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Prevalence And Association of Osteoarthritis of The Knee Joint Among Elderly Population Using ACR Criteria in A Rural Health Sub Centre Area

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Abstract

Osteoarthritis (OA) is a chronic degenerative disorder of multifactorial etiology characterized by loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis and range of biochemical and morphological alterations of the synovial membrane and joint capsule. Aim of our study is to study the Prevalence and association of osteoarthritis of the knee joint with selected socio-demographic variables in the elderly population above 60 years in a rural area using ACR clinical criteria. we did a community based cross-sectional study in the elderly population above 60 years residing in Nadubhuvanagiri Health Sub Centre (HSC), an area under Govt. Primary Health Centre, Bhuvanagiri, Cuddalore Health Unit District, Tamilnadu. The American College of Rheumatology (ACR) clinical classification criteria was used to diagnose osteoarthritis knee. The prevalence of osteoarthritis was 39 %. Age and BMI (Body mass Index) were found to be independent risk factor for osteoarthritis knee. While sex and occupation didn't had much of influence significantly. The Prevalence of osteoarthritis knee was high among the elderly population. In a resource constrained rural setup, ACR criteria can be an effective tool for the general practitioners and orthopaedicians in clinical diagnosis of osteoarthritis knee.

Keywords: Elderly, Osteoarthritis, Rural.

INTRODUCTION

Osteoarthritis (OA) is a chronic degenerative disorder of multifactorial etiology characterized by loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis and range of biochemical and morphological alterations of the synovial membrane and joint capsule. Pathological changes in the late stage of OA include softening, ulceration and focal integration of the articular cartilage; synovial inflammation also may occur. Presence of osteoarthritis in older adults was associated with more pain, functional limitations, and lower Quality of Life (physical component) typical clinical symptoms are pain, particularly after prolonged activity and weight bearing; whereas stiffness is experienced after inactivity. It is also known as degenerative arthritis, which commonly affects the hands, feet, spine, and large weight bearing joints, such as the hips and knees. Most cases of osteoarthritis have no known cause and are referred to as primary osteoarthritis. Primary osteoarthritis is mostly related to aging. It can present as localized, generalized or as erosive osteoarthritis. Secondary osteoarthritis is caused by another disease or condition.

Osteoarthritis (OA) is most frequent joint disease with prevalence of 40% in India. Osteoarthritis is more common in women than men but the prevalence increases dramatically with age. Osteoarthritis of knee joint contributes to nearly 80% of total osteoarthritis burden. Osteoarthritis of the knee is a major cause of

mobility impairment, particularly among females. An increase in our geriatric population necessitates the need to study the prevalence and associated risk factors of OA. In India, the prevalence of knee OA in the adult rural population is estimated to be 5.8% to 60.6%. OA of the knee is more common in women. It is also more prevalent among those engaged in agriculture, manual labor (men) and household work (women).

Osteoarthritis of knee joint is not given the importance it deserves in public health. It influences the quality of the life largely. With India witnessing demographic transition leading to proportionate as well as absolute increase in number of elderly, the magnitude of osteoarthritis is bound to increase.

Most of the cases of osteoarthritis seek treatment very late, only when the condition hampers with the physical activity. Definitive treatment in form of total knee replacement is costly, and unaffordable in Indian setting. Thus, prevention and early diagnosis remains the most cost effective strategy. Radiological assessment remains the mainstay of diagnosis of osteoarthritis of knee. At a rural level, it is difficult to perform radiography for diagnosis. In Indian setting, where health system is already overburdened with more important public health activities, concern for osteoarthritis takes a backseat. Thus, costly treatment and delayed diagnosis hampers the effective intervention for osteoarthritis of knee joint.

The aim in the treatment of osteoarthritis of the knee joint is to educate the patient about OA and its management, alleviate pain, improve function and decrease disability and prevent or retard progression of the disease and its consequences. The pattern of remissions and flares are a result of fluctuation in disease activity *of the osteoarthritis of the knee* joint. The Treatment modalities identified for the treatment of knee OA are non-pharmacological, pharmacological, Intra-articular and surgical. The pharmacological treatment included paracetamol, NSAIDs, opioid analgesics, Topical capsicum, Topical NSAIDs. The easy availability of the Over-the-counter prescription of NSAIDs results in severe gastritis in old age group. The surgical treatment includes arthroscopy, arthroplasty, Unicompartmental Knee Replacement, Total knee replacement.

In wake of this, clinical assessment for diagnosis of osteoarthritis of knee joint is of utmost importance. American College of Rheumatology (ACR) clinical classification criteria is one of most widely used tool for clinical diagnosis of osteoarthritis of knee joint in epidemiological studies. In this backdrop, the study is planned to estimate the prevalence, pattern of remission, treatment and association of osteoarthritis of the knee joint with selected Socio-demographic variables among elderly persons residing in a rural area using ACR criteria as clinical tool to diagnose osteoarthritis knee in community-based resource constrained setting of India. This study will be useful for the general practitioners and orthopaedicians in a constrained rural setup. Based on this aim of our study is to estimate the Prevalence, pattern of remission and treatment of osteoarthritis of the knee joint in the elderly population of 60 years and above also to find out the association of osteoarthritis of the knee joint with selected Socio-demographic variables. .

MATERIAL AND METHODS:

This study is an community-based descriptive cross-sectional study, done in Health Sub Centre (HSC), an area under Govt.Primary Health Centre in Cuddalore Health Unit District. Elderly Population of 60 yrs and above Patient those who were diagnosed as having knee osteoarthritis and taking treatment were included in the study. Study was done for period of nine months done as a structured pre-designed Proforma /clinical examination. The data was collected by house-to-house survey using a predesigned and pretested proforma. The association of variables such as sex, age, obesity and occupation in OA was determined. Person who were unable to comprehend and answer the question, or were physically not capable of getting the physical examination done, were excluded from the study

American College of Rheumatology (ACR) criteria: ACR criteria for diagnosing osteoarthritis of knee joint is presence of pain in knee joint plus any three of six factors as listed, Age more than 50yrs, presence of crepitus on active motion, less than 30 min of morning stiffness, bony tenderness, bony overgrowth, no palpable warmth of synovium. Data collected was analyzed using IBM SPSS Version 21. Statistical analysis includes descriptive statistics and appropriate tests of significance were used whenever necessary chi square test was used to test association between OA knee and risk factors.

RESULTS:

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Total HSC population was 6996 among which 3511 (50.2%) was male and 3485 (49.8%) was female. Population above 60 years were 582 and total participants in our study group was 468 patients. Majority (59.2%) of the study subjects were females in our study population.

In our study 367 (78.4%) of the study subjects were unskilled workers whereas 58 were skilled workers and 43 was semiskilled workers. Majority (n=237, 50.6%) of the study subjects (n=468) had an annual family income of < 60000 only 9 patients had family annual income more than 120,000. Majority (67.3%) of the study population (n=468) had done schooling up to primary level.

Prevalence of osteoarthritis is 39% when it involves both knees, while rest was affected in any one knee. Majority (29.3%) of them were in the age group of 60-70 yrs followed by 71-80 years.

We analysed body mass index as its one of important factor influencing osteoarthritis. Majority (65.8%) of the study subjects had BMI in the normal range while 154 patients (32.9%) were overweight in our study. Also majority (84.8%) of the study population (n=468) had moderate physical activity.

In our study we evaluated possible risk factors and Majority of the subjects had the history -of cycling (24.1%). The prolonged inactivity was found in 26(5.6%) in the right knee and 25(5.3%) in the left knee.

Table – 1: Risk factors among study subjects having OA

Risk factor	OA-Right knee N (%)	OA-Left knee N (%)
Congenital malformation	3(0.6)	3(0.6)
Trauma to knee Joint	8(1.7)	7(1.5)
Loose bodies	5(1.1)	2(0.4)
Prolonged inactivity	26(5.6)	25(5.3)
Excessive weight bearing	3(0.6)	3(0.6)
Cycling	113(24.1)	109(23.3)

Majority (36.2%) of the study subjects had taken treatment at Primary Health Centre followed by General Hospital (29.3%) and at medical college (22.8%). Almost 97.5% of total study population has had some sort of treatment for osteoarthritis. majority (80.5%) of the study subjects took Allopathy treatment and rest had AYUSH treatment.

Majority (77.2%) of the study subjects took oral drug therapy. Majority (68%) of the study subjects took injection by intramuscular injection route followed by intra-articular route (4%). Out of 196 subjects, 98.5% of the study subjects took injection once a week. Out of 458 subjects, only 2.2% of the study subjects took physiotherapy treatment, of which 1.9% took treatment once a week.

Out of 468 subjects, only 1.5% of the subject(n=468) had remission. Majority (77.4%) of the study subjects (n=468) had second degree disability.

Table – 2: Distribution of study subjects according to the locomotor disability due to OA-Knee

Sl.No.		Number	%
1.	Able to move in and out of Bed		
	Yes	447	95.5
	Total	468	100.0

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2.	Able to do kitchen work		
	Yes	415	88.7
	Total	468	100.0
3.	Able to squat		
	Yes	448	95.7
	Total	468	100.0
4.	Able to do day to day activities		
	Yes	457	97.6
	Total	468	100.0
5.	Able to standout without assistance		
	Yes	452	96.6
	Total	468	100.0
6.	Able to take bath without assistance		
	Yes	455	97.2
	Total	468	100.0
7.	Able to walk for short distance(2km)		
	Yes	131	28.0
	Total	468	100.0

Majority (97.6%) of the study subjects (n=468) were able to do day today activities and out of 468 subjects, only 28% were able to walk for a short distance.

Out of 468 study subjects,38% of them had pain in the right knee and 35.5% of them had pain in the left knee as per ACR criteria. We also analysed other features as per ACR criteria, among which, 59.4% had morning stiffness of the right knee and 41.5% had morning stiffness of the left knee also only 11.3% had crepitus in the right knee and 9.8%had crepitus in the left knee. Coming to warmth of knee, Only 4.3% had palpable warmth in the right knee and 4.9% had palpable warmth in the left knee. Out of the 468 subjects, 54.5% had bony tenderness of the right knee and 51.7%had bony tenderness of the left knee. Only 7.7% of the study subjects had bony enlargement of the right knee and 7.9% had bony enlargement of the left knee.

Next we moved on in analyzing the correlation of different factors, to start with age , More than 29.3% were in the age group of 60-70 yrs followed by 8.8% in the 71-80 years. There is significant association between age and knee osteoarthritis (P value-0.038). (Table 3)

In our study 17.5% of the male subjects had osteoarthritis of the knee and 21.4% of the female subjects had osteoarthritis of the knee. There is no significant association between Sex and knee osteoarthritis. Out of 182 subjects,30.3% were found to be unskilled workers, followed by skilled workers (5.1%), semiskilled workers (3.4%). There is no significant association between occupation and knee osteoarthritis. Out of 182 subjects,23.1% had BMI in the normal range followed by over weight (14.5%), underweight (0.9%), obese (0.4%). There is significant association between Body Mass Index and knee osteoarthritis (P value-0.004).

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Table 3: Factors related to Osteoarthritis

FACTORS		OSTEOARTHRITIS OF KNEE		TOTAL	P VALUE
		PRESENT	ABSENT		
AGE	60 – 70 YEARS	137	225	362	0.038
	71 – 80 YEARS	41	61	102	
	>80 YEARS	4	0	4	
SEX	MALE	82	109	191	0.136
	FEMALE	100	177	277	
OCCUPATION	SEMISKILLED WORKERS	16	27	43	0.901
	UNSKILLED WORKERS	142	225	367	
	SKILLED WORKERS	24	34	58	
BODY MASS INDEX	UNDERWEIGHT	4	0	4	0.004
	NORMAL	108	200	308	
	OVERWEIGHT	68	86	154	
	OBESE	2	0	2	

DISCUSSION

The present study was carried out to find the prevalence of osteoarthritis of the knee joint in the elderly population (> 60 yrs.) in a health subcenter, cuddalore district. The main purpose of the study was to evaluate the prevalence of osteoarthritis of the knee joint in the elderly, pattern of remission, treatment and also to find out the association of osteoarthritis of the knee joint with selected sociodemographic variables. Knowledge of geographical variations in the prevalence and pattern of distribution of a disease may contribute to an understanding of its etiology, to the planning of treatment and prevention programmes.

The study was carried out on a total of 468 subjects of which 191(40.8% were male subjects and 277(59.2%) were female subjects. In the present study the prevalence of knee OA is 39 % (Males-17.6%, Females-21.4%). Akihiro Sudo et al[1]in their study found the prevalence of symptomatic knee OA was 21.2%, 32.3% in women and 13.5 in men .MK Sharma et al[2] in their study found the prevalence of OA among elderly as56.6%where as in rural area it was 32.6% and urban Area it was 60.3 %.It was seen in their study that peak prevalence of OA was among the elderly of age group 84yrs and older. Community survey data in rural and urban areas of India shows the prevalence of OA to be in the range of 5.8% to 60.6%.The difference may be explained by the fact that they estimated the prevalence of osteoarthritis of all joint and some studies used a different criteria.

The majority of subjects with knee OA were in the age group of 60-70yrs (29.3%) followed by 71-80 years (8.8%) and greater than 80 were 0.9%. The mean age of the study subjects was 66.51 years. In the present study there is significant association between age and knee osteoarthritis. (P value-0.038). Despite the significant association between ageing and knee OA, the exact relations between ageing and knee OA remain unclear. With age, joint use becomes more frequent; cartilage degeneration progresses; and quadriceps muscle power becomes weak. Thus OA is thought not to be simply the result of mechanical wear and tear from joint use with age but to have multiple factors.

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In the present study 17.6% of the subjects are males and 21.4% of the subjects are females. Akihiro Sudo et al[1]in their study found the prevalence of symptomatic knee OA is 32.3% in women and 13.5 in men. This was lower in Bulgaria (9.6% in both men and women), the United States (18.0%) in women,8.3% in men, and Sweden (26.5% in women, 4.5% in men) but higher in Holland (35.2% in women, 20.9% in men) and in north England (56.3% in women , 42.3% in men) .There was no significant association between sex and knee osteoarthritis in our study. These discrepancies were due to differences in race and lifestyle factors, different methodologies, or different definitions of symptomatic and radiographic OA

Liying Jiang et al[3] in their study found that the prevalence increased dramatically after 50yrs old in both men and women suggesting that age might be a risk factor for knee OA. They also showed that the prevalence in women was higher than that in men, indicating that sex might be an important potential risk factor. The present study findings were similar to the findings from other parts of the world, Knee OA was more prevalent among women compared with men and increased with age.

In the present study, majority of the study subjects were unskilled workers based on the occupation 367(78.4%) followed by skilled workers 58(12.4%) and semiskilled workers (9.2%). Xiao Zheng Kang et al.[4] found that approximately 91% Of participants (men and women) reported having been engaged in farming for most of their adult lives. Almost all (91%) reporting that the job they had held the longest involved heavy physical work. In contrast only 34-39% of women and men in the Beijing OA study reported that the job they had held the longest involved moderate to heavy labour. They found that high prevalence of symptomatic and severe radiographic knee OA among older people in a rural farming region of northern China. They finding also suggested that having an occupation requiring heavy physical work is associated with knee OA, even in the absence of obesity. In the present study found there was there is no significant association between occupation and knee osteoarthritis.

In the present study majority of the study subjects were 308(65.8%) of the normal BMI, 154(32.9%) were overweight, 4(0.9%) were underweight and 2(0.4%) were obese. In the present study majority of the physical activity was moderate 396(84.6%) followed by sedentary which is 72(15.4%). There is significant association between Body Mass Index and knee osteoarthritis (P-value: 0.004). Obesity has been shown to increase the risk for knee OA in various populations. Obesity could increase stress on cartilage and induce breakdown of cartilage simply on the basis of excess force across a weight-bearing joint. Obese individuals may have abnormal levels of certain hormones or circulating factors such as an insulin-like growth factor that may affect cartilage breakdown and lead to OA. Felson and Chaisson pointed out that the weight loss is likely to alleviate symptoms and delay the disease progression in patients with knee OA. Therefore, obesity is an important modifiable risk factor for OA. Gabor Horvath et al[5] found out higher BMI showed a positive correlation with knee OA. Felson and Zhang[6] in their review article showed that higher the value of BMI, higher the prevalence of symptoms of OA. Liying Jiang et al[3] in their study found the association of obesity with knee OA. Obesity represents one of the most important modifiable risk factors for knee OA.

Mechanical stress resulting from high BMI is known to be a risk factor for the development of knee OA. Mechanisms other than a heavy load on joints are presumably responsible for knee OA.BMI and workload have a multiplicative mode of interaction, which predispose to more severe structural change rather than the disease occurrence per se. BMI might play a relatively more important role when compared with physical workload and or physical activities. Davis et al[7] reported that obesity was a stronger predictor of bilateral osteoarthritis.

Based on ACR criteria for osteoarthritis of knee, 178 (38%) of the study subjects had osteoarthritis of right knee, where as in the left knee it was found the 166 (35.5%) of the study subjects had osteoarthritis. Akinobu Nishimura et al[8] found in their study that the prevalence of definite radiographic bilateral and unilateral knee OA were 21.6% and 10.0% in older Japanese villagers. They also reported that 49.2% participants with unilateral knee OA developed bilateral knee OA within an average of 5.3 years. Davis et al[7] in their study reported the bilateral knee OA was more than twice compared prevalence of unilateral knee OA in the National Health and Nutrition Examination Survey sample. Spector et al[9]

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reported that 34% of women with unilateral knee osteoarthritis progressed to contralateral OA within two years. Spector et al also reported that 92% of patients with unilateral knee OA developed bilateral knee OA over 11years.

CONCLUSION

Awareness programme should be initiated at community level which is needed for early diagnosis of osteoarthritis knee. Awareness on healthy diet and regular exercise should be created for better maintenance of BMI and thereby body weight to reduce the risk factor for OA knee. Avoidance of untoward strain pattern on knee joint as the age increases, though it is well known that ageing is uncontrollable risk factor. The ACR is a very effective tool in community based rural setup to effectively screen, diagnose and treat osteoarthritis in a rural area particularly in old age people.

REFERENCES

1. Akihiro S, Noriki M Kazuhiro H, Masao U, Toru Y, Tomomi Y, and Atsumasa U. Prevalence and risk factors for knee osteoarthritis in elderly Japanese men and women.J Orhtop Sci : 2008: 13;413-416.
2. MK Sharma, HM Swami. V Bhatia, A Verma SPS Bhatia, G Kaur: An epidemiological study of correlates of osteoarthritis in geriatric population of UT Chandigarh.Indian Journal of Community Medicine Vol.1, No. 1, ;2007: 77-78.
3. Liying J, Jiesheng R, Qiuju Zhang, Fulan H, Shide Z, Xia L, Yashuang Z, Tianzun T.Prevalence and association factors of knee osteoarthritis in a community-based population in Heilongjiang, Northeast China.Rheumatol Int ;2012:32; 1189-1195.
4. Xiaozheng K, Marlene F, Yuqing Z, Hu L, Yan K, Ming L, Steve S, Xiongying S, Yong G, Jie C, Jingbo N, David F, JianhaoL: The high prevalence of knee osteoarthritis in rural Chinese population: The Wuchuan Osteoarthritis Study. Arthritis and Rheumatism; Vol61, No. 5; 2009: 641-647.
5. Gabor H, Gabriella K, Barnabas A, Peter T, Arpad B, Tamas I: Prevalence of radiographic primary hip and knee osteoarthritis in a representative Central European population. International Orthopaedics; 2011:35; 971-975.
6. Felson DT,ZhangY, Hannan MT, et al The incidence and natural history of knee osteoarthritis in the elderly.Arthritis and Rheumatism. 1987; 30:1500-1505
7. Davis MA, Ettinger WH NeuhausJM, Cho SA, Hauck WW. The association of knee injury and obesity with unilateral and bilateral osteoarthritis of the knee. Am J Epidemiol 1989; 130:278-88.
8. Akinobu N, Masahiro H, Hiroki W, Kakunoshin Y, Ko K, Tomomi Y, Atsumasa U. Prevalence and characteristics of unilateral knee osteoarthritis in a community sample of elderly Japanese: do fracture around the knee affect the pathogenesis of unilateral knee osteoarthritis? J Orthop Sci 2012; 17:556-561
9. Spector, T.D., Harris, P.A., Hart, D.J., *et al.* (1996). Risk of osteoarthritis associated with long-term weight-bearing sports. *Arthritis Rheum* 39:988-95.

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