A Cross-sectional Study on Knee Osteoarthritis among Rural Population in Field Practice Area of Tertiary Care Centre in Tiruvannamalai District, Tamil Nadu.

Dr R Senthil Kumar[1] and Dr G Kartheesan[1]*

1. Assistant professor, Department of orthopaedic surgery, Government Tiruvannamalai Medical college

*Corresponding author: gkartheesans@gmail.com

Abstract:

Background: Knee osteoarthritis (KOA) accounts for nearly four-fifths of osteoarthritis (OA) worldwide and increases with obesity and age[1]Osteoarthritis (OA) is one of the most common causes of pain and disability, representing a significant burden for the individual and for society

Methods: A community based cross sectional study was conducted to find out the prevalence of Knee Osteoarthritis among rural population of age group above 40 years and also to find out the association between risk factors and prevalence of Knee OA with the sample of 370 by simple random sampling

Result: The prevalence of knee osteoarthritis was found to be 31.6% in our study The prevalence was found to be highest in the age group70 and above. The prevalence of knee OA in females was more than the males. The lifestyle risk factor like DM and BMI ≥ 25 was found to be significantly associated with knee OA. ($p < 0.05$).

Conclusion:The prevalence of knee osteoarthritis was found to be highest among elderly (>70) population, more common in females, significantly associated with obesity.

Keywords: Knee Osteoarthritis, Rural population, Risk factors, BMI

Introduction:

Knee osteoarthritis (KOA) accounts for nearly four-fifths of osteoarthritis (OA) worldwide and increases with obesity and age[1]Osteoarthritis (OA) is one of the most common causes of pain and disability, representing a significant burden for the individual and for society.[2]   The most commonly affected peripheral joints are the knees, hips and small joints of the hand[3]. Worldwide, 9.6% of men and 18% of women over the age of 60 suffer from symptomatic OA, and the knee is the most commonly affected joint[4].OA occurs more often in women than in men, but the prevalence increases sharply with age.[5]In addition to aging and obesity, risk factors for KOA include gender, physical activity, genetic predisposition, and injuries.[6]

The economic burden of OA has increased threefold or more, especially in people with total knee/hip replacements.[7] Occupation is also thought to influence joint impact, as some jobs can place extreme stress on joints and ligaments.thereforedamaging the cartilage.[8]

A nationally representative study in India found that joint/pain disorders are the second and fourth most common causes of outpatient visits and out-of-pocket costs among noncommunicable diseases.[9]Given that the burden of diseases such as osteoarthritis is increasing significantly. with age in developing countries, the prevalence of osteoarthritis will increase in the future, especially in coastal Asia. Mobility and a pain-free limb are important

when doing daily regular activities.[10]   Musculoskeletal health is an important part of health. As it ages, many problems appear in musculosketetal system. Therefore, it is important to pay special attention to physical health and motor systems in macro-level society as an infrastructure for development

Material and Methods :

Study Design:

Community Based Cross sectional study

Study Period: 6 months

Study Population: Patients above 40 years residing in rural field practice area of a medical college in Tiruvannamalai District, Tamil Nadu

Sample Size : The sample size was calculated based on the previous study[11] prevalence of knee OA as 34.7 % with absolute precision of 5% , it was calculated 363 and rounded to 370

Sampling Method : Simple random sampling

Inclusion Criteria:

Patients with forty years and above residing in the rural field practice area

Exclusion Criteria:

Patients with terminal illness, psychiatric illness, hemiparesis, knee amputation in either lower limb. Patients on medications for osteoarthritis and any other surgical or medical condition that severely limits subjects functional ability.

Methodology:

Operational definition -Osteoarthritis was diagnosed clinically using the Revised American Rheumatology criteria for the diagnosis of OA. This includes knee pain associated with three of the following six factors: 1. Age over 50 years 2. Crepitus with active movement 3. Morning stiffness of less than 30 minutes .4.Bony tenderness 5. Bone Enlargement 6. No palpable warmth. Information was collected through a pre-prepared and pre-tested questionnaire. It consists of three parts: The first part contains socio-demographic information such as age, gender, education, occupation, socioeconomicstatusSES. Socioeconomic status was measured using the modified BG Prasad scale 2019.[12] The second part includes hypertension, diabetes, family history of OA, history of trauma, and information on personal habits such as physical activity, eating habits, smoking and alcohol consumption. Weight and height of patients were measured and BMI was calculated. The third part contains a clinical study

Statistical Analysis:

Data were entered into Microsoft Excel and analysis was performed using SPSS version 20. Chi-square test and Fischer's exact test were used to examine the association between sociodemographic characteristics and lifestyle factors with knee OA

Results:

Table : 1 Distribution of study participant based on Socio demographic factors (N = 37

Socio demographic factors	Number of study participant (n)	Proportion (%)
Age (years)		
41 - 50	202	54.5
51 - 60	103	27.9

61 - 70	40	10.9
>70	25	6.7
Sex		
Male	128	34.6
Female	242	65.4
Education		
Graduate	27	7.3
Higher Secondary	118	31.8
High School	104	28.1
Middle school	65	17.6
Primary	37	10
Illiterate	19	5.2
Socioeconomic Status		
Class I	18	4.8
Class II	37	10
Class III	166	44.8
Class IV	98	26.6
Class V	51	13.8

Table:1 showed that the majority of patients were in the age group of41-50 years (5 4.5%), followed by the age group of 51-60 years (27.9%) and 10.9% were in the age group of 61-70 years . The prevalence of OA was found to be 3 4.6% in men and 65.4% in women. The prevalence in women was higher than in men.According to B G Prasad classification, socio-economic status showed that most of them belonged to class III (44.8%) and least class I (4.8%) Almost 60% of the participants in the study had middle school education or lower.

Table : 2 Distribution of study participant with Knee Osteoarthritis (KOA)

Age(years)	No of participant (n)	No of participant with KOA (n)	Proportion of participant with OA(%)
41 - 50	202	36	17.8
51 - 60	103	38	35.1
61 - 70	40	25	62.5
>70	25	18	72.0
Total	**370**	**117**	**31.6**

In the Table :2, the prevalence of Knee OA was 31.6%.Majority of Knee OA was seen in the age group above 70 years.

Table : 3 Distribution of study participant based on gender with KOA

Sex	No of participant with KOA(n)	Proportion of KOA(%)
Male(128)	33	25.7
Female (242)	84	34.7
Total 370	**117**	**31.6**

Table: 3 showed that the prevalence of OA was 25.7% among the males and 34.7% among the females. The prevalence of KOA was more in females than the males.

Table : 4 Distribution of Study participant based on association between risk factors and Knee OA

Risk Factor	Knee OA		Total	P value
	Present	Absent		
Family History of OA				
Yes	6(30%)	14(70%)	20	0.473
No	37(38.1%)	60(61.8%)	97	
Diabetes				
Yes	41(53.9%)	35(47.1%)	76	0.001
No	16(39.1%)	25(60.9%)	41	
Hypertension				
Yes	24(35.3%)	44(64.7%)	68	0.872
No	18(36.7%)	31 (63.3%)	49	
BMI				
<18.5	1(11.1%)	8(89.9%)	9	0.000
18.5-24.9	8(25%)	24(75%)	32	
≥25	52(68.4%)	24(31.6%)	76	
H/O Alcohol				
Yes	16(47.1%)	18(52.9)	34	0.204
No	12(13.4%)	71(85.5%)	83	
H/o Tobacco usage				
Yes	15(53.5%)	13(46.4)	28	0.001
No	20(22.4%)	69(77.5%)	89	

Table 4 shows the association between risk factors and knee OA. It was found that study participants with diabetes had a higher prevalence of 43 (53.9%) and the association was found to be statistically significant. Study participants with a history of smoking had less knee OA. Factors such as family history of thekneeOA, hypertension, alcohol consumption were not associated with knee OA subjects. Study participants with a BMI more than or equal to had a higher incidence of knee OA 52 (68.4%) and this association was found to be statistically significant, and 15 (53.5%) who used tobacco were also found to be statistically significant with patient with knee OA.

Discussion :

In our study, we found that majority of patients were in age group 41-50 years (54.5%) followed by age group 51-60 years (27.9%) and 10.9% were patients between 61-70 years. In our study as age increases prevalence of knee OA also increases. Similar results were also observed by Ashok et al[11].And also studies conducted by Ajit et al, Sood et al andKaur et al.[13,14,15] Males were having a prevalence of knee osteoarthritis compared to females which were having but the association was not statistically significant. Similar finding was observed by Jadhoa A et al.[11] In our study showed significant association (p value 0.001) between

diabetes mellitus and knee osteoarthritis. Similar finding was observed by Jadhoa A et al[11]. In our study, it was found that the higher prevalence of Knee OA in study subjects with higher BMI and the association was statistically highly significant (p value 0.000). Similar findings were also observed by Sood et al.[14]

The present shows higher prevalence of Knee OA in study participant consuming tobacco but the association was not statistically significant. A cross sectional study done by Venkatachalam et al[16] shows significant association between tobacco consumption and knee osteoarthritis. The present study showed that the prevalence of OA was less among those who consumed alcohol when compared with participants not taking alcohol. Almost 27.6% of the people who never consumed alcohol had OA, whereas only 22.4% of people. Similar study conducted on arthritis and alcohol, has shown rather surprising but similar results; arthritis patients consume less alcohol. This may suggest that alcohol may protect the individual from arthritis or there is an inverse relationship.

Conclusion : The prevalence of knee osteoarthritis was found to be 31.6% in our study The prevalence was found to be highest in the age group70 and above. The prevalence of knee OA in females was more than the males. The lifestyle risk factors like DM and BMI ≥25 was found to be significantly associated with knee OA. (p <0.05).

Conflicts of interest :

There are no conflicts of interest.

Reference :

1. Vos T, Allen C, Arora M, et al. Global, regional, and national incidence, preva- lence, and years lived with disability for 310 diseases and injuries, 1990"2015: a systematic analysis for the global burden of disease study 2015. Lancet 2016;388(10053):1545–602

2. Odding E, Valkenburg HA, Algra D, Vandenouweland FA, Grobbee DE, Hofman A. Associations of radiological osteoarthritis of the hip and knee with locomotor disability in the Rotterdam Study. Ann Rheum Dis 1998;57:203- 8.

3. Osteoarthritis. Care and management in adults. NICE clinical guideline 177; 2014. www.guidance.nice.org.uk/cg177

4. Cross M, Smith E, Hoy D, Nolte S, Ackerman I, Fransen M, et al The global burden of hip and knee osteoarthritis: Estimates from the global burden of disease 2010 study Ann Rheum Dis. 2014;73:1323–30

5. Davis MA, Ettinger WH, Neuhaus JM, Hauck WW. Sex differences in osteoarthritis of the knee. The role of obesity. *Am J Epidemiol.* 1988;127:1019–30.

6. G. Gu ̈rer, G. T. Bozbas, T. Tuncer, A. I. Unubol, U. G. Ucar, and O. I. Memetoglu, Frequency of joint hypermobility in Turkish patients with knee osteoarthritis: a cross sectional multicenter study, International Journal of Rheumatology, 2016.

7. Xie F, Thumboo J, Fong K-Y, Lo N-N, Yeo S-J, Yang K-Y, et al Direct and indirect costs of osteoarthritis in Singapore: A comparative study among multiethnic Asian patients with osteoarthritis J Rheumatol. 2007;34:165–71

8. Felson, D.T., et al., Occupational physical demands, knee bending, and knee osteoarthritis: Results from the Framingham Study. Journal of Rheumatology. 1991. 18(10): 1587-1592.

9. Mahal A, Karan A, Engelgau M The Economic Implications of Non-Communicable Disease for India. HNP Discussion Paper series, The World Bank.Last accessed on 2019 Mar 15 Available from: http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627- 1095698140167/EconomicImplicationsofNCDforIndia.pdf

10. Shamsi M, Safari A, Soroush A, Safari Y. The Survey of Knee Osteoarthritis in the Population over Age 50 Visited in the Health Bus in Kermanshah, Iran. J Aging Res. 2021 Nov 12;2021:9809565. doi: 10.1155/2021/9809565. PMID: 34804610; PMCID: PMC8604593.

11. 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 [Internet]. 2021 Jan. 27 [cited 2023 Mar. 2];8(2):707-11.

12. Pandey VK, Aggarwal P, Kakkar R. Modified BG Prasad Socio-economic Classification, Update-2019. Indian Journal of Community Health. 2019;31(1).

13. 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)

14. 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

15. 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.

16. 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