	12	4
	91 and above	2	0.7
Religion	Hindu	274	91.3
	Muslim	2	0.7
	Christian	24	8
Literacy	Literate	124	41.3
	Illiterate	176	58.7
Occupation	Unemployed	12	4%
	Unskilled worker	137	45.67%
	Semiskilled worker	14	4.67%
	Skilled worker	11	3.67%
	Clerical/shop/farm	41	13.67%
	Semiprofessional	1	0.33%
	Professional	10	3.33%
	Home maker	74	24.67%
Type of family	Nuclear	167	55.7
	Joint	11	3.7
	Extended	122	40.7
	<18.5 (underweight)	4	1.3
BMI (kg/m^2)	18.5 to 24.9 (Normal BMI)	157	52.3
	25 to 29.9 (Over weight)	106	35.3
	30 or above (Obese)	32	10.7

Table 2: Prevalence of knee pain and knee OA

ACR Clinical findings among those with knee pain (n = 101)	Males n (%)	Females n (%)	Both N (%)
ACR- morning stiffness < 30 minutes	20 (76.9)	42 (76.4)	62 (61.4)
ACR- bony tenderness	18 (69.2)	38 (69.1)	56 (55.4)
ACR- crepitus on knee motion	7 (26.9)	27 (49.1)	34 (33.7)
ACR- bony enlargement	5 (19.2)	7 (12.7)	12 (11.9)
ACR- No palpable warmth	26 (100)	55 (100)	81 (100)
No knee pain	94 (75.2)	105 (60)	199 (66.3)
Knee pain present, but negative for ACR clinical criteria	5 (16.1)	15 (21.4)	20 (19.8)
Positive for ACR Clinical criteria for knee OA	26 (20.8)	55 (31.4)	81 (27)

Table 3: Quality of life (QOL) Scores in patients with knee OA

	Frequency	Percent
Very poor (21 to 41)	2	2.5
Poor (42 to 62)	7	8.6
Moderate (63 to 83)	29	35.8
Better (84 to 105)	43	53.1
Total	81	100

Table 4: Risk factors for knee OA (logistic regression)

	knee OA		Unadjusted OR (95%CI)	P value	Adjusted OR (95% CI)
	present	absent			
Sex					
Females	55 (31.4%)	120 (68.6%)	**1.745 (1.02-2.98)**	**0.041**	**2.21 (1.21 to 4.03)**
Males	26 (20.8%)	99 (79.2%)			

Age					
Age 50 to 60	44 (27.3%)	117 (72.7%)	1.03 (0.62 to 1.73)	0.897	0.736 (0.41 to 1.31)
Age >61	37 (26.6%)	102 (73.4%)			
BMI					
BMI >24.9 kg/m^2	61 (43.9%)	78 (56.1%)	**5.513 (3.10 to 9.806)**	**0.001**	**6.674 (3.62 to 12.3)**
BMI ≤24.9 kg/m^2	20 (12.4%)	141 (87.6%)			
Education					
Up to primary school (8years of education)	70 (28.8%)	173 (71.2%)	1.692 (0.83 to 3.45)	0.185	1.799 (0.83 to 3.91)
Above primary school	11 (19.3%)	46 (80.7%)			

Table 5: Risk factors for depression (logistic regression)

Category	Depression		OR (95% CI)	P value	AOR (95% CI)	P value
	Present	Absent				
knee OA						
Present	18 (22.2%)	63 (77.8%)	**2.694 (1.351-5.379)**	**0.006**	**3.259 (1.466 to 7.246)**	**0.004**
Absent	21(9.6%)	198(90.4%)				
Gender						
Female	28 (16%)	147 (84%)	1.97 (0.943 to 4.134)	0.06	1.703 (0.782 to 3.711)	0.18
Male	11 (8.8%)	114(91.2%)				
Age						
Age ≤60	16 (9.9%)	145 (90.1%)	0.557 (0.281 to 1.102)	0.9	0.559 (0.272 to 1.150)	0.114
Age >61	23 (16.5%)	116 (83.5%)				
BMI						
BMI >24.9 kg/m^2	16 (11.5%)	123 (88.5%)	0.78 (0.394 to 1.545)	0.476	0.565 (0.252 to 1.267)	0.166
BMI ≤24.9 kg/m^2	23 (14.3%)	138 (85.7%)				

DISCUSSION

The prevalence of knee OA was found to be 27%, which was similar to the prevalence in another rural southern Indian block but higher than the prevalence found in an urban area of Bangalore.[13,14]

The prevalence of overweight or obesity in the study population was 46%, which was relatively high compared to the results of a previous estimates in India.[15] The higher prevalence could be due to the higher age of the population selected and the higher number of females in the sample. Moreover, the prevalence of depression in the study population was lower than that found in a meta-analysis of Indian elderly populations. However, the prevalence of depression increased to 16.5% in adults aged above 60 years, indicating the need for targeted screening and intervention in this age group.[16]

The onset of knee OA in elderly populations was found to be earlier than expected, indicating the need for early detection and intervention. A simple tool like the clinical ACR criteria could be used to detect knee OA in this age group, given the resource constraints in the country. In rural communities due to lack of adequate health facilities and access to radiological facilities or laboratory, these is a need for clinical community-based method of making a diagnosis of knee OA.

The study found that 90.1% of knee OA cases were bilateral, which is consistent with previous research indicating that knee OA is usually bilateral or starts as unilateral and eventually develops in the other knee as well.[17] Additionally, the prevalence of knee OA was found to be higher among women aged above 60 years compared to those aged 50 to 60 years, highlighting the need for targeted intervention in this group.

This research exclusively employed the ACR Clinical criteria for the clinical identification of knee OA. Among the study population, the prevalence of knee pain was 33.7%, while the prevalence of knee OA specifically was 27%. Utilizing ACR clinical criteria in conjunction with knee X-rays could have identified a greater number of cases. Furthermore, it is essential to note that the study results may lack generalizability to other regions of the country due to potential variations in the sociodemographic composition of the population and the diverse array of risk factors associated with knee OA.

CONCLUSION

In conclusion, the study provides valuable insights into the prevalence of knee OA and its effects on quality of life in a rural area of Tamil Nadu. The findings highlight the need for targeted screening and intervention in certain age and gender groups to address the high prevalence of these conditions. The use of simple screening tools like the clinical ACR criteria could aid in early detection and intervention for knee OA, which is a significant contributor to disability in elderly populations. Overall, the study provides important information for healthcare practitioners and policymakers to design targeted interventions to address the high prevalence of these conditions in rural areas of Tamil Nadu.

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Conflicts of Interest: None.

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