

Original Research Article

DOI: <https://dx.doi.org/10.18203/2394-6040.ijcmph20210225>

Study of magnitude of knee osteoarthritis among adult population with age 40 years and above in rural area: a cross sectional study

Ashok R. Jadha, Punam M. Dambhare*

Department of Community Medicine, Indira Gandhi Government Medical College Nagpur, Maharashtra, India

Received: 09 November 2020

Revised: 25 December 2020

Accepted: 31 December 2020

***Correspondence:**

Dr. Punam M. Dambhare,

E-mail: punam.d30@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Osteoarthritis (OA) is a degenerative joint disease, which mainly affects the articular cartilage. Worldwide estimates are that 9.6% of men and 18.0% of women aged over 60 years have symptomatic osteoarthritis. It affects the daily physical activities like climbing stairs, squatting etc. Pain is the main symptom. Considering this the study was conducted with the objective to find out the magnitude of knee OA among adult population more than 40 years of age in rural area and to study the association between risk factors and knee OA.

Methods: A cross sectional study was conducted in rural health training Centre of study institute. Total 150 patients with knee joint pain were included in the study. Knee OA was diagnosed using American rheumatology criteria (ACR). Analysis was done by using epi info 7. Chi square test and Fischer's exact test was applied to see the association between risk factors and knee OA.

Results: The prevalence of knee OA among study subjects was found to be 34.7%. Study subjects with age >60 years were having prevalence of 32 (43.2%) and this association was statistically significant. The study subjects with history of DM and who are having $BMI \geq 25$ were having higher prevalence and the association was statistically significant.

Conclusions: The prevalence of knee OA in our study was 34.7%. Factors such as age >60 years, education, occupation, low socioeconomic status, DM, $BMI \geq 25$ were having significant association with knee OA.

Keywords: Knee osteoarthritis, Prevalence of knee OA, Risk factors

INTRODUCTION

Osteoarthritis (OA) is a chronic degenerative joint disease, which mainly affects the articular cartilage. It is related to ageing and it can presumably affect joints that are continually stressed throughout the years including knees, hips, fingers, and lower spine region. Osteoarthritis is already one among the ten most disabling diseases in developed countries. Farming 1 to 9 years increases the probabilities of osteoarthritis 4.5 times; farming 10 or more years increases the probabilities by 9.3 times. Globally, 9.6% of men and 18.0% of women aged above

60 years have symptomatic osteoarthritis. 80% of those with osteoarthritis will have limitations in movement, and 25% cannot perform their major daily activities of life.¹ Knee osteoarthritis is characterized by joint pain, swelling, stiffness, tenderness, crepitus, effusion. Patients visit to hospital when it affects their daily activities like walking, climbing the stairs, squatting etc. The most common complaint is pain. The conservative management includes patient education, lifestyle modification, physical therapy, analgesics, chondroprotective drugs and intraarticular injections. Surgery is indicated for pain which is not relieving, in case of locking of knee and deformities etc.² The

diagnosis of OA occurs because late till the time patients take analgesics repeatedly and when the condition worsens patient is referred to Orthopaedician. Thus, American rheumatology criteria is useful in diagnosis of OA clinically by all the practitioners where X-ray cannot be taken as in rural settings and the diagnosis can be done early and disabilities can be prevented. This criterion has been used in many studies. Considering this the study was conducted with the objectives.³⁻⁶

1. To find out the magnitude of knee OA among adult population with age 40 years and above in rural area.
2. To study the association between risk factors and knee OA.

METHODS

Study design

A cross sectional study

Study setting

The study was carried out in rural health training center (RHTC) of study institute from June 2019 to September 2019.

Sample size determination

The sample size was calculated by taking the prevalence of knee OA as 27.1% with 90% CI and 6% alpha error, the sample size calculated was 149.⁴ Therefore, a total of 150 patients were included in the study.

Study subjects

All Adults with age 40 years and above attending RHTC of study institute were included in the study.

Inclusion criteria

Adults with age 40 years and above coming with knee joint pain and those given consent for the study.

Methodology

Operational definition

Osteoarthritis was clinically diagnosed by using revised American rheumatology criteria to diagnose OA. It includes pain in knee with any 3 of the following 6 factors:

1. Age more than 50 years
2. Presence of crepitus on active motion
3. Less than 30 min of morning stiffness

4. Bony tenderness
5. Bony overgrowth
6. No palpable warmth.⁷

Data was collected in predesigned and pre-tested questionnaire. It consists of three parts: First part includes sociodemographic data such as age, gender, education, occupation, SES. Socioeconomic status was measured by using modified BG Prasad Scale 2019.⁸ Second part includes history of hypertension, diabetes, family history of OA, history of trauma and information regarding personal habits like physical activity, dietary habit, smoking, alcohol. Weight and height of the patients were measured and BMI was calculated. Third part includes the clinical examination.

Statistical analysis

The data was entered in Microsoft excel and analysis was done using epi info 7. Chi square test and Fischer's exact test was applied to see the association between sociodemographic characteristics and lifestyle factors with knee OA.

RESULTS

The prevalence of knee OA in adults with age 40 years and above was found to be 34.7%. Table 1 shows the association of sociodemographic characteristics and knee OA. The prevalence of knee OA was found higher in age group >60 years 32 (43.2%) as compared to age group 40-60 years 20 (26.3%) and it was statistically significant. In this study, males were having a prevalence of 26 (36.6%) compared to females which were having 26 (32.9%). With respect to education, graduates were having higher prevalence i.e. 6 (66.7%) of knee OA and the association of education and knee OA was found to be statistically significant. Considering occupation, unemployed had more prevalence 20 (51.3%) of knee OA and the association between occupation and knee OA was found to be statistically significant.

Study subjects belonging to socioeconomic class IV were having higher prevalence of OA which was 32 (45.7%) and this association between SES and knee OA was found to be statistically significant.

Table 2 shows the association of risk factors and knee OA. The study shows higher prevalence 40 (37.4%) of knee OA among those who take mixed diet compared to those who take vegetarian diet 12 (27.9%) but the association was not statistically significant.

Study subjects with a history of DM were having higher prevalence 22 (45.8%) and the association was found to be statistically significant. Study subjects with BMI equal to or more than 25 have higher prevalence 37 (44.6%) of

knee OA and this association was found to be statistically significant.

The association of factors such as family history of knee OA, HT, consumption of tobacco and alcohol was not found be statistically significant.

Table 1: Distribution of study subjects as per sociodemographic characteristics and knee OA (n=150).

Sociodemographic characteristics	Knee OA		Total	* P value
	Present	Absent		
Age group (years)				
40-60	20 (26.3)	56 (73.7)	76	0.022
>60	32 (43.2)	42 (56.8)	74	
Gender				
Female	26 (32.9)	53 (67.1)	79	0.380
Male	26 (36.6)	45 (63.4)	71	
Education				
Graduate	6 (66.7)	3 (33.3)	9	0.028
Higher secondary	9 (47.4)	10 (52.6)	19	
High school	6 (20.7)	23 (79.3)	24	
Middle school	12 (50)	12 (50)	39	
Literate, less than middle school	12 (30.8)	27 (69.2)	30	
Illiterate	7 (23.3)	23 (76.7)	39	
Occupation				
Arithmetic skilled job	0 (0)	14 (100)	14	#0.001
Skilled worker	3 (20)	12 (80)	15	
Semiskilled worker	15 (45.5)	18 (54.5)	33	
Unskilled worker	11 (39.3)	17 (60.7)	28	
Homemaker	3 (14.3)	18 (85.7)	21	
Unemployed	20 (51.3)	19 (48.7)	39	
Socioeconomic status				
I	0 (0)	1 (100)	1	0.027
II	1 (7.1)	13 (92.9)	14	
III	10 (32.3)	21 (67.7)	31	
IV	32 (45.7)	38 (54.3)	70	
V	9 (26.5)	25 (73.5)	34	

*Chi square test, #Fischer exact test

Table 2: Distribution of study subjects as per risk factors and knee OA (n=150).

Risk factors	Knee OA		Total	*P value
	Present	Absent		
Diet				
Mixed	40 (37.4)	67 (62.6)	107	0.181
Veg	12 (27.9)	31 (72.1)	43	
Family history of OA				
Yes	3 (16.7)	15 (83.3)	18	0.147
No	49 (37.2)	83 (62.8)	132	
Diabetes Mellitus				
Yes	22 (45.8)	26 (54.2)	48	0.048
No	30 (29.4)	72 (70.6)	102	
Hypertension				
Yes	17 (27.9)	44 (72.1)	61	0.101
No	35 (39.3)	54 (60.7)	89	
Consumption of tobacco				
Yes	12 (37.5)	20 (62.5)	32	0.428
No	40 (33.9)	78 (66.1)	118	
Consumption of alcohol				
Yes	5 (18.5)	22 (81.5)	27	0.051

Continued.

Risk factors	Knee OA	Total	*P value
No	47 (38.2)	76 (61.8)	123
BMI			
<18.5	0 (0)	9 (100)	9
18.5-24.9	15 (25.9)	43 (74.1)	58
≥25	37 (44.6)	46 (55.4)	83

*Chi square test, #Fischer exact test

DISCUSSION

In our study, the prevalence of knee OA in adults age 40 and above in rural area based on ACR criteria was found to be 34.67%. Similarly, a study done by Venkatachalam et al in rural population of Kanchipuram district, Tamilnadu shows prevalence of 27.1%.⁴ Also, the study conducted by Ajit et al in rural areas of Bangalore district shows the prevalence of knee OA as 17% by using ACR criteria.⁵ A study conducted by Singh et al among elderly persons in urban slums using ACR criteria shows the prevalence of knee OA as 41.1%.³

In our study as age increases prevalence of knee OA also increases (age 40-60 years- 26.3% and age >60 years- 43.2%). Similar results were also observed by Venkatachalam et al, Ajit et al, Sood et al, Kaur et al.^{4,5,9,10} A similar study conducted by Sharma et al in Chandigarh among elderly (above 65 years) in both urban and rural areas shows prevalence as 56.6%. Similar findings also observed by Bhaskar et al.¹²

In this study, males were having a prevalence of 26 (36.6%) compared to females which were having 26 (32.9%) but the association was not statistically significant. Similar finding was observed by Ajit et al where the association was not found to be statistically significant.⁵ While most of the studies like study done by Singh, Sood and Venkatachalam et al, shows prevalence of knee OA was significantly higher in females.^{3,4,9}

In this study, the prevalence of knee OA was found more in unemployed workers and this association was found statistically significant. (p=0.001) Similar findings were observed by Bhaskar et al.¹²

In our study, prevalence of knee OA was more in lower socioeconomic class. And the association between knee OA and SES was statistically significant (p=0.027). Similar findings observed by Aswin Kumar Das et al in his study on prevalence and risk factors of knee osteoarthritis in a rural community of Odisha: A Snap Shot Study shows lower socio-economic status being significantly associated with high prevalence of knee OA with OR=1.7 [1.0-2.9] and p value=0.03.¹³ Also, similar results were observed by and Ajit et al and Salve et al.^{14,5}

Our study shows significant association (p=0.048) between DM and knee OA. Similar finding was observed by Nieves-Plaza et al which shows in age and sex adjusted analysis, DM patients had a 2.72 fold increase risk of hand or knee OA(95%CI: 1.49-4.96).¹⁵

This study shows the higher prevalence of Knee OA in study subjects with higher BMI and the association was statistically significant (p=0.004). Similar findings were also observed by Singh et al, Venkatachalam et al, Sood et al, Bhaskar et al.^{3,4,9,12}

Our study shows higher prevalence of Knee OA in subjects consuming tobacco but the association was not statistically significant. A study done by Venkatachalam et al. shows significant association between tobacco consumption and knee OA. Another study done by Amin et al shows that the study subjects with symptomatic knee OA who smoke have an increased risk for articular cartilage loss and have severe knee pain than who don't smoke.^{4,16}

The limitation of the study is that it is a hospital based study carried out at RHTC OPD.

CONCLUSION

The prevalence of knee OA was higher in the patients attending RHTC. The sociodemographic factors like age >60 years, education, occupation, low socioeconomic status and lifestyle risk factors like DM and BMI \geq 25 was found to be significantly associated with knee OA. (p<0.05). Therefore, early visit to hospital can help in early diagnosis of knee OA. Awareness regarding modifiable risk factors like control of DM and obesity can prevent it and screening of persons above 60 years of age for knee OA should be done.

ACKNOWLEDGEMENTS

We would like to acknowledge the support of all interns posted in rural health training center during the study period who helped in data collection.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- WHO Department of Chronic Diseases and Health Promotion. Available at: <http://www.who.int/chp/topics/rheumatic/en/>
- Jain AK, Turek's Orthopaedics principles and their applications, 7th edition, India, Wolters Kluwer Pvt.Ltd, New Delhi, 2016.
- Singh AK, Mani kalaivani AK, Aggarwal PK, Gupta SK. Prevalence of osteoarthritis of knee among elderly persons in urban slums using American College of Rheumatology (ACR) criteria. *Journal of clinical and diagnostic research: JCDR.* 2014;8(9):JC09.
- Venkatachalam J, Natesan M, Eswaran M, Johnson AK, Bharath V, Singh Z. Prevalence of osteoarthritis of knee joint among adult population in a rural area of Kanchipuram District, Tamil Nadu. *Indian journal of public health.* 2018;62(2):117.
- Ajit NE, Nandish B, Fernandes RJ, Roga G, Kasthuri A, Shanbhag D, et al. Prevalence of knee osteoarthritis in rural areas of Bangalore urban district. *Internet Journal of Rheumatology and Clinical Immunol.* 2014;1(S1).
- Mahapatra A, Kar S. Osteoarthritis in women reporting to tertiary care hospital in Eastern India: Associated factors determining management. *J Family Medicine and Primary Care.* 2019;8(11):3544.
- Altman R, Asch E, Bloch D, Bole G, Borenstein D, Brandt K, et al. Development of criteria for the classification and reporting of osteoarthritis: classification of osteoarthritis of the knee. *Arthritis & Rheumatism: Official J American College of Rheumatol.* 1986;29(8):1039-49.
- Pandey VK, Aggarwal P, Kakkar R. Modified BG Prasad Socio-economic Classification, Update-2019. *Indian Journal of Community Health.* 2019;31(1).
- Sood A, Sood A. Prevalence of Knee Osteoarthritis in Elderly Persons in a District Of Central Uttar Pradesh: A Cross Sectional Study. *Physreva.* 2015;32:428-9.
- Kaur R, Ghosh A, Singh A. Prevalence of knee osteoarthritis and its determinants in 30-60 years old women of Gurdaspur, Punjab. *International Journal of Medical Science and Public Health.* 2018;7(10):825-31.
- Sharma MK, Swami HM, Bhatia V, Verma A, Bhatia SP, Kaur G. An epidemiological study of correlates of osteo-arthritis in geriatric population of UT Chandigarh. *Ind J Com Medic.* 2007;32(1):77.
- Bhaskar A, Areekal B, Bindhu Vasudevan AR, Ravi S, Sankar S. Osteoarthritis of knee and factors associated with it in middle aged women in a rural area of central Kerala, India. *International journal of community medicine and public health.* 2016;3(10):2926-31.
- Das AK, Routray D, Panigrahi TK. Prevalence and Risk Factors of Knee Osteoarthritis in a Rural Community of Odisha: A Snap Shot Study.
- Salve H, Gupta V, Palanivel C, Yadav K, Singh B. Prevalence of knee osteoarthritis amongst perimenopausal women in an urban resettlement colony in South Delhi. *Indian journal of public health.* 2010;54(3):155.
- Nieves-Plaza M, Castro-Santana LE, Font YM, Mayor AM, Vilá LM. Association of hand or knee osteoarthritis with diabetes mellitus in a population of Hispanics from Puerto Rico. *Journal of clinical rheumatology: practical reports on rheumatic & musculoskeletal diseases.* 2013;19(1).
- Amin S, Niu J, Guermazi A, Grigoryan M, Hunter DJ, Clancy M, et al. Cigarette smoking and the risk for cartilage loss and knee pain in men with knee osteoarthritis. *Annals Rheum Dis.* 2007;66(1):18-22.

Cite this article as: Jadhao AR, Dambhare PM. Study of magnitude of knee osteoarthritis among adult population with age 40 years and above in rural area: a cross sectional study. *Int J Community Med Public Health* 2021;8:707-11.